

Water, Sanitation and Poverty

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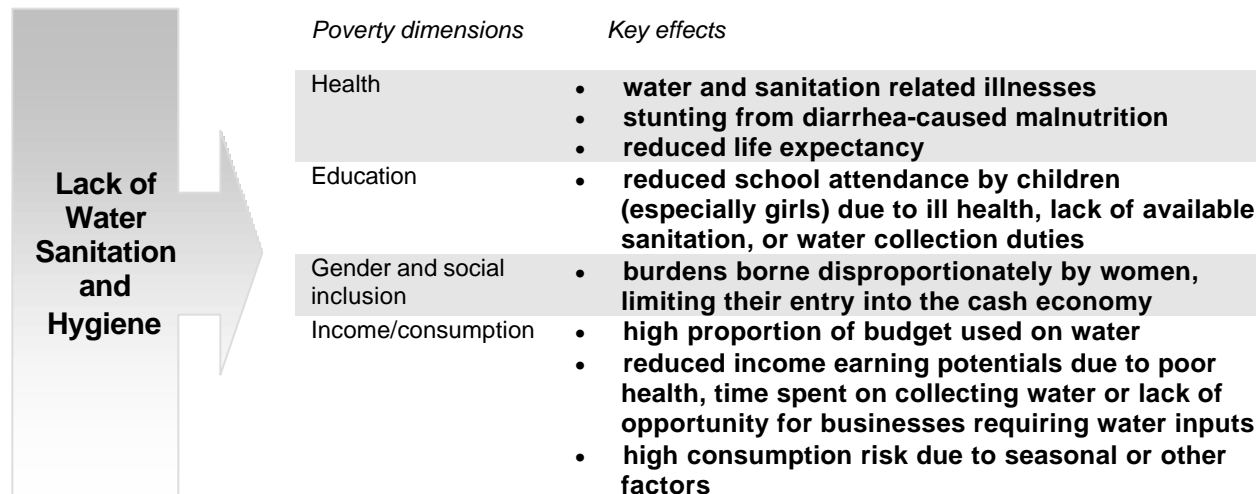
1. Introduction

1.1. Background

Approximately 1.3 billion people in the developing world lack access to adequate quantities of clean water, and nearly 3 billion people are without adequate means of disposing of their feces. An estimated 10,000 people die every day from water and sanitation related diseases, and thousands more suffer from a range of debilitating illnesses. *The impact of inadequate water and sanitation services falls primarily on the poor.* Badly served by the formal sector, the poor make their own, often inadequate, arrangements to meet basic survival needs. Many fetch water from long distances or end up paying high prices to water vendors for very small quantities of water.

The clear need for basic water and sanitation services for the poor assumes even greater significance when the linkages with other dimensions of poverty are considered. Water and sanitation related sicknesses put severe burdens on health services and keep children out of school. Human waste poses a tremendous social cost through pollution of rivers and groundwater. **Figure 1** below shows how lack of water and sanitation impacts poverty through these and other linkages.

Figure 1: Linkages between Poverty and Water and Sanitation



Despite significant investments made in the sector during recent decades by governments, non-governmental organizations, bilateral and multilateral agencies and the private sector, the outlook on access to safe and adequate supplies of water and environmentally sustainable sanitation remains grim. Coverage varies substantially by country, but well over a third of rural populations in most lower income countries lack access to safe water or sanitation. This is despite water being consistently identified as a basic need and a top priority by those who lack convenient or affordable access to it. National indicators on access to safe water and adequate sanitation are compiled by the United Nations and shown in **Technical Note 1**.

Lack of access arises both from income shortages and the specific cultural, economic, regulatory and institutional environment prevailing at the country in question. An urban household located in an informal settlement may not be connected to the piped water system because it does not have the property rights to the land it occupies, preventing the utility from building fixed assets on illegally inhabited land. Among the rural or urban poor, lack of a political voice may prevent their needs being heard by those who are in charge of allocating the funds earmarked for water supply and sanitation improvements. In other situations, it may be man-made pollution of water bodies and aquifers that limits easy and less costly access to safe water resources. The costs of treatment and the cost of technologies that extract water from deeper aquifers often cannot be afforded by the poor without major consumption sacrifices. Although both poorer and higher income segments of the population may face the same polluted resources or inadequate services, higher income households can afford private solutions to these problems -- solutions too expensive for the poor population.

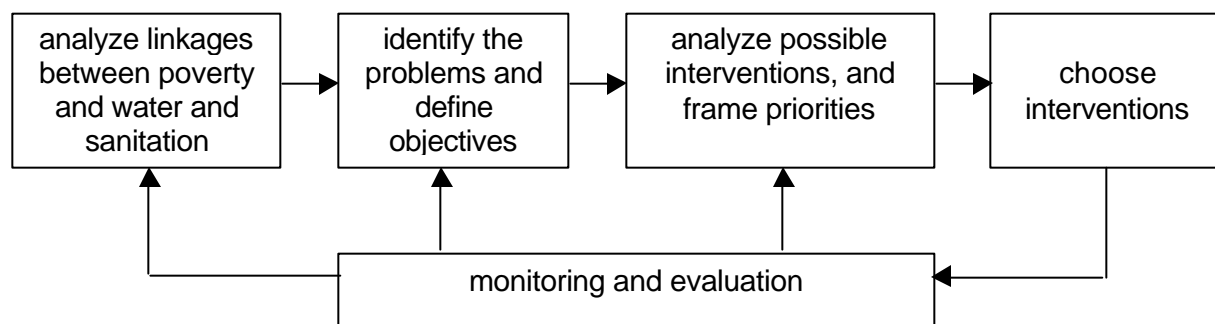
1.2. Approach

The objective of this chapter is to assist policy makers and sector departments in their design of water and sanitation strategies that actively address the needs of the poor.

The approach is to

- provide guidance on analysis of the linkages between poverty, water and sanitation (section 2);
- assist in identifying problem areas that require intervention and in defining objectives (section 3);
- provide a menu of possible public interventions, and a framework that assists in their prioritization (section 4);
- assist in defining a monitoring and evaluation framework that allows re-evaluation of the linkages, appraisal of poverty outcomes, and assessment of whether the chosen intervention has been effective (section 5).

Figure 2: Approach for Sector Strategy



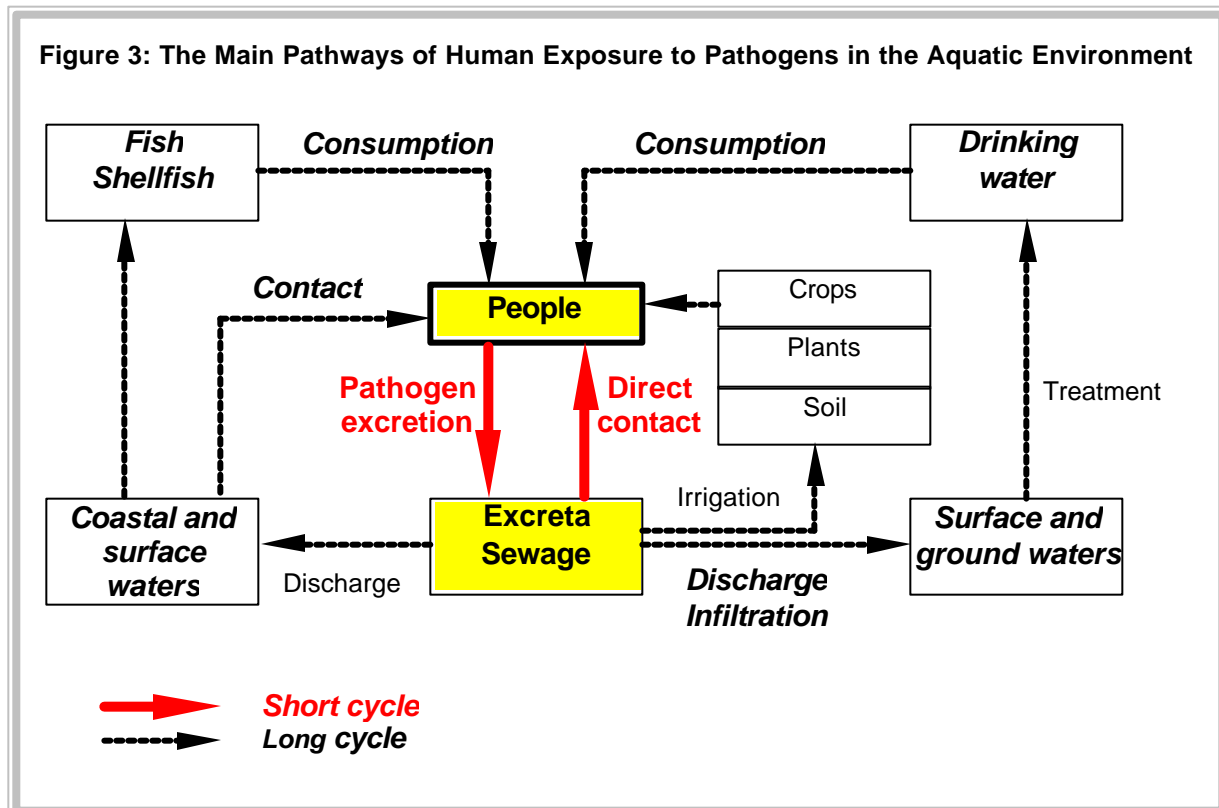
2. Poverty, Water and Sanitation – Understanding the Links

Inadequate water and sanitation services to the poor increase their living costs, lower their income earning potential, damage their well-being and make life riskier. The continuing, nearly universal, deterioration of the surface and underground water sources on which people survive means that water and sanitation pressures will simply become worse in the future.

This section seeks to improve understanding of the impact of the lack of water and sanitation on different poverty dimensions. Once the impacts are known and their relevance assessed in a given community or country, priorities for intervention can be decided.

2.1. Health Effects

The classical mechanisms of transmission of waterborne diseases are poor personal hygiene, described as the “short cycle” (excreta -> hand -> mouth), and environmental pollution, described as the “long cycle”. **Figure 3** below highlights these cycles. Typically, physical investments in community sanitation most effectively break the long cycle. Breaking the short cycle requires changes in personal behaviors and practices, a more difficult challenge.

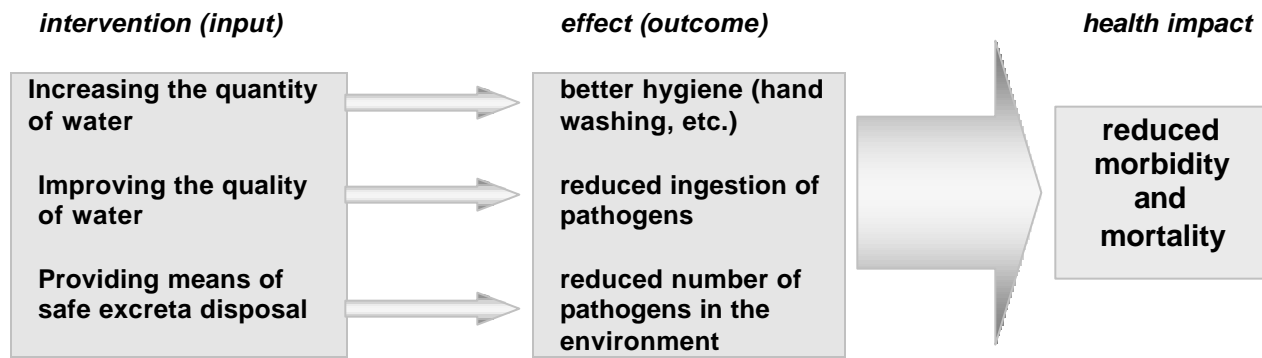


Diarrhea accounts for nearly 30 percent of the burden of childhood communicable disease, with an estimated 2.2 million child deaths annually and a much larger number of children (and adults) suffering illness. Repeated bouts of diarrhea contribute to malnutrition. Water and sanitation – and hygiene – are intimately related to diarrheal diseases. The interactions are complex, but adequate quantities of water, even low quality water, are necessary if people are to adopt the hygiene habits needed to break the disease transmission pathway.

