Draft for Comments. April, 2001

Water, Sanitation and Poverty Technical Notes

TN 1: Global Indicators on Access to Safe Water and Adequate Sanitation

		Population with access to safe water (%)		Population with access to adequate sanitation (%)	
	Year	**Urban**	**Rural**	**Urban**	**Rural**
Afghanistan	1989-90	38	17	2	0.3
Albania	1994	97	70	97	10
Algeria	1986-88	86	55	…	…
Angola	1990-95	69	15	71	4
Argentina	1995	71	24	80	42
Austria	1989-90	…	…	100	100
Azerbaijan	1991-93	…	…	67	0.1
Bahamas	1995	95	86	100	100
Bahrain	1996	100	100	100	100
Bangladesh	1995	49	96	41	36
Belgium	1989-90	100 a	91 a	100	100
Benin	1995	82	69	60	11
Bhutan	1995	54 b	26 b	90	70
Bolivia	1995	88	43	77	39
Bosnia and Herzegovina	1991-93	…	…	71	12
Botswana	1995	100	77	91	41
Brazil	1995	80	28	74	43
Brunei Darussalam	1991-93	100	92	71	51
Bulgaria	1989-90	…	…	100	96
Burkina Faso	1986-88	50	26	38	5
Burundi	1991-93	97	55	71	47
Cambodia	1995	20	12	…	…
Cameroon	1996	…	30	73 b	21 b
Cape Verde	1989-90	75	34	42	10
Central African Rep.	1994	20	25	…	…
Chad	1994	48	17	74	7
Chile	1995	99	47	95	…
China c	1995	…	…	68	16
Colombia	1995	90	32	70	27
Comoros	1996	74	41	40	16
Congo	1995	…	11	15 b	4 b
Costa Rica	1995	100	99	100	95
Croatia	1995	75	41	71	26

		Population with access to safe water (%)		Population with access to adequate sanitation (%)	
	Year	**Urban**	**Rural**	**Urban**	**Rural**
Cuba	1995	98	72	92	74
Cyprus	1996	100	99	100	100
Dem. Rep. of the Congo	1995	89	26	53	6
Djibouti	1989-90	26	14	94	50
Dominican Republic	1995	88	55	89	68
Ecuador	1995	81	10	70	26
Egypt	1996	95	74	95	49
El Salvador	1995	82	24	89	65
Equatorial Guinea	1996	41	31	…	40
Eritrea	1996	…	…	12	0.3
Finland	1995	100 b	85 b	100	100
France	1989-90	…	…	100	90
Gabon	1991-93	80	30	79	67
Gambia	1991-93	64	39	99 d	79 d
Ghana	1996	88	52	75	…
Greece	1989-90	…	…	100	94
Guatemala	1995	97	48	91	50
Guinea	1995	55	44	24	10
Guinea-Bissau	1990-95	38	57	32	17
Guyana	1991-93	100	75	87	30
Haiti	1995	38	39	43	16
Honduras	1995	91	66	91	71
Hungary	1989-90	…	…	100	85
Iceland	1995	100	100	100	100
India	1995	…	82	…	4
Indonesia	1995	87	57	88	61
Iran	1995	98	82	86	74
Iraq	1994	92	44	85	37
Ireland	1989-90	…	…	100	100
Israel	1995	100	95	100	99
Italy	1989-90	…	…	100	100
Jamaica	1995	92 b	48 b	99	…
Kiribati	1996	70	80	83	45
Korea, Dem. People's Rep.	1995	100	100	100	100
Korea, Republic of	1995	93	77	100	100
Kuwait	1995	100	100	100	100
Kyrgyzstan	1991-93	93	42	87	31
Latvia	1994	92	…	90	…
Lesotho	1995	64	60	76	32
Liberia	1986-88	50	25	…	…
Libyan Arab Jamahiriya	1995	90	91	90	75
Luxembourg	1989-90	…	…	100	100

		Population with access to safe water (%)		Population with access to adequate sanitation (%)	
	Year	**Urban**	**Rural**	**Urban**	**Rural**
Madagascar	1991-93	54	4	64	25
Malawi	1996	97	52	94	61
Malaysia	1995	100	86	94	66
Maldives	1995	94	78	98	26
Mali	1996	56 e	20 e	61	22
Malta	1989-90	100 a	…	100	100
Marshall Islands	1991-93	100 d	33 d	88	57
Mauritania	1996	86	41	44	19
Mauritius	1989-90	100	95	100	100
Mexico	1995	90 b	66 b	93	29
Monaco	1995	100	…	100	…
Mongolia	1996	100	68	100	54
Morocco	1995	97	20	97	39
Mozambique	1994	…	40	68	…
Myanmar	1995-96	78	50	56	36
Namibia	1991-93	62	45	78	37
Nepal	1996	61	59	74	18
New Zealand	1986-88	…	…	100	…
Nicaragua	1995	93	28	88	28
Niger	1997	70	44	79	5
Nigeria	1995	80	39	82	48
Norway	1995	100	100	100	100
Pakistan	1996	85	56	75	24
Panama	1995	99	73	99	81
Papua New Guinea	1991-93	97	18	95	12
Paraguay	1995	70	6	…	44
Peru	1995	91	31	78	23
Philippines	1995	94	…	…	…
Poland	1989-90	89 a	…	100	100
Portugal	1989-90	…	…	100	100
Qatar	1996	100	100	100	100
Republic of Moldova	1995	98	18	96	9
Romania	1991-93	70	10	81	3
Rwanda	1995	79	44	…	…
San Marino	1989-90	…	…	100	…
Senegal	1996	90	44	68	12
Sierra Leone	1989-90	86 a	20 a	90	…
Slovenia	1994	100 b	97 b	100	95
Solomon Islands	1996	…	…	60	9
South Africa	1994	90	33	78	12
Sri Lanka	1995	88	65	81	70
Sudan	1995	84	41	79	4
Surinam	1995	100	70	95	36

		Population with access to safe water (%)		Population with access to adequate sanitation (%)	
	Year	**Urban**	**Rural**	**Urban**	**Rural**
Swaziland	1996	80	46	…	…
Sweden	1989-90	…	…	100	100
Switzerland	1989-90	100 a	100 a	100	100
Syrian Arab Republic	1996	96	79	…	…
Tajikistan	1991-93	86	32	83	14
Thailand	1995	94	88	98	95
The FYR of Macedonia	1989-90	…	…	68	13
Togo	1995	82	41	76	22
Tonga	1986-88	100	100	…	…
Trinidad and Tobago	1995	100	88	97	92
Tunisia	1994	100	76	100	50
Turkey	1989-90	72 a	63 a	99	90
Turkmenistan	1991-93	80	5	70	5
Uganda	1995	60	36	60	50
Ukraine	1991-93	77	12	70	8
United Rep. of Tanzania	1991-93	65	45	97	83
Uruguay	1995	99	…	56	…
Uzbekistan	1991-93	72	46	46	5
Vanuatu	1989-90	95	67	90	88
Venezuela	1995	79	79	74	60
Yemen	1995	74	14	40	14
Zambia	1995	66	37	66	37
Zimbabwe	1991-93	99	64	99	48

Sources:
World Health Organization (1997)

Footnotes:
... Not available.
a Data refer to 1986-88.
b Data refer to 1991-93.
c For statistical purposes the data for China do not include Hong Kong Special Administrative Region (Hong Kong SAR), Macao Special Administrative Region (Macao SAR) and Taiwan province of China.
d Data refer to 1989-90.
e Data refer to 1995-96.

Other web sites with relevant statistical information on water, sanitation and health include:

WHO (2000), Global Water Supply and Sanitation Assessment 2000 Report
http://www.who.int/water_sanitation_health/Globassessment/GlobalTOC.htm

UNICEF (1997), Sanitation League Table
http://www.unicef.org/pon97/league1.htm

Technical notes:

Data on population with access to safe water and access to sanitation are obtained from the third evaluation of the Health For All strategy. For the latest evaluation, data were collected in 1997. The World Health Organization (WHO) collects this information from Member States through questionnaires as part of their continuous effort in monitoring and evaluation of safe drinking water and sanitation.

Percentage of population with safe water refers to the proportion of population *with access* to an *adequate amount* of *safe drinking water* in a dwelling or located within a *convenient distance* of the user's dwelling. The relevant definitions follow.

Population covered: Includes urban population served by house connections, urban population without house connections but with reasonable access to public standposts, and rural population with reasonable access to safe water.

Reasonable access to safe water: In the home or within 15 minutes walking distance. A proper definition should be adopted taking local conditions into account: in urban areas, a distance of not more than 200 meters from a house to a public standpost may be considered reasonable access; in rural areas, reasonable access implies that the housewife does not have to spend a disproportionate part of the day fetching water for the family's needs.

Convenient distance: Convenient distance and access are distinct in a sense that there may be access to water but it is not necessarily convenient to fetch water because of distance. The water should be within a reasonable distance of the home, i.e., 200 meters to fetch 20 liters of safe water per person per day.

Adequate amount of water: Amount of water needed to satisfy metabolic, hygienic and domestic requirements, i.e., 20 liters of safe water per person per day.

Safe water: Does not contain biological or chemical agents at concentration levels directly detrimental to health. "Safe" includes treated surface water and untreated but uncontaminated water such as that from protected boreholes, springs and sanitary wells. Untreated surface waters, such as streams and lakes, should be considered safe only if the water quality is regularly monitored and considered acceptable by public health officials.

Percentage of population with adequate sanitation refers to the proportion of population with access to a *sanitary facility* for human excreta disposal in the dwelling or immediate vicinity. A *sanitary facility* is a unit for the disposal of human excreta which isolates feces from contact with people, animals, crops and water sources. Suitable facilities range from simple but protected pit latrines to flush toilets with sewerage. To be effective, all facilities must be correctly constructed and properly maintained.

