

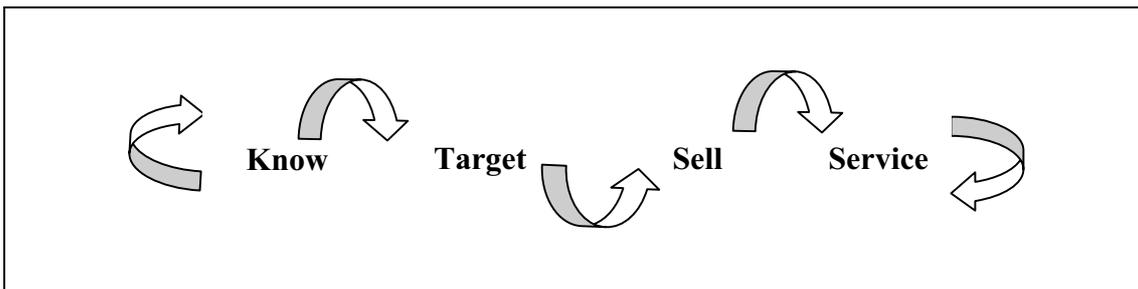
Chapter 2

Knowing and understanding all consumer groups

2.1 Introduction

The staff of a water utility need to have a good knowledge of the different consumer groups if they are to be able to do their work in a manner that increases customer satisfaction. There has been a tendency for utility/municipal staff to assume that they already know what the consumer wants. Experience in the business sector shows that good quality information about consumer perceptions, experiences and preferences is required if real improvements are to be made. Such quality information can only be gained through well-planned interactions with current and potential customers, using methods such as questionnaire surveys, focus group discussions and semi-structured interviews.

The first stage in the customer value chain, described in the previous section, is getting to know and understand consumers, their wants, their needs, their perceptions, their criticisms. In this category it is necessary to emphasize that we do not only mean existing consumers but also potential consumers, those who are presently unserved by the formal utility.



It is important to gather data on all the key consumer groups in a city or town, so that appropriate marketing strategies can be developed that balance the needs and demands of each group. The next section, on market segmentation, considers how best to define these groups or market segments.

2.2 Market segmentation overview

It is clearly impossible to get to know individual water customers, except perhaps for the few largest consumers or perhaps the constant complainers. The marketing approach therefore divides up customers into a manageable number of groups of customers, a process that is known as 'segmentation.' This dividing up for conventional marketing can

follow 'social class' lines which incorporate aspects of income or it can follow 'lifestyle' or 'life-cycle stage' patterns which are found to be better predictors of consumer behaviour for particular products. Segmentation has been defined as 'the process of identifying groups of customers with enough characteristics in common to make possible the design and presentation of a product or service each group needs' (Heskett, 1986). The concept of market segmentation is based on the belief that 'people with broadly similar economic, social and lifestyle characteristics tend to congregate in particular neighbourhoods and exhibit similar patterns of purchasing behaviour and outlook (Wilson and Gilligan, 1997).

One of the main reasons for market segmentation is to understand consumer perspectives and develop viable plans to serve the specific needs and demands of *all* consumer groups, and thus avoid some groups missing out, which otherwise often occurs. If we are to 'target specific consumer groups or market segments with suitable service and payment options, at appropriate price levels', as is proposed in the 'customer value chain' section above, then we need to think carefully about how we define our consumer groups or segment the market.

Selection of criteria for market segmentation in the water sector should consider factors such as:

- Is market segmentation feasible and practical using the selected criteria?
- Will the segments be substantial enough for meaningful service differentiation?
- Will the segments be different enough to be distinguished from each other?
- Will the segments be stable enough so that their present and future characteristics can be predicted with a sufficient degree of confidence?

While developing the criteria for market segmentation, it is important to ensure that each market segment has sufficiently similar characteristics to enable appropriate water service options to be provided by the utility.

In many cities in developing countries, needs and conditions differ substantially from one neighbourhood to the next. For example, viable service options in higher income low-density housing areas (such as in-house connections with full internal plumbing) will be quite different from those in informal settlements. It is not realistic, therefore, for the water utility to provide a uniform service to customers whose needs, wants and willingness to pay are so different. It is for this reason that market segmentation has to be used as a means of targeting viable options to appropriate user groups.

One approach to grouping the variables that can be used to segment markets is to define four categories (Wilson and Gilligan, 1997):

- Geographic
- Demographic (e.g. related to age)
- Behavioural (e.g. investment patterns)
- Psychographic or lifestyle

Relying solely on geographical areas such as ward boundaries has been found to be unreliable because even within a small area there can be a wide range of household types and income levels. There can be pockets of slum dwellers in a high-income area, for example, benefiting from their closeness to potential employment.

Segmentation based on demographic or behavioural variables is possible provided good data is available (e.g. from a recent census). But it is difficult to confirm and update the boundaries of the market segment areas on-site using such variables.

For urban water and sewerage services, potential variables for segmentation that have emerged from the strategic marketing research include:

- the type of dwelling and location (e.g. bungalows, flats, informal housing and mixed) which can serve as a proxy for household income levels;
- roofing materials; and
- housing densities (e.g. high, medium and low density).

Based on research in East Africa and India, a suitable and practical criterion for segmentation is the 'type of dwelling or building', described below.

Types of building as a criterion for market segmentation

In many urban areas of developing countries, the type of dwelling that people live in is generally a reflection of their socio-economic status. The people who live in slums and other informal settlements are generally the very poor - although poor people also live in other types of dwellings (tenements and multi-occupancy compounds) and it is not uncommon to find some wealthier householders taking advantage of unplanned areas. Those households in well-planned residential estates tend to be the more affluent in the population or living in housing provided by government for its employees. Housing area is therefore only in part a proxy indicator for income level. The type of dwelling is a better method for a water utility could use to segment the water market. This is more so because a dwelling often defines a household, which is an appropriate unit for the utility to form a beneficial exchange relationship, another definition of marketing.

Market segmentation in Mombasa's residential sector was carried out on the basis of the type of dwellings that households live in. Dwellings were categorized into the following four segments:

- bungalows and maisonettes
- flats
- single, two or three-roomed dwellings (including 'Swahili' type of dwelling)
- dwellings located in informal settlements, constructed using informal building materials such as recycled timber, iron sheets, packaging boards and paper

Using the type of dwelling as a criterion for segmentation, other possible market segments include:

- mixed development, consisting of a variety of different types of dwellings
- commercial, industrial and institutional establishments

Dwellings located in an area with mixed development could be regarded as belonging to one of the four market segments identified above. Commercial, industrial and institutional establishments may be grouped into one segment since they are likely to have similar service requirements.

The use of type of dwellings or type of building as criteria for market segmentation is relatively easy to implement in the field since dwellings are visible and can easily fit into one of the specified market segments. The use of GIS based on up-to-date aerial photographs by utilities can provide good base maps for market segmentation by type of dwelling. Another advantage of this type of segmentation is that viable technical and management options for water provision can be provided to suit different market segments on the basis of type of dwelling. For example, if people are living in small and cramped informal settlements, a variety of service options other than house connections with full internal plumbing are likely to be appropriate.

Socio-economic criteria for water sector market segmentation

Where more detail is required, market segmentation using income as the only criterion may not be practical because it is usually difficult to measure, particularly where many people's earnings are from the informal economy. Utilities can, however, use proxies for income such as household consumer goods, electricity connections, roof types and walling materials - and even, described by one commentator, the presence of television satellite dishes in the informal housing area.

To increase the rigour of the segmentation or zoning process, a basket of proxy indicators could be used to develop a socio-economic index in order to categorize an area of a city into household income segments.

As part of a water quality surveillance zoning exercise in Kampala, Uganda (Howard, 2002) a multi-factored index was used to classify areas into the following broad zones:

- high income
- middle income 1
- middle income 2
- low income 1
- low income 2
- low income 3

For the water quality surveillance zoning exercise in Kampala, the multi-factored index was derived from the variables, weighting, conditions and scores used in Table 2.1. The weightings were assigned because some variables (proxy indicators) were regarded as better proxy measures than others. The information on 'conditions' for each sample household was obtained from a recent census in Kampala.

Such a thorough multi-factored approach to developing a socio-economic index is potentially more accurate for zoning or the development of market segments in a city than using just one indicator. However, it is only likely to be feasible if recent and accurate census data is available. In addition the maps that are produced from the multi-factored index would be difficult to confirm on site and update as changes on the ground occur over

Table 2.1. Socio-economic index variables for water quality zoning in Kampala¹

Variable	Variable	Conditions	Score
Roof material	4.0	Iron sheets Asbestos sheets Concrete Papyrus Banana leaves/fibre Other	0 1 5 -3 -5
Floor material	4.0	Concrete Brick Stone Cement screed Rammed earth Wood	-1 1 4 0 -5 3.5
Persons per room	2.5	< 1.7 1.8 - 2.1 > 2.1	1.5 1 -1.5
Educational attainment	2.0	None - male None - female P1 - P7 male (Plus other levels of education attainment)	-3 -3 0
Main source of livelihood	2.0	Subsistence farming Commercial farming Petty trading Formal trading Cottage industry Property income Employment income Family support Other	3.5 4 -4 1 -1.5 4.5 0 -5
Average household size	1.0	< 3.4 3.4 - 4.3 4.4 - 4.7 > 4.4	1.5 1 -1.5 -1.5

1. Source: Howard (2002)

time. A multi-factored index based on census data could, however, be effectively used to verify the suitability of a single market segment criterion such as dwelling type or roof material, in a few sample market segment areas.

