Chapter 3

Targeting low-income water consumers

3.1 Introduction and summary

Funds for improving services in poorly served areas are often limited, so careful thought is required on where to target resources. Effective targeting or prioritizing of future investments and efforts for low-income areas is best done considering:

- The development of feasible service, payment and management options based on lessons learnt elsewhere and locally. Innovations should be considered, such as the use of local water storage tanks where water supplies are intermittent. The development of options should be guided by the principles of maximizing revenues but also providing the best feasible supply to poorly served areas until the utility can provide better services (such as house connections) in those areas.
- Assessing consumer demands for existing and new service options using appropriate techniques such as WTP surveys or PREPP. Such studies will inform the likely future take-up of different options and the scope for increasing tariffs, which is invaluable for utility financial planning.
- Exploring opportunities for working with other stakeholders such as CBOs, NGOs and small water enterprises is important when working in informal settlements, because utilities often do not have all the resources and skills to work in such areas. It is worthwhile finding out which NGOs have experience of working in those low-income areas that the utility is considering.
- The selection of priority areas on the basis of agreed objectives, using the best available information about the needs and demands of consumers for different service and payment options, together with utility performance data against key indicators.

These issues are discussed in more detail in the following sections. When initial pilot programmes for working in low-income areas are being developed, the targeting of which areas to work in is likely to be less rigorous. Larger programmes should include more systematic targeting so that issues of need, equity and consumer demand are adequately addressed.

3.2 The need for innovation

The approaches to understanding consumers that were described in the last chapter will inform the marketing strategy about the water and sanitation services that are being used at present by various different groups, the price they are paying and what they think of these services relative to the other demands on their limited resources.

For those people who receive good full pressure 24-hour water services, the service options which the utility might want to promote may seem somewhat limited. Good water utilities, however, seek to introduce viable options wherever they can, such as payment and service options, in order to improve customer satisfaction. The potential to introduce more service and shared management options increases substantially in situations where services are currently intermittent and/or inadequate, particularly in developing countries as described above.

To meet the challenges of improving current service levels and providing for future needs, innovative approaches are necessary that match consumers' preferences and paying capacity. For example, if utilities support the on-selling of water by vendors, or by households selling to their neighbours, then incremental service improvements can be made, without incurring the full cost of providing everybody with household connections.

Some of the potential improved service options that can be offered to consumers are compared to typical existing water sources in Table 3.1. Existing water sources are listed in the left-hand column and potential options as part of incremental improvements are in the right-hand column.

Table 3.1. Examples of existing and improved water options in informal settlements

Typical existing water sources	Potential improved service options
· Unregulated water kiosks · Handcart vendors (expensive) · Unauthorized connections · Public standposts from which little or no revenue is collected · Contaminated pools or rivers · Distant springs or boreholes · Seasonal dug wells	· Utility-supported private water kiosks · Regulated small-scale providers or vendors · Community-managed kiosks · Community-managed local water distribution pipes · Shared water connections with on-selling to neighbours · Individual connections · Prepaid metered kiosks · Water kiosks with storage tanks

Such incremental improvements are often a more realistic process, particularly where a utility is trying to improve services to as many people as possible. Whatever options are developed, a key objective is for the utility to recoup its investments or at least to cross-subsidize to the agreed level.

The following sections on service options, payment options and management options show examples of innovative approaches to improving services that have been successfully tried in various parts of the world, building on the examples described in Chapter 1. If utilities are to offer more of such options to existing and potential customers, then they will invariably need to be more flexible in terms of their design standards and procedures, as part of an effective strategic marketing strategy, so that customer satisfaction can be improved.

3.3 Service options

Many water utilities provide some limited options such as house connections and standpipes or water kiosks, but the scope for introducing more options to improve customer satisfaction is considerable. A key aspect of improving customer services is developing different service options that can be used to address the demands of consumers

in different market segments. These options should be technically feasible and financially viable. The service option should also be priced taking into account peoples' willingness to pay and it should be environmentally feasible.

In technical terms, water service options may generally be grouped into seven basic categories, in the context of utility provision, as follows:

- **Individual house connections** with various pressure regimes and frequency of water supply. There may be a variety of means of connecting to the water mains, for example by conventional buried pipe, possibly metered, or through informal connections to an individual manifold or meter some distance from the dwelling. Water is obtained from a tap in the house which is usually the desired level of service.
- **Individual yard connections** at various pressure regimes and frequency of supply, where water is obtained from a tap outside the house. The house is unlikely to have internal plumbing.
- **Shared group connections** with a few households or a 'street' sharing one connection at various pressure regimes and frequency of supply in order to minimize connection charges and any fixed standing charges. Alternatively one household with a yard connection may sell on water to neighbours.
- **Bulk supply connections** where the utility sells water through a bulk meter at special rates to a community or private contractor, possibly with on-site storage capacity, for selling on through a private distribution net-work to household connections or even to water kiosks.
- **Water kiosks**, essentially communal/public water points, technically similar to standposts where people buy water. A water kiosk may be sheltered (with a structure) or open and may include storage and/or bathing facilities. A utility, a private operator or a community group may manage the water kiosk and sell water at a predetermined price per container, although different payment methods may be adopted.
- **Standposts**, communal/public points where water is collected by many people. Standposts, as opposed to kiosks, are usually unmanned and there is no direct charge for the water provided (particularly in South Asia).
- **Supply by vendors**. Vendors may transport water in various ways such as using bicycles, handcarts, animal-pulled carts and motorized delivery vehicles (trucks) to deliver water to consumers.
- **Supply by water tankers**. The utility or a private provider may deliver water to an area using a water tanker, especially in cases of water short-ages.

For each of the above basic service options, different payment mechanisms and management systems could be adopted. Apart from these basic service options, others can be developed depending on the particular circumstances faced by respective water utilities and on consumer demand. In general terms, where intermittent water supplies are common, more options tend to be worth considering including local water storage tanks either at water kiosks/standposts or as part of a yard connection. Many of the variables such as water point delivery, supply hours, water pressure, etc. that can be used to develop different service options are shown in Table 3.2.

Table 3.2. Water service options for selected variables in urban areas

Location of water delivery point	Max 100m	Max 25m	Yard	House
Pressure	As in conventional network	Roof (1st storey)	Ground	Trickle feed
Hours of supply	24, 12, 9, 6, 2 hours (do those hours only apply to column 1?)			
Type of dwellings	Bungalows and maisonettes (with internal plumbing)	Flats (with internal plumbing)	1, 2 or 3-roomed (without internal plumbing)	Dwellings in informal settlements
	Commercial premises	Single or two-storey	Multiple storey	Tenement rooms/flats
Water point Delivery	Multiple taps	Single tap	Water kiosks	Valve clusters with hosepipe offtakes
	Standposts	Standpost vendors	Locked shared standposts	Machine dispensers
	Standposts or kiosks with storage tanks	Smart card or pre-payment meters	Neighbourhood on-selling	Handcart vendors
	Flow restrictors / trickle flow	Storage containers	Shared connections	Water flow regulator
	Site storage	Area storage		Tanker vendors

In developing service options that are suitable for their market segments or selected consumer groups, it is worthwhile for utilities to learn from elsewhere. The next section considers some typical service options that have been used in various parts of the world.

Examples of service options that utilities can provide or support

Different service options are applicable to different situations depending on the existing water supply infrastructure and the perceptions of consumers. The most important consideration is that the proposed service options should be at-tractive to customers and viable for the utility. Fourteen options are illustrated below and their potential advantages and disadvantages, from the perspective of both the consumers and the utility, are briefly discussed. Several of these options might have been seen as 'second best' or even 'illegal' according to conventional approaches. To achieve universal service to the poor however, we cannot afford to be conventional and the recommendation therefore is to absorb the ideas that people have, out of necessity, developed for themselves. Then adapt them slightly to ensure that they are 'good enough' and incorporate them into the revenue base of the utility, all without destroying the essence of what made them attractive in the first place.

Individual house connections

This is generally the preferred option for both utilities and consumers, where there are sufficient financial resources to fund the development of the infrastructure and where it can be sustainably managed with adequate and reliable services.

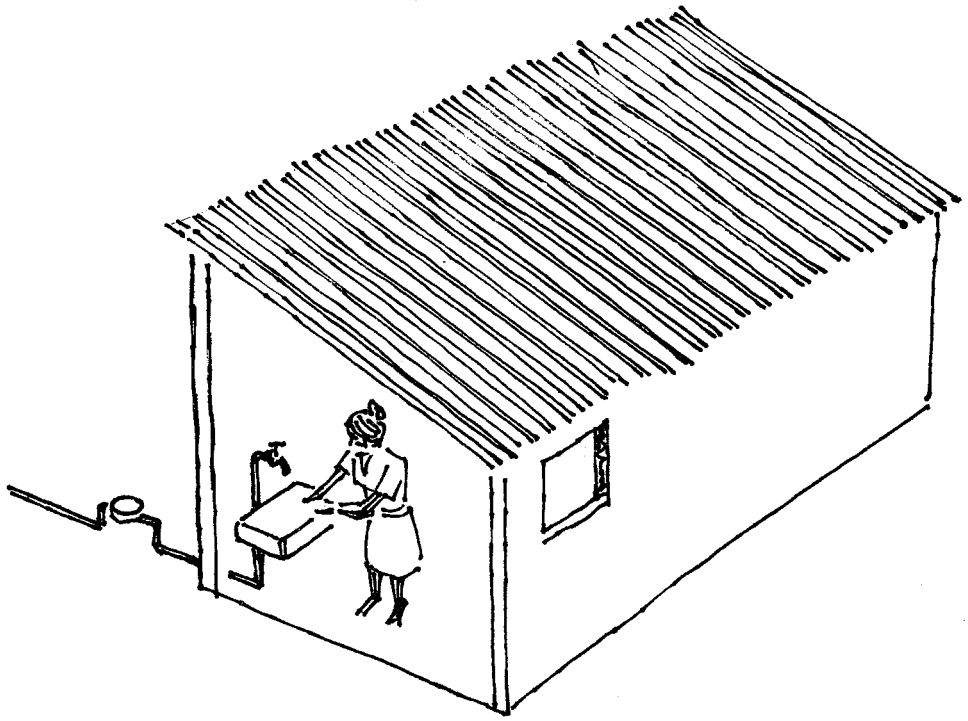

Figure 3.1. Individual, in-house connections

Potential advantages (for customers)