Just as everyone needs water daily, everyone, rich and poor, defecates and urinates daily. But where that takes place has a significant impact on family health. Households with private toilets have measurably lower morbidity rates than households without. Private toilets benefit not only the household but also neighbors who gain protection from the household's feces. The poor and their neighbors often lack private toilets, forcing defecation in public spaces, and leaving them more vulnerable to communicable diseases than the non-poor.

Figure 4, below, illustrates the key channels through which physical improvements of water and sanitation services influence health outcomes. The provision of hygiene education, in addition to the physical interventions, helps ensure that feces are safely disposed of, hand washing is done properly, and water is stored safely.

Figure 4: Effects of Water and Sanitation Interventions on Health



Additionally, inadequate water and sanitation infrastructure slows other health improvements. With regard to sanitation, women often have different privacy requirements from men. When the absence of latrines forces them to use public spaces, they can do so only in the shelter of darkness, during early morning and late evening hours. One response is urine retention, which leads to health problems. From the community perspective, the adequacy of drainage plays a large role in health outcomes. Where drains don't exist, or are blocked, and wastewater stands in the streets, children are particularly vulnerable to disease transmission through direct contact. The standing water may also serve to host other disease vectors, such as mosquitoes transmitting malaria and other diseases. Further discussion on the impact of infrastructure on health outcomes are discussed in the chapter on **Health, Nutrition and Population**.

2.2. Effects on Education

In some cultures the lack of toilets in schools serving the poor is known to be a major factor in deterring girls from continuing their education, particularly after puberty. In these cultures, private toilets (if only latrines) and even the availability of drinking water provide a necessary condition to reach school enrollment goals, as is highlighted in **Box 1** below.

Box 1: Girls, Sanitation and Education

Reasons for low female school enrollment and attendance related specifically to the water supply and sanitation sector are: inappropriate school sanitation or total lack of toilets or latrines; lack of water; and lack of privacy. The following examples illustrate this point:

- In Bangladesh many schools do not have any latrines, although it is recognized that latrines are important, not only for health protection, but also for the school attendance of girls.
- In Rohtas district of Bihar State in India, only 59 percent of schools have drinking water facilities and 11 percent have toilets. A study undertaken in this district suggests that to enhance the enrollment of girls, it is necessary that the parents and the girls themselves are motivated. Key motivating factors include providing mid-day meals, free teaching learning materials and aids, and constructing drinking water and toilet facilities.

Adapted from: IRC International Water and Sanitation Center (1997), Gender in Education and Training for Water Supply and Sanitation: A Literature Review, unpublished

On another dimension, children – particularly girls – are often required to help their mothers with the time consuming task of fetching water, as illustrated by the story of Elma Kassa from Ethiopia in **Box 2**, below. Fetching water has been found in many countries to reduce children's time for schooling or playing.

Box 2: The Lifestyle of a Young Girl in Ethiopia

Elma Kassa is a thirteen-year-old girl from Addis Ababa, Ethiopia. Her father is a laborer and her mother is a washerwoman. She has one younger sister and a brother.

'I go to collect water four times a day, in a 20-litre clay jar. It's hard work! When I first started collecting water I was about seven years old. In those days we used to have to walk for over a mile to fetch water. Now there is a tapstand about 10 minutes away from my home, which has made life easier. I've never been to school as I have to help my mother with her washing work so we can earn enough money. [...] Our house doesn't have a bathroom. I wash myself in the kitchen once a week, on Sunday. At the same time I change my clothes and wash the dirty ones. When I need the toilet I have to go down to the river in the gully behind my house. I usually go with my friends as we're only supposed to go after dark when people can't see us. In the daytime I use a tin inside the house and empty it out later. If I could alter my life, I would really like to go to school and have more clothes.'

DFID (1998), Guidance Manual on Water and Sanitation Programmes, DFID, London

Further details on the effects of education on poverty outcomes are discussed in the chapter on **Education**.

2.3. Gender and Social Inclusion Effects

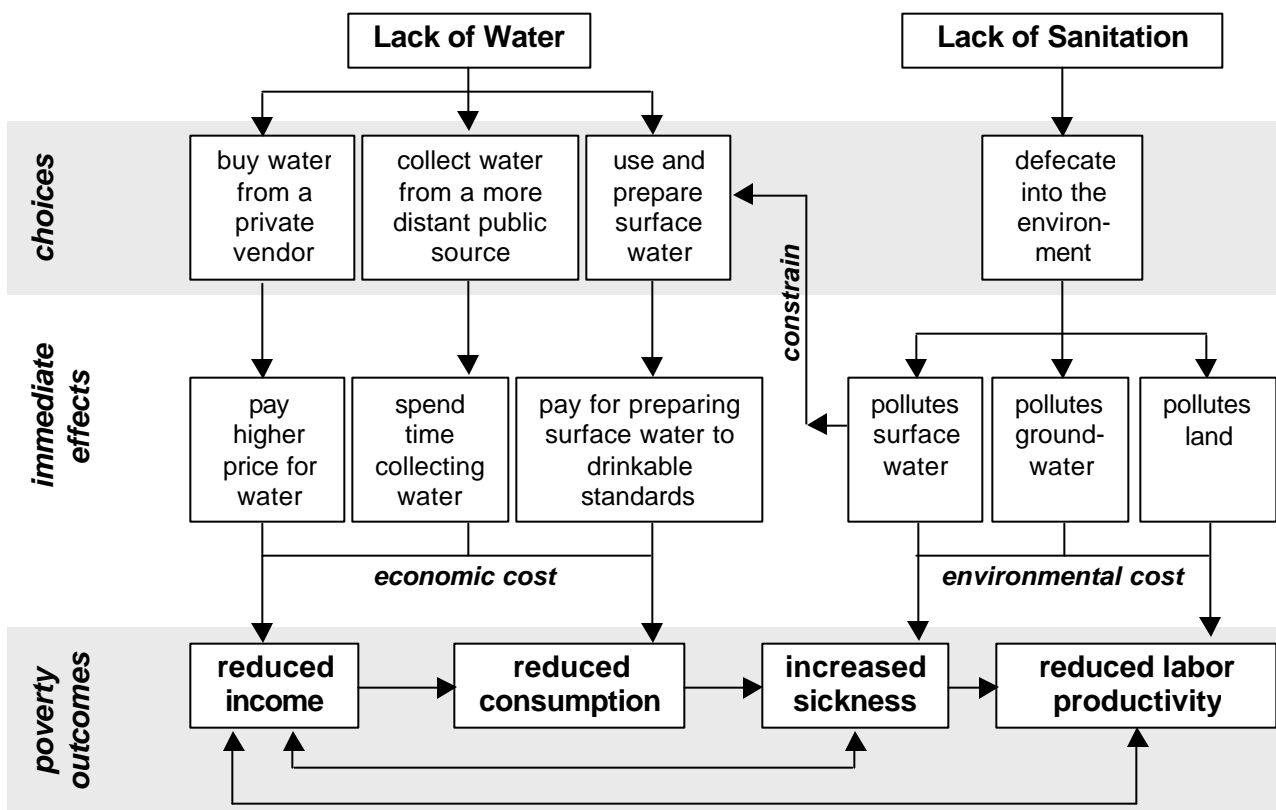
Groups such as female-headed households, the elderly and ethnic minorities are disproportionately poor, and among the poor they tend to be most adversely hit by a lack of water and sanitation services. The voices of these most vulnerable poor groups may be the last heard when such services are established. Even when they are the primary managers of household water, women are often not included in public decision-making processes concerning water and sanitation services. Geographically dispersed poor groups (often ethnic minorities) may be excluded in the process of setting up community water and sanitation services. Situations in which marginalized groups are excluded from wider community decision-making activities will lead to continued use of unsafe water as well as limited access to existing or future services by these same groups.

Furthermore, a lack of adequate sanitation will endanger girls and women in those cultures where they have to wait until the evening to be able to defecate and urinate. The health consequences have already been mentioned, but security issues also arise as women and girls are more vulnerable to violence, sexual harassment and other types of crime during the hours of darkness.

2.4. Effects on Income and Consumption

The lack of water and sanitation infrastructure has complex effects on consumption patterns, which significantly influence people's overall well-being. These effects are unbundled in **Figure 5** and discussed in more detail in the subsequent paragraphs.

Figure 5: Consumption and Income Effects



The economic cost of water: Traditional poverty measures focus on income, but the rural and urban poor may not only have lower incomes, they probably face higher costs for water than the better off. The lack of network water connections for the urban poor, or of any water service for the rural poor, typically leaves them buying from water vendors at high per liter prices (see **Box 3**, below); or waiting in long queues at, or walking long distances to, public sources; and incurring additional costs for storing and boiling water.

Box 3: How Much do the Poor in Urban Areas Pay for Water

The problem of lack of water services hits the poor in the slum areas of the large cities in developing countries. Often the only choice for low-income households that can not afford a house connection is to buy water from private vendors at a relatively high price, sometimes 100 times more than that provided by public authorities. Examples are shown in the following table:

Ratio Between Prices Charged by Vendors and by Public Utilities

Country	City	Ratio
Bangladesh	Dacca	12-25
Colombia	Cali	10
Ecuador	Guayaquil	20
Haiti	Port-au-Prince	17-100
Honduras	Tegucigalpa	16-34
Indonesia	DKI Jakarta	4-60
	Surabaya	20-60
Ivory Cost	Abidjan	5
Kenya	Nairobi	7-11
Mauritania	Nouakchott	100
Nigeria	Lagos	4-10
	Onitsha	6-38
Pakistan	Karachi	28-83
Peru	Lima	17
Togo	Lome	7-10
Turkey	Istanbul	10
Uganda	Kampala	4-9

Bathia, R. and M. Falkenmark (1993), Water Resource Policies and the Urban Poor: Innovative Approaches and Policy Imperatives, Water & Sanitation Currents, UNDP-World Bank Water & Sanitation Program

The lack of convenient and affordable access to water reduces a poor household's consumption of other commodities and services, leaves it consuming less than the optimum amount of water for good hygiene, and impacts health and labor productivity of the household members. It may also reduce income-generating opportunities of the household, thereby further reducing income and consumption.

WHO has established a norm of 20 liters per capita per day (lcd) for water use to satisfy basic personal and hygiene requirements. Of that amount, about 10 lcd serve drinking and cooking needs, while the remainder goes to bathing – particularly hand washing. When water is expensive, either in cash terms or in the time and energy needed to collect it, the poor often cut total consumption to 15 lcd or less, and cut back on bathing.

Box 4: Degradation of Water Quality and Implications for the Cost of Water in Indonesia

In addition to causing environmental damage, water pollution and excessive pumping have impacts on the cost of water. To improve water quality, amounts of (often costly) chemicals must be increased. For example, to treat the increasingly polluted raw water entering the Pulogadung water treatment plant in Jakarta, chlorine was increased from an average of 2.6 mg/l in 1982 to about 7 mg/l in 1984. This increase raised treatment costs by Rp 610 million per year (1985 prices) and decreased plant efficiency by 18 percent (Rp 870 million per year). The 'finished' drinking water frequently was off-color and exceeded limits for concentration of ammonium, organic matter, and fecal coliform. Another negative long-term effect of high chlorine use is production of chloroform and other carcinogenic residues.

Another large cost of the bacteriological contamination of raw water is the cost of boiling water to make it potable. The high levels of pollution and the poorly operated treatment and distribution facilities make the public water supply undrinkable unless boiled before use. For the Jakarta special capital province area, this cost has been estimated at Rp 96 billion (1987 prices) or US \$52 million per year, equivalent to 1.1 percent of the GDP then generated in Jakarta. A survey conducted in Jakarta showed that a household boils about 4.4 liters of water per capita per day, whatever the water source. Boiling water for between 15 and 20 minutes cost about Rp 7.5 per liter.