TN 2: Approaches to Assessing Health Impacts

Introduction

Attempts to measure the health impact of water supplies and sanitation have a long and checkered history. Many of them have been made by amateur epidemiologists at the behest of the agencies funding the construction of the facilities, and with insufficient planning and rigour. Even some studies supervised by eminent specialists have produced almost useless or meaningless results, after taking years to complete and costing substantial sums of money. This unhappy experience led a panel of experts, convened in 1975 by the World Bank, to conclude that the Bank should not undertake any long-term longitudinal studies of the question.

There were brief hopes during the 1980s, the International Water Decade, that a new technique, the case-control method, would provide a quicker, cheaper means of measuring the impact on diarrheal disease. However, several experimental studies of this type produced disappointing results, and it became clear that they suffered from similar shortcomings to studies of the more conventional design.

Methodological problems

One review of the literature listed eight common errors found in health impact studies; one or more of these shortcomings was found in every one of the studies reviewed.

Epidemiological studies depend on the intervention studied (in this case, water and sanitation) and an outcome measure (the health impact). Part of the problem is the nature of the intervention. The ideal way to measure the impact of any health intervention, the double-blind, randomized, controlled trial, is not feasible for water and sanitation. There is no placebo for a pit latrine. Moreover, the unit of intervention usually has to be the community, rather than the household. Besides, it is almost impossible to allocate water supplies and sanitation at random - ethically, politically and practically.

The principal outcome is diarrheal disease; by any reckoning, more than 90% of the health benefits of improved water supplies and sanitation arise from reduced diarrheal illness, most of it in children less than five years old. This raises other problems. Diarrhea is caused by a wide variety of micro-organisms, transmitted by a wide range of different routes. Water supply and sanitation affect only some of these. For these reasons, well-designed water supply and sanitation interventions typically reduce diarrhea incidence by about 25%.

Box 1 – Confounding Factors

An epidemiological study might well find that television ownership was associated with reduced incidence of diarrhea, but of course this does not mean that televisions prevent the disease. Rather, people who own TVs are likely to be richer and better-educated than their neighbors, and these and other factors help to protect them from illness, causing an apparent association. This is called confounding and is a major problem in health impact studies. For example, people who own latrines may have less diarrheal disease, but this does not necessarily prove that the latrines are the cause.

With more than 3 million children dying of diarrheal disease each year, a 25% reduction is a very substantial public health benefit; however, with many other factors (education, nutrition, climate) also affecting diarrhea rates, a percentage reduction of only 25% is extremely hard to measure reliably. Moreover, if detected, it is very difficult to attribute a reduction unambiguously to improved water and sanitation.

For these reasons, a review of the published and unpublished results of the best health impact studies of the Water Decade concluded that health impact studies are not an operational tool for project evaluation or 'fine tuning' of interventions. The results are not only unpredictable; they frequently offer no firm interpretation.

Moreover, by their very nature, epidemiological studies have little power to diagnose deficiencies and suggest improvements, a normal requirement of operational project evaluations. If no health impact is found, it could be because the water and sanitation facilities are not functioning, or because they are not used correctly. Functioning and use are the first questions to ask in any evaluation of a water and sanitation project. Whether or not a health impact is found, the study itself does not offer any guidance on how the project, and hence the impact, might be improved.

An alternative approach

What we do know from the existing literature on impact studies is that in those cases where a significant health impact was found, the provision of water supply or sanitation had been accompanied by improvements in hygiene. 'Hygiene' in this context refers to practices such as the washing of hands, food and utensils, or the disposal of children's stools. It may be promoted by better access to water and sanitation, or by hygiene education. Improvements in hygiene may be reflected in increased water consumption. If no such change in behavior results from improved water supply or sanitation, the only benefits which are likely to occur are those stemming from improved water quality; in many settings, these are relatively minor or even negligible.

Box 2 – Minimum Evaluation Procedure

Health improvements are only the culmination of a long chain of cause and effect. This runs from the original construction of the water supplies or sanitation facilities, through their operation and hence their use, permitting changes in hygiene 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. Hygiene behavior is another such link.

Instead of attempting to measure disease rates, studying patterns of hygiene behavior has far greater diagnostic power, in terms of indicating opportunities for project improvement. Since it is further back up the causal chain, it is easier to attribute to the project intervention. It is also quicker and cheaper than epidemiological studies. It can also be done at the project design stage. This will not only help to establish a baseline yardstick against which to compare evaluation results, but also improve project design. A convenient user-friendly manual is available, and so is a more detailed account with case studies.

Reprinted with authorization from: Cairncross, Sandy, WELL Technical Brief 10, 1999, also available at http://www.lboro.ac.uk/well/services/tecbriefs/impact.htm

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TN 3: Demand Assessment Techniques: Water Supply and Sanitation

	1. Elicit relative demand between different services*	2. PRA** option selection: internally facilitated*	3. PRA option selection: externally facilitated*	4. Revealed preference surveys (RPS)	5. Contingent valuation method (CVM)*	6. 'Real' detailed options considered by community groups or ballot
Description of technique	Improvements to a wide variety of different services such as water, drainage, roads, etc., are considered by the communities who express their relative demand for these services. Total funds available for each community area should be reasonably fixed.	Community volunteers are encouraged and trained to undertake a participators survey in their own community. Preferences and commitments are then agreed in meetings.	A variety of PRA techniques are used by trained researchers or facilitators to triangulate and confirm the preferences of different community groups, who are also involved in the analyses.	RPS estimate time and financial costs of current household behavior, (e.g., payments to water vendors and time saved in collecting water).	A questionnaire survey to determine the maximum willingness-to-pay of individuals for various options for level of service (including improved reliability), payment arrangements, within the context of the current or specified institutional regime.	Detailed options and their implications (costs, O&M, institutional, etc.) are considered by communities using PRA or ballot.
Potential benefits	simple and easily understood expresses 'real' demand if only in relative terms preferences can be refined during micro-planning inexpensive compatible with PRA work	very good community sense of ownership enhances empowerment useful if demand assessment involves on-going negotiation	good community sense of ownership extension staff can assess appropriate time to elicit demand can enhance empowerment can be used in changing institutional environment	can provide reasonably accurate estimates of current time and cost expenditure and hence possible willingness-to-pay for service improvements data and analysis requirements are modest good baseline data for impact assessment compatible with PRA	provides good data for Project Appraisal good data on WTP and potential revenues for different service levels, assuming a thorough survey is undertaken can guide tariff subsidy and cost-recovery policy similarity to public opinion polls means results conceptually easy for non-specialists and politicians to understand	more precise cost estimates lead to less confusion institutional charging of O&M implications can be thoroughly assessed can be used in a changing institutional environment
Potential risks and constraints	possible group or strategic bias WTP for different service levels not readily known process can be manipulated by extension workers, who do not use	possible group bias liable to lack of technical/ financial rigor reliant on skills being in the community	possible group bias process can be manipulated by extension workers, who may not use sufficient technical/	Cannot estimate HH response to price increases (including for new levels of service options) Poverty may constrain ability of poor people to	risks inhibiting community decision-making and ownership, for instance by raising expectations about particular options relatively high cost and requires	risk of key decisions being based on misleading results from an unrepresentative group unless care is taken to avoid group bias

	1. Elicit relative demand between different services*	2. PRA** option selection: internally facilitated*	3. PRA option selection: externally facilitated*	4. Revealed preference surveys (RPS)	5. Contingent valuation method (CVM)*	6. 'Real' detailed options considered by community groups or ballot
	who do not use sufficient technical or financial rigor	requires substantial flexibility by external funding agencies and local support institutions	financial rigor if not adequately supervised extension workers with good facilitation skills are required	convert time savings resulting from service improvements into cash payment for them Rarely useful for sanitation projects	specialist consultant for reliable results inaccuracies may occur in a changing institutional environment	requires detailed cost information, so earlier demand assessment may need to use other method detailed work on some options can be redundant requires flexibility by funding agency
Typical usage	suitable for village or slum general improvement projects. NGOs often use this technique	more suitable where low-tech, low-cost solutions are definitely viable, e.g., handpumps and latrines	suitable in most situations, possibly complemented by other methods	Suitable where substantial water supply problems exist. To be used in conjunction with PRA methods	suitable for informing strategic decisions on levels of service, cost-recovery policy, etc., in large investment programs, e.g., urban systems, or policy framework for small rural supply schemes	suitable where difficult choices are to be made between different options

Source: DFID (1998)

* estimated costs of technically viable options are needed for these techniques
** PRA = Participatory Rapid Appraisal

TN 4: Design Principles for Rural Water and Sanitation Interventions

Thematic Area	Problem Definition and Key Responses	Community Water and Sanitation (CWS) Strategy for Rural Areas and Small Towns
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 regulation, and conflicting priorities Response • Prioritization of areas where policy reform is in place, or where there is a demonstrated commitment to it • Government should clearly articulate and disseminate policies, regulations and programs • Role of stakeholders should be clearly defined • Broad consultation in policy review should be promoted	**Promote a demand responsive approach (DRA) where communities make informed choices regarding their participation, service level, and service delivery mechanisms.** Communities decide: • Whether to participate in project • Preferred level of service based on willingness to pay • How services are planned, implemented, operated and maintained • How funds are managed and accounted for **Promote institutional reform based on clear roles for key stakeholders where communities own their facilities, the private sector provides goods and services, and government facilitates the process.** • Community owns, manages, and helps finance services; • Government at all levels facilitates the process by encouraging stakeholder participation, setting policies and standards, and financing facilities. • Private sector and NGOs provide goods, services and financing • External support agencies: financing, technical assistance, policy coordination • Civil society provides policy and implementation support **Ensure appropriate legal framework for ownership and management.** • Ownership (water resources + assets); • Recognition and autonomy of community-elected Water Users Associations (WUAs) to operate, set tariffs, manage funds, especially vis-a-vis local government **Implement CWS projects within context of broader community and local government development.** • Support decentralization reforms • Recognize and promote cross-sectoral linkages (education, health, rural development, energy, etc.)
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. Response • Financial policy should link prices charged to costs of services. Users should pay more for higher levels of service • Tariff policy is important and should be designed to meet financial viability of each system • Subsidies should only be transitional and targeted to communities on a one-time basis • Balance capital investments with long term O&M	**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.** • Promote increased capital cost recovery from users • An upfront cash contribution based on their willingness-to-pay is required from users to demonstrate demand and develop community capacity to administer funds and tariffs • Ensure 100% recovery of operation and maintenance costs • Improve community level financial management and resource mobilization, especially for major repairs/replacements and service expansion • Set up robust financing mechanisms (public and private sector) and explore financial intermediation options (such as household credit for on-site sanitation) to increase internal resource mobilization • Small towns may need specific assistance for tariff-setting and financial management plan for service expansion and upgrading, • Provide detailed information on costs to allow for informed choice, and seek to reduce investment costs through lower cost options and more efficient delivery mechanisms

