FOOD AND NUTRITION TECHNICAL ASSISTANCE

SERIES

TITLE 2
INDICATOR GUIDES

Water and Sanitation Indicators Measurement Guide

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FOOD AND
NUTRITION
TECHNICAL
ASSISTANCE

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Copies of the Guide can be obtained from:

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This series

This series of Title II Generic Indicator Guides has been developed by the Food and Nutrition Technical Assistance (FANTA) Projects, and its predecessor projects (LINKAGES and IMPACT), as part of USAID's support to develop monitoring and evaluation systems for use in Title II programs. These guides are intended to provide the technical basis for the indicators and the recommended method for collecting, analyzing and reporting on the indicators. A list of Title II Generic Indicators that were developed in consultation with the PVOs in 1995/1996 is included in Appendix 1. The guides are available on the project website http://www.fantaproject.org

Guides are available on these topics:

Agricultural Productivity Indicators Measurement Guide
Food Security Indicators and Framework for use in the Monitoring and Evaluation of Food Aid Programs
Infant and Child Feeding Indicators Measurement Guide
Sampling Guide
Water and Sanitation Indicators Measurement Guide

PART I.

Introduction

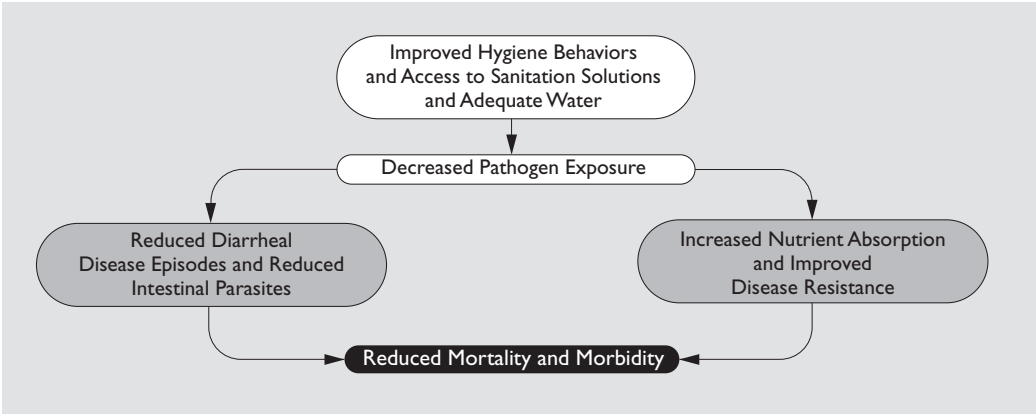
I.

Water and sanitation improvements, in association with hygiene behavior change, can have significant effects on population and health by reducing a variety of disease conditions such as diarrhea, intestinal helminths, guinea worm, and skin diseases. These improvements in health can, in turn, lead to reduced morbidity and mortality and improved nutritional status.

Water and sanitation improvements affect health primarily by interrupting or reducing the transmission of disease agents, as illustrated in Figure 1. This occurs through a variety of mechanisms. Of primary importance is the safe disposal of human feces, thereby reducing the pathogen load in the ambient environment. Increasing the quantity of water allows for better hygiene practices. Raising the quality of drinking water reduces the ingestion of pathogens. With less disease, children can eat and absorb more food, thereby improving their nutritional status. Also, a healthier adult population is a more productive population, and improvements in water and sanitation can improve income and the capacity to acquire food. Other benefits associated with better water delivery include time savings for primary caregivers, which can result in the preparation of more or better food for children (see Bergeron and Esrey 1993 for a review).

Improvements in sanitation have been shown consistently to result in better health, as measured by less diarrhea, reductions in parasitic infections, increased child growth, and lower morbidity and mortality. The expected reductions in mortality can be substantial, particularly in areas with low levels of education. Modest improvements in sanitation, such as pit latrines, will result in better health, but major improvements in sanitation, such as flush toilets, will result in even larger health benefits (Anker and Knowles 1980). These results have been reproduced consistently in a number of settings (e.g. Bateman and Smith 1991). Nutritional benefits were also shown in individuals belonging to households without adequate sanitation, in communities where other most people had adequate sanitation. This sug-

Figure 1



gests that all efforts towards improving sanitation are worth undertaking, as they have community-level effects as well as individual ones.