Using segmentation plans and data

If a utility decides not to base its data collection and marketing activities on detailed market segmentation, then it is recommended that they at least use an area-based approach. This ensures that decision-making and resource allocation are based on the distinct characteristics of each area and the people in it. Effective market segmentation, however, can provide a better approach for dealing with the needs and demands of different consumer groups.

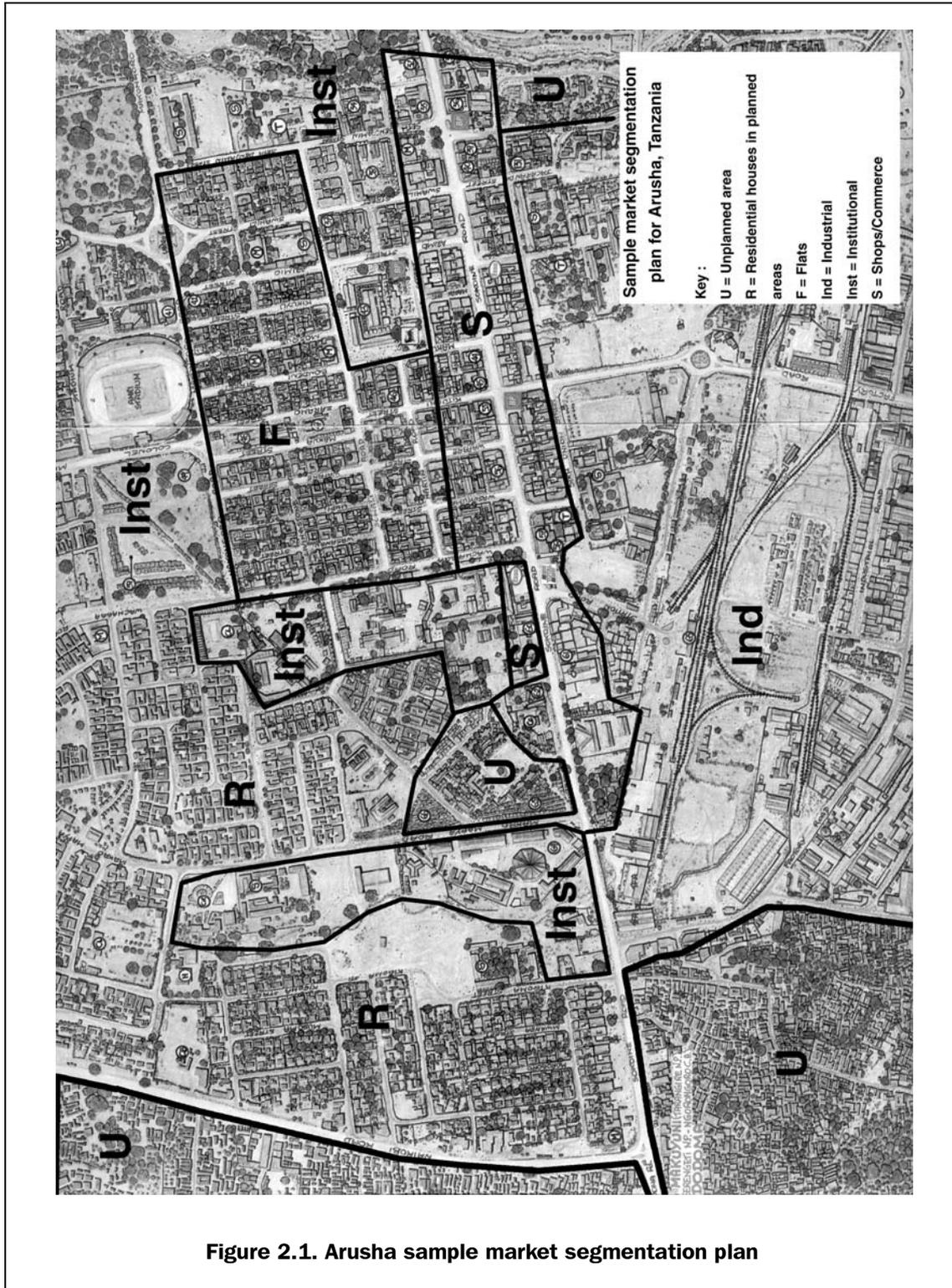


Figure 2.1. Arusha sample market segmentation plan

An example market segmentation plan for an area of Arusha in Tanzania is shown in Figure 2.1. The validity of the segmentation would of course need to be verified on the ground. Such plans are useful in a number of respects including for:

- consumer survey purposes - ensuring that each consumer group and area is adequately represented in the survey;
- developing and implementing marketing strategies for each segment and area;

- linking the location of water infrastructure and service levels with each market segment and area; and
- planning service improvements to poorly served areas or informal settlements.

Note that people living in one unplanned settlement may have quite different service levels, perceptions and demands from another unplanned settlement in the city. So it is important to sample each area.

Table 2.2 illustrates the use of the 'type of dwelling' as a basis for market segmentation as it was used in the Guntur Strategic Marketing Plan (SMP) from India. It is clear that income levels vary substantially between each of these segments.

Table 2.2. Average household income by market segment in Guntur, India¹

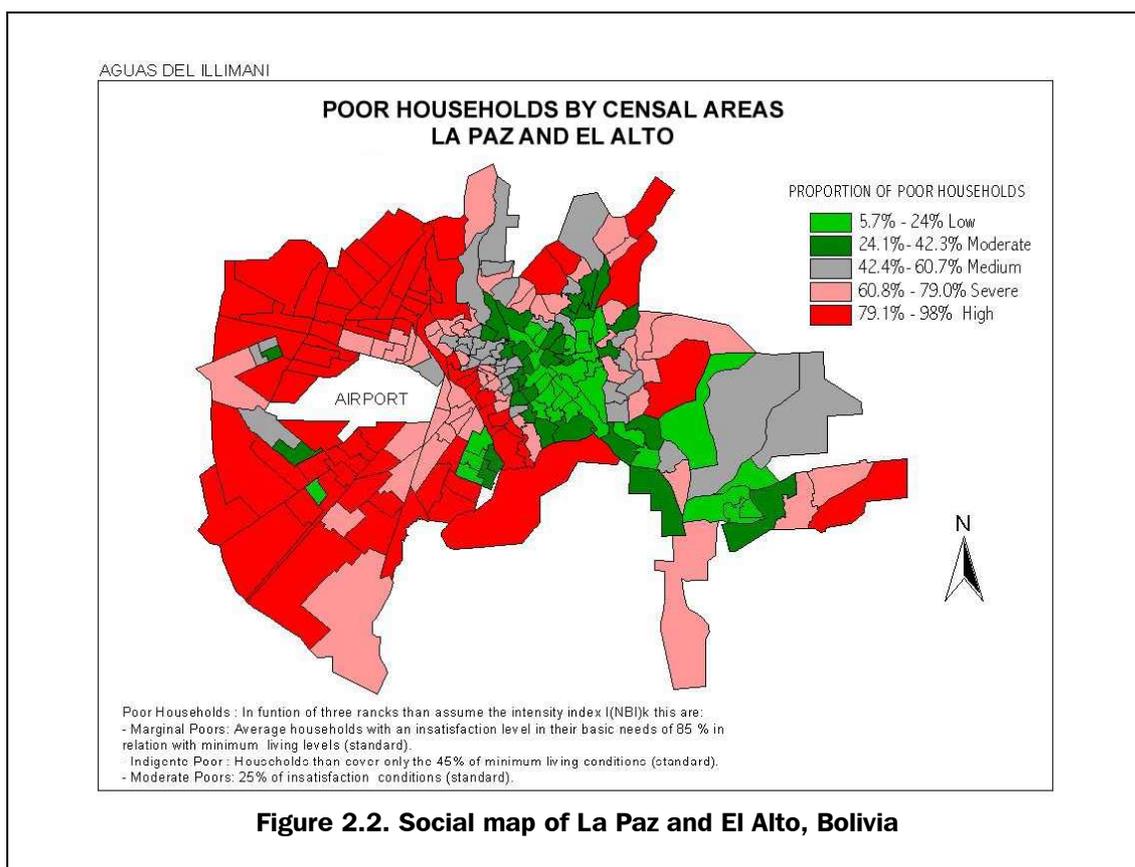
Market segment	Average household monthly income (estimated in Rs*)
Bungalows	1,1765
Independent houses in planned areas	7,833
Independent houses in unplanned areas	4,625
Flats in planned areas	10,078
Flats in unplanned areas	11,180
Slums with some water supply coverage	2,113
Slums with no water supply coverage	605

1. Source: Narender and Chary (2002)

*Note: the exchange rate is Rs42 to US\$1.00 (2002)

Use of type of dwelling or type of building criteria for market segmentation is relatively easy to implement in the field, since dwellings are visible and can easily fit into one of the specified market segments. Another advantage of this type of segmentation is that viable technical and management options for water provision can be provided to suit different market segments on the basis of type of dwelling.