- This is a convenient method of water delivery, as water is available from a tap inside the dwelling, offering a high level of service if the pressure is sufficient.
- Residents are potentially able to use more water from in-house connections and therefore reduce the risk of water-related diseases.
- In the case of intermittent supply it is relatively easy to fill storage containers within the house.
- Water is received directly from the distribution system, with less chance of contamination in the process of water collection
- The household has full control of their water service, and little chance of disagreements with other customers

Potential advantages (for utilities)

- Providing house connections within a given area enables a utility to sell more water (compared with other service options), thereby increasing revenues and thus recouping the investment in water supply infrastructure more quickly.
- It is easier to hold customers accountable for payment of bills, compared with other options such as water kiosks.

Potential disadvantages (for the utility)

- An expensive method of water supply in terms of both the capital and operational investment.

- Limited control of water use, for example customers may have leaks or sell on water to other people. This is more of a problem where there are no individual meters.
- If there are serious water shortages, it can be difficult to limit wastage of water on activities such as watering gardens.
- There is more potential for waste and leakage, as the size of the network is increased considerably compared with other options.
- More wastewater is generated, and this often requires some form of wastewater collection and disposal system. A proper sewerage and wastewater treatment system is usually very expensive.

For consumers the main disadvantage of this option is cost, in terms of both water and sewerage charges plus connection costs, so the customer has to be willing and able to meet these costs.

Individual house connections - flexible pipes by household to meter/valve clusters

This option entails the utility laying a limited pipe system in an informal settlement at a shallow depth or above ground, then installing clusters of valves and meters (as is shown in the figure below), from which residents can connect plastic pipes from their own meter to their dwelling. This option has been successfully used in Manila in the Philippines.

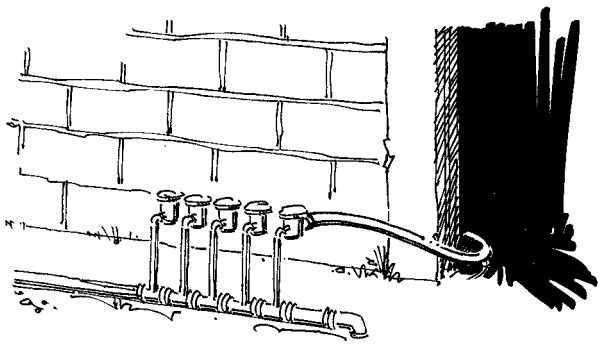

Figure 3.2. Individual house connections - flexible pipes to meter/valve clusters

Potential advantages (for customers) - similar to the first option (house connections)

- This is a convenient method of water delivery, as water is available from a tap inside the dwelling, offering a high level of service if the pressure is sufficient.
- Residents are potentially able to use more water from in-house connections and therefore reduce the risk of water-related diseases.
- In the case of intermittent supply it is relatively easy to fill storage containers within the house.
- Water is received directly from the distribution system, with less chance of contamination in the process of water collection.

- The household has full control of their water service, and limited chances of disagreements with other customers.

Potential advantages (for utilities)

- Providing house connections within a given area enables a utility to sell more water (compared with other service options), thereby increasing revenues and thus recouping the investment in water supply infrastructure more quickly.
- The valve cluster option is cheaper than a water distribution system built to standard designs and can easily be adapted as the settlement develops.
- It is easier to hold customers accountable for payment of bills, compared with other options such as water kiosks.
- Provided the meters continue to work it should be relatively easy to locate possible sources of non-revenue water (such as illegal connections and physical leaks).
- This option shows key stakeholders that the utility is doing its best to serve poorer communities.

Potential disadvantages (for the utility)

- Adequate disposal of wastewater can present problems.
- More expensive in terms of both the capital and operational investment, compared to alternative options such as water kiosks.
- There is more potential for leakage, as the pipes are laid at a shallow depth or are above ground.

Potential disadvantages (for consumers)

- The cost in terms of water charges plus connection costs can be higher than other options, so the customer has to be willing and able to meet these costs.
- Adequate disposal of wastewater can present problems.

Individual house connections - daily filled overhead tank

This option entails the utility providing a pipe system and overhead tanks for those communities or households that want them. Figure 3.3 below shows the type of arrangement that has successfully been used in Durban, South Africa.

Figure 3.3. Individual house connections - daily filled overhead tank

Potential advantages (for customers)
Similar to the house connection option, but because the utility provides the overhead tank greater storage is provided, so that a more reliable service is likely, particularly where intermittent water supplies are common.

Potential advantages (for utilities)
- Similar to the house connection option, but this option also shows key stakeholders that the utility is doing its best to serve poorer communities.

Potential disadvantages (for the utility)
- Adequate disposal of wastewater can present problems, compared to options that typically provide a smaller volume of water.
- More expensive in terms of both the capital and operational investment, compared to alternative options such as water kiosks.
- Expensive in terms of the capital cost of providing the storage tank on the roof.
- Where the ball valve or stop cock that shuts off the flow into the tank is not working, the water will continue to flow into the tank, causing it to overflow and water will be wasted.

Potential disadvantages (for consumers)
- The cost in terms of water charges plus connection costs can be higher than other options, so the customer has to be willing and able to meet these costs.
- Adequate disposal of wastewater can present problems.

Individual house connections - daily filled ground tanks
There are examples of utilities providing ground tanks, but more often householders invest significant sums of money to buy their own ground tank that is filled from the water distribution network. These tanks can fill during the night or at other times when water is not used, and can substantially increase both the available quantity and reliability of supply compared to customers without such tanks. In some situations householders ensure that their tank is filled by installing a suction pump on the mains. In other settings it is more common to find a pump used to fill an overhead tank to ensure adequate pressure in the household taps. This is common in regions where people are concerned about the adequacy and reliability of their supplies.

From the perspective of the utility and other customers, such tanks can cause problems, particularly where the ball valve that shuts off the flow into the tank is not working. In this case water will continue to flow into the tank, causing it to overflow leading to the wastage of water. is therefore in the utility's interest to check occasionally that the ball valves in private tanks are in working order, though less critical if there is a meter before the tank inlet.

Individual yard connections/taps
This approach is similar to individual house connections except that the only tap on the service pipe connection is outside the house in the yard or compound.

Potential advantages (for consumers)
- This option costs less than in-house connections and is therefore more affordable to households, as the house need not have internal plumbing.

Figure 3.4. Individual yard connections/taps

- It is generally easier to collect water from a yard tap than, say, a water kiosk.
- The household has a fair amount of control as the connection, though outside, is not shared with other households.
- If the householder wants to they can let their neighbours to use their yard tap, perhaps charging those neighbours for this service, which can make the pipe connection more affordable.
- Selling on water from yard taps can provide competition for water kiosks and therefore help to keep down the price of water.

Potential advantages (for the utility)

- Yard connections can be an intermediary service level between a water kiosk/standpost and an in-house connection, where the utility can potentially sell more water and generate more revenue than they would if there were only kiosks available and people did not have internal plumbing.

Potential disadvantages (for consumers)

- Some inconvenience from carrying water into the house.
- Reduced control over the use of the water tap, which is outside the house, and possibility of others using the water (especially at night).
- Waste may be a problem, leading to problems of drainage, breeding of mosquitoes, etc.
- Increased risk of water becoming contaminated after leaving the tap as it is carried to the house and stored.
- In some cultures women complain that it gives them a similar burden in having to carry water into the house while at the same time reducing their opportunities to meet other women at the standpost.

Individual yard connection with ground tank

This option has been used in Durban, South Africa, where the utility provided the tanks. In other countries customers have provided their own tanks.

Figure 3.5. Individual yard connection with ground tank

Potential advantages (for consumers)

The benefits are similar to those of the yard connection, but with additional security with regard to reliability of supply. The water stored in the ground will be available to households at the tap even when water is not flowing in the network.

- This option has the potential to improve the reliability of water supply in capacity constrained cities where water rationing is the norm.
- Consumers are less likely to have to queue at inconvenient times to collect water where local storage is provided.
- When the ground tank is full there is the option of extending the pipe supply into the house, to a kitchen sink, for example, to receive piped water for the first period of consumption.

Potential advantages (for the utility)

- Yard connections can be an intermediary service level between a water kiosk/standpost and an in-house connection, where the utility can potentially sell more water and generate more revenue, than they would if there only kiosks were available and people did not have internal plumbing.
- Often less water is consumed, postponing the need for high capital investment in bulk supply, treatment and distribution.
- If the householder wants to, they can let their neighbours use their yard tap, perhaps charging those neighbours for this service, which can make the pipe connection more affordable.
- Selling on water from yard taps can provide competition for water kiosks and therefore help to keep down the price of water.
- Where the utility supplies the ground tank, complete with sealable cover, it can be more sure of maintaining the potable quality of the water.