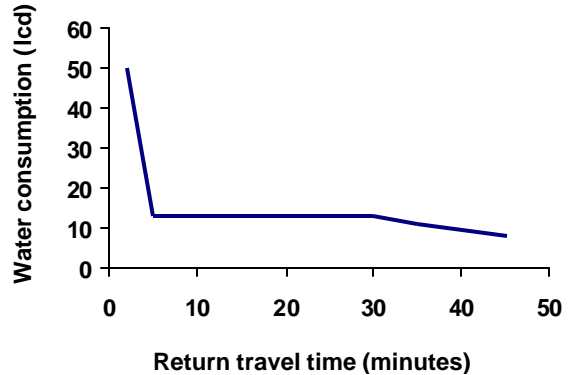
Bathia, R. and M. Falkenmark (1993), Water Resource Policies and the Urban Poor: Innovative Approaches and Policy Imperatives, Water & Sanitation Currents, UNDP-WB WSP

A number of studies have shown that the volume of water collected varies little for water sources from about 30 to 1,000 meters from the house. For sources closer than 30 meters, use increases, and over 1,000 meters, falls. This experience is illustrated in **Figure 6**, in terms of minutes required for a return trip to the water source. Distance matters, but so does queuing time. If users can walk 10 meters to a standpost, but then must queue an hour before use, they will collect no more water than someone travelling 200 meters to a standpost that has no queuing.

The environmental cost: Threats to water sustainability arise in both quality and quantity dimensions, driven by pollution and competing demands from many sectors, including industry, agriculture and energy. Environmental degradation reduces labor productivity by contributing to the increased burden of diseases and by limiting income potentials (especially in aquaculture).

Nationally, dwindling availability of clean water per capita will increase the economic cost of water and, in a situation of scarcity, limit the potential for economic development. Locally, communities that fail to protect their surface and ground waters from pathogens have fewer options for drinking water and require more expensive technologies for extracting water from

Figure 6: Water Consumption vs. Travel Time



DFID (1998), Guidance Manual on Water and Sanitation Programmes, DFID, London

deeper aquifers or for treating surface water to drinkable levels. In the urban context, where water may be supplied from a utility, increasing costs of extraction or treatment are passed on to consumers in terms of higher prices, an impact illustrated in **Box 4**. The poor have fewer resources, hence they disproportionately suffer the consequences (seek further details in the chapter on **Environment and Poverty**).

Water, sanitation, and risk: Inadequate water and sanitation services can bring with them a particular risk in each of the dimensions already described. And, water availability and quality may both be highly seasonal. During the dry season, the urban poor face higher water prices, while the rural poor face longer treks for lower quality water. Also, sewage return flows to water bodies, bearing pollutants of various types, make up a bigger proportion of total flows, reducing water quality and making effective treatment more difficult. The risk is faced in household consumption and in the use of water in economic activity such as agriculture. The poor are particularly unequipped to cope with this risk, since coping requires expensive storage or additional treatment. During the wet season, inadequate drainage and other sanitation infrastructure becomes problematic, as overflowing polluted water may stand in the streets for long periods.

3. Assessing the Problem and Defining Targets

The previous section highlighted impacts of inadequate water and sanitation on poverty outcomes. This section provides ideas on how to move from those general concerns to identification of specific poverty-related water and sanitation problems, and how to use that information to decide on sector strategy goals.

The section proposes a sequential approach to determining the sector strategy goals. It advocates beginning by taking stock of current government water and sanitation sector policies to determine whether they are designed to respond to the needs of the poor. That review would be followed by a re-examination of national experience with the links between poverty and water and sanitation services, asking whether the lack of adequate service causes disproportionate problems in areas such as health and education, or are impacts balanced across the dimensions of poverty. Next, information on the poor themselves and their perceptions of water and sanitation needs should be examined. Efforts to meet those needs are likely to face a number of constraints -- some social, others political -- which are then discussed. Finally, with this background, the section ends with an approach to incorporating the information to develop a sector strategy better targeted to serving the needs of the poor.

3.1. Taking Stock of Government Policies

Repeated national and international campaigns for improved water and sanitation have left most countries with clearly stated policy goals for coverage or service levels. The challenge in a poverty reduction strategy is to re-examine those goals for their impact on the poor and to reorient them as necessary. For instance, one goal might be universal availability of house connections. While arguably a desirable objective, it might encourage use of public money to increase urban connections at the expense of closing a much larger rural gap in safe water supply. A campaign to increase high quality latrine construction through matching grants to households would likely focus sanitation support on the non-poor. Clearly, the starting point for re-examining government policy objectives will be the existing government strategy and budget allocations for the sector.

Some key questions that could guide the review of the existing policy objectives are:

- ✓ What is the government commitment to formulate pro-poor policies in this sector?
- ✓ What are actual government priorities within the sector: extending access to those who do not have services, improving current service delivery to customers, or a combination of both? Who is the target group under each option?
- ✓ Are there any on-going government reform efforts that might affect service delivery, such as government decentralization or market liberalization?

3.2. Identifying Priority Areas – Spatially and Thematically

The proposed approach to identifying priorities is to map the income poor and the water and sanitation poor, looking for overlaps that promise high-return interventions. Restricting the focus

of public interventions to deprived rural regions, or to slums and informal urban settlements, may enhance the poverty targeting of a water or sanitation investment. However, such overlaps are likely only partial and policy makers need to assess where the health, education, and other linkages discussed in section 2 are important. Evaluating the importance of the linkages in tandem with the location of the poor will help guide intervention to actions that have the highest impact.

3.2.1. Identifying the income poor and the water and sanitation poor

National poverty statistics will provide information on the location and profile of the poor, and will almost always contain information on household variables such as access to water and sanitation services, and education, health, income and expenditures. Where such poverty statistics do not exist or are considered to be unreliable, other data sources could be consulted. Guidelines for using poverty data and their different sources are outlined in the chapter on **Poverty Data and Measurement**.

The following questions are important in the water and sanitation context :

- ✓ Where do the poor live and work?
- ✓ What percent of households consume less water than the national or WHO recommended minimum standards? What is their income and location?
- ✓ Which households have members suffering from a high incidence of diarrhea?
- ✓ How do poor households spend their income? What are their expenditures on water, hygiene, education and health (absolute and relative to income)?
- ✓ What percent of households have access to and use a latrine?

A profile of unserved households based on available poverty statistics will inform the water and sanitation authorities about the magnitude of the problem and – where poverty and the lack of water and sanitation access is spatially concentrated – about the geographical areas for priority interventions.

Where reliable and spatially disaggregated poverty statistics don't exist, an alternative approach would be to review existing water and sanitation use and service delivery in terms of quantity, quality and continuity. This could be done by consulting existing reports and statistics that may have been prepared by government, non-government or donor agencies, and assessing whether they contain recent information on coverage, use and performance. More expensive alternatives include gathering the data through rapid rural or urban appraisals, focus groups or traditional surveys. Ideally, these would be carried out as a part of a more comprehensive statistical capacity building effort (see chapter on **Building Statistical Capacity for Poverty Reduction**).

Relevant spatially disaggregated administrative and budget data on water and sanitation use and performance could include:

- existing water supplies (mains, standpipes, wells, water vendors, illegal connections, etc.)
- users by gender, ethnicity, and other social categories detailing income and water and sanitation sources
- consumption and price by supply method
- uses and quality of each supply method (water quality, reliability throughout the year, etc.)
- distance to and number of users of the supply point
- type of service delivery: the providers (formal and informal)
- existing on-site sanitation or sewer systems (ordinary pit latrines, VIP latrines, bucket sanitation systems, septic tanks, intermediate or pour flush sanitation with sewer, etc.)
- users and non-users by type of system
- cost of each system, and the needs for operation and maintenance

Since there are often competing demands for fresh water resources, consumption by other users such as agriculture and industry should be included, if possible, in this initial assessment.

3.2.2. Assessing the Importance of the Links

Understanding the links between poverty and water and sanitation access may be intuitively simple. To assess the strength of these links in a particular location is difficult. Evidence of cause (lack of water and sanitation) and effect (poverty) is limited by (a) lack of reliable data; and (b) confounding variables influencing poverty which are difficult to control for. Special concerns related to various effects are described below.

Effects on Health. Assessing the impact of water, sanitation and hygiene on health is methodologically difficult, since a wide variety of factors influence the state of health. In addition, the relatively long time required to establish scientific proof of health benefits often renders epidemiological surveys a far larger task than can reasonably be attempted when developing a sector strategy. **Technical Note 2** provides further background on this topic and suggests different approaches that could be considered for measuring health impacts.

Posing the question on health impacts from a different angle – does the lack of water and sanitation infrastructure inhibit health improvements – may be a better start. The link to health improvements is often seen through the adoption of hygienic behavior, which is enabled through the provision of adequate services (**Box 5**).

Box 5: Minimum Evaluation Procedure

Health improvements are only the culmination of a long causal chain. It runs from the original construction of the water supplies or sanitation facilities through their operation and use, permitting changes in hygienic behavior and thus the prevention of disease transmission. The principle of the WHO Minimum Evaluation Procedure is to examine the intermediate links in the chain – functioning and use. Hygienic behavior is another such link.

From: Well (1999), Measuring the Health Impact of Water and Sanitation, Technical Brief 10

The joint monitoring of the indicators (ideally disaggregated by location) shown in **Table 1**, below, allows a ready assessment of where linkages are weak or strong, and where interventions are most needed. For example, if water availability has increased rapidly, but child health indicators remain static, hygiene behavior has probably become the critical intervention. Similarly, programs to boost indicators in column (2) will likely fail without increases in water

volumes signaled by column (1) indicators. Of course, other inputs, such as education, can improve column (3) outputs without any changes in columns (1) or (2), and the strategic challenge will be to confirm linkages. For this purpose, the set of indicators should be over as long a period and as great a level of geographical disaggregation as possible.

Table 1: Indicators for Studying Possible Infrastructure and Health Linkages

<i>Indicators that assess the Level of Water and Sanitation Infrastructure</i> (1)	<i>Indicators that assess the Use of the Infrastructure and Hygiene Behavior</i> (2)	<i>Indicators that assess the Health Situation (reported by households/clinics)</i> (3)
<ul style="list-style-type: none"> • % of HH with water supply connections • % of HH with access to public water delivery point within 30 meters of residence • average distance to delivery point from HH • number of people per public water delivery point • % of population consuming less than 20 liters per capita per day • % of HH connected to piped sewer system • % of HH with access to functioning sanitation system within 10 meters of residence 	<ul style="list-style-type: none"> • household water consumption • household expenditure on soap • household expenditure on detergents • hand washing after defecation • hand washing before food preparation, eating, and child care • absence of fecal material on latrine surfaces 	<p>Child Health</p> <ul style="list-style-type: none"> • infant mortality rate • childhood mortality rate • prevalence of malnutrition <p>Incidence and prevalence of main diseases</p> <ul style="list-style-type: none"> • diarrhea • dysentery • hepatitis A

Effects on Education. The link between the lack of water and sanitation and children's enrollment in schools -- either due to the absence of water and latrines in schools, or due to the time children are required to spend on collecting water -- will be specific to country and cultural circumstances.

As with health, the strength of the link cannot be easily assessed. One approach to the analysis would be to use school enrollment data (particularly of girls). Where a high incidence of drop-out coincides with the lack of availability of water and sanitation infrastructure at the school level, further inquiries as to the reasons for the drop-out may be warranted. Similarly, where the burden of collecting water falls on the children or female members of the household, a negative correlation between school enrollment and distance to water sources would be an indication that such a link exists. However, this must be confirmed through sample surveys in the affected communities. In many countries, education authorities will have conducted, or know of, studies on enrollment rates that may already investigate these linkages. If studies have not been done, experience proves that the most efficient starting point is simply asking children and parents why they make the choices they do.

Where such links are important, educational objectives may not be met. The impacts of a lack of education on poverty are highlighted in the chapter on **Education**.

Effects on Gender and Social Inclusion. Assessing how poor women and social groups are affected by a lack of water and sanitation services can be done in a variety of ways. Techniques include carrying out a gender analysis, or using a variety of participatory evaluation methods that will enable the poor people concerned to voice the problems they experience with regards to limited access to, or a lack of, water and sanitation services.

Effects on Income and Consumption. Whether in rural or urban areas, if poor people do not enjoy access to efficient water services, they will face higher unit water costs that reduce consumption.