Thematic Area	Problem Definition and Key Responses	Community Water and Sanitation (CWS) Strategy for Rural Areas and Small Towns
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. Response • Promote community ownership and management and support a range of delivery and management options based on service levels, population size, etc . • Promote policies and institutional reform that remove barriers to private sector participation and other support and management arrangements • Develop mechanisms for allowing users to make informed choice (social intermediation) • Promote flexible standards that open up choice, support appropriate technologies and equipment standardization (where required for spare part network) • Consider management and O&M issues as an integral element of the community planning and decision process	**Support formation of representative Water User Associations (WUA) for planning, implementation, and management of community water supply facilities** Promote community contracting and transparency in all procurement • Recognize range of management options based on community size, technical and financial complexity, and consider the special needs of multi-community regional systems and neighborhood options in small towns. The larger and more complex the system, the greater the need for professional operators. • Ensure long-term support and technical assistance to community management (private and public sector support, association of WUAs, etc.), appropriate technology, availability of spare parts in the local market, etc. **Create competitive environment for allowing communities to access range of providers of goods and services for all aspects of the project cycle** • Community organization and formation of representative WUA, resource mobilization • Service planning: estimating costs, engineering designs, financing plans • WUA training in financial management, contract administration, operations and maintenance • Community awareness-raising, hygiene education, sanitation promotion • Contracting, procurement and construction supervision • Long-term support to management, operation, maintenance • Small towns are institutionally, technically and financially more complex than rural areas and require additional support and training
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 (HES). Approaches to sanitation have focused mainly on technology aspects, rather than on behavior changes and creating a market (supply and demand) for sanitation facilities Response • Ensure that HES components are included in national policy dialogue and resources provided in CWS programs	**Integrate water, sanitation and hygiene education in CWS projects** • Hygiene education and sanitation need clear objectives, performance indicators and monitoring and evaluation processes • Hygiene education should build on existing beliefs and community priorities, and seek to achieve effective and sustained use of improved water and sanitation services and hygiene practices • Schools and family units are both important in HES programs **Promote user investment in sanitation through public awareness and HES education and strengthen private sector's ability to construct facilities** • Subsidy programs for sanitation are not sustainable, however targeted subsidies may be appropriate to demonstrate approaches and stimulate demand • Include a wide range of technology options for waste water and excreta disposal and treatment • Interventions should be coordinated with and supplement National Health Programs
Participation and Gender	Lack of community involvement, and especially of women, has been the main reason for poor service sustainability. Traditional project design did not consider the required project rules and incentives to achieve full participation. Response • DRA requires ample information flow, and processes for the community to make all	**Ensure representative and informed participation of all stakeholders** • Place the community at the forefront of decision-making and management through appropriate project rules, incentives and social intermediation • Ensure participation of women and minority groups • Promote exchanges (meetings, newsletters, e-mail, associations of WUAs) • Facilitate stakeholder participation in policy formulation and program design/evaluation • Monitoring and evaluation should include participation of all stakeholder groups

Thematic Area	Problem Definition and Key Responses	Community Water and Sanitation (CWS) Strategy for Rural Areas and Small Towns
	investment decisions • CWS programs should recognize women as primary users of water, hygiene educators and managers and involve women in sector development, treating men and women as equal partners	
Capacity Building	Insufficient attention is paid to the appropriately targeted capacity building required to implement DRA, and there are also few incentives for local private sector and NGOs to participate in programs <u>Response</u> • Capacity bldg is central to Bank support in sector • Capacity building requires a commitment to long-term support • Projects must have realistic objectives consistent with local capacity and build in local knowledge • DRA recognizes the need to support community outreach, social intermediation and training	**Include clearly defined capacity building components that enable all stakeholders to play their roles and build partnerships** • Target training to communities, private sector and NGOs, local/regional/national government. • Innovative tools and methodologies are required as well as a learning-by-doing approach. • Community outreach, intermediation and training are required before, during and after facility construction. • Selection of trainers and community development workers should be done in a cost effective and competitive manner, with the community involved in the contracting process, as appropriate. • Capacity is most required in social intermediation skills and informing communities about choices. • Training should be time-bound, output and impact oriented, with performance monitoring and targets to measure capacity and achieve goals. • Develop opportunities for local stakeholders (private sector, local government, NGOs) to participate and build their capacity
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 <u>Response</u> • Design CWS programs to reach the poorer segments of the population • Expand range of technology and management options that are affordable to the poor	**Set rules to target poor, unserved communities and vulnerable groups in these communities.** • 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

Thematic Area	Problem Definition and Key Responses	Community Water and Sanitation (CWS) Strategy for Rural Areas and Small Towns
Environmental Management	Improper excreta and solid waste disposal are increasingly a source of pollution and related disease. Growing demand for water coupled with high variability of supply contributes to increased competition for scarce water resources and degradation of resource. <u>Response</u> • Consider environmental aspects of CWS: water resources and waste management • Promote holistic view of IWRM in designing CWS policies and programs	**Support community-based environmental management to improve living conditions and protect water resources.** • Consider source protection, conservation, and education of water users as stewards of water resources, watershed management and appropriate water resource allocation among competing sectors, etc. • Promote waste management as an integral part of integrated water resources management (IWRM) • Support public awareness and community education programs on environmental protection and IWRM • Rely on groundwater rather than surface water which must be treated to protect water quality

TN 5: Design of Pro-Poor Tariff Structures and Subsidy Mechanisms

Box 1 -- Do Cross-Subsidies Help the Poor to Benefit from Water and Wastewater Services?

Cross-subsidies form a common element of tariff policy designed to help the poor gain access to reliable water and sewerage services. The utility charges low income groups and residences a tariff below cost (often well below), and attempts to offset the revenue loss by charging industrial and commercial users a tariff above average cost. This study looks at the outcome of this approach in Guayaquil, Ecuador. Guayaquil has large unmet water needs, with 500,000 out of 2 million people lacking house connections. With an estimated average tariff of US$0.94/$m^3$ needed to meet supply costs and expansion needs, the utility charges residential users only US$0.02/$m^3$, but industrial and commercial users US$1.76/$m^3$.

In Guayaquil, the tariffs paid by the poor and residential consumers do not cover the costs of even collecting the tariff, much less providing services. Apart from the economic "welfare loss" of inefficient water distribution, the tariff structure gives the utility no incentive to extend residential service. Indeed, the utility lacks interest even in government grant financing of new connections, since each connection simply increases the utility's monthly losses. The poor have no alternative but to depend on unreliable sources of non-network water that are either costly, of poor quality, or both. At the same time, industrial and commercial operators appear to increasingly invest in self-supply, opting out of the expensive (for them) network system.

Source: Yepes, Guillermo (1999)
Downloadable at: http://www.wsp.org/English/index.html?wps_subsidy.pdf
Spanish version also available

Box 2 -- Infrastructure Reform, Better Subsidies, and the Information Deficit: A Case Study of Panama

In developing countries the provision of water and sanitation services is often subsidized. These subsidies take the form of a general underpricing of water, numerous cross-subsidies, and inefficient billing and collection. An essential part of infrastructure reform is the redesign of subsidies. In the design of an optimal subsidy scheme the key decisions are the choice of eligibility criteria, the level of the subsidy and the budgetary requirements. However, the lack of consistent and reliable data sets which combine socioeconomic and water consumption information may be an important obstacle to making good decisions, undermining efforts to provide affordable water services for the poor. This Note discusses the type of information required, where it can be found, and ways to deal with shortcomings in the data. To illustrate, the Note draws on data from World Bank work in Panama.

Source: Gómez-Lobo, Andrés, Vivien Foster, and Jonathan Halpern (2000a)
Downloadable at: http://www.worldbank.org/html/fpd/notes/212/212gomez.pdf

Box 3 -- Designing Direct Subsidies for the Poor—A Water and Sanitation Case Study in Panama

Direct subsidies are an increasingly popular means of making infrastructure services more affordable to the poor. Under the direct subsidy approach, governments pay part of the water bill of poor households that meet certain criteria. This approach was first used in water sector reforms in Chile in the early 1990s and is an alternative to the traditional method in which governments pay subsidies directly to utilities, often allowing the price of water to fall below economic costs indiscriminately. This Note illustrates how simulation techniques can be used to inform the design of direct subsidy schemes, ensuring that they are both cost-effective and accurate in reaching the target population.