Potential disadvantages (for consumers)

- Same as for yard connections, but in addition this option is more costly as a tank has to be provided for each connection (if the customer purchases the tank).

Potential disadvantages (for the utility)

- Where the ball valve or stop cock that shuts off the flow into the tank is not working, the water could continue to flow into the tank causing it to overflow and water will be wasted.

Communal or shared yard connections/taps

As an alternative to standposts or kiosks a utility may offer a number of shared or group connections to particular areas, typically to be shared by between two and ten households. This option is becoming more common in some countries.

Figure 3.6. Communal or shared yard connections/taps

Potential advantages (for consumers)

- This service option is relatively low cost and more affordable since several households can share the cost of one connection. Sharing the connection reduces the unit cost of services per household.
- It is easier to collect water from a shared tap than a water kiosk and it is likely to be cheaper than an in-house connection.
- This service option may not require a wastewater collection system, and can be provided to poor areas that do not have a sewerage system.
- Water from shared yard taps can provide competition for water kiosks and therefore assist in keeping down the price of water.

Potential advantages (for the utility)

- Shared connections can be an intermediate service level between a water kiosk/ standpost and an in-house connection, where the utility can potentially sell more water and generate more revenue than they would if only kiosks were available and people did not have internal plumbing.
- Often less water is consumed, postponing the need for high capital investment in bulk supply, treatment and distribution.

- The water utility ends up having fewer customer accounts, hence it is potentially easier and less expensive to deal with in terms of customer service, billing and revenue collection.

Potential disadvantages (for consumers)

- There is some inconvenience from carrying water into the house.
- No control over the use of the water tap, which is outside the house and is shared by several households, and there is the possibility of others using the water (especially at night).
- Unless one household takes responsibility for managing the shared tap, there is potential for disputes among those families who are sharing the tap.
- Increased risk of water being contaminated after leaving the tap, as it is carried to the house.
- Waste may be a problem, leading to problems of drainage, breeding of mosquitoes, etc.

Potential disadvantages (for the utility)

- The households sharing the tap may disagree on payments, and the utility could therefore lose revenues.

Communal yard connections with a high level or ground tank

A variation on the idea of shared or group connection but with the addition of a water storage tank (to ensure availability).

Figure 3.7. Communal yard connections with raised or ground tank

Potential advantages (for consumers)

- The same advantages as for group connections, with the additional security with regard to reliability of supply.
- The ground tank stores water that may be available to households at the tap even when water is not flowing in the network.
- This option has the potential to improve reliability of water supply in capacity-constrained cities where water rationing is the norm.
- Consumers are less likely to have to queue at inconvenient times to collect water where local storage is provided.

Potential advantages (for the utility)

- Where water supplies are intermittent and where people in poorer areas have more local storage in the local pipe system, it gives the utility more flexibility in terms of what time of the day it can supply water to these areas. This can lead to improved services and increased consumer satisfaction.
- The capacity of the water distribution system can be lower where customers have local storage tanks, because the tanks can fill at off-peak times.

Potential disadvantages (for consumers)

As for communal yard connections with, in addition:

- There is some risk of water contamination directly into the tank, especially if the tank is at ground level or is not properly sealed.
- This option is more costly, since a tank has to be provided for each connection.

Potential disadvantages (for the utility)

- If the utility decides to subsidize the costs of the storage tanks, it will incur significant additional costs.
- Where the ball valve or stop cock that shuts off the flow into the tank is not working, the water will continue to flow into the tank causing it to overflow and waste water.

Public standpost - staffed (kiosk)

Water kiosks may be managed by a private operator, a community group or the utility itself and are common in Africa. A person (a vendor) is usually required to stand by the kiosk to sell water to customers at an agreed price per plastic jerrican or other container. Some kiosks have shelters for the vendors to protect themselves from the hot sun.

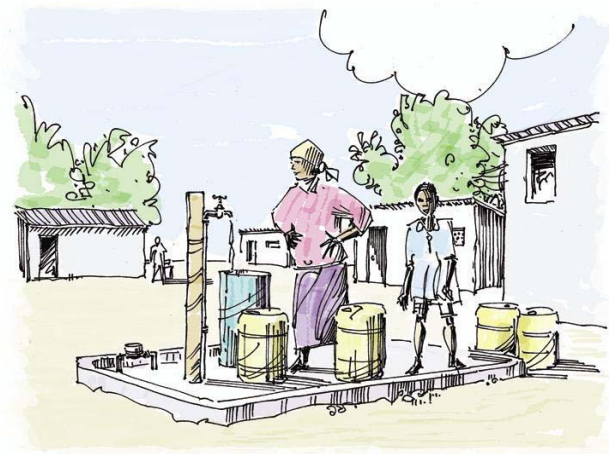

Figure 3.8. Public standpost - staffed (kiosk)

Potential advantages (for consumers)

- Water is sold in small quantities, and this is often more affordable for low-income customers than house connections.
- This is a popular option in Africa in urban areas where people do not have any other suitable service option.

- There is little or no wastage or stagnant water because water is metered and sold by volume.
- Effective cost recovery for the group or person managing the kiosk, because customers pay up front as they collect the water.

Potential advantages (for the utility)

- This is a low-cost service option for the utility, because many people can be served by one kiosk. Also, kiosks often do not require an extensive distribution system, making this method suitable for areas where it is difficult to lay pipes.
- Billing is convenient for the utility, if there is a working meter for the kiosk, as only the kiosk operator is billed.

Potential disadvantages (for consumers)

- The price per unit volume of water is often very high compared with household connections.
- In periods of water shortages the price of water from unregulated vendors with limited competition can go up dramatically.
- Availability of water is limited to kiosk opening times.
- Time may be wasted because of queues at water kiosks, especially if kiosks are far apart or if the water pressure in the distribution system is low.
- It is tiring carrying the water, since the kiosks can be 200m from the household or further.
- Water can become contaminated at the supply point and/or while carrying or storing the water.
- If the kiosk does not have a storage tank it will only have water when there is water available in the local pipe network. This is a common problem in systems with intermittent supplies.

Potential disadvantages (for the utility)

- Only limited amounts of water per household is generally sold from kiosks, particularly when people are also using informal (unprotected) sources because of the high cost of kiosk water. So relatively low levels of revenues are generated from kiosks for the utility (most of the amount charged goes to the vendor), so it is difficult for the utility to recoup its investment in infrastructure unless other service options are used as well.
- In some cases informal water kiosks are supplied by illegal connections, so the utility receives no revenues from such kiosks.

Public standpost with water storage - staffed (kiosk)

This option is a variation on the staffed standpost (water kiosk), with the storage tank provided to increase the service reliability. In some examples the tanks are below ground, where pressure is particularly low, and are accessed using handpumps, which studies in Dhaka, Bangladesh, have shown limits water use. Other variations have the tanks above ground, built from brick or with circular concrete rings as in Kathmandu, Nepal or Bangalore, India.

Figure 3.9. Public standpost with water storage - staffed (kiosk)

Potential advantages (for the consumers)

- The same advantages as for the staffed standpost (kiosk) above, but with additional security with regard to reliability of supply.
- The ground tank stores water that may be available to households at the tap even when there is no water in the network.
- This option has the potential to improve the reliability of the water supply in capacity-constrained cities where water rationing is the norm.
- Consumers are less likely to have to queue at inconvenient times to collect water where local storage is provided.

Potential advantages (for the utility)

- Where water supplies are intermittent and where people in poorer areas have more local storage in the local pipe system, it gives the utility more flexibility in terms of what time of the day it can supply water to these areas. This can lead to improved services and increased consumer satisfaction.
- The required capacity of the water distribution system can be smaller where customers have local storage tanks, because the tanks can fill at off-peak times.

Potential disadvantages (for consumers)

Similar disadvantages as with the kiosk without a storage tank, in addition:

- There is some risk of water contamination directly into the tank, especially if the tank is at ground level or is not properly sealed.
- This option is more costly, since a ground or raised tank needs to be provided.

Potential disadvantages (for the utility)

- Similar to the communal yard connections with ground tank.

Public standpost - pre-paid

This option has been used in South Africa and Uganda and offers an innovative alternative to more labour-intensive water kiosks. Nowadays pre-paid public standposts are likely to use electronic measuring systems such as 'smart cards' rather than the tokens that have been more commonly used in the past.

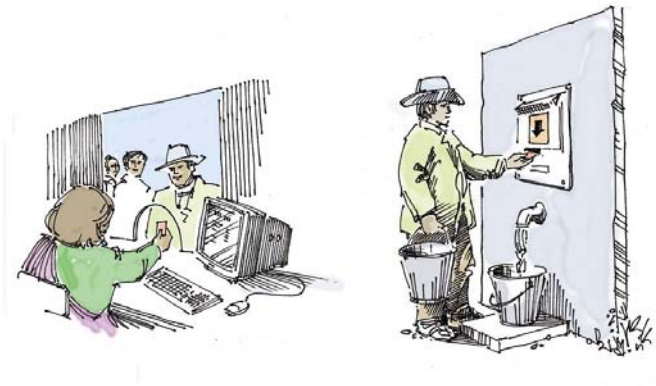

Figure 3.10. Public standpost - pre-paid with tokens

Potential advantages (for consumers)

- There is no need for a vendor to stand by the kiosk and sell water by the container, so it has potentially cheaper running costs, which should be reflected in the cost of water.
- The smart cards avoid the problems associated with dealing with cash and accounting for that cash.
- The smart card option can be programmed to give credits to individual customers, and this can be used to apply limited subsidies for some specified minimum consumption.