The importance of this linkage may be assessed through existing household consumption studies. Such studies typically include questions on household connections to networked water, allowing a quick service profile in both urban and rural areas. To assess cost impacts on households without network supply, careful inquiry must be made of patterns of water consumption and the costs of the various alternatives used (households often rely on more than one source). The household survey cost information can be matched with direct surveys of suppliers to double check costs and coverage. Water supply conditions often vary significantly among cities and rural areas within a country, so care must be taken in extrapolating results of small samples.

Care must also be taken when assessing income effects. For example, if a water and sanitation investment frees women's time from water gathering or treatment, that would not by itself fully liberate a woman's income earning potential if more general social disapproval of female labor mobility overlay the water and sanitation situation.

Tracking urban water prices and quality across seasons will reveal whether seasonal water scarcity or quality risks are an urban problem. That said, conditions can be radically different from year to year. For rural areas, water impact assessments must be made during all seasons to properly capture risks. Again, results can vary substantially from year to year.

3.3. Understanding the Situation of the Poor

The foregoing analysis provides insights on the strength of the linkages between water and sanitation and poverty. This section seeks to provide guidance on assessing the needs and demands of the poor in specific locations and on understanding the constraints they face in accessing water and sanitation services.

3.3.1 Assessing the Needs and Demands of the Poor

There are various approaches to assessing the demands of the poor, ranging from revealed preference surveys to participatory rapid appraisals. All of them have pros and cons in terms of expected benefits and their suitability for different purposes, as detailed in **Technical Note 3**. Whatever the approach taken, the objective is to understand people's preferences, the levels of service users are willing to pay for, and what financing and delivery mechanisms might ensure that the poor have affordable access.

Water and sanitation interventions never take place in a vacuum. Even the poorest communities may have individuals or small groups selling water and sanitation services. A failure to properly consult the poor on their preferences and current practices may lead to interventions that are simply not used or have a negative economic return because they displace existing water and sanitation services or facilities without offering significant quality or other service improvements.

Principles to be observed when conducting needs and demand assessments include ensuring that:

- the voices of the poor and underprivileged are heard and included in decision-making
- the preferences for services expressed by different groups and the contribution they are willing and able to make are clearly understood
- gender and cultural differences in the needs of different groups are recognized
- the existing networks, power structures and institutions are taken into consideration

While recognition of the needs or demands felt or expressed by the poor is important, they may not be the sole determinant guiding interventions. For example, because it is a public good, sanitation may not get the attention it would deserve, and the lack of expressed demand is not a signal for doing nothing. It may rather point to creating demand for sanitation through hygiene education and increased awareness of its benefits.

3.3.2. Understanding the Constraints

Demand assessments will provide some information on the constraints the poor perceive in accessing services. Some inhibiting factors may, however, not be known to the household, and may therefore not surface in household interviews. A constraint analysis would therefore consider both the obstacles recognized by the poor, as well as other limiting factors that may indirectly influence household access.

In a general sense, people have inadequate water and sanitation because they are poor and lack the income to purchase the services they want. However, as discussed in section 2, the poor often pay more for their access than do the better-off households, both in absolute terms and relative to their income. Poverty alleviation programs seek to improve the income of the poor and thus their purchasing power. Pro-poor water and sanitation programs seek to improve access to services through policies or investments that reduce costs.

At the center of understanding the constraints is a good knowledge of the institutional, political and regulatory framework that governs decisions by, and incentives of, the key stakeholders. The constraints on accessing water and sanitation services are likely to differ among rural areas, small towns and cities. Location-specific features are explored below.

Rural Areas. The outreach of central government is often limited in rural areas, and focused on rural district centers remote from communities requiring assistance. This makes government agency managerial and logistical support cumbersome and costly, and unattractive to agency staff. In addition, the general lack of communication infrastructure such as roads increases the cost of accessing markets, clinics, schools and other services, and reduces information flows

from and to isolated communities. More details on the dimensions of rural poverty are provided in the chapter on **Rural Poverty**.

In other situations, it is not the remoteness that determines the poverty of a location. In many villages the poor live among the better-off households. There, their constraints to accessing water and sanitation services are more likely associated with their lack of power to be properly consulted on their needs or to influence decisions.

Small Towns. Small towns are perhaps best defined as being large enough that collective action and community management do not easily emerge, yet too small to meet the fixed costs of a formal utility organization. Technically, their water supply and sanitation needs are not amenable to simple, point source solutions (such as a spring or a borehole), but the appropriate water and sanitation services have technical and managerial requirements that exceed the capacity of most small community organizations. Small town governments may not have the fiscal or legal authority to provide or regulate private provision of services that would be efficient or responsive to local needs. Even where towns have such authority, staff capacity to play these roles may be weak.

Urban and Peri-Urban Areas. Slums and informal settlements housing the urban and peri-urban poor are commonly found on low-lying, flood-prone land, leading to drainage and sanitation problems, or on the steeply sloped hills, from which the residents have to descend to collect water. These places are often geographically isolated, dangerous, unhealthy and lack basic infrastructure and services. Illegally squatting on a piece of land left vacant for the above reasons, the poor lack title to the land they occupy. For this reason, they have no access to formal service provision such as water and credit, rely on temporary low wage employment in the informal sector, are harassed by the authorities or are exploited by criminal gangs and profiteers who take advantage of their lack of recourse to the legal system. (More details on the situation of the urban poor can be found in the chapter on **Urban Poverty**.)

In addition to the constraints associated with urban poverty, urban water supply, in contrast to rural water supply, generally relies on a hierarchical system of networks that feed into neighborhood-level tertiary distribution systems. Serving the urban poor through the formal networks requires sufficient capacity in the primary and secondary network and adequate economic returns.

Network capacity increases may not be feasible where water resources are scarce, calling for careful management of water demand (financial and physical controls). And where economic returns are low, as is common in fringe or poor areas, there is low incentive for a utility to provide services. Combining this with the perceived high risk and, at times, legal constraints to delivering services to informal settlements renders financial costs prohibitively high. Possible activities aimed at reducing costs and ensuring adequate economic returns, such as providing bulk water to the edge of the informal settlement and allowing residents to organize and manage water distribution, are sometimes frustrated by unrealistic design and engineering standards that require household connections.

Construction of latrines and washing facilities is – by contrast – generally not limited by network economies. On-site sanitation, instead of sewerage connections, may be a suitable technical option and should not be discouraged without evidence of likely environmental damage. The

constraints to on-site sanitation solutions are associated with other factors, such as lack of space for individual latrines in a densely populated slum or the reluctance to share a public latrine. The latter are often not well maintained and may not grant the privacy users require.

Constraints to service provision – many of which are inter-linked – vary among rural, small town, and urban areas of a country. One of the larger challenges in developing the poverty reduction strategy for water and sanitation will be understanding how the constraints function in the differing governance, financial, and social environments within the country. **Table 2** below, presents one example of listing constraints and their relative importance. This work, when combined with the mapping of the poor discussed in the next section, provides the basis for prioritizing government interventions.

Table 2: Problems Limiting Access to Water and Sanitation Services and their Relative Importance by Location

<i>Problems</i>	<i>Relative Importance</i>		
	<i>rural areas</i>	<i>small towns</i>	<i>urban areas</i>
<u>Policies</u>			
Fiscal Policies untargeted broad-based subsidies often don't bring benefits to those they were intended for, while reducing limited public funds for more targeted interventions	high	high	high
Volatile and Uncertain Political Climate the often perceived risks of uncertain private property rights and insufficient safeguards either deter private investors or increase the price of capital	low	moderate	high
Water Resource Management Policies absence of clear policies targeting the management of overall water resources or the allocation of property rights may lead to unsustainable extractions (e.g. agriculture, industry), reducing overall availability of groundwater sources, and to pollution of surface waters from industrial, agricultural and domestic effluents, thereby limiting the potential uses of surface water and increasing the cost to down-stream users	high	high	high
<u>Laws and Regulations</u>			
Tenure Regulations lack of secure land titles makes formal network connections illegal or increases uncertainty and reduces incentives of potential service providers to invest in fixed assets (piped water system)	low	high	high
Exclusive Rights to Providers exclusive mandates to a utility to provide services reduces competition and innovation, and can prevent the poor from getting services from alternate providers where network services are not readily available	low	moderate	high
Technical Standards inflexible and unrealistic service standards reduce affordable	moderate	high	high

Problems	Relative Importance		
	rural areas	small towns	urban areas
technical choices, by increasing the cost and creating entry barriers for potential providers			
<u>Institutions and Governance</u>			
Lack of Capacities and Incentives general lack of administrative, managerial and technical capacity of both central and local government institutions – exacerbated outside principal cities by poor transport and communication networks – constrains effective interaction with consumers and other stakeholders; this reduces the access to information	high	moderate to high	low to moderate
Corruption and Lack of Transparency presence of corruption and lack of transparency in decision-making of public institutions creates barriers to private competition and participation of the poor (who lack the voice or the money to bribe)	high	high	high
Social Capital absence of social capital (defined as the ability of individuals and households to secure benefits from being a member in social networks and other social structures) reduces the effectiveness in reaching the poor as beneficiaries from service provision	moderate	high	high
<u>Affordability</u>			
Credit Constraints lack of access to capital (microcredit or other banking institutions) due to underdeveloped financial markets, lack of creditworthiness of customers and high transaction costs and absence of flexible payment mechanisms render investments that require cost contributions less affordable to the poor	high	high	high
Connection Cost and Tariff Structures high connection fees or tariff structures (e.g., increasing block tariff structures) at times make the cost of water prohibitively expensive	low	moderate	high
Quantity of Consumption lack of incentives for providers to serve the poor because low consumption does not provide sufficient economies of scale to cover the initial high fixed costs of the investment	high	high	high
Location-based Affordability Constraints where poor communities are inhabiting marginal lands or remote locations more expensive to serve from the engineering point of view, incentives for service provision are low and where these services are provided they tend to be more expensive	high	high	high

3.4. Targeting the Poor

The foregoing sections identified the dimensions of income poverty and water and sanitation poverty that need to be assessed when developing a poverty reduction strategy. The impact of current government policy, whether the poor are indeed suffering from water and sanitation shortages, and understanding the behavior of the poor in the face of deprivation all need to be understood when designing a water and sanitation program that targets the poor. If that analysis can be undertaken, it should reveal how best to target sector investments. But where large data or other gaps prevent good analysis, a simple methodology can yield a set of initial targets that can be refined as experience accumulates.

If poverty mapping data exist and show a very high overlap between income poverty and poor water and sanitation services, a poverty-oriented strategy could simply seek improved coverage within poor communities, using WHO minimum standards as a norm. However, such a program should be complemented by work to better identify the relative impact of water stress and the poverty-water links discussed in section 3.2.

If one or more of the links stand out in either the initial or follow-on analysis, the strategy would concentrate resources on that link. For example, if the lack of water and sanitation in schools plays a major role in inhibiting girls' schooling, the strategy could complement education sector resources with those from the water sector to provide needed water points and latrines. If sanitation coverage is good but health outcomes are still poor, further analysis might show that emphasis must shift to hygiene education. In that case, water sector financial resources might be less important than efforts to convince education and health authorities to add this to their own agendas.

An analysis of the constraints may orient strategy towards interventions that remove service barriers faced by the poor. Those interventions, however, may not be in the water sector itself. For example, if the poor are deterred from connecting to water or sanitation services by the initial capital investment, the key intervention may be access to flexible payment mechanisms or small credit schemes that allow them to spread costs over a longer period.

Finally, with the insights gained from this work, the existing national strategy for water and sanitation must be revisited for realism and consistency with the evolving goals in the poverty reduction strategy. These initial goals must also be tested against the tools available to government for meeting them. As the next section stresses, government's most effective tools may be incremental policy change rather than incremental financing. The "Water Decade" of the 1980s pressured governments to boost spending on potable water supply. Countries have seen very slow progress since then. An important reason for that slow progress has been capture of the benefits by the non-poor. Many countries now need to shift responsibility for water and sanitation services for the non-poor off government budgets, freeing resources for their poverty reduction strategy.