One means of illustrating the resulting segmentation of present and potential consumer groups is through 'social mapping.' An example of a social map from Bolivia is shown in Figure 2.2. Data obtained from a consumer survey was collected and presented on the basis of the identified market segments in order to provide useful decision-support information.



2.3 Use of GIS

A significant challenge for those seeking to improve water services to informal settlements is obtaining comprehensive information on precisely where all the poor and unserved houses are located. Updating existing maps by manually surveying all the new houses and drawing the new buildings on the utility maps is a laborious task and that is rarely undertaken.

A number of utilities, for example in Kampala and Durban, are now using GIS (Geographical Information Systems), which are based on aerial photographs of the utility service area. The photographs are stored digitally on the utility's computers and can be used to produce accurate maps to the required scale for whatever purpose. Some of the key features of the GIS used at Durban Metro Water in South Africa are discussed briefly in Box 2.1.

It is clear from Durban Metro Water's GIS experience that having such valuable and up-to-date information at the 'press of few buttons' has a number advantages:

- Good access to data and management information summaries about different consumer groups (or market segments) including those in poorer areas, which enables well-informed and quick decision-making;
- Where repairs, maintenance work or new connections are required, key technical information about the existing water infrastructure is readily available.
- Enables effective strategic planning to providing services to unserved areas.
- Enables more accurate and speedy responses to customer requests and complaints.

Box 2.1. GIS at Durban Metro Water¹

Durban Metro Water (now called Ethekewini Water) in South Africa have developed their GIS (Geographical Information Systems) in recent years to enhance the management of water and sanitation services to over 3 million consumers.

The aerial photographic surveys for the GIS are redone each year to produce up to date digitized maps of all properties, at a 'relatively cheap cost'. Such maps are very useful, particularly for locating recently constructed properties in informal settlements that may otherwise be unknown to utility service providers. The Durban GIS system has more than 30 different layers of relevant information that can be shown on its digitized computer maps including the following:

- the precise location of all connected and unconnected properties
- the location of all water and sewer pipes and utility facilities
- the location of all water meters (to enable quick meter reading)
- records of repairs over the years on each water main
- links to each customer's water consumption
- links to each customer's payment records
- links to customer complaint records
- unique numbers for all properties (to enable the speedy location of properties and maintenance problems)
- roads and street furniture
- links to the design or 'as built' drawings of each pipeline

These various layers can be turned on or off to suit the purpose of the member of staff using the GIS, and printouts can be made of the map area under consideration at an appropriate scale.

Durban Metro Water has 700,000 connections and it has connected 98,000 new customers in the last eight years.

1. Source: Presentation by Neil McLeod, Head of Ethekewini Water and summarized by Kevin Sansom in December 2003.

Such benefits are best achieved by obtaining and maintaining good quality data on the GIS. Other utilities and government may, therefore, wish to consider this approach.

2.4 Overview of consumer survey techniques

Consumer surveys enable the organization to collect data to:

- understand the different customer and potential customer groups, including their attitudes, practices, perceptions and preferences, as well as water use and buying habits, so that affordable service improvements can be devised;
- develop new service options or modify existing service options and carry out service differentiation;
- estimate future demand;
- estimate affordability to pay for services;
- establish maximum willingness to pay levels for service options; and

- develop a customer care programme and monitor the progress of customer service initiatives.

Many organizations use the traditional method of monitoring complaints and compliments in order to keep track of the views of their customers. By being proactive in finding out about customer concerns and taking prompt action on customers' complaints, the organization saves, rather than spends, money.

Although monitoring complaints enables the organization to actively listen to customers, on average only a small percentage of the organization's customer base actually bothers to complain. Research in America showed that one in 26 people actually take the trouble to complain to the organization (Cook, 1992). The organization should therefore not rely entirely on complaints/compliments monitoring.

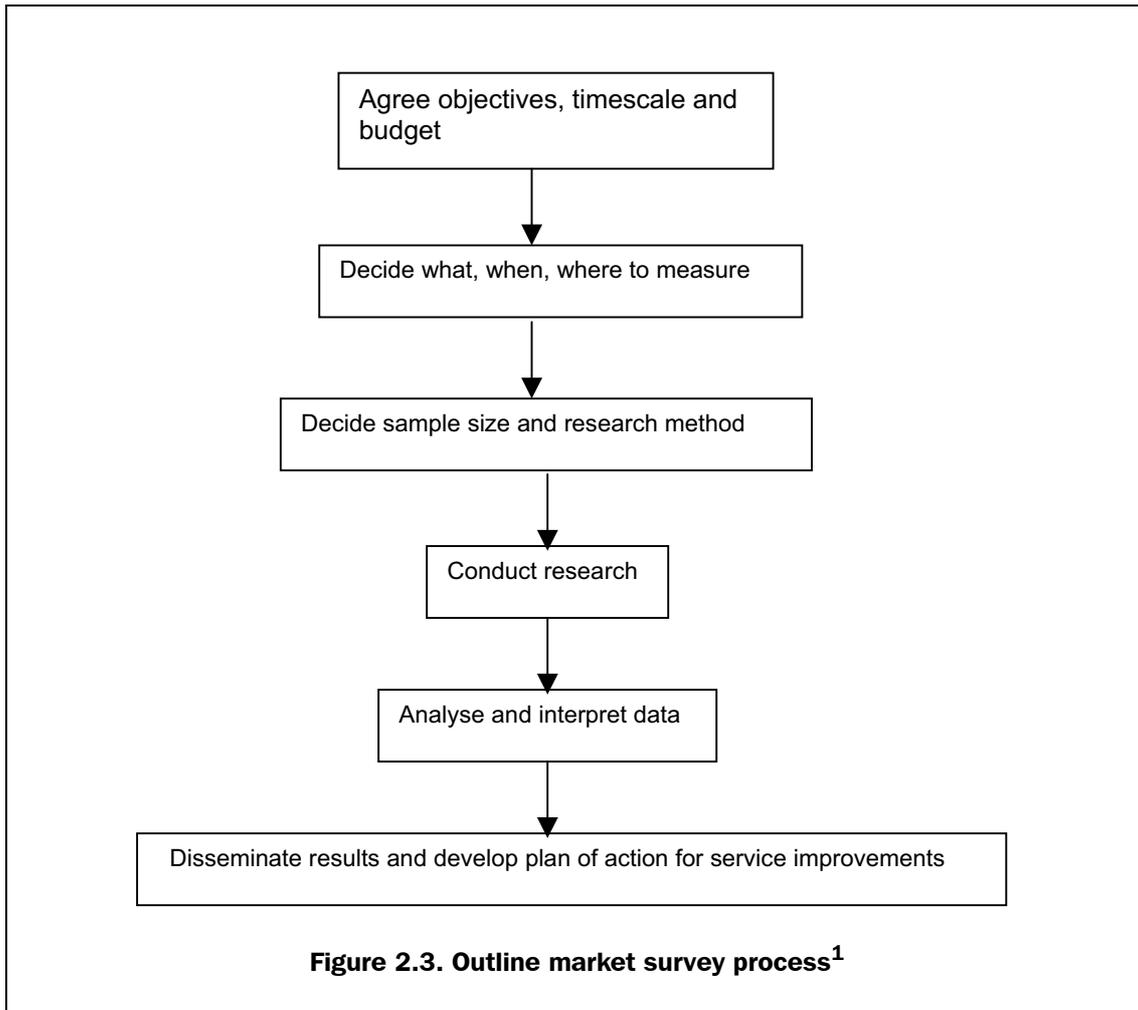
In order to make market research a cost-effective task, management should be convinced of the need to carry out the research, and should be committed to the process. Before embarking on a market research programme, management should review data from previous research. Typical questions to ask are (Cook, 1992):

- What do we know about existing and potential customers?
- What do we know about their expectations?
- How well are we meeting their expectations?
- Do we have any information about future trends of customer requirements?

Cook (1992) recommends the following sequence of activities concerned with market surveys in Figure 2.3.