Potential advantages (for the utility)

- Cost recovery is reliable because customers pay before collecting water.
- As the system is computerized, the financial accounting can be automatic.
- It is relatively easy to change tariffs, as the system is computerized.
- It is relatively easy to establish how tariff change affects water consumption.

Potential disadvantages (for consumers)

- Some customers may be reluctant to buy and use the tokens or cards because the system is unfamiliar.
- If the system fails due to technical problems the water dispenser will not work and consumers will need to find alternative water sources.

Potential disadvantages (for the utility)

- Relatively high installation costs.
- This option is relatively high tech and requires specialized maintenance, which might not be readily available in some cities of developing countries.
- Requires a reliable power supply for proper operation, with a 24-hour supply for the main computer. This may not be available in some areas.
- Significant training is required for operators in order to provide back-up support for this option.[not really clear who the 'operators' are]
- Requires high pressure in the distribution network, and only operates at a pressure of at least 10 bars.
- This option is not completely foolproof, and may be tempered with.

This option carries the substantial risk of becoming a technical solution to a social problem. If that is the case it will fail. Where it is introduced with community agreement as a means of enabling people to pay small amounts as they find convenient, to budget their scarce resources whilst ensuring a continuing, conveniently located, quality water supply, then it has potential, provided there are enough of these pre-paid meters in a particular area to make the specialised maintenance and repair viable.

Public standpost

The public standpost system, where people can come and take water without paying an agreed sum per container, is common in South Asia. User payment may be in the form of small monthly or quarterly payments.

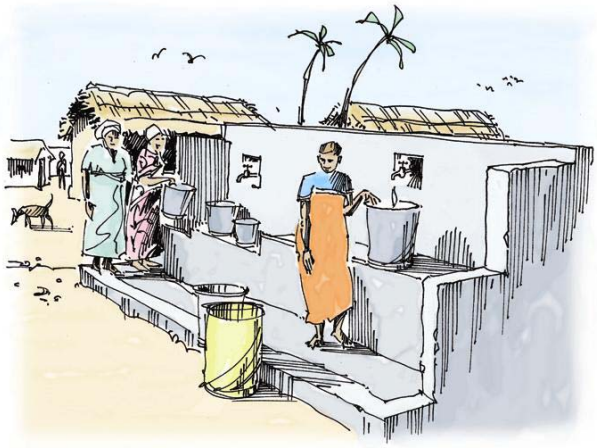

Figure 3.11. Public standpost

Potential advantages (for consumers)

- A relatively low or zero financial cost option which makes it more affordable, particularly for poor consumers.
- This option may not require a wastewater collection system, just adequate standpost drainage, and it can be provided to poor areas that do not have a sewerage system.

Potential advantages (for the utility)

- A relatively low-cost option in terms of construction cost. People tend to collect less water from standposts compared to other options, so infrastructure investment requirements are lower, however the utility is likely to receive very little revenue, if any, from this option.

Potential disadvantages (for the utility)

- Invariably the revenues from standpost users are low compared to other options, because it is not always clear who uses the standposts regularly in cities and so is difficult to obtain payments from users.
- Where no water charges are levied, this option sends the wrong message of 'water is free' to the people, who may be reluctant to pay for water again.

- People can waste a lot of water when they do not pay on a volumetric basis. Standposts with broken taps are a common sight in some areas.
- Maintenance of the standpost is likely to be a problem, as no-one is responsible for its proper use. With the utility not getting any revenue from this option, there is little motivation to maintain it adequately.

Potential disadvantages (for consumers)

- Poor maintenance of standposts is common, as something that is everybody's property ends up not being looked after by anyone, so poor performance can result.
- In areas where there are not enough satisfactory alternative water supply options, long queues are common.

Private vendors, price regulated

The handcart option is common where small water enterprises carry water from distant water points to sell it to people in areas with water shortages. A variation of this option is to use bicycles, although the number of containers that can be carried is very much limited with this option.

Figure 3.12. Private vendors, price regulated

The service provided by handcart vendors can be improved where the utility regulates and supports their activities. For example, the utility can provide a convenient water collection point for the vendors and can potentially regulate the price that is charged to consumers by publicizing the price that is charged to the vendors. This can be done to some extent by the utility, who can put up a sign up showing the cost of the water at the collection point, as is shown in the figure below. Alternatively, community groups or even local government can be empowered to take on this monitoring role.

Potential advantages (for consumers)

- It can be convenient for consumers to have water delivered to their houses. In marketing terms, the customers are receiving an added value which, if it is cost reflective, is a good service.
- Consumers spend less time collecting water than they would if they used alternatives such as water kiosks or standposts.

- If the utility is supporting and regulating the cart vendors, then consumers can receive a better service, hopefully at a reasonable price.

Potential advantages (for the utility)
- The cart vendors can serve areas that the utility is unable to serve adequately in the short to medium term.
- By working in partnership with the handcart vendors, the utility is more likely to be perceived by consumers and politicians as an organization that is doing its best under the circumstances.

Potential disadvantages (for consumers)
- Water from handcart vendors is usually very expensive because the vendors charge for all the time and effort it takes to collect, transport and sell the water.
- In some cases water may not be from a protected water source and could therefore be contaminated. Regulation can minimize this problem.
- This option may not be reliable if the vendor is not working or if water is sold to others instead.
- The price can be set by criminal gangs claiming monopoly rights over supply in certain areas.

Potential disadvantages (for the utility)
- Consumers who are served by the handcart vendors represent a missed opportunity for the utility to sell water in their city.
- If a sizeable proportion of consumers are served by vendors at expensive prices, the utility is likely to be perceived by key stakeholders (politicians and consumers) as an organization that is not doing its required job.
- The vendors may not be paying for the water they are selling, or in some cases they may be buying the water illegally from utility employees rather than from the utility itself.

It should be noted that the service options that should be adopted will depend on local circumstances, especially regarding feasibility of options and perceptions of customers.

Public or private street tank/water tankers

Tankers may be provided by the utility or a private company who regularly deliver water to areas experiencing serious shortages. The tanker can fill a local street tank or fill people's containers directly. Public supply to street tanks is common in drought-prone areas.

Potential advantages (for consumers)
- This method is effective in emergency situations, as water tankers can be mobilised relatively quickly. However it is also used in some prolonged water shortage situations.
- Water tankers are suitable for transient communities, where people are only settled temporarily, such as in emergency situation.

Potential advantages (for the utility)
- This method requires minimal infrastructure investment, apart from procurement of a tanker and perhaps a pump. Water can be pumped directly into a tank feeding a single tap-stand. There is no requirement for a pipe distribution network.

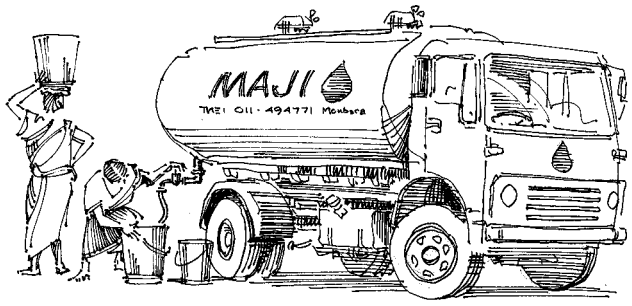

Figure 3.13. Public or private street tank/water tankers

- It is easy to train people to use this method of delivering water compared to other methods.

Potential disadvantages (for consumers)

- This method of distributing water is very expensive in terms of the cost of water per container. In some cases utilities or municipalities subsidize this lifeline option.
- Not suitable for areas with limited access, such as informal settlements.
- Water tankers can damage poorly constructed roads.
- Consumers are likely to experience inconvenience in terms of queuing for the tanker water and not being sure when it may come to their area.
- This method can create dependency, when no alternative supply has been planned.
- This is not a sustainable method in the long run unless users can afford to pay high prices for water.

Potential disadvantages (for the utility)

- Can be expensive for the utility where it is providing a subsidized service.
- Where consumers are relying on tankers, the utility is liable to receive pressure from politicians and other stakeholders to provide a better level of service.
- If tankered water is common, it can have an adverse effect on the utility's corporate image, which can reduce customer's willingness to sustain payments.

Water transported using this method may need to be chlorinated to a higher dosage when it has to be transported long distances, because the water will be sitting for longer before being used, hence the need to use more chlorine.

Public handpump in urban or peri-urban areas

Handpumps are usually associated with rural areas but are also common in peri-urban areas, particularly where there are good groundwater yields and where adequate pipe systems have yet to be provided. In some cases the water is provided free to people who use the handpump, in other locations charges for are levied as people collect water from the handpump or as part of a general tax. Handpumps are not usually provided by a utility but they may be provided by a government department.

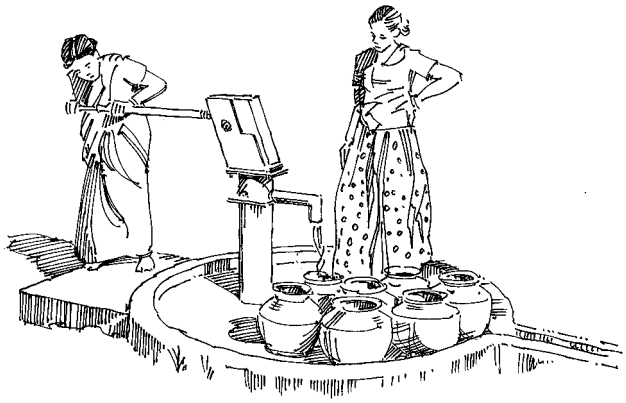

Figure 3.14. Public handpump in urban or peri-urban areas

Potential advantages (for consumers)

- Water is either free or sold in small quantities, and this is often more affordable for low-income customers compared to other options.
- This option can provide a clean source of water, provided the groundwater is not contaminated.
- A good temporary option where the nearest pipe distribution network is far away.
- It can provide a back-up option where piped water services are unreliable.