4. Options for Government Intervention

The previous section recommended approaches to identifying priority areas for assistance, possible constraints faced by the poor in accessing water and sanitation services, and realistic and pro-poor policy targets. This section suggests a framework for considering options to close the identified service gaps. This does not necessarily mean that the government provides the services. Reduced government and increased private sector involvement may be appropriate, in which case the government intervention could be the removal of regulatory or legislative obstacles to private sector participation.

Rethinking Sector Strategy. Sector strategies that most effectively reach the poor emphasize efficient service delivery and improved targeting. With this in mind, the sequence of strategy formulation should begin with sector policy. Sector policy to help deliver better water and sanitation to the poor will be either hindered or supported by the overall national institutional and policy environment. But other chapters of this *Sourcebook* address those important issues (for example, the chapters on **Governance and Poverty Reduction**, and **Public Spending for Poverty Reduction**), which will not be repeated here. Instead, this discussion will concentrate on the sector policy environment and related choices about sector financing and direct service provision.

The impact of sector policy on the poor may be difficult to recognize. For example, many countries have seemingly innocuous engineering standards specifying pipe size and materials, trench characteristics, delivery pressures and so on; standards most often adopted from international (wealthy country) norms. Two immediate problems arise. First, technology has been changing rapidly in recent years and standards may not have kept pace. In this case, new and cheaper engineering solutions may be ignored, to the detriment of the poor. Second, even when technology has not advanced, use of a lower standard may permit cheaper service to the poor. (An example might be a community water system operating at lower pressure than the urban standard, through pipes in trenches shallower than the standard.) The cost savings in such an approach may be sufficient to allow network service to the poor, a service much improved over current levels, even if it increases the risk of pipe failure.

Many other sector policies should be examined for their impact on service delivery to the poor. Does procurement policy make community contracting difficult? Labor policy may slow the entry of the private sector. Subsidy policy may favor wealthier communities who more easily generate matching funds or find political support in the legislature. Pricing policies might hinder cost recovery and jeopardize the sustainability of services and their extension to unserved, poor communities. Community consultation policies may overlook the poorest elements of generally poor communities. (For example, a recent village consultation in one country showed that the very poorest ranked drinking water supplies as the most important investment, while the less poor ranked irrigation water most highly.)

Sector policy should stress efficient service delivery. Many national, local, and consumer resources have been absorbed in inefficient operations which leave few resources with which to expand service access or improve service quality. Government has tools to address this,

either through institutional change—most commonly the introduction of private operation—or through financial changes that shift payment burdens in a way that forces greater accountability.

Policy interventions are typically broad-based and therefore may not be targeted exclusively to the poor. As a minimum, however, the government should ensure that policies avoid hurting the poor. While not all policies will speak directly to the needs of the poor, those on financial and service provision mechanisms generally can aspire to target them. The service gaps analysis, poverty mapping and WSS-poverty linkage assessment described in earlier sections provides the basis for this.

Poverty mapping, for example, will almost certainly reveal that needs are far greater than the government's direct capability to satisfy them in a reasonable timeframe, reinforcing the requirement of effective government policies that support self-supply and other private solutions.

Settlement density and institutional structures play a large role in the choice of water supply and sanitation technology. Densely settled urban areas are almost always most efficiently served by piped water networks, and effluent concentrations almost always demand collective handling. Such areas usually have local government units with substantial power to regulate, finance, or provide services. Small towns often have less obvious technical solutions, dependent in part on unknown future growth possibilities. In some countries they will have sufficient governance power to regulate or provide services, while in others they lack this power and staff capabilities. Rural areas typically lack the density that keeps unit costs low in piped networks, and they lack governance powers that lead easily to effective organization and regulation of such public supply. Sector policy and other interventions must take these differences into account.

Government plays three different roles in improving water and sanitation services:

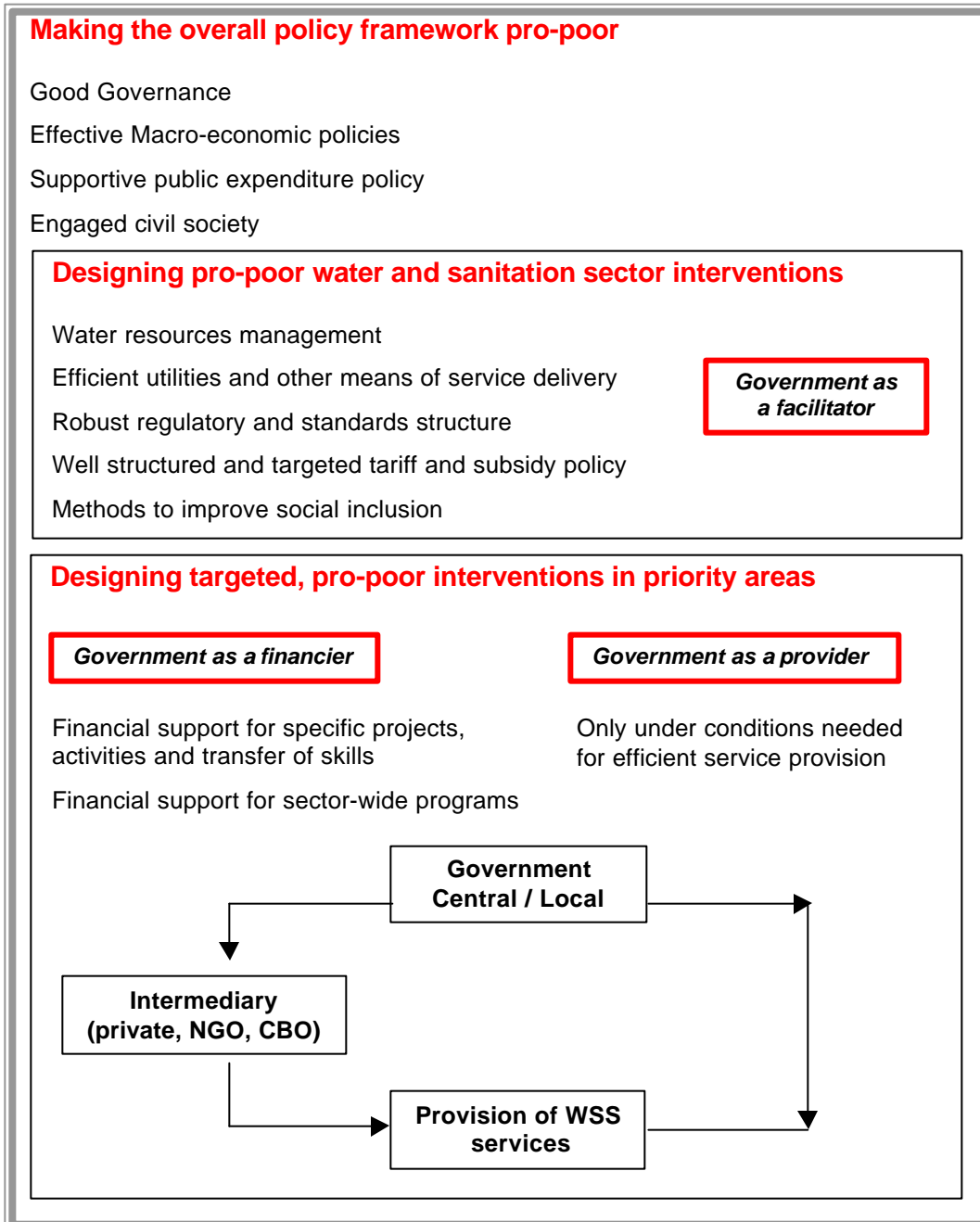
- the role of a **facilitator** through an effective balance of sector organization and policy-making, including regulation and standard-setting;
- the role of a **financier** through targeted subsidies and support to private, community-based solutions to water and sanitation problems, or to private or public service providers; and
- the role (very rarely) of a **direct provider** of services targeted to the poor.

Depending on the country and the geographical focus (urban or rural), the role of the government may be very different, as will be the mix of interventions. However, one important lesson from international experience is that governments need to work more on the facilitating role of structuring good policy and institutional support for improved water and sanitation. Too often, governments attempt to close service gaps through direct financial support or provision of services in a weak policy and institutional environment. The result has consistently been that services to the poor improve little or not at all. In urban areas, resources are lost in hugely inefficient government utilities that deliver little water to the poor. In rural areas, wells and pumps are put in but not maintained, and their service quickly deteriorates. Urban sanitation investments go to sewers for the better off housing estates, or public toilets so badly kept that they repel visitors, while rural latrine subsidies go to the better off rural households.

Because of the international experience, the ensuing discussion will stress the facilitator role. Progress on policy and institutional constraints costs relatively little in cash terms, but political costs may be substantial. The status quo tends to favor the wealthier and politically more

powerful segments of society, groups that may not enjoy the pricing reforms nor pressure for efficient services that will free resources to expand coverage to the poor. They may not want to be reminded that the subsidies given to public systems in the name of the poor never reach that group, who continue to rely on more expensive, unsubsidized private services. The most sustainable means of freeing resources to spend on the poor may well be through changing long-standing practices of distributing the benefits of public finance through routine subsidies for the operation of water and sanitation services. **Box 6**, below, summarizes the framework within which government and other actors are operating.

Box 6: Framework for Government Intervention



4.1. The Government as Facilitator

Historically, and today in most low income countries, the poor provide their own water and sanitation services, obtain them through community groups, or purchase them from private operators. For this reason, the starting point in designing or updating a poverty-oriented sector strategy must be that array of government laws, regulations, and institutions – the facilitating tools of a government – that help shape such service provision. Government policy choices can encourage (or discourage) demand-responsive and cost-conscious service provision. It can reinforce competition through transparent market entry and protect the market place from arbitrary government action, or it can increase the cost of services to the poor through inappropriate entry restrictions or regulation.

This section highlights possible government policy interventions that help the poor capture water and sanitation benefits. The arena for action is large and the importance of policy areas will vary substantially among countries. The following list of policy areas is designed as a reminder of what may be important, rather than a ranking of importance.

4.1.1. Improving the Overall Policy Framework

A policy framework for improving water and sanitation services for the poor rests on a number of pillars: (i) sustainable management of water resources; (ii) efficient delivery of public and private services; (iii) better access to those services; (iv) research, development and implementation of low-cost technologies; and (v) functioning pro-poor financial mechanisms.

Water Resources Management: Every country's water resource management regime has a major long-run impact on the quantity and quality of water available to the poor. The basic pro-poor goal coincides with that for society as a whole: to protect and equitably share water resources in a way that ensures sustainable access to low-cost, reasonable quality water supplies. The review of water use by the poor through the tools mentioned in Section 3 will allow judgment on whether they are losing water access because of pollution or excess withdrawals by others. Where such losses are found, government intervention will usually be needed to design or enforce pollution control regulations (see the chapter on **Environment** for guidance), help bring together water users to improve resource management, or to protect existing rights of the poor. Most countries have made only slow progress in dealing with these issues, but failure here must typically be answered with costly treatment technologies, development of alternative water sources, or increased morbidity among the poor.

Efficient public and private service delivery: Public water and sanitation services are often plagued by inefficiency, which drives up service costs, restricts coverage, and leads either to needlessly high tariffs or equally needless subsidies. This performance has led to a recent increase in the number of public systems that have been concessioned or have otherwise brought in private operators. **Technical Note 7** describes the privatization option in more detail. Private network services will likely have good technical efficiency for the level of inputs they use,

but may provide inferior or no services to the poor if the regulatory regime does not provide the right incentives for good performance. In creating a pro-poor sectoral policy environment, the following dimensions of the efficiency challenge deserve attention:

- **Competition and market structure.** Policy should support competition in infrastructure services. Often, this is best done by avoiding exclusive service licenses, service standards that force use of a particular technology or high fixed administrative costs for businesses entering the market. The policy challenge is greatest in urban areas, where the middle and upper class neighborhoods may be served by network supply. In such cities, the poor often rely on standpipes, private vendors, or community supply. The regulatory temptation will be to dictate equal standards for all suppliers in such cities, but rules appropriate to large urban networks may be unworkable for the otherwise acceptable non-network suppliers of the poor.
- **Regulation of water and sanitation suppliers.** The importance of water and sanitation services to public well-being dictates that they be regulated. Despite the value of competition, most urban citizens will be supplied through network utilities with substantial monopoly power. Good regulatory regimes will encourage more competition for the right to provide services, thus holding down costs. Such regimes will promote access to information and open competition in the awarding of contracts. They will benchmark utility performance (public and private) through databases of performance indicators. One benchmarking component can be service to the poor, measuring coverage in poor neighborhoods, and utility response to service or customer problems, analyzed on a neighborhood basis.