Depending on the objective of the survey, the types of consumer being surveyed, and the intended use of the data, an organization may decide to use one or several of these research methods for data collection:

- **Self-completed questionnaires:** The questionnaires may be delivered to the households or distributed at any point of contact with potential customers. The questionnaires may also be sent through the post. Although they are easy to administer, self-completed questionnaires have relatively low completion rates, may sometimes be biased to a particular category of customers, and may be abused by staff.
- **Enumerator completed questionnaires:** While this approach is more expensive than self-completed questionnaires, it generally produces more reliable data and has a higher completion rate. It is also easier to ensure that a representative sample of the various market segments has been surveyed. Carefully planned training of the enumerators is important for ensuring the validity of the data.
- **Face-to-face interviews:** Interviews may be either structured or semi-structured, depending on the objective. Accurate responses can be collected in a short time. This method also enables the interviewer to probe potential customers for a more detailed explanation of issues. The main disadvantage is the high cost involved.



1. Source: Cook (1992)

- **Focus groups:** These are a powerful means to evaluate services or test new ideas. Basically, focus groups are interviews, but of six to 15 people at the same time in the same group, and therefore act as multiple interviews where interviewees get an immediate response, confirmation or challenge from the group. This leads to immediate validation of the ideas discussed, where the group agrees. However, there is a risk that discussions can be distorted by particular individuals, leading the group in a direction which suits that individual's interests. It is possible to obtain a great deal of qualitative information during a focus group session, but only if it is managed by experienced facilitators.
- **Telephone surveys:** In countries where the telephone network is fairly developed, telephone surveys may be carried out. The advantage of this method is that it gets an immediate response from customers in a short time. It can also be carried out at a relatively low cost. However, this method has several disadvantages: the respondents may consider telephone interviews as an invasion of privacy, and it is difficult to conduct a lengthy interview with customers. Telephone surveys, irrespective of the recent surge in mobile phone use, are extremely unlikely to be representative of the lowest income water users.

For existing customers it is useful to remember to use ongoing means of consulting with them, in addition to the methods described above.

- **Customer service groups or forums and user panels:** These meetings enable the participants to express their opinions on the quality of service an organization provides. The number of participants has to be optimal to keep the discussion focused. Such meetings also enable dialogue and discussion among customers, and between customers and the organization. The main disadvantage is that the participants may not be representative of the organization's customer base.
- **Suggestion schemes:** These are used to solicit for customer opinions on how products and services meet customer requirements, and to identify areas for improvement. However they tend to deliver information only on existing customers.
- **Freephone:** When telecommunication technology allows, customers can provide feedback on the organization through a telephone link fully paid for by the organization.

All social surveys, whether quantitative, qualitative, focus group or questionnaire, require skilled practitioners to undertake them successfully. In general, the lead researcher should be from a reputable research agency such as experienced private consultants, social sciences departments in a university, government-recognized institutes of social research, or capable NGOs.

Enumerators are required to undertake questionnaire surveys, visiting householders individually. Enumerators can be experienced students from university or similar institutions with training in sociology and social methods. Reporters, who could be a research assistant from a reputable research institute, are required to note discussions in focus groups to allow the researcher to focus on facilitating and guiding the discussion.

The lead researcher should be responsible for analysing the text of any discussions and for drawing out the conclusions from any quantitative questionnaires. Focus group discussions are likely to require inputs from an engineer or manager from the water utility to explain technical issues to the researcher and to the group participants.

Communicating with different consumer groups

The technique chosen to obtain information will depend on the type of data required and the characteristics of the particular consumer groups. For example, for larger commercial consumers, interviews may be cost effective, if those consumers then choose to or continue to use utility piped water, rather than their own sources, as they can be a significant source of revenue for the utility.

The use of enumerator-completed questionnaires is a good technique for general customer surveys, where detailed and accurate information is required. It is necessary, however, to design, test and review the questionnaires carefully.

People in informal settlements may have limited trust in or experience in dealing with public utilities. Focus group discussions offer an effective technique for a utility to develop an understanding of the attitudes, practices, perceptions and preferences. It can also be the basis for ongoing dialogue.

A utility needs to consider who will undertake consumer surveys - in-house teams, consultants or a social intermediary such as an NGO. If the required skills and staff are not available within the utility, then it is better to use reputable private companies. Where focus group discussions are the chosen method for informal settlements, capable NGOs or college staff may be the best organizations to facilitate discussions and document the process.

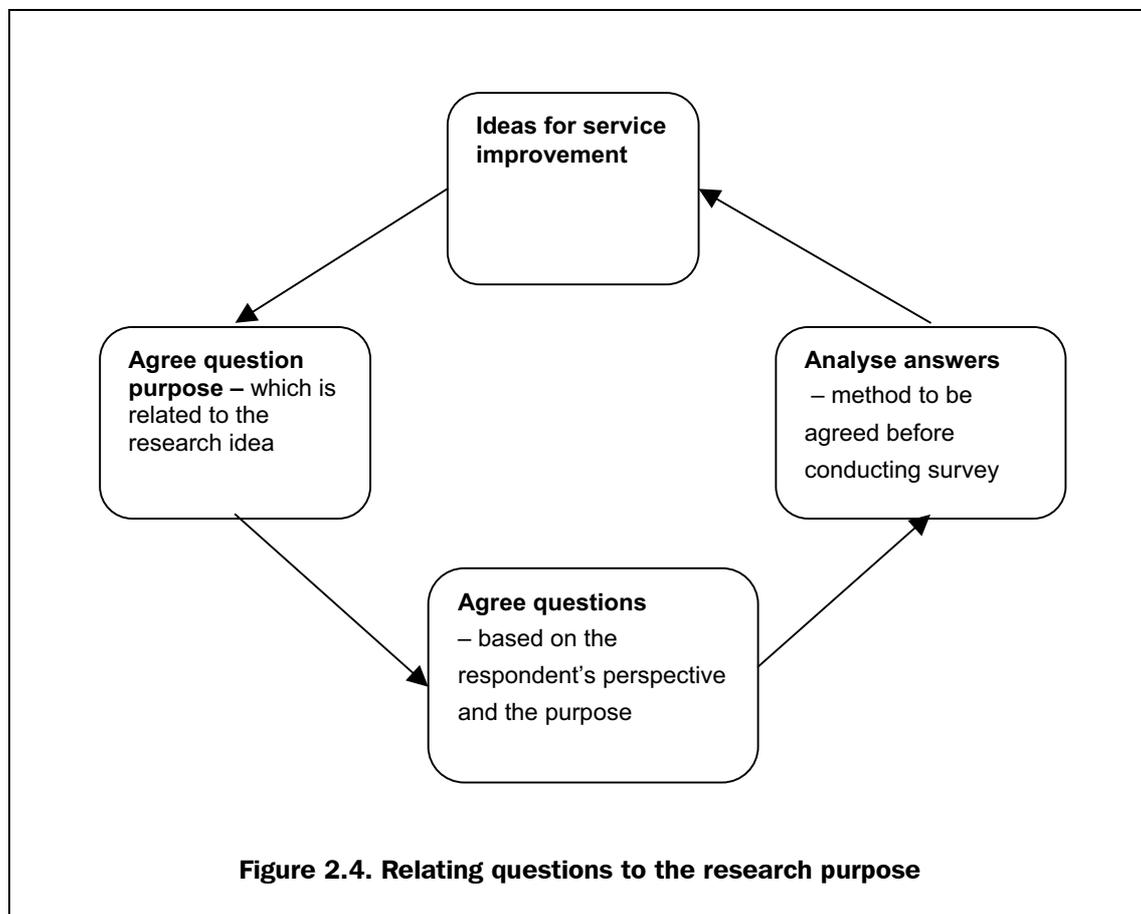
Although it is preferable to survey all consumer groups, there may be times when a utility only wants to survey some market segments or areas. There is no problem with this provided it is clear which areas have been included in the survey and which areas have not and why.

Questionnaire surveys

Key principles of questionnaire development

In order to collect accurate data from customers, an organization should use a good data collection instrument. Carefully designed questionnaire surveys can provide reliable data to inform decisions on future investments plans and improvements in the way staff undertake their work, in order to increase customer satisfaction.

A typical questionnaire development process is outlined in Figure 2.4. Note that the analysis of the completed questionnaires should inform the viability of ideas for service improvements.



Asking the right question is key. So when drafting the form, two issues should be explored:

Is the question necessary? A question should not be included if it is merely interesting, it must relate to the purpose of the research. While it is necessary to keep the length of questionnaires to a minimum, some questions may need to be included to establish rapport and neutrality, particularly when dealing with sensitive subjects.