Potential advantages (for the utility)

- Many utilities do not provide this option. A handpump can provide a temporary option for a new area until piped water is provided.
- It can provide a back-up option where piped water services are unreliable, otherwise the utility may have to provide more tanker supplies.
- It is a low-cost service option, because many people can be served by one hanndpump.

Potential disadvantages (for consumers)

- Time may be wasted due to queues at handpumps and the time taken to pump and carry the water.
- It is tiring using a handpump and carrying water, and the nearest pumps could be a long distance from the household.
- Handpumps often fall into disrepair and it is not always clear who is responsible for maintenance.
- Possible contamination of the groundwater from septic tanks and leaking sewers can lead to contaminated handpump water.
- Often only limited volumes of water are available from handpumps due to the problems outlined above.

Potential disadvantages (for the utility)

- Consumers who are served by handpumps represent a missed opportunity for the utility to sell water in their city.

- If a sizeable proportion of consumers are served by handpumps, the utility is likely to be perceived by key stakeholders (politicians and consumers) as an organization that is not doing its required job.

The selection of service options to be promoted for a particular town or city will depend on local circumstances, especially regarding the feasibility of the various options and perceptions of customers. Where utilities are contemplating offering more service options to different consumer groups, it is preferable to undertake consumer surveys and dialogue. Section 4 on 'Understanding water users' discusses approaches that can be used to reliably investigate consumer perceptions and demands for different options.

Consumer-organized service options

Where services in a particular area are inadequate, consumers will often seek to develop their own water sources. In some cases such sources can in effect be competition to utility-managed services, and should be taken into account in any investment programme. In areas where the utility cannot provide piped water in the medium term, it would be good public relations for the utility to provide information on the most viable alternative water sources.

Examples of consumer-organized service options are set out below. It is important for a utility to find out the extent of the use of such consumer-organized service options, in order that they can understand the local water market in their city, prior to investment in new infrastructure.

A sensible marketing strategy is to develop trust in the utility amongst existing and potential customers. One way of developing such trust in areas that are likely to remain poorly served with pipe water for some time, is to be helpful to potential customers about alternative water sources.

a) Private individual or community boreholes

In situations where groundwater is available, consumers may install their own borewell with electric pumps, so that they have an adequate and reliable supply. Individual boreholes are very widespread in South Asia. In Guntur, India, for example, the extent of the use of such alternative water sources is clearly demonstrated in Table 3.3, with 70 to 100 per cent of households in a number of consumer groups having their own borehole or sharing one.

Such extensive use of alternative water sources is significant ´competition' for the utility or municipality and needs to be borne in mind when the utility develops its investment plans. If customers have already invested a lot of money in alternative water sources such as boreholes, they may be reluctant to pay large water tariff increases. This has been borne out in a willingness to pay survey conducted in Guntur (Narender, Chary and Sansom, 2004).

b) Private individual ground-level storage tanks

Some customers invest significant sums of money by buying their own ground tank, which is filled from the water distribution network, often with a pump connected to their overhead tank. This is common in some regions where people are concerned about the adequacy and reliability of their supplies. These tanks can fill during the night or other

Table 3.3. Alternative water sources in Guntur

Consumer group	Alternative water source	Percentage use
Bungalows	Individual borehole	80%
Independent houses in planned areas	Individual borehole	70%
Flats in planned areas	Shared borehole	100%
Independent houses in unplanned areas	Own borehole	33%
	Own open well	33%
Flats in unplanned areas	Shared borehole	100%
Slums with some water supply coverage	Public borehole	32%
	Own borehole	54%
Slums with no water supply coverage	Municipal tanker	96%
	Open well	0%

times when water is not being drawn from the network for immediate use and can substantially increase both the available quantity and reliability of supply compared to customers without such tanks.

From the perspective of the utility and other customers, such tanks can cause problems, particularly where the ball valve that shuts off the flow into the tank is not working. In this case water will continue to flow into the full tank, causing it to overflow and wasting water It is therefore in the utility's interest to occasionally check that the ball valves in these private tanks are in working order.

c) Roof catchments

The collection of water from roofs into tanks is used in both rural and urban settings as a means of supplementing other water sources. It is particularly useful in urban areas that the water distribution system does not reach. An example of the successful use of roof catchments in Tegucigalpa, Honduras is briefly described in Box 3.1

Box 3.1. Roof catchments in low-income shanties in Tegucigalpa, Hondurash[1]

In a survey of two low-income areas in Tegucigalpa with inadequate piped systems it was found that more than half the households used rainwater as their principal source of water, while 90 per cent of inhabitants collected at least some water from their roofs. The mean area of the iron sheet roofs varied from 23 to 45m^2.

Most households stored water in 200-litre oil drums, while about a quarter had somewhat larger cement tanks known as *pila*. Research findings revealed that provision of loans for fully equipping roofs with guttering and for building pila with up to 2000-litre capacity could be repaid over a relatively short time, using money saved from not having to purchase water from vendors.

1. Source: Brand and Bradford (1991), cited in Gould and Nissen-Peterson (1999).

The Tegucigalpa case demonstrates the viability of this service option in poorly served urban areas. This technique is also successful in many other areas around the world, in both wet and semi-arid regions. Problems have been experienced, however, where there are high levels of air pollution, such as heavy industry and coal-fired power stations, which make rainwater unsuitable for drinking or cooking (Thomas and Greene, 1993).

Water utilities are not generally in the business of providing materials for roof catchments. However, a utility wishing to demonstrate that it is concerned about existing and potential customers may wish to provide information about roof catchments and potential suppliers in areas that it cannot serve for some time.

The range of alternative water sources that people have to resort to in newly constructed areas in Kampala are evident from Table 3.4.

Table 3.4. Coping strategies of new middle-income residents in Kampala

Water source	Frequency	Percentage
Roof catchment with portable storage	99	66%
Roof catchment with underground tank	4	3%
Protected spring	104	70%
Water vendors	20	13%
Open well	16	11%
Privately operated powered borehole, pre-paid	14	9%

d) Individual or community open wells

Open wells are common in some urban areas where there is a high water table. If it is known that water from these wells is contaminated, the utility or municipality may wish to promote piped water as a safer alternative, provided they are confident that the piped water is clearly better than the well water. It is preferable if there is third party verification of this claim from a health department, regulator or NGO.

One approach for promoting piped water for drinking as an alternative to well water would be to undertake participatory water tests with community groups. This will enable increased awareness of a contamination problem and possible health impacts.

Unprotected or unauthorized water options

In areas where service provision is poor, many people may resort to alternative service options that are either unprotected sources or unauthorized such as:

- untreated water taken directly from rivers or ponds;
- water from a leaking pipe (often made easier to access by digging a hole under the leak);

- leaking pipes above ground; and
- illegal connections to piped supplies.

The first two options are likely to entail clear contamination risks. The best means of discouraging these practices is to provide alternative service options that are more convenient and are affordable. Well-designed hygiene promotion programmes can be useful in discouraging people from using the above options, provided there are viable alternative protected sources. To reduce the occurrence of the third and fourth possibilities the utility needs to be proactive in undertaking surveys and implementing strategies for reducing these sources of non-revenue water.

3.4 Payment options

Successful international water utility companies generally have a wide variety of payment options for their customers. This is essentially because they know that if they make it easy for customers to pay, they are more likely to pay their water bills promptly. They know that people living in a city have a variety of different lifestyles and preferred payment methods. Severn Trent Water in the UK, for example, offers a number of payment options, enabling customers to payby the method they choose:

- by post
- by direct debit
- at a bank
- at a building society
- at a post office
- at a payment point ('Paypoint') in a shop
- by home or telephone banking
- through the internet, via the utility website

Severn Trent have also found that not all customers are able to pay in the normal pattern of two payments per year. They have had to accept small payments on a monthly and even weekly basis to help those on low incomes or social welfare benefits.

While a utility in a developing country may not offer quite the same list of options to its customers, they still need to think about suitable payment options for their high, medium and low-income customers. The method of payment is most important in the urban areas of low-income countries where many households have a low disposable income. In a World Bank study of ten cities in Africa, for example, more than 80 per cent of these countries' residents live on less than a dollar a day (Collignon and Vezina, 2000).

In Kampala, Uganda, the preferred means of payment amongst customers is through vendors rather than the utility, as can be seen from Box 3.2.

Utilities serving low-income communities may wish to consider more flexible payment options, rather than monthly payments for individual connections. Utilities could negotiate with community groups or private individuals to manage water kiosks or shared connections, so that consumers pay the owners of the kiosk or shared connections small

Box 3.2. Payment option preferences in Kampala[1]

In September 1999, a questionnaire was sent out to a random sample of registered customers of the National Water & Sewerage Corporation, Uganda, to solicit their perceptions on the quality of service. Respondents were asked whether they agreed or disagreed with the following statement:

'Water vendors are able to receive payment for their services easier than NWSC because the terms for sale are simple and more convenient to customers.'