Source: Foster, Vivien (2000)
Downloadable at: http://www.worldbank.org/html/fpd/notes/211/211foste.pdf

Box 4 -- Better Household Surveys for Better Design of Infrastructure Subsidies

Reform of the water, electricity, and telecommunications sectors is gathering momentum in nearly all developing countries. Reform should include an assessment of whether subsidies are necessary and if so, how to design subsidies that reach their intended beneficiaries accurately and do not distort the market. A major challenge for reforming governments is to build the capability to do this fast enough for subsidy redesign to be incorporated in sector reform. Clearly, it would save time to use existing sources of information. Potentially, one of the most useful sources is the Living Standards Measurement Study (LSMS) survey. However, the LSMS questionnaires do not generate all the information needed for subsidy design. Fortunately, with a few simple and inexpensive changes, these surveys could be made much more useful for the design of subsidies and for devising policies that would give the poor better access to infrastructure services.

Source: Gómez-Lobo, Andrés, Vivien Foster, and Jonathan Halpern (2000b)
Downloadable at: http://www.worldbank.org/html/fpd/notes/213/213summary.html

Box 5 – W&S Subsidies in the Former Soviet Union

Utility subsidies can serve many objectives. Sometimes governments want to ensure that all households receive a basic (universal) level of service because of the perceived positive externalities associated with it, or as an attempt to win support from the electorate. A temporary subsidy may be an acceptable price to pay for making a large tariff increase politically palatable. Subsidies to certain classes of consumers may facilitate a systematic effort to strengthen payment discipline and reduce the stock of outstanding receivables. Finally, subsidies may help to redistribute income and enable the poor to receive utility services without having to sacrifice other essential needs.

Source: Mitric, Slobodan (1999)
Downloadable at: http://www.worldbank.org/ecspf/ecsin/Papers/WP5.htm

TN 6: Learning from Good and Bad Practice

1. GENERAL

Box 1 - Water and Sanitation and the Poor: Case Studies Available Online (in English, unless otherwise noted)

Asian Development Bank: http://www.adb.org/Publications/Online/

EHP (Environmental Health Project): http://www.ehproject.org/live/Rptspub.html

GARNET (Global Applied Research Network – Water and Sanitation): http://www.lboro.ac.uk/garnet/

Hydroconseil (in French): http://www.hydroconseil.com

IRC (International Water and Sanitation Centre): http://www.irc.nl

Programme Solidarité Eau (in French): http://www.gret.org/pseau

SANDEC (Department of Water and Sanitation in Developing Countries at the Swiss Federal Institute for Environmental Science and Technology): http://www.sandec.ch

Water and Sanitation Program: http://www.wsp.org

WEDC (Water, Engineering and Development Centre): http://info.lboro.ac.uk/departments/cv/wedc

WELL (Water and Environmental Health at London and Loughborough): http://www.lboro.ac.uk/well/

World Bank: http://www.worldbank.org/watsan

WSSCC (Water Supply and Sanitation Collaborative Council): http://www.wsscc.org

Box 2 -- DFID Guidance Manual on Water Supply and Sanitation Programmes

The Department for International Development (DFID) commissioned this Guidance Manual to assist staff and partners to develop effective and sustainable water supply and sanitation programs. The Manual comprises three chapters and appendices. These take the reader from an overview of the sector, through specific development perspectives, to detailed recommendations for each stage of the project cycle. The guidelines are concerned with household WS&S with the emphasis on meeting the basic needs of the poor in rural and peri-urban areas, inner city informal settlements and slums, and small towns.

Source: WELL (Water And Environmental Health At London And Loughborough), **DFID Guidance Manual on Water Supply and Sanitation Programmes**, 1999

Downloadable at: http://info.lboro.ac.uk/orgs/well/gm/contents.htm

2. AFRICA

Box 3 -- Independent Water and Sanitation Providers in African Cities

When walking through the low-income neighborhoods of large African cities, one is struck by the presence of countless small artisans going about their business to perform the most basic of public services: delivery of water and removal of sanitation wastes.

Whether they are operators of standpipes or public toilets, water carters, resellers of water, or latrine cleaners, these self-employed individual entrepreneurs and small businesses are the ones who distribute water for domestic use and perform sanitation services for most families in these neighborhoods. Though the water they sell may be drawn from the city piped water network, these private operators rarely have any official status. Most of the time, they work for themselves, independent of the city water agency or concessionaire and of the modern formal sector. In the case of sanitation, they are virtually the only providers, since piped sewerage systems are virtually nonexistent in sub-Saharan Africa. Mostly unregulated and untaxed, they belong rather to the non-formal sector of the economy which employs 70 to 90 percent of all urban workers in Africa.

In contrast to parastatal or multinational companies that seek new urban service concessions, these independent entrepreneurs reap no monopolistic benefits or rents. They must win their customers' loyalty and maintain their equipment on a daily basis. They must be ready to innovate and adapt in order to stay in business in this competitive market.

These women and men provide a public service without any subsidy. They are responding to the demand for water and sanitation services from most poor households. This clientele is often ignored by the city water authorities because they are said to be too poor to pay for their services. In fact, they are able to pay, but for a lower cost, lower standard, more adaptable range of services, as offered by the independent providers.

The provision of water and sanitation services to low-income urban areas in the developing world is a major focus of the Water and Sanitation Program (WSP). The program's objective is to improve the involvement of independent providers as partners with formal utilities, with the ultimate goal of improving the supply of water and sanitation services to low-income and informal urban settlements. This means encouraging operators who can sustain low-cost provision of these services to this clientele—not creating new enterprises, but supporting existing ones that have been catering to this market for many years.

As part of this program, surveys were carried out in ten sub-Saharan African countries during July 1998 and July 1999. The countries covered were Benin, Burkina Faso, Côte d'Ivoire, Guinea, Kenya, Mali, Mauritania, Uganda, Senegal, and Tanzania. The report consolidates the results of the ten city studies and seeks to answer the big questions about independent water and sanitation providers:

- How do they provide water service in areas where city water authorities and concessionaires hesitate to invest?
- How important are the services they supply—how many households do they serve, how many people do they employ, and what is the volume of their business?
- How do they finance their investments in an infrastructure-intensive sector of business?
- What kinds of relationships do they have with local authorities and with large water producers, both public and private?
- What are their main advantages, what obstacles do they face in seeking to expand their activities or improve the quality of service, and what policies would be likely to improve their services and benefit the low-income urban consumers they serve?

The overall picture that emerges from the study suggests that by recognizing and regularizing the activities, roles, and institutional position of independent providers, and by facilitating intermediation, coordination, and partnership between city-wide operators and independent providers, municipal and national authorities can set the stage for better delivery of water and sanitation services to the urban poor.

Source: Collignon, Bernard, and Marc Vézina (2000)
Downloadable at: http://www.wsp.org/English/pdf/providers.pdf
French version also available

Box 4 -- The Welfare Effects of Private Sector Participation in Guinea's Urban Water Supply

In 1989 the government of Guinea enacted far-reaching reform of its water sector, which had been dominated by a poorly run public agency. The government signed a lease contract for operations and maintenance with a private operator, making a separate public enterprise responsible for ownership of assets and investment. Although based on a successful model that had operated in Côte d'Ivoire for nearly 30 years, the reform had many highly innovative features.

It is being transplanted to several other developing countries, so the authors evaluate its successes and failures in the early years of reform. They present standard performance measures and results from a cost-benefit analysis to assess reform's net effect on various stakeholders in the sector.

They conclude that, compared with what might have been expected under continued public ownership, reform benefited consumers, the government, and, to a lesser extent, the foreign owners or the private operator.

Most sector performance indicators improved, but some problems remain. The three most troublesome areas are water that is unaccounted for (there are many illegal connections and the quality of infrastructure is poor), poor collection rates, and high prices.

The weak institutional environment makes it difficult to improve collection rates, but the government could take some steps to correct the problem. To begin with, it could pay its own bills on time. Also, the legislature could authorize the collection of unpaid bills from private individuals.

Source: Clarke, Georges, Claude Ménard, and Ana Maria Zuluaga (2000)
Ménard, Claude, George Clarke (2000)
Downloadable at : http://www.worldbank.org/research/

Box 5 -- Reforming the Water Supply in Abidjan, Côte d'Ivoire

Compared with other urban water systems in West Africa, the water supply system in Abidjan performs very well. Documenting the recent history of that system, the authors try to answer three questions: What motivated reform in a system that was already performing well? How and why did the reform affect sector performance, and what additional changes might improve performance further? And what explains the relatively strong performance of Abidjan's water system? Is the success attributable primarily to an efficient contractual arrangement or more generally to Côte d'Ivoire's institutional environment?

In a region plagued by political instability, Ivoirian political institutions were remarkably stable for close to 40 years. In part, the success of the Ivoirian model is the result of these institutions' stability and credibility.

The single-party system in place at the time of reform might suggest that there were few restraints in place to prevent the government from behaving opportunistically. But several features of the institutional environment protected against such opportunism. Because of this, and because reform was based on a system already performing well, the contractual arrangement with a private operator proved exceptionally capable of adjusting even in the face of dramatic changes in the external environment.

Reform in Côte d'Ivoire was motivated primarily by a macroeconomic crisis, which reduced the resources available for public investment. Without either a sector crisis or a realignment of political forces, the will for reform was weak. Consequently, opportunities for improvement were missed and some problems remain.

Among the ways in which the system could be improved: Splitting the water system into autonomous subsystems for different cities, and allowing bidding for investment contracts, would increase the chances of competition for investment, which does not currently exist.

Source: Ménard Claude, and George Clarke (2000)
Downloadable at : http://www.worldbank.org/research/

Box 6 -- Promoting Urban Sanitation in Lesotho

It is generally accepted that improved health starts with the basics of clean water, good sanitation and health education. But in any given developing country, how many people understand this? How many are prepared to divert their very limited resources to sanitation when they also have the priorities of food, shelter, clothing, transport, medical costs and school fees to pay for? Is it necessary for people to fully appreciate the health benefits? If they desire improved sanitation, does it matter what the motivation is?

Good sanitation can be viewed as a product which must be marketed to the public. It is likely to be quite low among their priorities, and it is the job of the community workers, public health workers, health assistants, sanitation teams, etc. to create a demand for improved sanitation.