Are several questions needed instead of one? Once we have ascertained that a question is necessary, we must make sure that it is sufficient to obtain the desired information. Sometimes several questions are necessary to ensure that accurate information is gathered. The questionnaire survey format also needs to be easy to read and understand by utility staff, enumerators and other interested parties. For easy analysis, open-ended questions should be minimized and where possible tick boxes for multiple answers should be included. When producing summaries of the analysis, a spreadsheet computer programme can be used to produce summary tables, graphs and bar charts, etc. to communicate the key findings of the survey. Further guidance on questionnaire design is as follows:

- Make the questions as clear and simple as possible, without losing the meaning.
- Decide which questions will be worded negatively, in order to minimize the tendency of some respondents to mechanically choose the points toward one end of the scale.
- Some questions may require respondents to recall experiences from the past that are hazy in their memory. Such recall-dependent questions should be minimized.
- Questions should not be phrased in such a way that they lead the respondents to give answers that the researcher wants.
- Avoid questions that are phrased in an emotionally charged manner ('loaded questions'). Such questions create a lot of bias in the responses.
- The sequence of questions in the questionnaire should be such that the respondent is led from questions of a general nature to those that are more specific.
- Personal information or classification data should be asked for in a carefully worded tone. The respondents should be assured of anonymity.
- The questionnaire should have a good introduction that clearly identifies both the researcher and the purpose of the survey.

Potential aspects to be researched for the water sector

To understand the state of the water supply market in a comprehensive manner, particularly if a utility is to maximize the number of satisfied customers and work towards financial sustainability, the following aspects could potentially be investigated using customer survey questionnaires:

a) **The experiences and perceptions of existing and potential customers with regard to:**

- the water supply services provided by the utility in terms of key service characteristics such as: frequency, reliability, timing, duration, quantity, quality, pressure, or other characteristics that are valued by customers;

- the utility's water charges and billing arrangements;
 - the utility's customer services in general, in terms of dealing with requests and responding to complaints;
 - the comparative advantages and disadvantages of water services provided by competitors, such as water vendors and private water tankers;
 - the coping strategies used by people in the city to deal with poor water services, for example: use of storage and selection of different water sources at different times of the year; and
 - opportunities for supply improvements or utility cost reductions, such as new supply options with storage incorporated and tertiary supply systems being managed by community groups.
- b) **Information on the socio-economic situation of respondents** for aspects such as housing and income, so that a detailed picture can be developed about the various customer groups in the city, as well as their 'ability to pay'. The specific topic of willingness to pay is discussed in detail below.

A utility may prefer not to get all the data it requires from one survey, in order that the questionnaires can be kept to reasonable length. In addition, analysing the results of a preliminary survey may inform the contents of a further survey. An example of a comprehensive water utility consumer survey form is in Annexe 1; this is based on the Mombasa marketing field research. A shorter survey form based on key indicators for serving the poor is shown in Annexe 5.

Sampling

The sample selected for a survey needs to be both representative and random. Sampling is the process of selecting a sufficient number from the entire group of people, events or things of interest that the researcher wishes to investigate. The entire group is referred to as the population, and a single member of the population is called an element. The population frame is a listing of all the elements of the population from which the sample is to be drawn. The sample is to be drawn such that understanding the properties or characteristics of the sample elements will enable generalization to the population elements.

Sampling is necessary because in a large population it is difficult and expensive to collect data from all elements of the population. A discussion of the different types of sampling is included in a publication called *Willingness to pay surveys - A streamlined approach* by Alison Wedgwood and Kevin Sansom (2003) which is available on the WEDC website.

When considering all consumer groups in the urban water sector, a representative sample should be selected for each of the market segments being surveyed. A good market segmentation plan of sufficiently large scale that is up to date can be a useful aid in selecting which households to visit as part of a representative and random sample.

Pilot testing

Pilot testing is an essential part of any household survey. Pilot testing is a rehearsal for the real thing: it allows the enumerators to practice the questionnaire with members of the public, rather than through stage-managed role playing. It also enables the survey field

manager to monitor the ability of the enumerators in the field through observing interviews (Wedgwood and Sansom, 2003).

A key consideration is were any of the questions difficult for the respondents to understand? Were any questions irrelevant? Pilot testing should also be considered an important part of enumerator training. The enumerators can improve their knowledge of the questionnaire in the 'real' environment, away from blackboards and role-playing in the classroom. Persistent problems may emerge after a few interviews have been carried out, which can be addressed during the follow up meeting with the enumerators.

Managing the survey and analysing the results

Developing a questionnaire and then managing a survey requires a considerable amount of specialist work. Hence it is generally better for a utility to contract out the survey design, implementation and analysis of the results. Clearly the utility will have an editorial role over the design of the questionnaire, so it meets their objectives. A typical questionnaire is shown in Annex 1. This form is quite comprehensive, being part of the marketing research that informed the compilation of this publication. Shorter, more simple forms can be developed by utilities provided they provide all the information that is required. An example of a short survey form based on selected key indicators is shown in Annex 5.

After the pilot testing, it will be practical for the survey manager to select enumerator team leaders. The team leaders can co-ordinate each day's activities with the survey manager, including where the survey will take place each day. The team leaders can collect the questionnaires at the end of the day and carry out an initial check to ensure that they have been filled in correctly. It is always best to check the questionnaires each day, because if there are any errors or gaps these are more easily rectified immediately. If there are consistent errors in the quality of filled in questionnaires, the only course of action may be to dismiss the enumerator (Wedgwood and Sansom, 2003).

The field manager should act as the general co-ordinator, working with the team leaders. Random checks on the enumerators, observing them during interviews, etc., are vital to maintain the quality of the survey.

Once all the questionnaires have been completed, the next steps are very important. If a consulting firm is carrying out the analysis of data the utility manager can still monitor progress to ensure robust results. Things to look out for include:

- Use of a data entry table to store all key information. This could be a table in Microsoft Excel or a similar spreadsheet programme. In the spreadsheet programme each column represents a question from the questionnaire. Each horizontal line represents one completed questionnaire. SPSS is a commonly used statistical programme, this too requires all the data from the questionnaires to be sorted onto one 'page' before analysis can take place.
- At least two members of staff should enter the data, as this provides a constant checking service. Sorting through hundreds of questions, or ensuring that the answer is entered in the correct cell in the Excel or SPSS programme can be tedious and mistakes are easily made. A simple mistake in data entry, inputting a 1 instead of a 0, completely changes the results once analysis takes place.

- Evidence that data has been 'cleaned' to eliminate obvious errors, either on the part of the respondent (answering deliberately untruthfully) or the enumerator (recording the answers inaccurately). The easiest way to look for 'outliers' is to assess the raw data frequency distributions of the answers to each question for obvious discrepancies.

Thorough analysis of the consumer survey and willingness to pay results data is best done using the computer package SPSS, or similar. This allows for cross tabulation of results, which means that graphs and tables of different questions can be joined together. For example, household income or expenditure can be compared with the existing water sources. This will provide the utility with useful information to help them plan new water source options that are more likely to be within the price range of new customers and meet their existing and future water requirements. More information on conducting surveys is contained in publications such as *Designing Household Survey Questionnaires for Developing Countries: Lessons from 15 Years of the Living Standards Measurement Study. Volumes 1, 2, and 3*. M. Grosh. and P. Glewwe, The World Bank, Washington DC, (2000).

Surveys and gender

In order to capture useful information from both male and female consumers it is desirable to ensure that at least 50 per cent of your participants in the survey are women. Where there are concerns that few women will participate, some strategies to consider are:

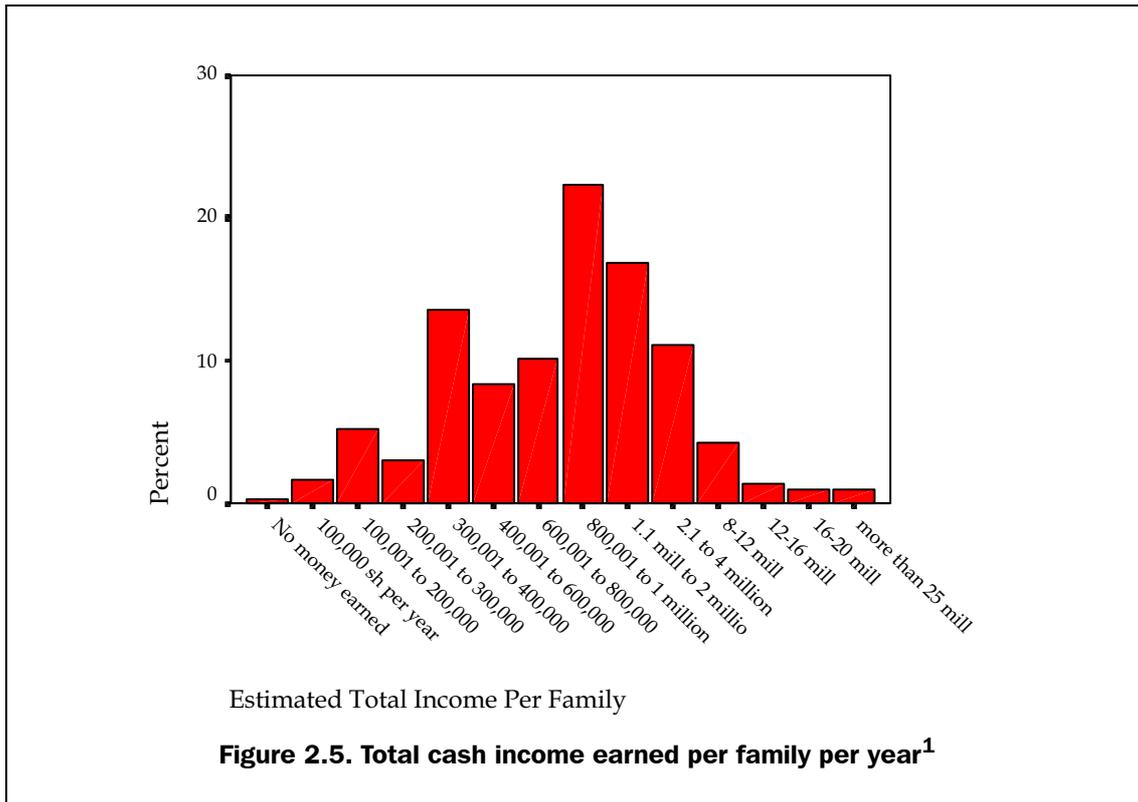
- At least 50 per cent of the enumerators should be women, to make it easier to interview the senior female members of the households.
- Enumerators could interview both male and female members of the household simultaneously. However, in many cases this might not be possible because either the male or female may be away at the time.