Of the 510 valid responses, only 137 customers (27 per cent) disagreed; 232 respondents (46 per cent) agreed with the statement. The rest of the respondents (26 per cent) were undecided about the validity of the statement.

1. Source: Sam Kayaga (2001)[missing from refs, need details of title and where.]

sums of money when they take water and the kiosk or shared connection owners pay the utility each month. Or the utility could set up local payment offices in poorer areas and allow weekly payments of water bills.

There are several dimensions of payment options. The options could outline different ways to pay in terms of:

- where to pay;
- how to pay;
- when to pay;
- whom to pay; and/or
- a combination of all these dimensions.

Table 3.5 shows a choice of options for payment, arranged according to different dimensions such as those listed above. A utility can develop its own payment options based on the choices shown for each dimension in the table. Whatever options are preferred, it is worthwhile being systematic about the option development process, which is discussed below.

3.5 Shared management options

It can be beneficial for a utility to share the management of water services together with other partners such as community groups or vendor groups, particularly in low-income communities or areas that are poorly served. This is true for both publicly and privately managed water utilities. Such arrangements can reduce the utility's operational management costs and enable the vendors or community groups to be more effective in service provision. Examples of the latter are discussed below.

Shared management between a utility and community groups

Shared management of water services between a utility and local community groups can be cost efficient and both empower communities to manage their services and enable improved service provision in areas where a utility may be unable or reluctant to operate. For example, in Arusha (Tanzania) and Dhaka (Bangladesh), community groups manage water kiosks that are supplied with water by the utility and payment is based on meter

Table 3.5. Payment option summary

Dimension	Payment choices
Method of payment	Cash Cheque Bank debits Prepayment cards or tokens Water stamps A combination of methods
Where to pay	Pay at a cash point at utility head office Pay at a cash point at utility zonal office Pay at a cash point at utility zonal and head offices Deposit cash or cheque onto a bank account Through direct debit of your account Pay to a water vendor Pay to a private operator of a standpipe or kiosk Buy a pre-payment card/token from a water cash office, chainstore, or bank Pay to a community water user committee Pay to a landlord Pay as part of a local tax rate A combination of places
When to pay	Per month, per quarter, half-yearly, annually, etc. in arrears Per day Every time one draws water Per month, per quarter, half-yearly, annually, etc. in advance Whenever convenient but with a time limit A combination of these
Basis of payment	Fixed charge Volumetric charge, basing on metered rates Per house value Per plot value Estimated consumption A combination
Who to bill?	Utility Collective community billing using a bulk meter Street billing Landlord billing Household billing

readings. In Kibera (Nairobi), Haiti and Dakar (Senegal), community groups manage small tertiary water distribution systems and pay the utility or municipal council for the bulk water supply.

Such arrangements for managing water services are best explained by example. Box 3.3 and Box 3.4 summarize a successful case in Port-Au-Prince, Haiti.

Box 3.3. Shared management of water services in Haiti (Part 1)[1]

Programme context

Port-Au-Prince is a rapidly expanding capital city of 2 million inhabitants, where the population has increased 10-fold during the last 30 years. The water distribution network has not kept pace with this growth. Approximately 55 litres per capita of water are available each day, but only about 12 per cent of families have water connections in their homes. For the remainder of consumers the standpipes have not been functioning regularly. CAMEP, who are the public water company, are reported to be heavily in debt. Consequently Port-au Prince has seen a rapid increase in water distribution by the private sector. Water is sold to private individuals who do not have their own pipe connection by the water carriers at a price of $3 to $5 per cubic metre.

Programme to serve 14 shanty towns

A programme of improvement was developed that was led by GRET (a French NGO), with technical assistance from HYDROCONSEIL. The project aims were to supply water to the shanty towns through new pipe distribution networks that would be managed by local community associations. The construction works were undertaken by local private companies from 1995 to 1998. Particular attention has been paid to technical surveys and the design of the new pipelines, in order to avoid conflicts over land rights and to reduce the risk of breakdowns. As the CAMEP network only has water pressure for a few hours a day, additional water storage was provided in the system to allow for more reliable distribution of water.

On completion of the construction work, water was provided to poor neighbourhoods via the main urban network, which is managed by the public operator (CAMEP). This avoids the need to use private transportation for water. Water is distributed to users via standpipes in the shanty towns, where water is sold at an average cost of $1 per cubic metre, which is considerably cheaper than the water provided by the independent service provider chain.

A key to the success of the programme is the active and capable participation of the neighbourhood water committees. An intensive mobilization and training process was, therefore, carried out by GRET and SOLAM, who are a local NGO who specialize in social mobilization work in the shanty towns. The committees are made up of representatives from all the community organizations in the neighbourhood. They decide what work is to be done (e.g. choosing the number and location of standposts) and collect the revenue from water sold at the standposts.

The division of responsibilities between the water company and the water committees is shown in Figure 3.15 below. CAMEP maintains the pipe network and bulk supply of water up to the flowmeter just outside the shanty town, while the local water committee maintain the pipelines and stand posts inside their community area.

Water is purchased from CAMEP at $0.3 per cublic metre by the local committee and the monthly bill is based on the flowmeter readings. The users pay about $1 a cubic metre at the standposts. This difference in price enables the committees to pay the water sellers at the standposts, provide a small payment to committee members and finance the O&M of their local pipe network. The remaining profits (15-20 per cent) are invested in other public facilities such as drains and walkways.

1. Source: A summary case study based on Collignon (1998)

Box 3.4. Shared management of water services in Haiti (Part 2)[1]

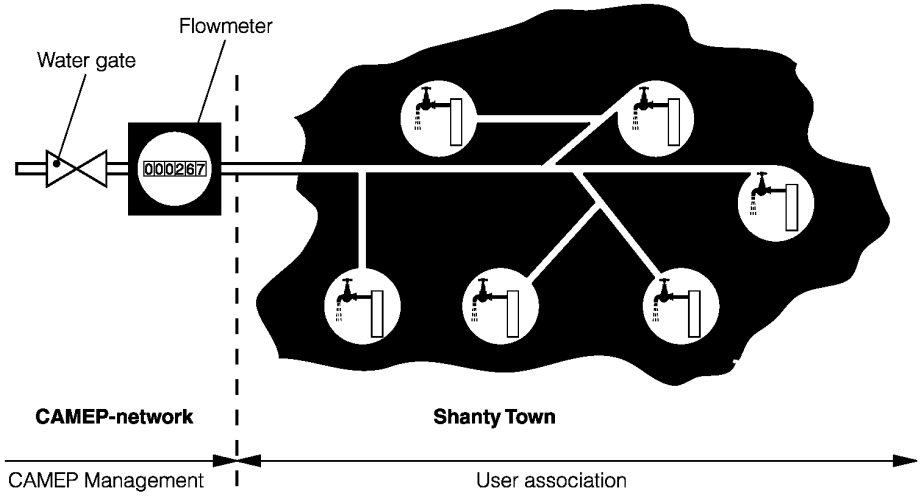

Figure 3.15. Water services in Port-Au-Prince shanty towns

Results

By 1998 20 kilometres of pipeline had been constructed, providing water to approximately 60 new standposts. No water bill presented by CAMEP has yet gone unpaid, which is a good indicator of the success of the programme and encourages the water company to serve more informal settlements using this management arrangement. The introduction of this new competition to these areas has had the effect of reducing the price previously charged by water vendors, who have come to accept the new system, and there have been no cases of sabotage.

The volume of water sold by CAMEP to the first eight water committees increased from zero in October 1995 to 15,000m3 per quarter in July 1998. This shows that the new system is meeting the demands of the users.

However, it is interesting to note that during the rainy season consumption declines as people opt for cheaper sources such as rainwater collected from rooftops.

The water committees have shown great maturity in dealing with conflicts within the communities and managing funds effectively. The successes that have been achieved in Haiti would suggest that it would be worth adapting the management arrangements described above to provide improved water services to informal settlements elsewhere in the world.

1. Source: A summary case study based on Collignon (1998)

Some of the key factors for a utility to consider when contemplating collaborating with community groups for the shared management of water or sanitation services are as follows:

- Are there community or user groups who are able and willing to take on the management of distinct service provision tasks?
- Do the groups have the necessary skills to undertake the identified tasks, or are there clear opportunities for them to develop their capacities to the required level?

- Consideration should be given to where the community groups have 'comparative advantage' over other management arrangements. For example, if a community group wants to manage O&M and/or cost recovery for water services in their own informal settlement, they have the advantage of understanding what is and is not acceptable in that community. In addition they are likely to be competitive in terms of labour costs in their own area, because they may want to improve services for themselves and neighbours and they do not have to incur travel costs.
- When negotiating with community groups it may be easier and more effective to use an intermediary or facilitator, perhaps from an NGO, who has good experience of working with such communities and has suitable communication skills.
- To minimize the cost of monitoring and evaluation of the work of community groups, it is best to keep matters simple wherever possible. This can be achieved by having easily measurable indicators for success and simple payment terms. For example, indicators of success may be the number of working water kiosks and connections, as well as the prices they charge compared to vendor prices. The payment terms for, say, a community group managing the water distribution system in their area, could be based on readings of the bulk flow meter on the water main that supplies their pipe network.

3.6 Processes for option development

Having considered the range of possible options, the outline process of developing new products or options is set out below in Figure 3.16. This process could particularly apply to new service or payment options, where there are novel aspects not tried in the region before. Even where there is a reasonable level of confidence that a new option or product is viable, it is worth testing or piloting it in a particular area to confirm its viability before scaling up to a broader use of the option/product.