It is commonly believed that the main health benefit from improved water supply occurs through better water quality, which reduces the ingestion of pathogens. Reviews, however, suggest that the improvements in health associated with better water quality are smaller than those obtained through increases in the quantity of water, which allow for better personal and domestic hygiene practices (e.g., hand washing, food washing, and household cleaning) (Esrey et al. 1991, Huttly et al. 1997). Population groups that consistently use more water have better health than groups that use less water. This has been shown repeatedly for several health outcomes, such as specific diarrheal pathogens, diarrheal morbidity, and child growth (Esrey et al. 1991).

Another potential benefit from increasing the quantity of water is the use of water for income generating (e.g., local industries) or food producing (e.g., gardening) activities, both of which could result in the intake of more and better food, improving the family's diet as well as child anthropometry. A fourth benefit is a reduction in the time spent obtaining water. Studies suggest that when women have more time for other activities, they spend much of that time in food-related activities, such as preparing food and feeding young children (Bergeron and Esrey 1993). More time for women can also increase women's opportunities for generating income (ICRW 1996).

Improvements in water and sanitation do not automatically result in improvements in health. The addition of hygiene education is often required to see health impacts materialize. The most important hygiene messages to impart concern the basic issues of hand washing, proper disposal of feces, and protection of drinking water (EHP 1999). Several studies in different parts of the world, in daycare centers, and in community settings, have indicated that frequent hand washing, with and without soap, results in less diarrhea. Collectively, these studies report a 33 percent reduction in diarrhea from hand washing alone (Esrey et al. 1991, Huttly et al. 1997). Proper

disposal of feces, which is not guaranteed by the mere presence of latrines, is also critical for the potential benefits of sanitation to materialize.

All of the mechanisms are summarized in Figure 1. Improvements in water, sanitation and hygiene education are expected to reduce the burdens of disease and improve the overall health of people. Reductions in morbidity, such as diarrhea, are expected to improve nutritional status by a reduction in dehydration, fever and malabsorption of nutrients. In turn, improvement in nutritional status is expected to decrease rates of severe diarrhea (e.g. shorter duration). Reductions in diarrhea and malnutrition would lead to a reduction in mortality (Bergeron and Esrey 1993).

The Water and Sanitation Guide was developed by the Food and Nutrition Technical Assistance Project for use by PVOs and USAID in monitoring and evaluating Title II supported activities. The purpose of the Guides is to facilitate the consistent measurement of a set of generic performance indicators for results reporting to USAID. USAID will use this information to report the impact of food aid on global development to Congress and the American public.

This Guide provides information on the Water and Sanitation Impact Indicators and the Annual Monitoring Indicators for WAS-related Title II activities, a subset of the P.L. 480 Title II Generic Performance Indicators for Development Activities.

The Impact Indicators are:

1. Percentage of children under <36 months with diarrhea in the last two weeks, where diarrhea is defined as more than three loose stools passed in a 24 hour period

2. Quantity of water used per capita per day, where all the water collected by or delivered to the household and used for personal purposes is considered

3. Percentage of child caregivers and food preparers with appropriate handwashing behavior, where appropriate handwashing includes the

time at which it is done and the technique used

4. Percentage of population using hygienic sanitation facilities, where sanitation facility is defined as an excreta disposal facility, typically a toilet or latrine; and hygienic means there are no feces on the floor or seat and there are few flies

One or more of these indicators, or equivalent alternatives, are to be used in the reports of projects with water and sanitation components and should be collected at baseline, mid-term and final-year evaluations.

The monitoring indicators are:

1. Percentage of households with year-round access to improved water source, where access means either direct connection to the home or a public facility within 200 meters of the home

2. Percentage of households with access to a sanitation facility, where sanitation facility is defined as above

3. Percentage of recurrent costs for water supply services provided by the community served, where recurrent costs refer to the full operating and maintenance costs of the water supply system which services the community

4. Percentage of constructed water supply facilities maintained by the communities served, where the constructed facilities refer to those established by the NGO or project

The choice of indicators for annual monitoring and reporting should be decided based upon a review of available sources of data and the information needs of the Cooperating Sponsor and USAID. The primary purpose of collecting and reporting the monitoring indicators is to improve program management, but these indicators can also provide valuable insights into the interpretation of the program's impact on health. In addition, reporting the annual indicators may provide PVOs a further opportunity to demonstrate progress towards the achievement of results.

PART 2.