Improved Access: Access by the poor can be a complex, multi-sectoral problem. For example, one common problem arises from property rights and land tenure. Without customer security of land tenure, utilities or other providers may face great risk investing in service to peri-urban and slum areas. These issues are discussed in detail in the chapter on **Urban Poverty**. One challenge for network supply expansion comes from the relatively high upfront costs of a connection and in-house plumbing. The poor typically lack access to local capital markets or financial intermediaries. Policies that develop financial institutions, including micro-credit, and reduce transaction costs will increase the ability of poor households to connect. They will also provide the means for utilities or small-scale private entrepreneurs to invest. Finally, but only with the support of sustainable financing regimes, utilities may be required to undertake universal service obligations. Such obligations must be designed with great care. Policies forbidding disconnection, for example, can encourage consumer refusal to pay reasonable and necessary service costs.

Research and Development: Very modest financial assistance may be devoted to support of technological or social measures that aim to increase the affordability or availability of infrastructure services. For example, such a program could pilot innovative community-based sanitation or water delivery institutions or technologies. When choosing areas to support, care must be paid to understanding how the pilot project will be scaled-up to broad regional or national use.

Pro-poor Financial Policy: Government policy on tariffs and subsidies may influence access of the poor to water and sanitation services even when government plays no direct financial role. For example, government may dictate tariff structures, collection policy and cross-subsidy

policy where services are privately supplied. Tariff and subsidy design will typically play a large role in strategy formulation.

Full cost recovery for water and sanitation suppliers need not conflict with reducing poverty. Many studies have found that poor people already pay high prices, and a significant proportion of their income, for water supply. They often have little choice but to pay those costs if they buy water from private suppliers, as do so many of the urban poor. Ways should be sought, however, to ensure that the poor have access to a minimum volume of water necessary to meet their basic needs at an affordable price. Possible approaches, ideally within the context of the reform of a utility's cost-recovery policy, are shown in **Box 7**, below.

Box 7: Meeting Poverty Objectives while Restructuring Utility Cost Recovery Policy

- Avoiding reverse cross-subsidy – ensure that poor people are not charged more for their water than better-off users
- Identifying the poor and providing direct government payment to the utility for a portion of their bill
- Easing the cost of connections for low-income users by subsidizing connection costs, or by allowing connection fees to be spread over a longer period, and included in monthly bills
- Lifeline tariff – charging a low (often flat) rate for low-income, or low-volume users. A typical ceiling for the lifeline tariff would be 6-8 liters per capita per day

DFID (1998), Guidance Manual on Water and Sanitation Programmes, DFID, London

The basis for tariff reform should be an analysis of the utility's financial costs and the economic costs of supply (and of necessary wastewater collection, treatment and disposal), complemented by an analysis of consumers' willingness-to-pay for water, and a financial analysis of existing and planned subsidies.

Sanitation services pose a special challenge in designing financial policy. The poor directly and almost fully capture the benefits of improved water services, but improved sanitation services may be perceived more in terms of convenience (for example greater privacy) than the health benefits that drive pro-poor sanitation policy. This may lead the poor, and poor communities, to under-invest in sanitation. The health externalities argue for subsidies to close the demand gap, but in poor rural communities experience has shown that subsidy programs for improved latrines benefit primarily a small number of wealthier households and fail to reach the poorer households. Effective hygiene education campaigns may help close the demand gap and lower the subsidies needed to reach any target coverage level. Lowering sanitation investment and operation costs may be more effective than demand subsidies. This could be done through aiding small businesses to provide products and services rather than by subsidizing the products themselves.

Subsidies for the operation and maintenance costs of sewerage services should be avoided, because they will typically be captured by the middle- and upper-income households and commercial and industrial users who are the first sewered. Recovering O&M costs through sewerage surcharges based on water consumption has the benefit of discouraging excessive water use.

4.1.2. Improving Services in Rural Areas and Small Towns

Strategy development for rural areas and small towns hinges on institutional strength in such areas. Private water service provision is likely to dominate in these areas, either through self-supply or vendor supply. Other common modes include community supply, through standpipes or networks. Sanitation services, even more than water, rely on self-supply.

Direct government investment to increase rural and small town services has a dismal record of failure. The essential problem has been sustainability, an issue itself linked to initial technological choice and financing arrangements. Government often lacks low cost means of working with communities, a challenge answered by shifting to a model of community-driven development. (The chapter on **Scaling Up Community Driven Development** discusses approaches that rely on community contracting and/or management.)

A rural and small town strategy should seek opportunities to reduce the cost of improved service. This section has already discussed the role of a research and piloting program to test new technologies. Another avenue to reduce costs is to improve the flow of goods and services to the rural areas. This flow is known as the “supply chain.” If pumps, pipes, latrine pans, spare parts, etc., cannot be purchased locally, or have high price mark-ups due to distribution inefficiencies, investment will be reduced. Although these constraints are known to be important, our understanding of how to overcome them is not well developed. In the case of hand pumps, preliminary research results suggest that having more than 200 installed within a local marketing area provides sufficient demand for parts that retailers will stock them. This, in turn, suggests that government efforts to popularize such innovations should avoid piloting small numbers over a large area—all will fail due to lack of inexpensive repairs. On the other hand, geographically more concentrated investments may have the benefit of creating self-sustaining local parts supply and repair skills.

Village or small town water and sanitation supply often presents the challenge of being too small to enjoy substantial economies of scale or generate sufficient revenue to retain high quality staff. Sector strategists will face difficult challenges in giving guidance in the choice between network and individual supply. Governments can assist by:

- exploring possibilities of arrangements between towns and villages to develop effective services on a regional scale.
- providing managerial and technical help through staff who move among localities, either on demand or on a regular schedule. These staff will provide training and assist in trouble-shooting.

Where community water and sanitation services appear the most effective way to proceed, key design principles include the following (elaborated in **Technical Note 4**).

Policy area	Identified constraints	Possible interventions
Policy Environment	Limited political commitment, weak legal framework and poor governance lead to unstable policy environment for sector. This results in: under-investment, undefined ownership, poor participation, weak	Promote a demand responsive approach (DRA) where communities make informed choices regarding their participation, service level, and service delivery mechanisms. Promote institutional reform based on clear roles for key stakeholders where communities own their facilities, the

Draft for Comments. April, 2001

Policy area	Identified constraints	Possible interventions
	regulation, and conflicting priorities	<p>private sector provides goods and services, and government facilitates the process.</p> <p>Ensure appropriate legal framework for ownership and management.</p> <p>Implement Community Water Supply (CWS) projects within context of broader community and local government development.</p>
Financing Options	Demand for services is increasing, but service expansion has been constrained by insufficient resource allocation from the public sector, inefficient investments in costly schemes, and a lack of capacity to mobilize resources from users, local government, private sector and others.	<p>Establish financial policies that underpin demand responsive approach where communities pay part of the capital cost in proportion to the cost of the facilities, and all operations and maintenance costs.</p> <p>Promote increased capital cost recovery from users by establishing mechanisms that reduce upfront capital cost</p>
Service Delivery Options	Government monopoly on service provision has resulted in lack of accountability and community ownership, poor management and sustainability, low quality services and weak development of private sector and alternative delivery options.	<p>Support formation of representative Water User Associations for planning, implementation, and management of community water supply facilities</p> <p>Promote community contracting and transparency in all procurement</p> <p>Create competitive environment for allowing communities to access a range of providers of goods and services for all aspects of the project cycle</p>
Hygiene and Sanitation	Full economic and health impact of improved CWS are often not achieved due to lack of attention to hygiene education and sanitation. Approaches to sanitation have focused mainly on technology aspects, rather than on behavior changes and creating a market (supply and demand) for sanitation facilities	<p>Integrate water, sanitation and hygiene education in CWS projects</p> <p>Promote user investment in sanitation through public awareness and education in hygiene and environmental sanitation. Strengthen the private sector's ability to construct facilities.</p>
Participation and Gender	Lack of community, and especially of women's involvement, is a major cause of poor service sustainability. Traditional project design did not consider the project rules and incentives required to achieve full participation.	Demand-responsive rules, tools, and incentives for project staff to include excluded groups will help achieve full participation and improve outcomes.
Poverty and Access	Majority of clients are the poor, poorest are outside cash economy and politically weak, it is easier to provide services to rich, population is increasing, and there are decreased services and resources as well as lack of political commitment towards the poor	<p>Set rules to target poor, unserved communities and vulnerable groups in these communities.</p> <ul style="list-style-type: none"> • Develop baseline information, identify vulnerable groups and monitor access of the poorer communities to project services • Expand range of technology options, building on existing resources in community • Ensure adequate flow of information to all eligible communities and ensure adequate social intermediation and participation by all groups, including women, poor and minorities • Recognize and build on informal safety nets within communities • Involve women and minority groups in community decisions and management

4.1.3. Urban and Peri-Urban Areas

In urban settings, sector policy should seek to substantially increase efficiency in network supply. This may not, in itself, improve service to the poor, but it is a precondition for expanding such service. A diagnosis of current efficiency can be done with the help of benchmarks established for similar water supply systems elsewhere. This often reveals very high leakage from physical causes and, sometimes, illegal connections. It also often reveals extremely high levels of low quality labor input. Investing additional funds in such a system will probably lead to increased expenditure on labor and other inputs, but very little additional water reaching the poor.

Any government seeking to close gaps in urban network services to the poor should, at a minimum, study both the efficiency of the current public services and compare them to the efficiency of private services in similarly sized cities in other countries at similar income levels. This will help highlight whether private provision offers significant scope for savings.

The countries most successful in expanding urban water service provision are those that charge cost-covering tariffs. This permits self-financing by systems, thereby ending public fiscal burdens. Because they are paying full costs, customers are more likely to demand adequate service. Covering costs of existing service may not provide enough cash to expand service to the poor, but it allows the utility to efficiently operate the existing system and it ends general system subsidies from the government, subsidies going mostly to the non-poor. These actions, in turn, facilitate the introduction of pro-poor policies, whether the utility be publicly or privately managed. Good pricing policy thus forms a key element of pro-poor policy and should be implemented before either a switch to private providers or programs to increase public utility efficiency. And those actions must precede the injection of additional public funds to expand services. **Box 8** summarizes the steps to reaching the urban poor through network supply.

Box 8 Steps to Reach the Urban Poor through Expanding Network Supply

1. Analyze current supply efficiency and the cost of efficient supply.
2. Restructure tariffs to eliminate general subsidies and increase revenue to fully cover the cost of efficient supply.
3. Concurrently implement lessons of Step 1 to boost utility efficiency through new labor and wage policy, metering, etc., through the public sector or public/private partnerships.
4. Introduce pro-poor policies (i.e. increased connection rates) based on the anticipated higher utility efficiency. This would be part of the regulatory and incentive framework in a switch from public to private operation.
5. Introduce complementary measures such as credit schemes to finance hook-up costs for the poor.

The network efficiency efforts must recognize that the poor continue to rely on various forms of non-network water supply. Thus, an urban sector strategy should seek to minimize the cost of alternative supply sources, *even when the long run policy goal may be complete coverage by network supply*. This does not entail subsidization, but rather that government provide a policy environment that permits alternative suppliers to operate under business conditions no less supportive than other business lines.

4.2. The Government as Financier

Governments tend to have a low success rate in financing water supply and sanitation for the poor. Too often, funds and subsidies fail to reach the intended beneficiaries and they have typically proven unsustainable.

4.2.1. Government financing

The type of assistance that may be provided by government in partnership with donors and financial institutions includes both conventional capital aid (financial support for specific projects and activities) and technical cooperation (transfer of skills). There is also the option to provide resources more strategically in support of sector-wide programs. For the water supply and sanitation sector, the various types of assistance may be managed through longer-term development assistance programs (for example, multi-donor sector-wide approaches or sector investment programs).