The key factor which has not been discussed in relation to these various service options is price. Ultimately, customers, present or potential, make their choice according to the value they perceive they can obtain from the product or service, relative to its price. Figure 3.16 requires the planner to check whether the proposed service 'will have an attractive price and value.' To achieve the 'mutually beneficial exchange relationship', the goal of marketing, it is therefore necessary to sell the service at a price the customer is willing to pay but also at a price which covers the costs of the supplier. For all the options listed above it is possible to determine the specific direct costs of the variations relative to alternatives. However, the actual price of the water (or wastewater) service can only be determined having undertaken the strategic marketing or investment planning exercise described in Part III.

The iterative process therefore requires pilot programmes for low-income consumers that are priced as close as possible to the final price, but that final price cannot be known until the concepts are proven and some estimate can be made of the take-up of the idea throughout the city or service area. Marketing is relatively simple in concept, but in practice it is remarkably hard to balance all the necessary factors.

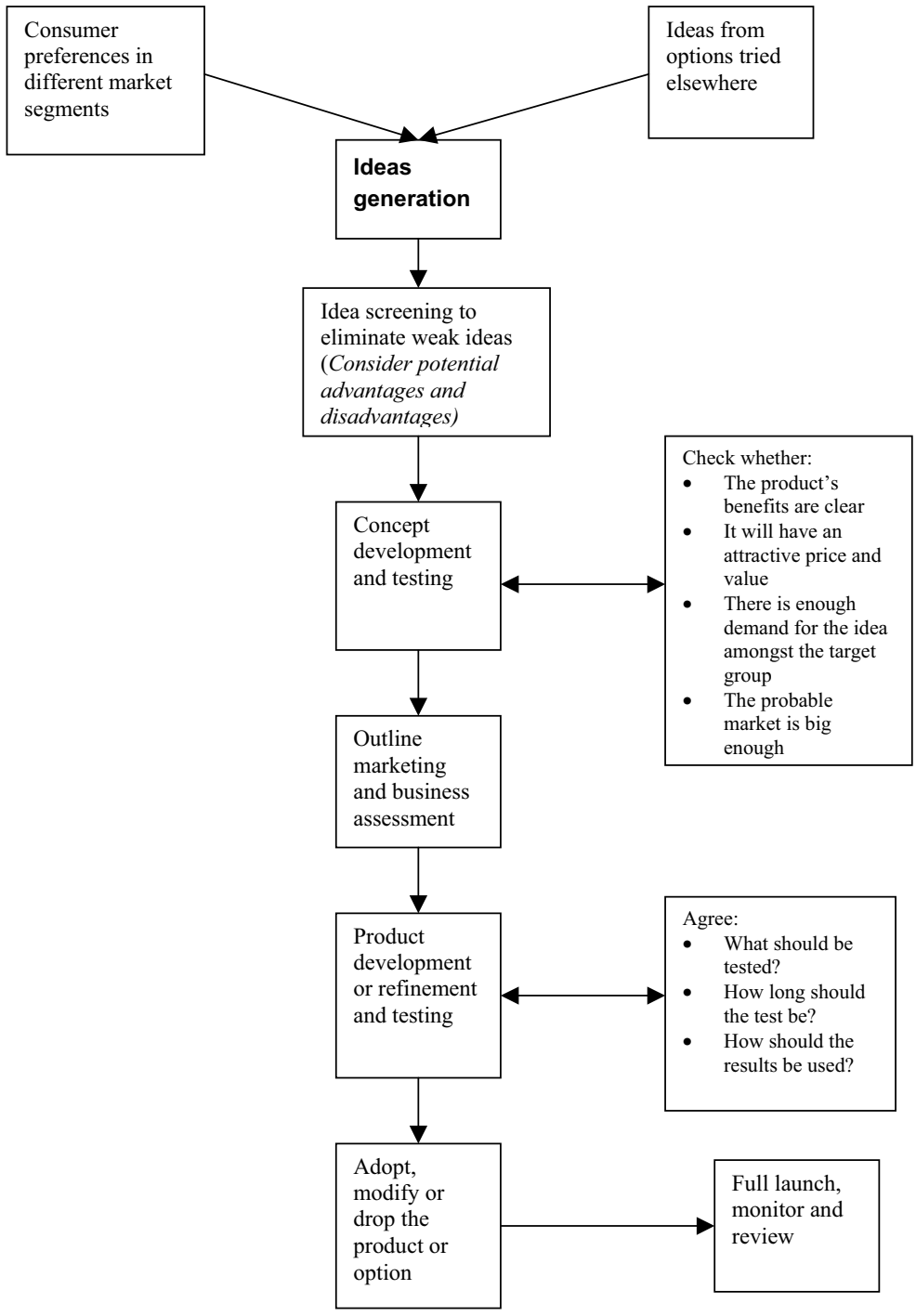

Figure 3.16. Outline process for developing new service/payment options[1]

1. Source: Adapted from Wilson and Gilligan (1997)

3.7 Demand assessment - the Contingent Valuation Method

A number of demand assessment methods were outlined in Chapter 2. The method that provides the most reliable data for the maximum WTP of consumers for particular service options is CVM.

Outline of CVM

Contingent valuation surveys principally entail carrying out house-to-house surveys using carefully designed forms and asking respondents a range of questions. Typically, the main topics on a CVM survey form are:

a) the consumers perceptions of their existing water supply system;

b) key socio-economic factors such as household expenditure; and

c) a hypothetical scenario for potential service options that are offered to the respondent at various prices to determine their WTP.

When undertaking (c) the potential service options are presented to respondents to determine what kind of water and sanitation services users want and are willing to pay for. The economic concept that CV surveys are trying to capture is the maximum amount that a respondent would be willing to pay for the proposed improvement in water services in the context of the existing institutional regime within which households are free to allocate their financial resources (Whittington, 1997). An example CVM questionnaire based on market research in Mombasa can be found in Annexe 1.

The most important part of the contingent valuation methodology is creating a realistic contingent valuation scenario, which has accurately priced water supply 'options' reflecting the levels of prices that the water service provider would be willing to charge in order to provide the service. The respondent is asked about their preferences and is effectively asked at what price they would be willing to 'buy' the water, based on the level, quantity and quality of service (Wedgwood and Sansom, 2003). A bidding game approach is usually used. This could entail the enumerator asking the respondent if they are prepared to pay the highest value of a range of prices for a particular service option, then going to the next lowest bid, until the respondent says they are willing to pay that particular price for that service level. Bidding can also start low and move higher until the respondent confirms that they are prepared to pay a stated price.

The CVM manager needs to ensure that the service options included in the CV survey are technically feasible without been prohibitively expensive to build and maintain. It is equally important when conducting CV surveys to keep the range of options offered to the respondent to a minimum (three to five service options are recommended). Otherwise the survey becomes very difficult to conduct, is complicated for the enumerator when in the field, and analysis of the results and development of realistic tariff models becomes too unwieldy.

Ideally the WTP survey questionnaire and the service options to be used in the survey should be developed after the analysis and dissemination of the consumer survey results. This should enable the development of more feasible options based on consumer preferences and perceptions in the different market segments.

A typical CVM process is shown in Figure 3.17 and Figure 3.18. The last two steps (10 and 11), which use CVM to develop tariffs and ensure that the results inform policy, are often neglected - but they are very important to maximize the benefits of the survey.