Impact Indicators for Measuring Water and Sanitation-Related Program Performance

Percentage of children <36 months of age with diarrhea in the last two weeks

Definition of terms

This indicator is the **period prevalence** of diarrhea based on the two-week recall of the child's primary caretaker (usually the mother). It is defined as the proportion of children in a given sample who have diarrhea at the time the information is collected or who have had it anytime in the two preceding weeks. **Diarrhea** is defined as more than three loose stools passed in a twenty-four hour period. **Age** is calculated in completed months at the time the information is collected from the caretaker. A child who is 20 days old is considered zero months of age, and a child of 50 days is considered one month old.

Calculation

$$\frac{\text{Number of children < 36 months of age in the sample with diarrhea in the last two weeks}}{\text{Total number of children < 36 months of age in the sample}}$$

divided by

Sources of data

Data for this indicator are obtained directly from the caretaker by means of a population-based survey of a sample of households. The accuracy of the two-week recall period is well established. The survey respondent should be the principal caretaker of the child. He or she must provide information on how many children <36 months of age there are in the household and whether or not they have had diarrhea as defined above in the two preceding weeks.

Health service records should not be used as a source of data for this indicator. They underestimate the overall disease burden of diarrhea because most children with diarrhea are not taken to a health care facility.

Issues

The simple definition of diarrhea given above is suitable for the purpose of assessing programmatic performance. Additional criteria may be used to define diarrhea, such as the presence of blood in the stool, which strongly suggests dysentery (a severe form of diarrhea that may be caused by amebas or bacteria). However, for a water and sanitation intervention, the type of diarrhea would not substantially influence the type of intervention.

Diarrheal disease prevalence is also influenced by season, generally being more prevalent in the rainy seasons. Therefore, surveys must occur in the same seasons to be comparable.

Target Values

Water and sanitation-related programs include improvements in facilities as well as hygiene education for behavior change. It is well-documented that such programs can bring about decreases in the rate of diarrheal disease on the order of 25%.

In an assessment of the impact of combined water, sanitation and hygiene

education, Aziz *et al.* (1990) found a 25% decrease in diarrheal morbidity. Esrey *et al.* (1991) reviewed 74 studies on the effect of water and sanitation on diarrheal disease morbidity and mortality and nutritional status. The median reduction in diarrheal morbidity calculated for all the studies was 22% and from the more rigorous ones, 26%. Using studies on individual interventions from which morbidity reductions could be calculated, the review showed median reductions of 22% for sanitation alone, 17% for improvements in water quality alone, 27% for improvements in water quantity alone, and 33% for hygiene alone. The median reductions were greater if only the most rigorous studies were considered. An update of Esrey's review by Huttly *et al.* (1996), which added studies completed in the interval, reported similar findings.

Handwashing promotion is one of the most effective hygiene interventions. Reductions of 32 to 43% in diarrheal disease have been documented from improvements in handwashing with soap (Feachem 1984). In three studies assessing only handwashing, the reduction ranged from 30 to 48% (Boot and Cairncross 1993).

It can be assumed that greater effects can be achieved when interventions are combined, although the estimated effects of single interventions cannot necessarily be summed. The type of water and sanitation service provided will likely affect the impact as will the level of service before and after the intervention and the environmental conditions in the project area . Several studies have found that the impact of water and sanitation on child diarrhea is greatest among infants who are not breastfed (VanDerslice *et al.* 1994). In areas where breastfeeding is the norm, the rate of diarrheal disease would likely be lower and targets for improvements might be set below the suggested 25%.

Quantity of water used per capita per day

Definition of Terms

This indicator includes **all water collected by or delivered to the household and used there for drinking, cooking, bathing, personal and household hygiene and sanitation** by the inhabitants of the household. It does not include water used for gardening or for watering animals. A **day** is a 24-hour period. All adults and children in the household are counted. It is assumed that the amount collected is the amount used.

Calculation

Volume of water (in liters) collected for domestic use per day by all households in the sample

divided by

Total number of persons in the sample households

Note: This calculation is more precise if calculated for individual households first and then averaged for the total number of houses sampled. Adding this step helps account for potentially large variations in the number of persons per household.

Sources of Data

For water systems in which water is collected or delivered in containers from a community source and brought to the home, data should be collected through random surveys of households. Cluster surveys should not be employed because water sources or availability may be location-related. The mother or person responsible for water use in the family–this may be the person who collects most or all of the water–is asked in an interview how much water has been collected since the same time the day before. As the answer will probably be given in numbers of containers rather than liters, the interviewer should be trained to assess container volume visually or to have a series of pictures of the common water containers in that community with the volumes pre-measured. The person being interviewed should also be asked the number of people for whom the water has been collected. Information about all household water acquisitions (except gardens and animals) is needed.