Government may also financially support utilities during the reform process. Indeed, a key issue is to establish financially autonomous utilities: poor people are unlikely to benefit from system expansion to cover low-income areas unless steps are taken to tackle the financial and operational weaknesses of the utility as a whole.

Other important issues:

- Avoid grants that promote irresponsible pricing or excessive capital investment.
- Promote links with municipal finance and fiscal decentralization reforms. Municipalities that are in systemic deficit may use the cash flows of their utilities to fill financial gaps. On the other hand, municipalities that can benefit from generous tax breaks or grants may lack incentives to adopt efficient institutional setups or to price water responsibly.
- A key challenge is to have banking and capital market resources available locally, and help utilities tap these local markets. Where government provides financial assistance, they should make equity and quasi-equity contributions and provide guarantees, using direct loans only as a last resort.

4.2.2. Subsidies

Many national and local governments devote considerable resources to subsidizing the capital and operating costs of water and sanitation schemes. But, in country after country, studies of the impact of those subsidies show that the benefits go primarily to the non-poor. Several factors drive this outcome. Among them, the grant nature of many of these projects removes much of the incentive for careful procurement and funds end up with construction firms through excessive capital costs. Second, inefficient operation of investments similarly diverts funds to employees or suppliers. Third, network water supply or wastewater collection services go primarily to the non-poor, thereby allowing them to capture the bulk of subsidies to such systems. Fourth, subsidies are often positively related to consumption, which is higher for the non-poor. And, last, where subsidies come with beneficiary co-financing requirements, they tend to go first to the non-poor or less-poor people better able to meet that requirement. Thus, the first challenge in rethinking subsidy strategy is to analyze the poverty impact of existing

subsidies. **Technical Note 5** provides several country case studies showing how the analysis has been done and has facilitated subsidy redesign.

The economic rationale for subsidies—to offset market inefficiencies where prices fail to reflect significant external benefits—supports their use in certain, well-defined water and sanitation projects. But the lessons cited in Technical Note 5 show very few cases where income redistribution occurs efficiently through such projects. The externality argument can certainly be made for subsidies in some sanitation projects, but again the challenge is to target the benefit to the poor. The non-poor, who could afford improved sanitation without subsidy, are often the main beneficiaries. Good subsidy design recognizes these problems and seeks approaches that maximize benefits to the poor. In the sanitation case, subsidies could support hygiene education and sanitation promotion through means known to reach the poor. (For example, in a region with low literacy, this might imply reliance on oral teaching and pictures, rather than text.)

Subsidy design problems are not particular to the water and sanitation sector. Good policy design principles apply to all utility services and, more broadly, are best applied through an incomes policy with national scope. Because of their common features across infrastructure, subsidy design is treated in Annex 2 of the chapter **Overview: Private Sector Development and Infrastructure (PSI) and Poverty Reduction**. Readers should consult that Annex for a more systematic discussion of subsidy design.

In summary, government financing can play a valuable role in improving water and sanitation services to the poor. But, historically, much of the benefit of such efforts has gone to the non-poor. The challenge facing the sector strategy is thus effective targeting. In most cases, that will mean avoiding blanket subsidies and looking for ways to reduce input costs, increase private demand for sanitation, and facilitate the extension of credit to the poor.

4.3. The Government as Provider of Services to the Poor

Governments have often proven to be very inefficient direct providers of water and sanitation services to the poor. Whether in rural areas, where they face high overhead costs in service provision, or urban areas, where state-owned firms in water and sanitation fare no better than those in any other sector, government services consistently fall well below efficiency benchmarks set by the private sector. The result is higher cost services that fail to meet quality or coverage targets. Exceptions to this pattern can be found, but are sufficiently rare that, unless a country already enjoys efficient provision from public providers, a forward-looking strategy should not be based on these limited success stories.

4.3.1. The Rural Context

International experience provides clear guidance on the role of government in direct water and sanitation service provision in rural areas: do not make this an element of strategy. Costs are simply too high in relation to local private provision and the willingness or ability of poor people to pay. As a result, the facilitating and, possibly, financing roles are the only ones that should factor in a rural water or sanitation poverty reduction strategy.

Poor communities may lobby for direct government service provision. They typically do so in countries with a long history of heavy government subsidies in providing such service. Unfortunately, those services also have a correspondingly long history of low efficiency, wasteful water use, and high service failure rates. They have simply proven unsustainable. In countries where the sector has inherited a government role as a direct service provider, the best strategy will be devolution of control to community groups or private providers. Where that is not possible, government should at a minimum avoid creating further long term subsidy demands through further system expansion.

4.3.2. The Urban Context

There are a few examples of successful reform of inefficient, publicly run water and sanitation utilities, but failed attempts at such reform are much more common. This fact has led a number of medium-size and large cities to privatize their system operations in recent years. Privatization is not a panacea; examples of badly run private systems can also be found. However, private operation has succeeded in many cases. First, the profit motive compels the utilities to seek operating efficiencies. Lost water means lost revenue, hence lost profit. Second, a private utility works under much closer public scrutiny and under regulation from a government that is much readier to criticize and act against a private operator than a public operator. Third, private operators are likely to draw more efficiently on international experience to optimize system performance. In many urban areas, private operators can produce sufficient efficiencies to earn their profit while actually reducing total operating costs. Unfortunately, this does not mean that tariff increases may not be needed. If revenues in the existing system covered only a small percentage of total operating costs, a tariff increase would be needed no matter what type of operator was employed.

The government should make an informed decision as to whether it would be desirable to continue to directly provide water and sanitation services. This decision should be based on the analysis of its comparative advantage, or lack thereof, vis-à-vis alternatives such as provision by community-based organizations or the private sector:

- **Efficiency:** Do public providers have a record of economic efficiency in line with that of private operators?
- **Financial resources:** Would a shift to private sector or community-based operation bring in more financial resources?
- **Technical capabilities:** Does the private sector routinely use more modern technologies?
- **Managerial record:** Does the private sector or do the community-based operations have stronger managerial records?

Technical Note 7 provides additional detail on the public-private decision.

4.4. Prioritizing Government Interventions

The history of government intervention in the water and sanitation sector provides clear lessons for the process of pro-poor strategy development. The poor rely much more than others on self provision or other private solutions. Thus, government must first review the institutional and policy environment it creates for such solutions. It must pay special attention to water resources

and environmental management, for these determine the quality and quantity of the raw water resource on which so many poor people directly depend. If needed, it must recast other policy to maximize competition and lower administration.

With the policy and institutional review complete, government is in a position to consider the most effective means of using any available fiscal resources. In the case of water and sanitation, this means avoiding blanket service subsidies for water or sanitation. It implies a search for financing mechanisms, such as support for micro-credit, that base operations on borrower demand. Experience suggests that direct government provision and management of services should not be a central element of strategy, except in countries already demonstrating highly efficient delivery of such services.

Sections 2 to 4 have pointed to causes of poverty related to water and sanitation, as well as means to address the constraints faced by the poor. Making use of the information provided in these sections for prioritizing government interventions entails the following step-by-step approach:

- ✓ identifying the location of the poor geographically, in order to better target possible government interventions;
- ✓ in parallel, monitoring the proposed linkages between water and sanitation access and poverty dimensions, and assess whether these hold true in the country context;
- ✓ assessing the needs of the poor, and the constraints they are facing in accessing services in the priority areas identified in the first two steps;
- ✓ identifying options for government intervention that would address the constraints and would cater to the needs of the poor assessed; and
- ✓ ranking options based on the numbers of poor benefiting, relative to the degree of benefit, the financial cost, and the political feasibility of realizing the chosen intervention in an acceptable time-frame.

While some options for government intervention that are cost-effective may not be politically feasible in the short term (for example, some institutional reforms), they should not be discarded. A prudent approach towards a poverty reduction strategy takes into consideration trade-offs, and designs short-, medium-, and long-term strategies with a menu of different options. These could entail (i) rapid response mechanisms to address the immediate needs of the poor for the short-run; and – in parallel – (ii) the design of a framework for medium- and longer-term policy changes that will set direction for the future.

There is an inherent risk that medium- and long-term policy visions may be hijacked by political considerations. In order to set a poverty reduction strategy on a firm track, current governments may want to pursue irreversible changes requiring the consensus of other political parties, combined with a clear communication campaign to advertise changes to the stakeholders that are affected or benefit from such policy changes.

5. Monitoring and Evaluation Framework

While improving access to water and sanitation services may in itself be one of the goals of poverty reduction strategies, it is more often regarded as a means of achieving goals in other dimensions of poverty. Such goals may include improving health and education; promoting gender equality and social inclusion; and reducing income poverty. In this context, monitoring and evaluation of the poverty impacts of water and sanitation policies requires a cross-sectoral approach that fully accounts for the many indirect benefits associated with the provision of water and sanitation services.

As discussed in-depth in the Monitoring and Evaluation chapter, these are two complementary but different activities. Monitoring involves tracking progress towards agreed goals and targets, whereas evaluation entails establishing causal links between policy actions and observed outcomes. Both activities are important to measure performance, identify and correct potential problems early on, and improve the understanding of the relationship between different poverty outcomes and water and sanitation policies.

Although many of the concepts and some methodologies are the same, there are important differences between monitoring and evaluation at the project level and at the level of a national strategy. These differences are associated with the scale of the system required, the selection of indicators, data sources and the objectives of the feedback process. The following sections focus on monitoring and evaluating water and sanitation activities for Poverty Reduction Strategies.

5.1. Monitoring issues in water and sanitation

5.1.1 Selecting indicators

Monitoring starts with selecting a few key indicators that are relevant to the goals agreed on the poverty reduction strategy. There is no general rule about the optimal number of indicators. However, it is preferable to select only a few that can be measured well on a timely basis and provide useful information for decision-making rather than selecting too many, measuring them badly and not using them at all. It is important to distinguish between a cross-sectoral core set of indicators for monitoring the overall PRSP progress from a probably larger and more comprehensive set of indicators for sectoral monitoring.

As discussed in the Monitoring and Evaluation chapter, the selection process would generally consider three broad types of complementary indicators: impact, outcome and intermediate indicators. Technical Note 8 provides some guidance and examples on the choice of indicators. However, the final selection of indicators should be driven by the specific poverty reduction goals, policy choices, monitoring capacity and the views expressed in the participatory processes of each country.

Impact indicators. Impact indicators measure the final effect of water and sanitation interventions on different poverty dimensions. In particular, they are used to track progress on achieving goals related to improving the health status of the population, increasing education

levels and reducing gender inequities and social exclusion. For health related goals, mortality rates, malnutrition rates or water-borne disease incidence can be appropriate indicators. Since children are particularly vulnerable to water-borne diseases, such as diarrhea, which may affect their nutritional status, the above indicators are usually measured in children under five years old. As mentioned in sections 2 and 3, lack of appropriate sanitation facilities in schools and the time spent in fetching water may be factors hindering progress in education goals, particularly for girls. Therefore, girls' school enrollment or girls' educational attainment are alternative indicators for monitoring progress on education, as well as gender equity goals.

Outcome indicators. A combination of measures of use, and satisfaction with water and sanitation services is desirable for complementing impact monitoring. These outcome indicators are intended to capture 'midway' effects that are generally considered as necessary but not sufficient conditions to achieve final impacts. Ideally, the monitoring system should include indicators such as the percentage of households with a minimum consumption of safe water per capita per day to satisfy their basic drinking, cooking and hygiene requirements. However, this involves a number of definition and measurement problems.

For example, it requires an agreement on what can be considered as 'safe' water, what is the minimum acceptable level of consumption and how to measure these. An accurate self-reported measurement of water consumption is difficult to get: typically, relatively few households in urban areas have private connections with individual water meters, and relatively few know how much water they are buying from private vendors. Where people normally haul all of their own water, the best estimate available may be the number of buckets of water fetched daily. It is also costly to perform lab tests to obtain an accurate measure of water quality. While routine in the context of urban networked water supply, regular monitoring in rural areas have proven difficult to establish.