At the start of any sanitation project, it cannot be assumed that people will automatically desire the product that is being promoted. The product must be adequate, acceptable and affordable. After that, much hard work must go into convincing people that they need or want improved sanitation. An initial lack of willingness-to-pay (WTP) for improved sanitation can be changed by education and promotion.

Two primary approaches were successfully used to advertise the VIP latrine. The first was to publicize the health, hygiene and cleanliness benefits of improved sanitation, and the second to heighten the status of a VIP latrine as a new, desirable, modern, and convenient product.

In Lesotho, people put a lot of emphasis on status, prestige, and position. Therefore the project team promotes the VIP latrine as affordable but not cheap. Pictures are shown of neatly constructed and painted VIPs which have attractive doors and plastering inside and outside. Mirrors, potted plants, a tiled floor, and toilet paper holders can be added to improve the appearance and status value. These extras add prestige to the basic affordable latrine.

Source: Blackett, Isabel C. (1994)

Box 7 -- Ghana: The Community Water and Sanitation Project

When Ghana's Community Water and Sanitation Program (CWSP) was launched, the country was undergoing considerable social and economic reform. This made the introduction of a new demand-responsive approach to rural water and sanitation (RWS) acceptable to most small towns and rural communities, particularly as delays in service delivery had developed under the old policies.

Despite the government's initial concerns about managing extensive change in small, illiterate, low-income rural communities, acceptance of the demand-responsive approach has been swift: community involvement (including women) is high and there is overwhelming evidence that communities regard the facilities as their own. Having the project coincide with the government's efforts at decentralization and good governance showed excellent timing, particularly as demand had shot far above the ability of the government to meet it.

Under the new program, the community initiates and makes informed choices about service options. Based on its willingness to pay for the service level chosen, it also accepts responsibilities for all operation and maintenance costs. Poorer communities would also benefit from the program if technical options were more varied and flexible. The Community Water and Sanitation Division sets national policies and strategies and creates an enabling environment for all stakeholders, and the community (along with its legal representative, the district assembly) owns and is responsible for sustaining the water facilities.

Source: Asamoah, Kofi (1998)
Downloadable at: http://www.wsp.org/English/Conference/main_ghana.pdf

3. EAST ASIA AND PACIFIC

Box 8 -- Community-Based Sewer Systems in Malang, Indonesia

Indonesia has one of the lowest rates of urban sewerage coverage in Asia, causing widespread contamination of surface and ground waters. As a result, the country has experienced repeated local epidemics of gastrointestinal infections, and has the highest incidence of typhoid in Asia. Economic losses attributable to inadequate sewerage are conservatively estimated at US$ 4.7 billion per year, or 2.4% of 1997 GDP, roughly equivalent to US$12/ household/month.

The low coverage is partly the result of the Government of Indonesia policy, which currently assigns responsibility for sanitation to households. This policy, which is a result of the poor past performance of large centralized sewer systems, has inhibited the evolution of effective local government institutions for the planning, implementing and operating of sewer systems.

Since about 1980, the proportion of the urban population in Indonesia served by sewer systems has stagnated. Yet in 1995, 73% of urban households had some form of private on-site sanitation. The partially-treated, or untreated, effluent from these facilities typically flows into open drains or directly into water bodies. Proper disposal of human waste, either septage or sullage, is a rare exception. Given the scale of the problem, interest in neighborhood or community-based sewer systems (CBSS) is increasing. This study summarizes one of the more successful examples of CBSS in Indonesia.

The main lesson that has emerged is a familiar one: *there is a direct relationship between community participation in all aspects of decision making, construction and operation of a CBSS and its operational success.*

Source: Foley, Sean, Anton Soedjarwo, Richard Pollard (2000)
Downloadable at: http://www.wsp.org/English/Regional/eap/eap_malang.pdf

Box 9 -- Determinants of Diarrheal Disease in Jakarta, Indonesia

An empirical investigation of the effects of engineering variables (water supply, proxies for the risk of contamination) and individual behavior on diarrheal disease was conducted in Jakarta, Indonesia. The survey elicited information on the households' socio-economic and demographic circumstances, their local environmental conditions and practices, and the health of those household members (the mother and children under six) most likely to be adversely affected by the household environment. Diarrhea was one of the health conditions monitored, and many of the environmental variables were relevant to the fecal-oral routes through which diarrheal diseases typically spread. Complementing the questionnaire surveys, water samples were tested for fecal contamination.

Among the engineering variables, poor reliability of the water supply is most strongly associated with diarrheal illness. Interruptions in the supply are consistently found to interfere with defensive behavior (washing hands after using the toilet), and to result in higher incidence of diarrhea. Surprisingly, the water sources that supply wealthier households (government-piped water and private wells) have the highest interruptions rates, making those households particularly vulnerable to diarrhea. The availability of a waterbasin near the toilet area(another "engineering" variable) appears to significantly increase defensive behavior and reduce the risk of diarrheal illness. While they should be viewed more as exploratory that definitive, the results of the study highlight the importance of looking at both economic/behavioral factors and engineering approaches to reducing diarrheal disease, particularly maintenance of a reliable water supply and assuring that housing affords people options for taking defensive measures. Wealthier, better educated households are, in general, better able to undertake defensive behavior. However, it was found that for the specific case of Jakarta, economic development strategies that raise personal incomes and education do not necessarily guarantee lower rates of diarrhea. This paradox is at least in part resolved by noting that the most convenient supplies of water sought as incomes rise (household connections) are not necessarily uncontaminated or exempt from interruptions.

Source: Alberini, Anna, G. Eskeland, A. Krupnick, G. McGranaham (1996)
Downloadable at: http://www.worldbank.org/html/dec/Publications/Workpapers/wps1568-abstract.html

5. LATIN AMERICA AND CARIBBEAN

Box 10 -- Providing Water and Sanitation for the Urban Poor in Brazil's Urban Slums

One of the hardest things about life in Brazil's urban slums is the lack of clean water and sewage disposal systems. In a crowded neighborhood, these two simple urban services can mean the difference between health and disease, cleanliness and filth, convenience and daily backbreaking labor. These shantytown neighborhoods—called favelas—that dot the urban landscape in Brazil have grown so explosively and so haphazardly that urban services are either non-existent or plainly inadequate.

The favelas are a water engineer's nightmare. They are crowded and chaotic. Flimsy tin shacks are stacked on one another along forbiddingly steep hillsides—or are mired together in muddy swamplands. They often lack strong local organizations, and too often are plagued by drug-related violence. Brazil's state-owned water companies find it impossible to maintain water systems or collect bills in the favelas. Thus, even as Brazil greatly improved water and sanitation services throughout the country in the 1980s, the urban favelas have remained unconnected. Instead of clean water piped directly to their homes, favela residents often pay ten times the legal rate from water pirates who tap illegally into the main systems. And instead of sewage being piped safely away for sanitary treatment, wastewater flows down favela streets in stinking rivers, or is dumped into natural drainage channels to feed polluted streams and lagoons. About 21 million Brazilians do not have access to safe water, and twice as many lack access to sewerage networks or septic tanks. Most of them live in the favelas.

New Success Means New Hope. An innovative project offers new hope for bringing water and sewerage services to Brazil's favelas —and perhaps to poor urban neighborhoods around the world. Brazil recently completed PROSANEAR, a pilot program that developed a new approach to delivering water and sanitation services to the urban poor--and enjoyed a whole new level of success. PROSANEAR provided 900,000 poor people with fresh water piped directly into their homes, and one million people were also connected to sewerage systems. This is more than four times the number of new connections that project planners hoped for when PROSANEAR began, and all for a cost below original estimates: less than $98 per person for water connections and less than $140 for sewerage.

Cost-Effective Technology and Community Participation. PROSANEAR worked so well by combining two novel approaches to delivering urban services: cost-effective, appropriate technologies and

community participation. By putting engineers and social experts on the same team, PROSANEAR found a way to overcome the usual shortcomings of top-down infrastructure planning. In the favelas, standard designs are foiled by the haphazard layout of the houses. Furthermore, favela residents are poorly equipped to pay for and maintain systems that have never been explained to them and which in many cases they never requested.

- Instead of implementing a pre-designed project, PROSANEAR teams went into communities to ask what kind of water project the people wanted—if any--and what kind they would be willing to support with their money and labor.
- Instead of expensive, high-tech systems, neighborhoods were able to choose from a range of simple, innovative systems that made water and sanitation affordable and more environmentally appropriate for poor, crowded settlements. In many places, groups of households were batched together in a creative "condominium" approach that not only made the networks more efficient and affordable, but also forged new bonds among neighbors.
- PROSANEAR sought a more permanent impact by mobilizing local clubs—women's, sports and religious groups, for example, to educate people about the importance of sanitation, and to teach them how to operate and maintain their new systems.

With all of these innovative elements at work, PROSANEAR projects became more than just infrastructure projects; they became neighborhood projects, fueled by the creative energy of fully informed and involved local residents.

The Results: Cleaner Water and Stronger Communities. The results were powerful, and they went far beyond the better health and greater convenience enjoyed by one million people newly connected to water taps and toilets.

- For many residents, getting a formal postal address and a water bill in one's own name meant they had graduated from squatter status to permanent citizenship—a new level of identity within the society. Many went on to make additional improvements to their houses.
- Some groups that came together to build water systems stayed together to work for other neighborhood needs, such as garbage removal or income generating activities.
- Women—deeply involved at all stages of the PROSANEAR project—found an unusual chance to speak and gain respect in the community.
- PROSANEAR cured many water companies of the misconception that the poor would not pay for water and sanitation services. The poor will pay, as long as they understand what they're paying for and receive adequate services for their payments.
- Local construction and consulting firms have adjusted their business practices to include the community consultation and low-cost technology alternatives that worked so well in PROSANEAR.