Collecting data on water use when water is piped directly into the house or compound is very difficult for small-scale systems characteristic of rural and some peri-urban communities. Because these systems are typically not metered either at the source or at the household, it is not possible to calculate total water used in a community. In some situations, it may be feasible to install a meter at the source for the purposes of a water usage study, but installing individual house meters is not recommended. If a central meter were installed, then the per capita consumption would be the amount of water delivered per day by the system divided by the population in the service area.

Many problems call into question the reliability of this method. For example, piped water may be used for purposes other than those specified for the indicator; piped systems may have leaks or water may be taken from them by persons outside the service area; and/or it may be difficult to get accurate population figures. For these and other reasons, it may be advisable to obtain technical assistance in methods of determining per capita use in piped systems with household connections.

Some researchers believe that distance to the water source may be an indirect indicator of water use (Boot and Cairncross 1993). The closer the source of water is to the home, the greater the use. Per capita use per day has been shown to average less than 10 liters when the public standpipe is farther away than one kilometer; at the other extreme, with house connections the average per capita use per day ranges from 150 to 400 liters (also used for gardens) (Gleick 1996).

Issues

Esrey *et al.* (1991) concluded that, after excreta disposal, the next most effective intervention for reducing water and sanitation-related diseases is making more water available and accessible to households. Their review showed that increasing water quantity had more of an impact on diarrheal disease than improving water quality.

Water use varies seasonally, based on climate and household activities. Pre- and post-intervention comparisons should be conducted within the same season.

Also, data based on a single survey interview may be highly inaccurate because families' water needs may not be constant from day to day. A family may periodically collect larger volumes of water for non-routine uses such as brewing or washing clothes. The survey sample should be large enough to take account of such variations.

Water used for purposes not specified in the indicator should not be included in the numerator. Water used for household gardens and animals is not among the specified uses. In houses without household connections, the mother or water caretaker can be asked how much of the water is used for gardening, and that volume can be deducted from the total volume used by the household. In systems with household connections, the volume of water used for gardens and animals might be estimated (along with other amounts that would have to be deducted—such as water loss from leakage) or it might be calculated by multiplying the estimated flow rate of the hose or faucet by the amount of time spent watering the garden or by asking mothers or other household members how much water is carried from the faucet to the garden or to animal watering troughs.

In urban areas, family members will often be at work for extended periods. Because washing and bathing are typically the major water use activities, those people who wash and bathe routinely at home should be considered as part of the household even if they are gone most of the day.

Target Values

It is difficult to establish uniform per capita water quantity goals because of local and regional differences in availability of water, climate, and type of water supply. The 1977 Mar del Plata conference and the 1992 Earth Summit in Rio de Janeiro both endorsed the right of all people to have access to potable water for their basic needs, but in neither case was a specific quantity suggested. In a 1996 article in *Water International,* Peter H. Gleick of the

Pacific Institute for Studies in Development, Environment, and Security, in Oakland, California, sets a reasonable target by looking at basic needs for the specific uses of water.

Drinking Water Minimum drinking water requirements for survival in a temperate climate with normal activities have been estimated by different experts at 2.5 to 5 liters per capita per day (lcd). These requirements could increase substantially with changes in climate and activities. Gleick's recommended standard is 5 lcd, since the lower level is for subsistence only.

Bathing Estimates of minimum requirements in developing country settings for bathing range from 5 to 15 lcd, for showering from 15 to 25 lcd. The recommended standard is 15 lcd.

Food Preparation Food preparation needs in both developing and developed countries probably range from 10 to 20 lcd. The recommended standard is 10 lcd.

Hygiene and Sanitation Gleick recommends 20 lcd for sanitation, including personal and domestic hygiene. Setting a standard for sanitation is problematic because of the wide range of excreta disposal technologies. A number of them requires no water at all (such as ventilated,-improved-pit (VIP) latrines, composting toilets, etc), but cultural and social preferences favor water-based systems. The standard of 20 lcd permits use of a pour/flush toilet (6–10 lcd) or other rudimentary water-based system. However, 20 lcd is not high enough to allow for conventional sewered systems which can use up to 75 lcd.

Gleick's target is the sum of the quantities for the four basic uses or 50 lcd. This is in line with the standard of 20 to 40 lcd set by USAID, the World Bank, and WHO, which excludes water for cooking and cleaning. Fifty-five countries report average domestic water use below 50 lcd. In addition, millions of people in countries where the national average use is above 50 lcd live in locales that are below the national average. Per capita use in the United States averages from 246 to 295 lcd, depending on which study is cited.