Ideal indicators may not be good indicators, if they are too difficult or costly to measure well. It may be better to use a proxy, such as a measure of access to water, rather than water consumption. Commonly used access indicators include the percentage of households with water supply connections or private tube wells and the percentage of households with access to a public water delivery point within a reasonable distance of home. It is important to specify the distance or travel time to the water delivery point. As discussed earlier, how far a family has to travel and the queuing time influence the consumption level. What is considered as a reasonable distance or travel time will vary depending on specific circumstances such as climate and terrain conditions – a half an hour travel time under extreme weather conditions or uphill is not the same as half an hour walking on flat terrain and moderate temperatures.

While somewhat easier to obtain, access indicators need to be considered with care. It is important to complement them with measures of quality and user satisfaction. Alternative quality and satisfaction indicators are the percentage of households with continuous water supply throughout the year, and the percentage of households reporting satisfaction with water and sanitation services.

As shown in Technical Note 1, most countries experience large variations in access to water and sanitation across rural and urban areas. Monitoring indicators – particularly outcome indicators -- should be disaggregated at least at the rural and urban level to allow tracking progress in closing the gap between better off and worse off areas.

Intermediate (input/output) indicators. Variables measured by impact and outcome indicators depend on a multitude of cross-sectoral factors. Many, such as household behavioral responses, are outside government control. Moreover, changes in these variables may occur only in the medium to long run. Thus, it is important to complement impact and outcome indicators with intermediate indicators. Intermediate indicators provide information on actions taken and their efficiency level in improving the coverage and quality of water and sanitation services. They measure things that reflect policy changes and are relevant inputs to achieving the agreed goals. Since it is difficult to find all these attributes in just one indicator, generally the monitoring system would include a combination of measures of investment or expenditure levels in water and sanitation that are pro-poor, some measure of the services generated, and the efficiency of their production as intermediate indicators. **Box 9** describes a software tool for monitoring utility performance using intermediate indicators.

Box 9: Monitoring Utility Performance

Most utilities compile some form of performance statistics. The use of these statistics to inform stakeholders of the relative performance of utilities is less well developed. There can be large performance disparities within and between countries – even among those at the same stage of development. Inadequate performance, highlighted by such comparisons, typically reveals that poor performers have low tariffs, poor bill collection, high system leakage levels and high unit operating costs. The end result is insufficient funds to invest in the systems to provide good quality water and to expand water service coverage, particularly to the poor.

A current World Bank initiative helps client countries measure the performance of their water and sanitation utilities. Called the Benchmarking Start-Up Kit initiative, it comprises a suite of software resources which will allow users to compile a representative set of performance indicators for the sector. The Kit includes standard data definitions, computational approaches and presentational methods, and performance indicators on coverage, unaccounted for water, pipe network performance, quality of service, financial performance, water consumption and production, metering practices, cost and staffing, billings and collections and capital investments.

5.1.2 Data sources for monitoring

Monitoring water and sanitation interventions requires a combination of data sources including household surveys and administrative data from utilities and other agents engaged in the provision of services. Qualitative data from participatory poverty assessments or other similar studies may also be required. **Table 3** summarizes the main sources of household data relevant for water and sanitation monitoring (for more information see the Poverty Diagnostics and the Monitoring and Evaluation chapters).

Baseline data on impact and outcome indicators can be obtained from recent Living Standards Measurement Surveys (LSMS) or Integrated Surveys (IS), Demographic and Health Surveys (DHS), and the census. Annual monitoring for a number of indicators can be done using information from Priority Surveys (PS) or Core Welfare Indicators Surveys (CWIQ). The monitoring frequency of indicators not included in the CWIQ – mainly health and income or consumption indicators – will vary between 3 to 5 years depending on the schedule of the following round of LSMS or DHS.

Table 3: Main Data Sources for Monitoring Water and Sanitation Interventions

Data source	Relevant data for water and sanitation monitoring	Remarks
Census	Collects demographic and socio-economic information, as well as data on access to basic services including water and sanitation.	<ul style="list-style-type: none"> • Information can be highly disaggregated • Conducted only once every ten years
LSMS/IS	Record detailed data on household expenditures to construct consumption aggregates. They also collect some health indicators such as diarrhea incidence and often include anthropometric measures. For water and sanitation use, they generally ask how much the household has spent on water services; the source of water supply; the average number of hours a day in which the dwelling receives water and whether there is a sewerage connection.	<ul style="list-style-type: none"> • Comprehensive, nationally representative household survey; allows simultaneous measurement and analysis of various poverty dimensions • Collection and analysis of information is very time consuming
DHS	Provides data for a wide range of population, health and nutrition indicators including mortality rates, children nutritional status, diarrhea and sometimes other waterborne diseases incidence. It also collects basic data on socio-economic indicators including access to safe water or to a sanitary latrine.	<ul style="list-style-type: none"> • Nationally representative data on health, nutrition and population • Interim surveys focused on key indicators are conducted between rounds of full DHS • No consumption or detailed income information
PS/CWIQ	Collects information – ideally on an annual basis – to measure people’s access, utilization and satisfaction with selected social and economic services. Relevant information include access to safe water; type of toilet facility; children nutritional status; net enrollment rates and reasons for not attending school	<ul style="list-style-type: none"> • Quick and cost-effective • Collects limited information; no consumption or detailed income information
Qualitative studies	Can provide information on user satisfaction with water and sanitation services and sometimes hygiene behaviors.	<ul style="list-style-type: none"> • Sample size generally too small

Administrative records can provide useful information for monitoring some indicators. For example, if utilities have effective metering programs, client databases can provide some information on consumption levels. Records kept by public health departments can provide information on water quality. In addition, appropriate government ministries or departments may collect data on service coverage. These data can be a relatively low cost alternative to collect data for water and sanitation monitoring on a frequent basis. However, they have some drawbacks. They do not provide information on the consumption patterns of informal connections or users without meters. Moreover, unlike other sectors, administrative data relevant for water and sanitation comes from different line ministries and other government offices. This requires a great deal of inter-institutional coordination and collaboration to ensure timely availability of all necessary data and makes more difficult to ensure quality control.

5.2. Assessing water and sanitation policies and programs

Regular monitoring can be complemented with more in-depth assessments of particular policies and programs. Depending on the methodology applied, these studies can answer different questions of interest such as which social groups are benefiting from public spending in water and sanitation and to what extent changes in wellbeing indicators can be attributed to a particular policy or program. Two commonly used assessments for water and sanitation are discussed below.

5.2.1 Impact Evaluation

As discussed in detail in the Monitoring and Evaluation chapter, impact evaluations try to determine the causal relationship between policies and programs and observed changes in individual's well-being. In the water and sanitation context, evaluations have focused mostly on establishing the causality between changes in health indicators, mainly diarrhea incidence, and improvements in water and sanitation. Experience in conducting this type of studies is mixed. A number of methodological problems and concerns regarding costs have led to limit the use of impact evaluations as an operational tool for project evaluation and propose alternative approaches that look at outcomes such as hygiene behavior rather than health impacts (see **Technical Note 2**).

There are, however, some rigorous attempts to measure health improvements from investments in water and sanitation. Jalan and Ravallion (2001) assessed the impact of piped water on the incidence and duration of diarrhea among children under five in poor families. Another example is the evaluation of the Social Fund in Nicaragua. It assessed the impact of water supply investments and latrine projects on malnutrition (see World Bank 2000). Two factors may have contributed to the usefulness and reasonable costs of these studies. First, they piggy backed on existing or ongoing large household surveys, saving much of the costs of creating and implementing a whole new data collection instrument. Second, they applied a methodology recently adapted for evaluation of social programs -- propensity score matching — that is generally considered as a second best solution, when randomization is not feasible (see **Monitoring and Evaluation** chapter).

5.2.2 Benefit Incidence Analysis

Benefit or spending incidence analysis is another common tool for performance assessment. As described in detail in the Public Spending chapter, benefit incidence analysis examines whether poorer households derive a proportionally larger share of benefits from public spending than do wealthier households relative to the overall income distribution. It helps determine how progressive, regressive or neutral is the public spending on water and sanitation. Technical Note 5 presents some examples of the use of benefit incidence analysis to assess tariff structures and subsidy schemes.

Benefit incidence analysis can provide useful insights into the social distribution of the benefits of government service provision and spending on water and sanitation, and is relatively simple to carry out. However, it has its limitations (see **Public Spending** chapter). The cost of services

is used as a proxy for the benefits received from having access to a particular type of service. This, of course, is a crude measure of benefits and fails to consider the ability of different social groups to transform access to the service into improved wellbeing as measured by, for example, lower mortality rates. Furthermore, government spending used to calculate service costs may not represent the full cost to users. Full costs may also include direct payments to service providers, travel expenses, and the opportunity cost of time lost to productive activities.

5.3. Using Monitoring and Evaluating Results

A critical issue in monitoring and evaluation is how to use the results and create a feedback process. As shown in Figure 2, monitoring and evaluation results can be used to clarify further the linkages between water and sanitation and other poverty dimensions; redefine problem areas; and refine the menu of possible public interventions. Diagnostic questions that can be answered by the feedback from monitoring and evaluation results include:

Progress in goal achievement

- ✓ Were all the targets set met?
- ✓ Were the targets realistic?
- ✓ Were there major economy-wide factors or shocks that influenced the progress in goal achievement?

Poverty linkages

- ✓ Did improvements in water and sanitation access parallel reductions in water and sanitation related diseases, especially diarrhea? If not, was improved access to infrastructure accompanied by better hygienic behavior? If improvements of hygiene behavior could be observed, but no improvements in health indicators, is the water of drinkable quality and available throughout the year?
- ✓ Did improvements in water and sanitation infrastructure in schools parallel an increase in children (especially girls) attending classes?

Identification of problem areas

- ✓ Is there evidence that constraints to service access were removed with the help of the chosen set of interventions?

Choice of interventions

- ✓ Who is benefiting from public spending and in what proportion?
- ✓ Do the key interventions achieve their intended goal?
- ✓ Can the changes in outcomes be explained by these intervention, or are they the result of some other factors occurring simultaneously?
- ✓ Does the impact of key interventions vary across different groups of intended beneficiaries (males, females, indigenous people), regions, and over time?
- ✓ How effective is a particular policy or program in comparison to alternative interventions? Is the intervention worth the resources it costs?

6. Summary

This chapter has described possible elements of a contribution by water and sanitation to a national poverty reduction strategy. It has highlighted the pathways through which water and sanitation services influence poverty status. And it has stressed the importance of understanding exactly how the poor use water and sanitation services, and the fact that among the poor such use may vary by region, by rural, town, and urban status, by gender, by ethnicity, and by the depth of poverty. In this complex environment, devising an effective strategy that reaches the target groups will require consultation with those groups.

Everyone, no matter what their poverty status, has water and sanitation services. But service levels vary tremendously, even within the broad category of the poor. Some differences in service levels, such as supply pressure, are matters of convenience, but others, such as pathogen loads in drinking water or latrines to isolate feces from human contact, affect fundamentally the health, education and other attributes that can exacerbate or ease poverty. A poverty reduction strategy will focus on the latter aspects of water and sanitation service.

Most rural people and, in most countries, the bulk of the urban poor rely on private provision to meet their water and sanitation needs. Indeed, recent evidence strongly indicates that publicly provided water and sanitation services repeatedly fail to provide efficient service or to reach the poorest segments of the population. Any water and sanitation strategy will need to recognize and be built around the centrality of private provision.

The chapter therefore recommends an approach to a water and sanitation strategy that first concentrates on providing a strong, supportive policy environment for existing private service provision. One important government role may be the establishment of micro-credit or other arrangements that avoid unsustainable subsidized services, yet facilitate improvements demanded by the poor. Where direct government provision and management of networked water services or standpipes continues, the chapter recommends immediate assessment of service efficiency, measured against national and international benchmarks, to determine efficiency levels. A forward-looking strategy would be very unlikely to depend on further expansion of direct government service provision, but would seek means of increasing the competitive pressure on existing services.

A successful strategy will adapt to new understanding and new circumstances. For this reason, an element of the poverty reduction strategy will be a monitoring and evaluation program that provides continuous feedback on what is working and what is not. This chapter concludes with a recommendation for monitoring and evaluation programs built on heavy participation by the poor themselves.

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