Source: Katakura, Yoko, and Alexander Bakalian (1998)
Downloadable at: http://www.wsp.org/English/index.html?wps_prosan.pdf

Box 11 -- Management Contracts and Water Utilities: The case of Monagas state in Venezuela

The management contract for water and sanitation services in the Venezuelan state of Monagas, awarded in early 1997 to a Spanish firm, is one of very few signed and active management contracts in the water sector. The early operational results are very positive, and the experience sheds light on when a management contract is the right choice, how it should be designed to introduce the right incentives for the contractor and the public representatives, and what steps to take in awarding it.

Source: Mariño, Manuel , John Stein, and Francisco Wulff (1998)
Downloadable at: http://www.worldbank.org/html/fpd/notes/166/166marin.pdf

Box 12 -- Competition in Water and Sanitation: The Role of Small-Scale Entrepreneurs

There has long been a belief that the water and sanitation sector has a high degree of natural monopoly. But competition is widespread in the low-income retail market in developing countries. There is no inherent monopoly in such small-scale activities as reselling water by the bucket. This Note explores the diversity of small-scale entrepreneurs supplying unserved niches of the water and sanitation market. Small enterprises often account for a larger share of the market than do incumbent utilities, and they are well placed to complement and even compete with trunk concessions and public companies in tailoring services to the poor. So in designing concessions or any long-term rules for the sector, governments should take account of existing or potential small providers.

Source: Solo, Tova Maria (1998)
Downloadable at: http://www.worldbank.org/html/fpd/notes/165/165solo.pdf

Box 13 -- Designing Pro-Poor Water and Sewer Concessions: The Case of El Alto/La Paz, Bolivia

Bolivia is one of a growing number of developing countries turning to the private sector to improve urban water and sanitation services. The country's first major contract in the sector, a twenty-five-year concession for the neighboring cities of La Paz and El Alto, was implemented in August 1997. The public utility in La Paz–El Alto provided center city residents with in-house water and sewer connections but did not serve lower-income residents in outlying areas. Unserved households relied on alternative water and sanitation services—often at high cost. A primary objective in moving to a private concession was to turn this situation around—expanding services to low-income households while holding down costs by increasing efficiency. Because the La Paz–El Alto concession was explicitly designed to expand service to the poor, this concession is a good case study for evaluating how different provisions in the contract and the sector regulation may help or hinder service expansion.

To date the La Paz–El Alto concessionaire has met its service expansion obligations. But certain features of the contract could make it unnecessarily difficult to achieve the broad objective of universal service—as well as unnecessarily painful for some households. For example, the contract mandates a uniform and costly level of service, the tariff provides disincentives to meet expansion goals, and exclusivity provisions have the potential to restrict water and sanitation options before in-house connections become available.

The author finds that outcomes in services can be affected by the concession contracts, by the contract bid process, by sector regulations, and by regulatory arrangements. To increase the likelihood of improvements in low-income areas, policymakers should:

- Make contract objectives clear and easily measurable.
- Eliminate policy barriers to serving the poor (including property title requirements and service boundaries that exclude poor neighborhoods).
- Design financial incentives consistent with service expansion or improved objectives for low-income areas.

Contracts are subject to negotiation, so expansion or connection mandates alone do not guarantee that concessionaires will serve poor areas. Provisions and standards that reduce service options (for example, requirements that eliminate all alternatives to in-house connections) or restrict the emergence of new service providers (for example, granting exclusivity in the service area) could do more harm than good.

In two years of operation, Aguas del Illimani met its first expansion mandate and took many steps to facilitate the expansion of in-house water connections in low-income areas. The company and the Bolivian water regulator were willing to discuss and seek possible solutions to problems associated with servicing poor neighborhoods.

It is too early to tell whether these gains will be sustainable or to predict how privatization will ultimately affect poor households in La Paz and El Alto.

Source: Komives, Kristin (1999)
Downloadable at: http://www.worldbank.org/research/
and http://www.worldbank.org/html/fpd/notes/178/178komiv.pdf

Box 14 -- The Buenos Aires Concession

The signing of a concession contract for the Buenos Aires water and sanitation system in December 1992 attracted worldwide attention and caused considerable controversy in Argentina.

It was one of the world's largest concessions, but the case was also interesting for other reasons. The concession was implemented rapidly, in contrast with slow implementation of privatization in Santiago, for example. And reform generated major improvements in the sector, including wider coverage, better service, more efficient company operations, and reduced waste. Moreover, the winning bid brought an immediate 26.9 percent reduction in water system tariffs.

Consumers benefited from the system's expansion and from the immediate drop in real prices, which was only partly reversed by subsequent changes in tariffs and access charges. And these improvements would probably not have occurred under public administration of the system.

Still, as the authors show, information asymmetries, perverse incentives, and weak regulatory institutions could threaten the concession's sustainability. Opportunities for the company to act opportunistically - and the regulator, arbitrarily - exist because of politicized regulation, a poor information base, serious flaws in the concession contract, a lumpy and ad hoc tariff system, and a general lack of transparency in the regulatory process.

Because of these circumstances, public confidence in the process has eroded. The Buenos Aires concession shows how important transparent, rule-based decisionmaking is to maintaining public trust in regulated infrastructure.

Source: Alcázar, Lorena, Manuel A. Abdala, and Mary M. Shirley (2000)
Downloadable at : http://www.worldbank.org/research/

Box 15 -- From Pilot (Yacupaj) to National Program (PROSABAR) in Bolivia

This case study on the scaling up of the Yacupaj pilot project into the National Rural Water and Sanitation Project (PROSABAR) in Bolivia assesses the contribution of both Yacupaj and PROSABAR to reforming Bolivia's rural water and sanitation sector. The study analyzes how the institutional arrangements established in the Yacupaj project created behavioral incentives that led to demand-driven investments and long-term sustainability. It describes the project's rules, processes, and implementation strategy and presents results on the impact of the project at the community and institutional levels. In addition, the study shows how working through NGOs and other agencies led to the institutionalization of the project.

Source: Sara, Jennifer, Alexandra Gross, and Caroline van den Berg (1996)
Downloadable at: http://www.wsp.org
Spanish version also available.

Box 16 -- Infrastructure Reform, Better Subsidies, and the Information Deficit: A Case Study of Panama

In developing countries the provision of water and sanitation services is often subsidized. These subsidies take the form of a general underpricing of water, numerous cross-subsidies, and inefficient billing and collection. An essential part of infrastructure reform is the redesign of subsidies. In the design of an optimal subsidy scheme the key decisions are the choice of eligibility criteria, the level of the subsidy and the budgetary requirements. However, the lack of consistent and reliable data sets which combine socioeconomic and water consumption information may be an important obstacle to making good decisions, undermining efforts to provide affordable water services for the poor. This Note discusses the type of information required, where it can be found, and ways to deal with shortcomings in the data. To illustrate, the Note draws on data from work in Panama.

Source: Gómez-Lobo, Andrés, Vivien Foster, and Jonathan Halpern (2000a)
Downloadable at: http://www.worldbank.org/html/fpd/notes/212/212gomez.pdf

Box 17 -- Designing Direct Subsidies for the Poor—A Water and Sanitation Case Study in Panama

Direct subsidies are an increasingly popular means of making infrastructure services more affordable to the poor. Under the direct subsidy approach, governments pay part of the water bill of poor households that meet certain criteria. This approach was first used in water sector reforms in Chile in the early 1990s and is an alternative to the traditional method in which governments pay subsidies directly to utilities, often allowing the price of water to fall below economic costs indiscriminately. This Note illustrates how simulation techniques can be used to inform the design of direct subsidy schemes, ensuring that they are both cost-effective and accurate in reaching the target population.

Source: Foster, Vivien (2000)
Downloadable at: http://www.worldbank.org/html/fpd/notes/211/211foste.pdf

6. MIDDLE EAST AND NORTH AFRICA

Box 18 -- Management Contracts in Water and Sanitation—Gaza's Experience

In 1996 a management contract was awarded to help the local government service providers and the Palestinian Water Authority improve water service. Since the contract became active, water quality has improved, water losses have fallen, and consumption and revenues have increased. Despite the improved performance, the management contract has illustrated some of the limitations of this approach to private participation in water supply. This Note reviews the contract design and discusses the lessons.

Source: Saghir, Jamal, Elisabeth Sherwood, and Andrew Macoun (1999)
Downloadable at: http://www.worldbank.org/html/fpd/notes/177/177saghi.pdf

7. SOUTH ASIA

Box 19 -- Small Private Initiatives in the Water and Sanitation Sector in India

In India, water and sanitation services are predominantly provided by Government and parastatal agencies. There are very few instances of large-scale formal private sector participation. Where they

exist they are mostly service contracts or management contracts. However, a number of small-scale informal private initiatives have emerged to fill the gaps in the existing delivery system. Some of these private initiatives are in partnership with the Government, and others have come about on their own in response to demand from clients. This series of Field Notes on Small Private Initiatives in the Water and Sanitation Sector in India is designed to document a few successful urban and rural experiences focusing on the poor.