Enumerators should conduct the survey when they think there is a good chance of women being at home.

Presenting the consumer survey results

It is worth thinking about how best to present the survey results in a report, so that important information is clearly presented and the reader can understand the results and consider the implications. Figure 2.5 below shows the ranges of incomes per household for families in a small town in Uganda. The graphical format provides a pictorial summary of family incomes. A quick glance shows the reader that a large percentage of families earn between US\$800,000 and US\$4 million per year, but also that at least 15 per cent earn only US\$300,000 to US\$400,000. Caution is required in collecting income data, as people may underestimate their earnings, particularly if they work in the informal economy. In the Bushenyi study by Wedgwood and Sansom (2001), the cash income figures were derived from survey questions on household expenditure.

This form of presentation in Figure 2.5 can also show any potential anomalies in the data, for example if one range has a much higher value than the rest of the data, and such anomalies can be investigated further. An alternative presentation is a table which shows data against a variety of variables, as in Table 2.3. While this presentation requires more detailed reading, it is a useful way of summarizing key information. Other graphical methods of presentation such as pie charts should also be considered as a means of clearly presenting key information.



1. Source: Bushenyi CVM Survey 2001 (Wedgwood and Sansom)

2.5 Triangulating and cross-checking results

It is helpful to cross-check the data from specific water and sanitation related studies with broader household survey data. This form of triangulation can lead to greater confidence in the results and the marketing plan that results.

'The Living Standards Measurement Study was established by the World Bank in 1980 to explore ways of improving the type and quality of household data collected by government statistical offices in developing countries. The objectives of the LSMS were to develop new methods for monitoring progress in raising levels of living, to identify the consequences for households of current and proposed government policies, and to improve communications between survey statisticians, analysts, and policymakers.

As of 1997, surveys with several, if not all, of the hallmarks of the Living Standards Measurement Study had been conducted in about two dozen countries. Although the first few LSMS surveys followed a very similar format, as time passed and countries with different circumstances were added, substantial variety arose in the surveys across the different countries' (Grosh and Glewwe, 1996)

An example of the way in which the data from the *Living Standards Measurement Study* can be helpful for planning water and sanitation surveys can be seen in Figure 2.6.

The analysis of LSMS data in Figure 2.6 suggests that the willingness to connect to electricity (upper line in figure [triangles]) at low incomes is far higher than the willingness to connect to water (second line [circles]) and what they term sewer (third line from top). By 'sewer' they appear to mean 'flush toilet', as that is the descriptor most

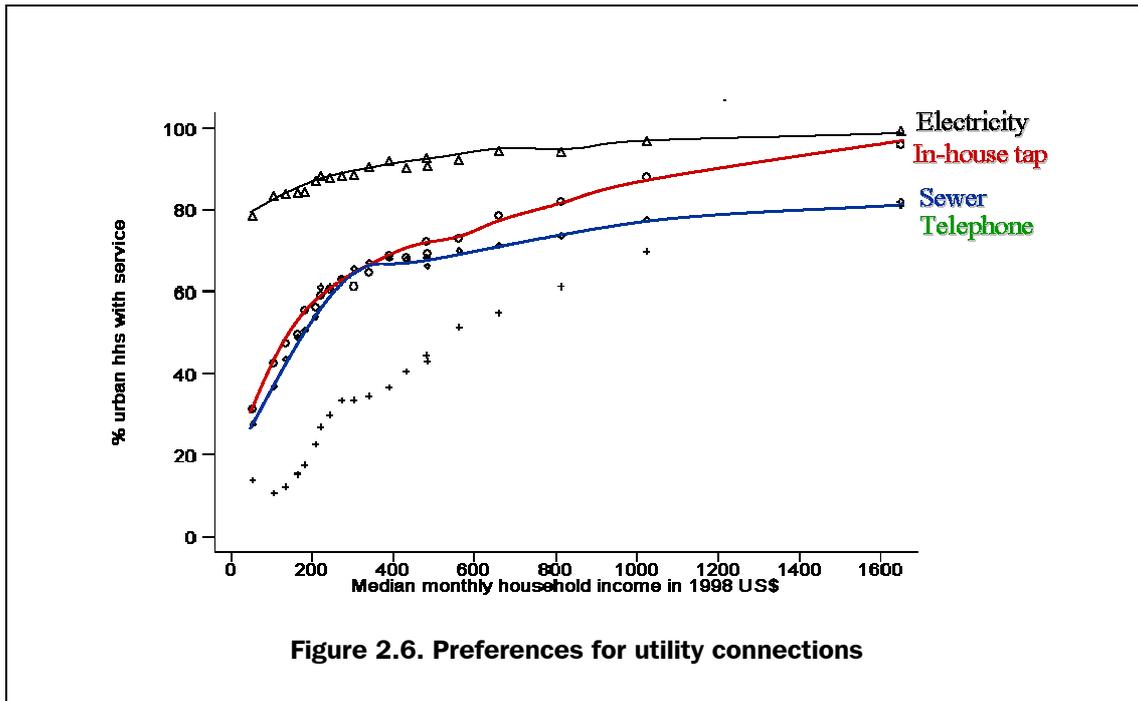
Table 2.3. Key socio-demographic data for urban population in Uganda¹

Attribute	Variable	Percentage
Gender	Male	48.5
	Female	51.5
Age structure	Less than 20 years old	60.9
	20-50 years old	33.9
	More than 50 years old	5.2
Household size	1-2 people	27.9
	3-5 people	38.5
	6-10 people	29.7
	More than 10 people	3.9
Access to education	Literate, aged 10 years or older	81.4
	Aged 15 years or more, completed primary school	56.8*
	Aged 20 years or more, completed Ordinary Level education	27.1*
Household expenditure <i>(Mean monthly expenditure = US\$167,900)</i>	Expenditure on food, drink, tobacco	43
	Expenditure on clothing, footwear, and household equipment	11
	Expenditure on rent, fuel, and power	19
	Expenditure on transport, health care and education	17
	Expenditure on others	10
Type of dwellings	Independent house	37
	Tenement (<i>Muzigo</i>)	51
	Others	12
Type of tenure	Owned by household	36
	Rented by household	53
	Others	11
Water supply	Households that use piped water as main source	36*
	Households that use boreholes as main source	10.4*
	Households that use protected wells/tube wells as main source	26.9*
	Households that use unprotected wells/springs as main source	19*
Toilet facility	Flush toilet	9.2
	Pit latrine	87.7
	Others	3.7

1. Sources: Uganda Statistics Department (1994; 1998) (Only data marked with * extracted from Uganda Statistics Department, 1994)

commonly used in the questionnaires although it does not necessarily imply a sewer connection. The lowest line [+] represents telephone connections, though it should be noted that much of this data predates the very recent growth in mobile telephones.

Various reasons may be cited to explain why low-income families are more willing to pay for electricity connections than water. Does this represent the demand for television by some members of the household? Or is electricity required for cooking or for evening lighting? To answer questions such as these, marketing and investment plans need to be more sophisticated and explore in more detail the characteristics of demand for new services; in particular understanding willingness to pay to acquire different and higher levels of water and sanitation services becomes crucial if a utility is to manage a financially sustainable system.