The 50 lcd target may have be to be adjusted downward based on considerations of availability, climate, and technology mentioned above, and on baseline conditions and desired coverage goals.

The 50 lcd target may be used as a guideline in designing a water supply system when important decisions have to be made about the quantity to be made available per capita. In some projects, a decision may be made to design a system which will provide a smaller quantity of water per capita (for example, 20 lcd) so that a greater number of persons can have access. In others, the goal may be to assure that all users are provided with 50 lcd (or a similar “ample” amount) even if fewer households can be connected to the system. Design decisions should be made on the basis of the goals to be achieved by the system with attention to the relationship between quantity of water and reductions in water and sanitation-related diseases.

Percentage of child caregivers and food preparers with appropriate handwashing behavior

Definition of terms

Food preparers and child caregivers are persons who prepare most of the food in the household and provide most of the care for young children. **Appropriate handwashing behavior** includes two dimensions: critical times and technique:

Critical times for handwashing:

- After defecation
- After cleaning babies’ bottoms
- Before food preparation
- Before eating
- Before feeding children

Handwashing technique:

- Uses water
- Uses soap or ash
- Washes both hands
- Rubs hands together at least three times
- Dries hands hygienically–by air drying or using a clean cloth

Calculation

Number of food preparers and child caretakers in the sample who report and demonstrate appropriate handwashing behavior

divided by

Total number of food preparers and child caretakers interviewed in the sample

Sources of data

Handwashing can be measured by self-reporting of critical times and demonstration of technique in a household survey. The interviewer first identifies the main food preparer and principal child caretaker in the household. Usually this is the mother; but it could be two persons. The interviewer asks the person or persons the following two open-ended questions without prompting and checks off all the items mentioned by the interviewee, using a survey form that lists the five critical times and five techniques given above.

Question 1: When do you wash your hands?

Question 2: Would you explain and show me what you do when you wash your hands?

One point is given for each correct time or technique mentioned or observed. A score of 8 points or more (out of a possible 10) qualifies as appropriate handwashing behavior.

Data on handwashing behavior can also be obtained through direct observation in the household, but this method is not recommended because it is difficult to design, it requires extensive training of observers, and it is intrusive, time-consuming, and expensive.

Issues

Handwashing is one of the most effective ways to break the fecal-oral route of disease transmission.

Handwashing behavior is strongly influenced by the presence or absence of a convenient source of water and soap. Studies have shown that, because they facilitate handwashing and other important hygiene behaviors, in-house water supplies are associated with reduced rates of diarrhea (Boot and Cairncross 1993).

A key issue is the bias that may be present in self-reporting of behavior. Maun'Ebo *et al.* (1997) compared direct observation to survey results in a study of handwashing behavior of mothers in Zaire. The investigators concluded that mothers generally over-report desirable behaviors. Persons conducting the survey should be as neutral as possible when posing the questions and not prompt or suggest answers. Initial and follow-up surveys should use exactly the same methodology so that any bias is systematic.

Sustainabilty of improved handwashing behavior after the conclusion of promotional programs is an important issue that has not received adequate attention.

Target Values

Few studies indicate reasonable targets for improvements in handwashing practices; instead, most correlate handwashing improvement programs with reduction of diarrheal disease. Extensive evidence confirms that improved handwashing leads to reductions in diarrheal disease (see period prevalence indicator section).

Examples from social marketing and health extension programs may provide guidance for setting targets for improvement:

In Lombok, Indonesia, Wilson et al. (1991) reported the following improvements in handwashing behavior in the intervention village after a program in which 65 mothers were given soap and an explanation of the fecal-oral route of transmission.

Percentage Improvement Based on Self-reporting Before and After Intervention

	Before	After
Wash hands with soap after defecation	0%	92%
Always wash hands before cooking	26%	60%
Sometimes wash hands before cooking	14%	35%

A USAID-supported effort to reduce cholera in rural areas of Ecuador where the disease was endemic through a community-based behavior change program found improvements between the baseline and follow-up survey a year later (White-ford *et al.* 1996).

Self-reporting of Community Members

	Baseline	Follow-up
People engaged in food preparation wash their hands with soap and clean water.	25%	40%
After washing their hands, food preparers air-dry their hands or dry them on clean cloths.	20%	30%
After defecating or urinating, people wash their hands with soap and clean water.	50%	77%
Handwashing is done in running water or in a container of clean water.	37%	46%.