1. *Privatizing the Operation and Maintenance of Urban Water Supply: The Experience of Ajmer, Rajasthan, India:* http://www.wsp.org/English/Regional/sa/sa_amjer.pdf
2. *Sustainable Community Management of a Multi-village Water Supply Scheme in Kolhapur, Maharashtra, India:* http://www.wsp.org/English/Regional/sa/sa_kolhapur.pdf
3. *Profits from Waste: An NGO-led Initiative for Solid Waste Management in Lucknow, Uttar Pradesh, India:* http://www.wsp.org/English/Regional/sa/sa_lucknow.pdf
4. *Villagers Treat Water as an Economic Good, Olavanna, Kerala, India:* http://www.wsp.org/English/Regional/sa/sa_olavanna.pdf

Box 20 -- Environmental Health Successes in Surat, India

Environmental health problems in Surat, the oldest municipality in India, were at their worst in the early 1990s. This city of 2.2 million was incurring nearly half of all diarrheal cases in Gujarat, even though it represented only 5 percent of the state's population. Then, in 1994, it had an outbreak of the plague-making international headlines and costing the city both lives and an estimated $1.5 billion in disrupted commerce and trade. Considered one of the dirtiest cities in India, it was mobilized into action despite the tight fiscal constraints common to all Indian municipalities. By 1997, Surat was voted the second cleanest city in India. As a result of prudent actions over four years, water supply and sanitation coverage has improved considerably, and the incidence of diarrheal disease has dropped to only 10 percent of the state total. The plague disappeared. Incidents of malaria-correlated with stagnant surface water and poor drainage-dropped significantly. These health gains were achieved largely through decentralization, improving efficiency, enhancing infrastructure performance standards, and strengthening health services.

In addition, sanitation and drainage infrastructure in the city has been extended: 217 of the previously 253 unserviced slum communities have been provided with proper sanitation (including toilets) and drainage facilities. The city has upgraded two sewage treatment plans, which now meet discharge standards. Solid waste management has dramatically improved, to a collection efficiency of nearly 98 percent, and has been partly contracted out in order to make it financially viable. The city also operates a controlled landfill. To combat air pollution, traffic management has been streamlined with the intention of reducing congestion and hence vehicular emissions, but reductions in ambient levels are yet to be recorded. Unleaded gasoline will be introduced shortly.

The municipal corporation collects 85 percent of its property tax-the highest rate for any city in India-and has earned an investment grade credit rating. Its infrastructure policies and investment planning have met its urgent environmental needs in a way that is consistent with sound urban fiscal management. To continue making progress in badly needed infrastructure, the city has made ambitious plans to reach full coverage in the provision of piped water supply, expand the sewerage system to cover half the city's population, and introduce buses fueled by natural gas.

Source: Brandon, Carter (1998)
Downloadable at: http://www-esd.worldbank.org/envmat/vol1s96/

Box 21 -- Health Impact of Water Supply, Sanitation and Hygiene Education in Mirzapur, Bangladesh

The UNDP-World Bank Water and Sanitation Program undertook a study of an integrated project comprising handpumps, improved latrines, and hygiene education in the Mirzapur area, a rural area some 60 km north of Dhaka, Bangladesh. The cost of the three project components were $15.16 per inhabitant (slightly less than 10% of per capita GDP), and were distributed as follows: $6.89 for handpumps, $4.67 for latrines, and $3.60 for hygiene education. The study involved longitudinal follow-up over four years of an intervention area and a control area, some 5 km apart, each with a population of about 5,000. Regular questionnaire surveys, combined with occasional observational studies to confirm the accuracy of responses, were used to investigate the use of the new facilities and compliance with hygiene education messages.

The results showed substantial differences compared to the control area regarding handpump water use, latrine use, use of ash for hand cleansing after defecation. The project had a significant impact on childhood diarrheal disease in the intervention area, where the incidence of diarrhea fell to three quarters of that in the control area. The prevalence of diarrhea in small children and the proportion of days on which the average child suffered from diarrhea were both reduced by almost half. Analysis of diarrhea rates in subgroups within the intervention area suggested that they were lower among households within 25 meters of a handpump and among those using handpump water exclusively for all major domestic activities in the wet season. The rates were also lower among those disposing hygienically of the feces of children under three years of age. In spite of the project's impact on diarrhea, no impact was detected on the nutritional status of small children in the intervention area. Finally, the project interventions reduced the prevalence of Ascaris infection by more than a third.

Source: Aziz, K.M.A et al. (1990)

Box 22 -- Lessons from Sri Lanka on Community Water Supply and Sanitation

The Community Water Supply and Sanitation Project (CWSSP) in Sri Lanka is one of the few examples of a large-scale project that has attempted to establish project rules that respond to user demand and community preferences. The project employs "structured learning" as a tool to modify the project's rules and processes. Structured learning is the process of establishing monitoring mechanisms, collecting data and analyzing a project as it progresses. This study explores CWSSP's experience with structured learning and examines how project staff created a culture of learning and flexibility among all stakeholders including the government, project staff, partner organizations, and communities.

The study examines how structured learning and an adaptive project design has helped to achieve the objectives of the project. It describes how the project's rules and processes were originally established, monitored, and later modified, and how the project gradually moved away from predefined needs and closer to user demand. The study illustrates how the project rules have changed and why, and what more needs to be done to design investments that respond to demand.

Source: Minnatullah , K.M., Thilak Hewawasam, Alexandra Gross (1998)

TN 7: Design of Pro-Poor Private Sector Participation Arrangements

Shared Responsibilities: Possible roles for Government and the Private Sector

An increasing number of low-income countries have turned to the private sector to finance, implement and operate infrastructure systems, notably in the telecoms, power and transport sectors. The experience in these sectors has mostly been positive, as increased competition and large efficiency gains have led to the emergence of innovative technologies and performing systems, substantially decreasing unit cost, thus granting more users, especially the poor, access to services. Also, macroeconomic effects have been significant. Removing a number of infrastructure bottlenecks has stimulated growth, which in turn has benefited the poor.

Success in these sectors has led to a rethinking of the role of government in the provision of water and sanitation services. Indeed, in recent years a number of private sector projects have emerged in the water and sanitation sectors.

The more risk and responsibility a government hands over to the private sector in water and sanitation, the more powerful the incentives for better performance. At the same time, the government must accept increased responsibility for negotiating an appropriate contractual arrangement, and then regulating and monitoring the new service provider. A government about to enter into a long partnership for a water concession or build-operate-transfer arrangement--typically for twenty-five to thirty years--needs to be sure that it does not overlook details that will later land it in messy renegotiations. A lease is less demanding, but offers smaller gains and will not fix such problems as chronic under-investment. It will, however, give the government time to prepare a longer-term option.

Table 1 below sets out the range of options for involving the private sector in water and sanitation and reviews lessons learned regarding private participation in water and sanitation services provision.

Table 1: The Main Options for Private Sector Participation and their Allocation Of Responsibilities

Option	Asset ownership	Operations and maintenance	Capital investment	Commercial risk	Duration	Provision by government
Public provision	Public	Public	Public	Public	Indefinite ?	
Service contract	Public	Public and private	Public	Public	1–2 years	
Management contract	Public	Private	Public	Public	3–5 years	
Lease	Public	Private	Public	Shared	8–15 years	
Concession	Public	Private	Private	Private	25–30 years	
Build-operate-transfer	Private (bulk services)	Private	Private	Private	20–30 years	
Divestiture	Private	Private	Private	Private	Indefinite	

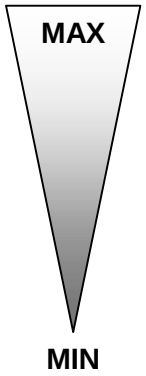
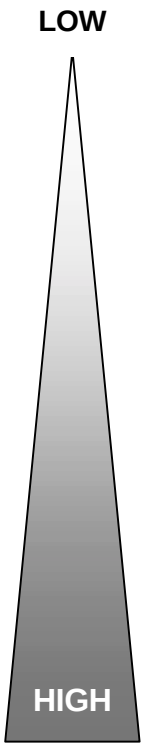


Table 2: Prerequisites for Successful Implementation of Different Private Sector Options

Option	Stakeholder support and political commitment	Cost-recovering tariffs	Good information about the system	Developed regulatory framework	Good country credit rating	Potential benefits of the option
Service contract	Unimportant	Not necessary in the short term	Possible to proceed only with limited information	Minimal monitoring capacity needed	Not necessary	
Management contract	Low to moderate levels needed	Preferred but not necessary in the short term	Sufficient information required to set incentives	Moderate monitoring capacity needed	Not necessary	
Lease	Moderate to high levels needed	Necessary	Good information required	Strong capacity for regulation and coordination needed	Not necessary	
Build-operate-transfer	Moderate to high levels needed	Preferred	Good information required	Strong capacity for regulation and coordination needed	Higher rating will reduce costs	
Concession	High levels needed	Necessary	Good information required	Strong regulatory capacity needed	Higher rating will reduce costs	
Divestiture	High levels needed	Necessary	Good information required	Strong regulatory capacity needed	Higher rating will reduce costs	



The shading signals the degree of importance:
Not significant (white), Low (grey), Moderate (medium grey), High (dark grey)

Addressing Concerns about the Implications of PSP on Poor Communities

Most poor communities are served by the private sector, especially at the retail level by water vendors. The establishment of a public-private partnership may provide proper incentives to improve service in poor communities, if appropriate regulatory and monitoring systems are incorporated into contracts and effectively implemented. Effective management and oversight of private operators has been the key challenge to improving service to the poor. Some of the lessons learned regarding the design of pro-poor private sector service arrangements can be found in papers presented at a recent conference on this subject, at http://www.ppiaf.org/ppiandthepoor/presentations.html.

There is always reluctance to consider the private sector for addressing the service gap for the poor. Belief is that water is a basic need, a social good that can best be provided by the public sector at very low cost. In practice, the public sector, due to lack of finance and incentives, has often failed to reach the poor, and the poor have instead relied on a number of private options. Indeed, the private sector (small-scale) is generally already present in poor areas. The question, therefore, is whether existing arrangements should be fully replaced, or whether the formal sector – public or private – could capitalize on the strengths of the small-scale sector.

Service arrangements should be analyzed on the basis of comparative advantage. For instance, the formal sector is much better placed in terms of access to the resource, and could sell bulk water to poor neighborhoods. This design could go a long way towards reducing the cost of water for the poor (removing bottlenecks, e.g., water truck having to travel long distances, increasing water costs, problems of water quality).

Conversely, local water vendors are probably better placed to provide tailored water services to poor neighborhoods, peri-urban areas with uncertain land tenure, etc. They know their customers better and can tailor services to them from technical and financial standpoints.