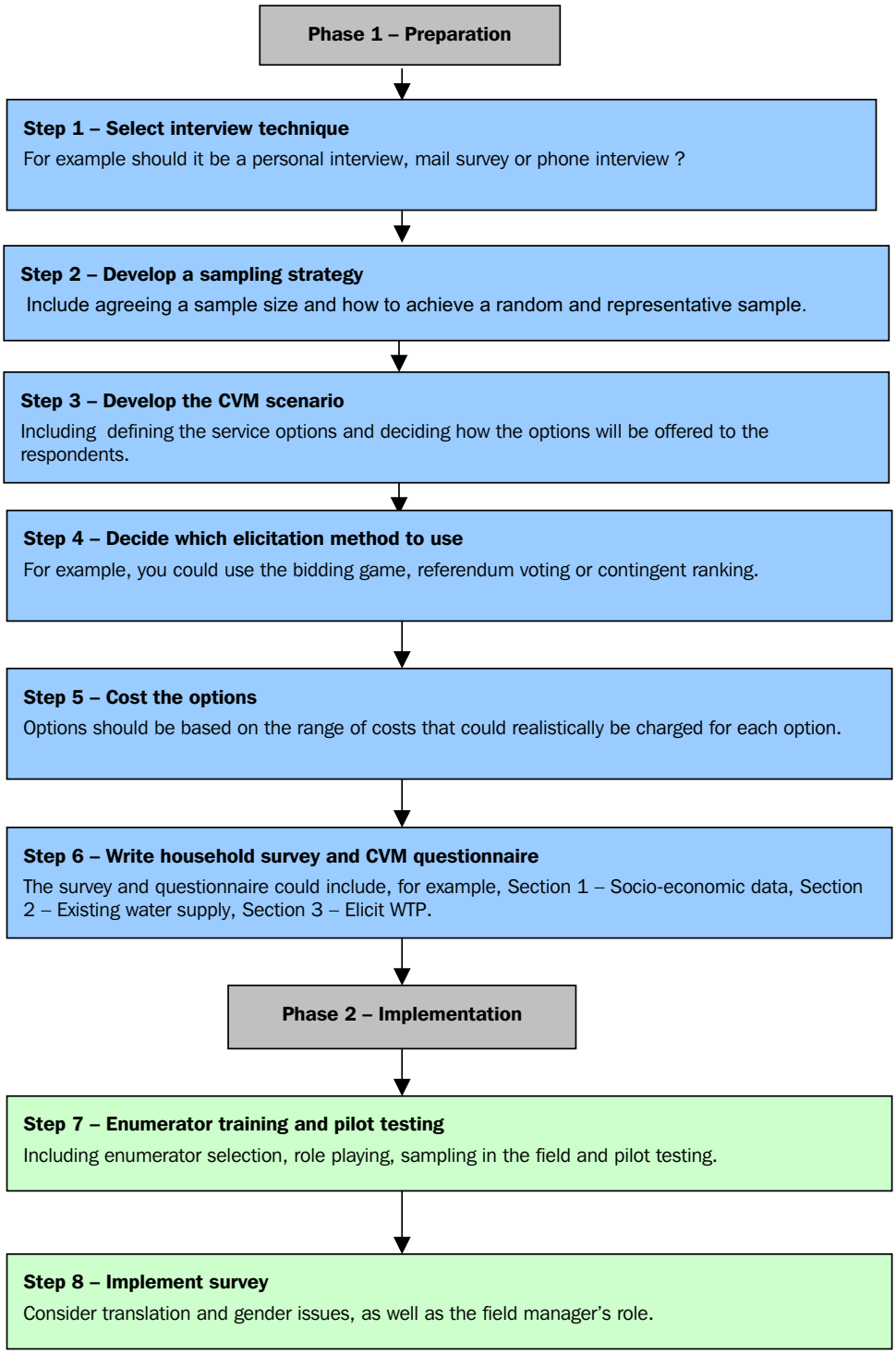

Figure 3.17. Typical contingent valuation process (Part A)

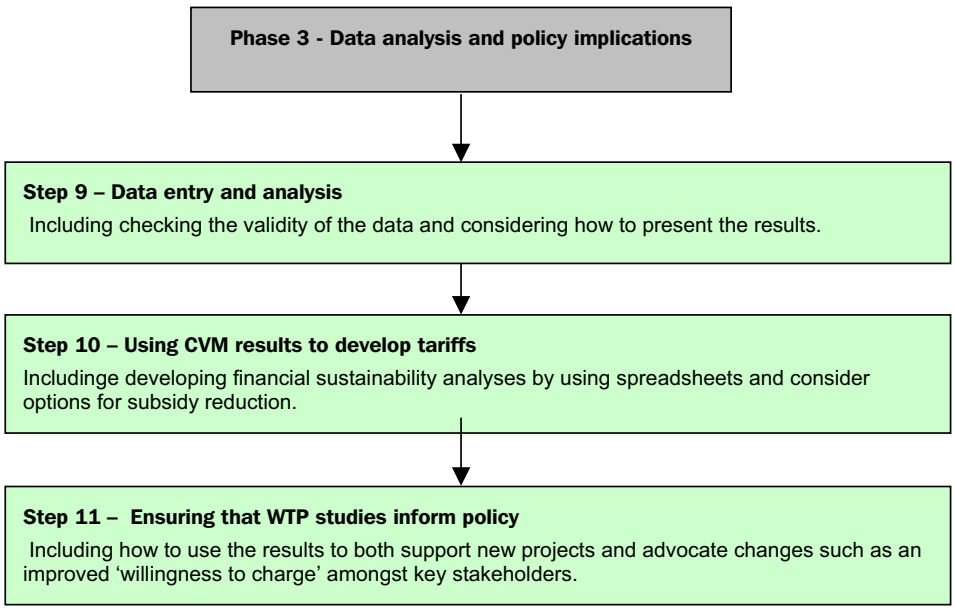

Figure 3.18. Typical contingent valuation process (Part B)

An example WTP survey questionnaire is included in Annexe 2, based on research in Mombasa that was conducted in 2001. The research in Mombassa split households into four market segments based on type of dwelling (bungalows, flats, 1, 2 or 3-roomed swahili houses and informal settlements). This was done so that disaggregated data can be presented for these four consumer groups to aid decision-making in how to improve services for each group.

The results of the willingness to pay studies are analysed to reveal the average amounts that users are willing to pay for improved water services. A simple frequency distribution curve of households' willingness to pay bids for improved water services, obtained from a contingent valuation survey, can be used to support management decision-making. Figure 3.19 shows such a frequency distribution curve of WTP results from the Mombasa survey.

It can be seen in Figure 3.19 that 6 per cent of respondents are willing to pay the first bid amount of KSh2500 per month. 74 per cent of respondents are willing to pay over KSh700 per month for this service. The weighted mean willingness to pay for this service level is KSh1124 per month. 54 per cent of respondents are willing to pay the weighted mean. These WTP values are considerably higher than the utility tariff levels that were charged at the time of the survey.

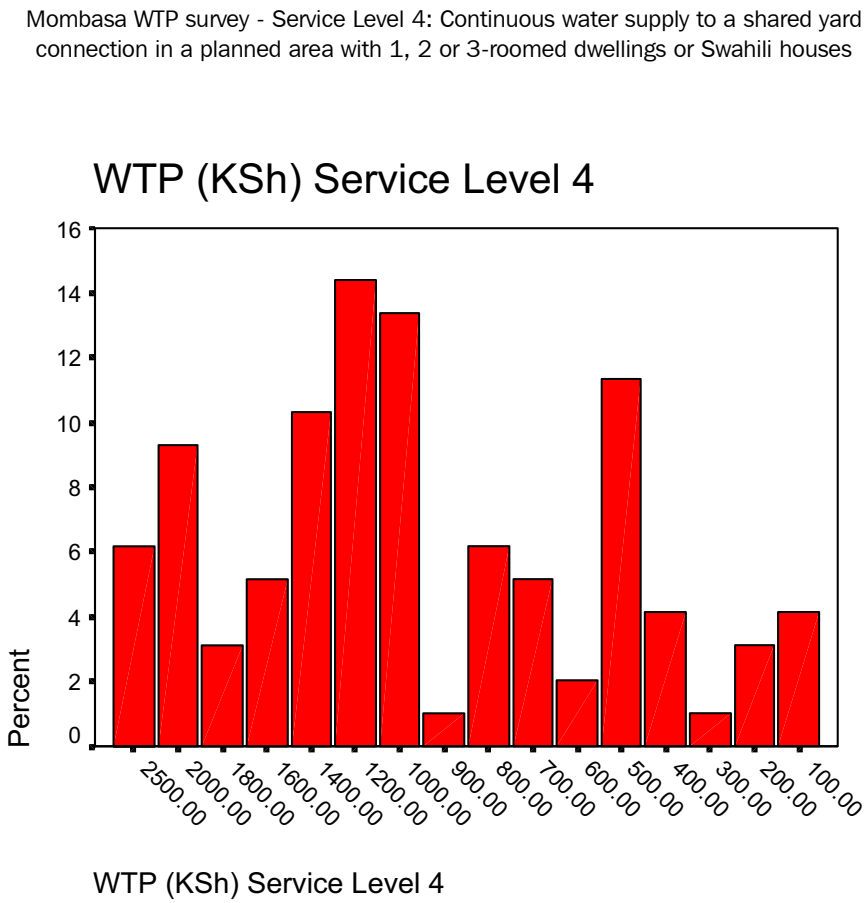

Figure 3.19. Mombasa example WTP survey results

Benefits and potential drawbacks of CVM

Other demand assessment techniques such as revealed preference techniques and PREPP provide useful information on understanding user experiences, perceptions and preferences for different options. Well-designed CVMs are also able to provide such information but, in addition, CVMs provide reliable data on people's maximum willingness to pay for different service options. This is invaluable for developing investment projections and guiding future water tariff policies.

Some critics may claim that respondents will not answer truthfully, and what they say they will pay does not reflect what they would actually pay. It is true that some respondents might bias their answers: selecting expensive options in the hope that the government would eventually pay for them if the customers cannot or will not. Various techniques have been developed to minimize biased responses. In particular, the way that the CV scenario is presented to the respondent, and how the willingness to pay question is asked, can be very specifically designed to reduce bias.

Assuming that the utility contracts specialist consultancies to write, manage, and analyse the CVM survey results then the utility manager's awareness of the limitation and advantages of CVM will assist in writing more focused terms of references to ensure that

the end report can be used to provide financially sustainable water services to low-income communities.

For more detailed information on conducting and managing a contingent valuation survey for the water sector refer to Wedgwood and Sansom (2003) WTP Surveys - A streamlined approach: Guidance notes for small town water services.

The question of how willingness to pay results can be used in a utility's investment planning process is discussed in Chapter 7 - 'Stage 2 - where we want to be', as part of strategic marketing, and is shown in Figure 7.1.

3.8 Selecting priority areas

As funds are invariably limited, utilities need to agree which areas are a priority for improved services. Market segmentation plans, utility performance data, as well as the results of consumer surveys and demand assessment surveys, provide an effective and impartial basis for selecting the priority areas, thus avoiding the potential criticism of favouritism during the selection process.

As many low-income consumers often live in informal or unplanned areas that typically experience inadequate services, these are often likely to be priority areas for improvement. Governments with clear poverty reduction strategies are likely to encourage utilities and other stakeholders to improve services in such areas.

Initially, when comprehensive city-wide data may not be available, a utility is likely to want to target certain low-income areas to pilot work based on limited information. This is a sensible strategy initially, because there is a need to 'learn by doing', but ultimately when planning for city-wide services this needs to be done based on more comprehensive survey information.