2.6 Understanding water consumer's willingness to pay

When income or expenditure data is collected for each market segment, it can be used to estimate the '[not sure what this open quote belongs to?]' ability to pay for service improvements and then be compared to other data. Clearly, just because a particular household earns X amount each month doesn't really prove that they will spend a proportion of X on water services if given the chance to do so by the utility. However, at the very minimum, understanding the levels of earned cash income or expenditure within the poorer districts of cities will provide the utility with an idea of what water services could be provided and which ones are prohibitively expensive and shouldn't be considered. Much more accurate information can be derived from carrying out a Contingent Valuation Survey (CVS) which uses the contingent valuation methodology (CVM) to determine users' willingness to pay for improved water supply services. Willingness to pay data based on the results of a contingent valuation survey is more reliable, but the 'ability to pay' estimates based solely on household income can be a useful check.

CVM is one of a number of techniques to estimate consumers' willingness to pay for improved water supply systems. There are various definitions of willingness to pay (WTP), but the one most used states that:

'WTP is the maximum amount that an individual states that they are willing to pay for a good or service' (DFID Demand Assessment Seminar, December, 1997).

The urban water sector in low and middle-income countries (LMICs) requires good quality data on user willingness to pay in order to:

- justify future investment proposals;
- develop a better understanding of user perceptions and preferences;

- support the selection of preferred service options; and
- set out the scope for future tariff increases and subsidy reduction plans.

There are three ways of estimating WTP:

- observing prices that people pay for goods in various markets (i.e. water vending, buying from neighbours, paying local taxes);
- observing individual expenditures of money, time, labour, etc. to obtain goods - or to avoid their loss. This method might involve an assessment of coping strategies and involve observations, focus group discussions and even household surveys; and
- asking people directly what they are willing to pay for goods or services in the future (contingent valuation methodology).

The first two approaches are based on observations of behaviour and are called Revealed Preference techniques. The third technique is based upon stated preferences and includes the Contingent Valuation Methodology, often shortened to CVM in development literature. In its purest form, the contingent valuation methodology is a tool used by the water sector to elicit the potential service users' maximum willingness to pay (WTP) for carefully selected water supply service options such as house connections, standposts, protected springs, public kiosks, etc.

Observations of the behaviour of people living in low-income communities, plays an important role in understanding how consumers use water, their perceptions on its quality and reliability and how they cope when the water is unreliable, from a variety of sources and a long distance from their homes.

Methods of estimating willingness to pay based on Revealed Preference techniques can develop a better understanding of user perceptions and support the selection of preferred service options without the need for large-scale rigorous surveys. Therefore, Revealed Preference techniques are a useful tool to tackle the first stage of the customer value chain, of getting to know consumers. The contingent valuation methodology draws on more sophisticated uses of surveys and analysis to understand consumers' potential use of new water supply and sanitation options, how much they are prepared to pay for these services and which services they prefer. Therefore, CVM is a more useful tool in targeting consumers and suitable areas for investment and is discussed in Chapter 3.

2.7 Revealed preferences: Coping strategies and costs

It is often assumed that utilities cannot provide water services to poorer communities because the poor are unwilling and unable to pay water tariffs and so any efforts by the utility to recover costs and maintain a quality water supply will fail. Yet a number of studies reveal that poorer households often pay a high price for their existing water supplies; this might be cash paid to vendors or the economic opportunity cost associated with spending many hours per day collecting water instead of carrying out other essential tasks.

Low-income consumers adopt a series of coping strategies, often drawing on many different water sources depending on the end uses of the water and the season. Even the very poorest households spend cash purchasing water in most urban slums. Revenue that could be captured by the utility to provide a more reliable and cheaper service to

consumers is lost through a network of independent water suppliers that source water either from the utility or from poor quality groundwater supplies.

Table 2.4 summarizes the findings from a study in Dehra Dun in India which demonstrates the real cost to consumers of using different water supplies.

Table 2.4. Coping costs for water users in Dehra Dun, India¹

	Public tap	Individual connection	Weighted average
Average income (Rs/month)	1969	5908	4862
Average coping costs (Rs/m3)*	33.2	2.32	10.5
Average water bill paid (Rs/m3)	0.6	3.8	3
Average total price paid (Rs/m3)	33.8	6.12	13.5
Estimated quantity of water consumed (m3/month/hh)	3.9	15.9	8.4
Average monthly costs for water(Rs/month/hh)	132	97	113
Average percentage of income spent on water	6.7%	1.6%	2.33%

1. Source: Choe et al (1996) cited in World Bank, India (1998)

*Note: 'Coping costs' include the value of time spent collecting water, as well as costs incurred for pumps and filtered water and occasional purchases from a private tanker.

Although tariffs for households with individual connections are higher, the economic cost to the household using public taps is much higher because of the time spent queuing and collecting water. Furthermore, standpost users not only have higher average monthly costs for water than people with individual connections, they also spend 6.7 per cent of their income on water compared to 1.6 per cent for households with individual connections.

To illustrate the high coping costs paid by all consumers for inadequate water supplies, a summary of the calculated coping costs in Guntur, India are presented below, based on a marketing study (Chary and Narender, 2002) [missing from regs]. Most high and middle-income earners in Guntur have to rely on their own or shared boreholes and municipal piped water, while people in slum areas rely on public standposts and water tankers.

The Guntur coping cost estimates are based on:

- annualized capital expenditures by the household
- annualized operating and maintenance costs by the household
- opportunity cost of time spent in collecting water
- expenses incurred on waterborne diseases
- expenses on boiled/bottled water
- any other relevant costs

The actual costs for each of the above items were estimated based on the data collected through household interviews and surveys and the coping cost was estimated as a percentage of household income.

Because of the inadequate and intermittent access to piped water supply, households have adopted various coping strategies that result in additional coping costs. The household survey found that those on low incomes and people living in slums invest a significant amount of time collecting water from standposts and other sources. The monetary value of this coping cost can be quite large, as shown in Table 2.5

Table 2.5. Opportunity cost of time spent collecting water

Income group (Rs.per month)	Opportunity cost as percentage of income
<2000	15.10
2000-5000	2.9
5000-10000	1.01
>10000	0.55
Average	4.81

As a preventive measure against waterborne diseases, households have spent money buying water purifiers or mineral water, or boiling water, as shown in Table 2.6.

Table 2.6. Expenses on boiled/mineral water (as a percentage of income)

Income group (Rs.)	Percentage of income
<2000	0.2
2000-5000	0.3
5000-10000	0.23
>10000	0.38
Average	0.27

Households have also invested in pumping equipment to cope with the inadequate pressure of the water supply in Guntur. In total households spent 15 per cent of their annual income coping with their poor water supply (see Table 2.7).

The Guntur study has also calculated the total coping costs as a percentage income (see Table 2.8), which is high for low-income households and also quite high for middle and higher income groups. These results demonstrate the great potential benefits to the city residents of a much-improved piped water supply.

Table 2.7. Total annual capital expenditure (TACE) as a percentage of income

Income group	Municipal	Non-municipal	TACH
<2000	9.7	10.0	19.27
2000-5000	4.4	16.0	20.4
5000-10000	2.3	10.0	11.7
>10000	1.4	9.2	10.6
Average	4.45	11.3	15.4

Table 2.8. Coping costs as percentage of income¹

Income group	Percentage of income
<2000	18.0
2000-5000	16.0
5000-10000	9.4
>10000	9.2
Average	13.15

1. Source: Narender, Chary and Samson, 2004

2.8 Revealed preferences: Small scale providers and informal market

Over 75 per cent of the urban poor in Africa get their water from small-scale providers (vendors, water tankers, etc) (Collignon and Vezina, 2000) and about half of the African urban population have no piped water supply. The gap created by the low service coverage is often filled by small-scale independent water service providers. Table 2.9 shows the contribution of small-scale independent water service providers in ten selected African cities.

As these figures show, in many cities a large portion of households rely on independent providers and point sources as their principle water source. Good opportunities exist for water utilities and municipalities to capture a higher percentage of the water market, not for the sake of competition or to put private entrepreneurs out of business, but to provide improved services in a sustainable manner.

The amount of money that low-income households are prepared to pay to water vendors, usually through lack of alternatives, represents their existing willingness to pay for a good utility supply. Some householders have to pay water prices to vendors that are often higher than European water prices (see Box 2.2). However, this approach has led to problems, such as in Buenos Aires for example, where the apparent high payments to vendors did not mean that households were willing to connect to the new distribution system because of the extraordinarily high connection fee of about US\$1,500.

Table 2.9. Small-scale providers' market share in 10 African cities¹

City	In-home connection	Standpipe water fetched by household	Independent providers or traditional sources
Abidjan, Cote d'Ivoire	76%	2%	22%
Nairobi, Kenya	71%	1%	27%
Dakar, Senegal	71%	14%	15%
Kampala, Uganda	36%	5%	59%
Dar Es Salaam, Tanzania	31%	0%	69%
Conakry, Guinea	29%	3%	68%
Nouakchatt, Mauritania	19%	30%	51%
Cotonou, Benin	27%	0%	73%
Ougadougou, Burkina Faso	23%	49%	28%
Bamako, Mali	17%	19%	64%

1. Source: Collignon & Vezina (2000)

Box 2.2. High vendor prices in East Africa¹

In Nairobi, Mombassa and Kampala, the usually price for water from a kiosk vendor in an informal settlement ranges from US\$1 to US\$5 per cubic metre. This level is common in other Africa cities. Only about 30 per cent of the people living in these cities have direct access to piped water. The rest depend on point sources (shallow wells, etc.) and on small service providers such as water kiosks, handcarts, tankers and borewell operators.