Successful private sector participation (PSP) requires a balanced partnership between the private sector and government client. The regulatory role is crucial: if the government/utility are not well versed in the practice of measuring financial and technical performance in the sector, they are not likely to make good clients/regulators without substantial institutional development. Well-designed contracts with the right balance of minimum standards with penalties and success incentives are key factors. Where substantial PSP contracts are being considered, the regulatory authority will need to focus on services to the low-income areas, because the operator will be inclined to focus on the richer areas to maximize income.

The PSP scheme can combine concession incentives and partial private financing with targeted use of government sources for such activities as service expansion to the poor, household subsidies, or time-bound revenue deficiency funds.

Some ideas to consider in the analysis include:

- Tailor service delivery modes to different groups (for instance, bulk service with community retailing for untenured slums).
- Leave space for small scale private providers.

- Prompt the concessionaires to offer users a range of technology options at different price tags.
- Target any subsidies to new connections rather than water usage.
- Before designing a PSP scheme, talk to users including poor, and look at the ways they have been obtaining services.
- "Micro-liberalization" of the services the poor receive from informal vendors: to facilitate entry in this business and deter water cartels.
- In designing the contractual service targets, think about the "lost generation" (people who won't get hooked up before the outer years of a concession), and define interim solutions that could improve service and reduce cost to them (such as bulk service by the concessionaire with local retailing by CBO/NGOs).
- Waive legal restrictions on serving people who don't have land title (at least with standpipes or yard taps) .
- Consider (in very poor countries) projects in which the private sector would finance trunk infrastructure and services to the more affluent parts of town, and donors or government would finance targeted programs for service expansion in slums (the concessionaire could execute these programs, then operate the services).
- Encourage partnerships between utilities and CBOs/NGOs.

Table 3: Characteristics of the Most Recent Approach to PSP Contracts

	"New" PSP paradigm
Financial incentives	Universal service obligation as a principle, but flexibility in implementing it (output indicators, redefinition of coverage). Realistic timeframe.
Users contributions	Tailored financing arrangements. Allowing the poor to pay in kind through labor.
Technology	Differentiated and tailored service standards
Standards	More reliance on output standards (e.g. user satisfaction)
Market structure	Allowing entry of large and small-scale competition, notably at the retail level.
Legal framework	More flexible, but effective regulation.
Subsidies	One time subsidies on capital investments (e.g. water connection, latrine).
Expansion	Use of non-conventional means to reach out to the poor, or combination (e.g., conventional bulk supply, retailing by small-scale independent providers, either network or non-network based solutions).
Pricing	Full cost tariffs (uniform tariffs) with rebates, or subsidy for connection.
System integration	System is unbundled, multiple players in financing and operation of tertiary networks (or non-network retailing). Need to pay attention to interconnection with effective partnerships.
Regulation	Output-based. Monitoring of competition and prices at retail level (for all types of water provision), and bulk supply. Water quality both at production site and at point of use (network or not). Promotion of participation and community involvement.

If care is taken in analyzing the distribution of benefits and this is done early, private intervention can help improve contract designs and yield more socially sustainable outcomes. The box

below shows how up-front analysis of economic and financial outcomes can help design concessions that achieve distribution objectives more effectively.

Table 4: Possible Modifications to Concession Structures to have More Favorable Poverty Impact

Concession structure initially proposed	Problems identified	Adjustments made to draft concession documents
Ambitious service expansion targets in the initial years of concession	• Concessionaires will suffer liquidity problems in the early years of concession • Concessionaires will not get sufficient rates of return on investments • Expansion targets are unlikely to meet customers' willingness to pay for services	• Expansion targets in the initial years were reduced • Capital subsidy, especially for sewage treatment, was introduced • Secondary network costs charged to all customers, through a surcharge, instead of being charged to new and mostly poor customers
No clear strategy to address the issue of the poor	• New and poor customers may be losers of the reform program.	• Secondary network costs charged to all customers, through a surcharge, instead of being charged to new and mostly poor customers • Use of canon payments to provide direct investment subsidies to the poor • Introduction of appropriate technologies to reduce cost of service to the poor • In very special cases, the possible introduction of lifeline rates can be considered

Source: Van den Berg, Caroline (2000)

TN8: Indicators for Monitoring Water and Sanitation-related PRSP Goals

Indicator	Definition	Data sources	Remarks
Impact indicators			
Goal: To improve the health status of the population			
Child mortality	• mortality rate (deaths per 1,000 live births) of children under 5 years • diarrhea-caused mortality of children under 5 years (ratio of deaths caused by diarrhea in children under five to all deaths in the same under-five group)	DHS, vital registries, WHO	Records from vital registries may be unreliable.
Prevalence of malnutrition in children • stunting (chronic) • wasting (acute) • underweight (combined)	• % of children below minus two standard deviations from the reference median in terms of: - height-for-age - weight-for-height - weight-for-age	DHS, multi-topic hh surveys (LSMS/IS), CWIQ with the National Center for Health Statistics/WHO providing benchmarks	Stunting, wasting and underweight can be more accurately measured than the incidence of diarrhea or other water-related diseases. They also capture better the chronic harmful effects of lack of adequate access to water and sanitation. However, these measures of malnutrition depend on factors such as food availability that are beyond the scope of water and sanitation interventions. Collection of information on some diseases may require laboratory equipment and substantial expertise.
Incidence of water-related or sanitation-related diseases	• incidence of diarrhea within last 15 days • number of episodes of diarrhea per year • prevalence of parasitic infections, for example - Ascaris - Trichuris - Hookworm • prevalence of other diseases - Hepatitis A - Malaria	DHS and multi-topic hh surveys such as the LSMS regularly collect information on diarrhea incidence. Data collection on the incidence of other diseases varies by country.	
Goal: To achieve gender equality in education			
Ratio of girls to boys in primary and secondary education	• Primary gross enrolment ratio for girls as a percentage of the primary gross enrolment ratio for boys • Secondary gross enrolment ratio for girls as a percentage of the secondary gross enrolment ratio for boys	Census, multi-topic hh surveys (LSMS/IS), CWIQ, EMIS	Enrolment rates are usually considered as outcome indicators. However, for goals related to water and sanitation, they may be a more relevant impact indicator than literacy rates or learning achievement, for example.

Indicator	Definition	Data sources	Remarks
Outcome indicators			
Water consumption	• % of hh that consume less than 20 liter/capita/day	Utilities records Price and expenditures information: income/ expenditure surveys; multi-topic hh surveys (LSMS/IS)	Difficult to get complete and accurate information on water consumption For urban areas, water consumption may be estimated by using price and expenditure information on water from household surveys
Use of sanitation facilities	• % of hh where all members three years and older use a sanitary facility for defecation • % of hh with surroundings free of human wastes	Specialized surveys	Information infrequently collected; generally not representative at the national level
Access to safe water	• % of hh with access to safe water supply (rural/urban) - with private access - with shared access (within 30 meters of residence) • % of primary and secondary schools without - water supply - latrines	Census, multi-topic hh surveys; DHS, CWIQ/PS Facilities surveys (conducted as part of some multi-topic hh surveys)	Proxy indicators for water consumption. A consistent definition of what is considered “safe water and convenient access” needs to be established
Access to adequate sanitation	• % of hh connected to piped sewer system (rural/urban) • % of hh with access to sanitary latrine within 10 m of residence (rural/urban)	Census, multi-topic hh surveys, CWIQ/PS	Proxy indicators for use of sanitation facilities. A consistent definition of what is considered “adequate sanitation and convenient access” needs to be established
Quality of service	• % of hh without continuous water supply during the day • % of hh with water shortages during the dry season • % of households reporting satisfaction with w&s	Multi-topic hh surveys (LSMS) Qualitative studies	Complement access indicators; capture issues of seasonality and satisfaction with services.
Hygienic practices	• % of hh washing hands - after defecation - before and after cleaning children - before handling food - in prior cleaned container	Knowledge, Attitude and Practices (KAP) Survey; qualitative studies	Hygienic practices are an intermediate link in the chain that leads to disease prevention. Since they are promoted in part by better access to water and sanitation, can be used as a proxy for

Indicator	Definition	Data sources	Remarks
			water consumption. A major drawback, however, is that data are usually collected at the project level.
Intermediate indicators			
Efficiency in the provision of services	• % of unaccounted water • utility staff per 1000 connections	Utility records	Service providers usually do not capture information on self-built facilities or systems installed by small local communities
Expenditures/ Investment level	• Capital investments (public and private) in water supply (rural/urban) • Capital investments (public and private) in sanitation (rural/urban)	Utility records, government statistics	
Goods/services generated	• % wastewater captured • % wastewater treated • number of newly installed water point s (connections, or other) - shared - private • number of newly installed sanitary latrines	Ministry responsible for water and sanitation, Utility records	

Abbreviations

CWIQ: Core Welfare Indicators Questionnaire
DHS: Demographic and Health Surveys
EMIS: Education Management Information Systems
IS: Integrated Survey
LSMS: Living Standards Measurement Survey
PS: Priority Survey
WHO: World Health Organization

References and further Reading

Gómez-Lobo, Andres, Vivien Foster and Jonathan Halpern. (2000a)

Gómez-Lobo, Andres, Vivien Foster and Jonathan Halpern (2000b)

Jalan, Jyotsna and Martin Ravallion (2001)

The World Bank (2000)

The World Bank. (1999)

Weblinks

WHO, Water supply and sanitation sector monitoring
http://www.who.int/water_sanitation_health/wss/Monitoring1.html

WHO/UNICEF, Joint Monitoring Programme for Water Supply and Sanitation
http://www.who.int/water_sanitation_health/Archives/Monitoring3.html

UNICEF, Sanitation access: Data dilemmas
http://www.unicef.org/pon97/p10a.htm