1. Source: UNDP-World Bank WSP (2000)

During water shortages, vendor prices can increase dramatically. In an informal settlement in Nairobi called Kibera, for example, water kiosk prices can range from KSh5 to KSh20 per jerrican, compared to the typical level of KSh2 per jerrican (US\$1 = approx KSh73). Figure 2.10 shows the range of water prices quoted in focus group discussions in Kampala (Kayaga and Sansom, 2004).

Table 2.10. Water Price Range in Kampala poor communities

Water source	During normal period (Ush per kilolitre)		During periods of piped water scarcity (Ush per kilolitre)	
	Range of costs	Most common	Range of costs	Most common
Non-utility? • Protected springs? • Vended water	Nil 2,500-5,000	Nil 2,500	Not readily available 10,000-20,000	10,000
Utility - indirect? • Vended water	5,000-10,000	5,000	10,000-20,000	10,000
Utility direct? • Landlord supplied? • CBO/NGO tap? • Public standpost? • Direct customer	2,500-5,000 5,000-70,000 (*per month) 1,650-2,500 2,500-5,000 500-750	2,500 6,000 (*per month) 2,500 2,500 750	Not applicable	

The data displayed in Table 2.10 shows that normally consumers in low-income settlements who are not direct customers of national water and sewerage corporations (NWSC) pay between three and seven times more than direct customers. However, during periods when there is a scarcity of piped water in the area, the main source of water for people living in low-income settlements is vended water, and the price surges up to 13 times the price charged by NWSC for domestic customers.

In many cases, vendors do not pay the utility for the water that they sell on to their customers, which is therefore lost income to the utility. Indeed unauthorized water connections for which the utility receives no revenue are common in many countries. A more proactive marketing style could enable a utility to substantially increase both its customer base and revenues.

It should be noted that all the small-scale providers are also water users, as they often buy or collect water before selling it on to their customers. Chapter 4 considers the subject of partnerships for improving services to informal settlements, including partnerships with small-scale providers to enhance services. A utility may be considering supporting and regulating water vendors to improve services in areas where the utility will not be able to provide a service for some time. In that case it would be worthwhile assessing the perceptions, experiences and preferences of the small-scale providers in those areas. This is probably best done through methods such as meetings and focus group discussions, as part of an ongoing dialogue that can encourage the development of trust and mutual understanding.

The high direct costs and indirect coping costs that people pay for inadequate water services, particularly the poor, makes a compelling case for utilities to seek to capture more of their local water market with good quality piped water services. This entails developing different services and payment and management options that will meet the needs of different consumer groups.

2.9 Focus group discussions and the 'PREPP' approach

People living in informal settlements may have limited trust in, or experience in, dealing with public utilities. Focus group discussions (FGD) offer an effective technique for a utility to develop an understanding of their customers' (or potential customers') attitudes, practices, perceptions and preferences. It can also be the basis for ongoing dialogue.

A refinement of focus groups, PREPP - 'Participation, Ranking, Experience, Perception and Partnership', has undergone development and testing in East Africa and India (Coates et al., 2004). This approach provides a practical method of directly addressing some of the issues that arise from the miscommunication between the utility and the poor. Too often that relationship is one where low-income consumers do not see themselves as valued customers at present or in the future.

PREPP is a practical way for utilities to consult low-income consumers about their experiences, perceptions and preferences. Developed with the assistance of utility engineers, social scientists and economists and piloted in low-income communities in Kenya, Uganda, Zambia and India, PREPP is grounded in the belief that a utility and a low-income consumer can have a mutually profitable relationship.

PREPP methodology outline

This methodology has a number of benefits and possible uses but one of its strengths is that it is a reasonably rapid means of gaining quality information about a community's experiences and perceptions about water services, together with their preferences for alternative service options (Coates et al., 2004).

The process involves water engineers, facilitators (usually drawn from local councils, NGOs, university departments or consultants) and low-income consumers in a mutually beneficial exercise based around a comparison of proposed service options with existing sources and supply. It serves a number of purposes, not least demonstrating the decision-making process used to select 'best for purpose' water supply options by the utility and the consumer.

In focus groups, usually segregated by gender, the PREPP facilitator and engineer take the participants through a set of carefully prepared steps providing a framework for informed dialogue between the water engineer and his/her potential customers. Another person needs to document the responses of the focus group to questions raised by the facilitator. The whole process takes on average less than a couple of hours to facilitate and is proving to be an eye-opener for the engineer and water users alike. The key Steps 1 to 5 are shown in Table 2.11 below.

The researchers have found that just as engineers and utility managers often have entrenched perceptions about the viability of service provision in informal settlements, the residents may have ill-conceived views of utility motives and interests. The PREPP dialogue is valuable because among other things it clears up misunderstandings.

Table 2.11. PREPP - The basic steps

Topic/research area	Tool used to facilitate
1. Existing experiences (sources, supply and coping strategies)	Water ladder, group probing and discussion
2. Existing preferences (exploration by type)	Household voting, group probing and discussion
3. Consumer perceptions (of the utility)	Questions and probing
4. Service option preferences (existing options compared to new)	Costed option ranking Pocket chart voting
5. Household expenditure	Household expenditure charts

The key step for determining future services is costed option ranking. Here the purpose is to determine which service options should be considered by the utility for future marketing in the same or similar market segments. The consumers are informed that the utility wishes to find out what local consumer preferences are for potential future service options, compared with the existing water services and sources. The group is presented with pictures showing a mix of two types or categories of service option - potential options with estimated costs for the following year and the most popular existing sources determined during Step 2 of the PREPP process. This enables the utility to find out information regarding the consumer's first, second and third preferences for a range of service options as part of a negotiated demand process.

Potential PREPP benefits and outputs

PREPP is primarily a tool for water utilities. The information gained through approach can be used directly by the utility to make decisions about service options to be offered and marketing strategies that could be used to target low-income consumers. The approach's primary purpose is to benefit the poor and low-income consumer. Benefits include:

- Greater utility understanding of the nature of consumer preferences for the different potential service options that it is both willing and able to offer.
- Improved utility understanding of both consumer preferences for existing sources and consumer coping strategies.
- Improved mutual understanding and trust between the utility and its potential customers, built upon open dialogue that can continue after the PREPP process.
- Improved knowledge of the utility's comparative advantage - or disadvantage - against other providers.
- The information generated by PREPP can contribute effectively to a utility's normal investment planning.

PREPP is consistent with a partnership approach and draws on techniques that are familiar to social scientists, economists and engineers. It can assist utilities to think strategically about how to both engage with the urban poor and maintain the customer-utility relationship thereafter. Potential PREPP outputs in relation to the 7Ps of marketing are summarized in Table 2.12.

Table 2.12. Potential outputs from PREPP surveys

	Potential outputs of PREPP
Product	Knowledge of existing provision - by all suppliers including traditional sources and small-scale providers Knowledge of type of service and payment options preferred by the communities and comparative advantages to existing sources
Price	Knowledge of existing informal and formal tariff structures and seasonal fluctuations Cost of provision for storage, queuing, treatment and scarcity (coping costs) The relative preferences of community groups for costed service options Knowledge of attitudes toward connection schemes and payment options
Promotion	Knowledge of existing communication patterns between utility and consumers, and potential marketing opportunities Potential for active on-going customer-utility dialogue Enables the development of future targeted promotion strategies for each area
Place	Knowledge of where alternative providers operate, where new potential markets exist Better sense of specific local problems and living conditions, to enable the development of realistic solutions Improved estimates for service option take-up in each area
People	Knowledge of present and potential customers, income distribution, behaviours and practices, resistance to change Knowledge of community groups who are interested in collaborating in shared management arrangements
Process	Establishes the beginning of a consultative planning process between the utility and the communities, as part of realistic negotiated demand
Presence	Establishes a means for future mutually beneficial exchanges Improved utility corporate identity and image

Armed with this information the utility can now begin to make informed decisions about which service, payment and management options are most feasible. Planning for services that involve the primary stakeholders enables mutually beneficial solutions to be found. The information gained during PREPP surveys can also be triangulated against household semi-structured interviews and observation at existing water points, in order to verify information.

One thing is very clear, once engineers and utility managers step out and enter such dialogue with their existing and potential customers, there should be no going back to the 'supply-driven' ways.

The demand assessment aspects of the PREPP approach, such as the results from the costed option ranking, can also be used to 'target' investments, which is discussed in the next chapter.