CARE's Sanitation and Family Education (SAFE) pilot project in Bangladesh organized by ICDDR, B, aimed for behavioral change through two project models; one was a conventional model using courtyard education sessions; the second added school programs, child-to-child activities and activities with influential community members (Bateman *et al.* 1995). Data were obtained in a household survey; mothers were asked the two open ended-questions recommended for this indicator and the surveyor observed the presence or absence of soap or ash and a drying cloth. The results in terms of handwashing behavior were as follows:

Handwashing Times and Techniques at Conclusion of Promotional Program Intervention Community Compared with Control Community

Appropriate handwashing times = interviewee mentions six handwashing times (the five given above for this indicator plus a sixth: "after disposal of children's feces").		
Model 1	SAFE 33%	Control 0%
Model 2	SAFE 78%	Control 3%
Appropriate handwashing technique - all five elements of handwashing technique as given above.		
Model 1	SAFE 74%	Control 3%
Model 2	SAFE 82%	Control 16%
Observations of availability of soap or ash in the house-hold confirmed the self-reported behavior. Soap/ash any place in the household.		
Model 1	SAFE 92%	Control 25%
Model 2	SAFE 99%	Control 16%

The above and other studies that could be cited suggest that considerable improvements in handwashing behavior can be achieved through promotional programs. Targets aimed at increasing appropriate handwashing by 50% over the baseline would not be unrealistic.

Percentage of population using hygienic sanitation facilities

Definition of terms

A **sanitation facility** is defined as a functioning excreta disposal facility, typically a toilet or latrine. **Hygienic** means that there are no feces on the floor, seat, or walls and that there are few flies. **Using sanitation facilities** means that a sanitation facility is the predominant means of excreta disposal for household members >12 months of age.

Calculation

Number of people >12 months of age in households in the sample using hygienic sanitation facilities

divided by

Total number of people >12 months of age in households in the sample

Sources of data

Information concerning usage of sanitation facilities can be obtained through a household survey in which the surveyor asks the mother or household head about family latrine use and then inspects the latrine to see if it is (1) is functioning and (2) hygienic and (3) shows signs of use. The person being interviewed is asked "Do you use the toilet/latrine?" and "Who in the family uses the toilet/latrine?" For young children, the issue is whether their feces are deposited into a sanitation facility, not whether they actually use the facility themselves. For example, mothers may put soiled diapers or feces from small pedi-pots into a latrine.

The toilet or latrine is inspected for maintenance and evidence of use, such as a well worn path between the house and sanitation facility, signs of wear on the seat, absence of storage materials, door in good repair, absence of spider webs, etc. If the household's facility is not hygienic, the number of household members >12 months of age should be counted, but

none should be counted as a sanitation facility user. In other words, for an individual to be counted as a user of the sanitary facility, four conditions must be met: (1) the facility must be functioning and (2) hygienic; (3) the person must be reported as a user by him/herself or the mother or head of the household; and (4) the facility must show signs of use.

Issues

Sanitation facility programs might focus on building or improving latrines or other excreta disposal facilities or on improving the maintenance and use of existing facilities. As is clear from the indicator, it is the consistent use of the facility by all family members, not its mere existence, that leads to health and environmental improvements.

In many cultures, the topic of sanitation use is sensitive and may not lend itself to direct questioning. Interviewers should be well-trained and familiar with the culture, and the survey should attempt to be as unobtrusive and sensitive as possible. In some cultures, female interviewers may be needed to interview female household members (Samanta and Van Wijk 1998).

Baseline data may indicate that use of a sanitation facility is low among children. In such cases, children may be especially targeted and the program may include use of pots for tots or pedipots, or construction of child-friendly latrines, along with a hygiene behavior change program for sanitary disposal of children's feces. In many communities, latrines are not used by young children, either because they are not considered safe or clean or because children are afraid or reluctant to use them. Information on use of existing facilities and community preferences and knowledge, attitudes, and practices vis a vis excreta disposal is critical for program design.

Target Values

The World Summit for Children in September 1990 called for universal access to safe drinking water and sanitary means of excreta disposal by the year 2000. In 1991, the U.N. General Assembly reaffirmed the International Drinking Water Supply and Sanitation Decade (1980-1990) goals of providing safe water and sanitation for all. In Rio de Janeiro in 1992, the U.N. Conference on Environment and Development proposed a target of universal access to water and sanitation by 2025. For urban areas it proposed that by the year 2000 all residents have access to at least 40 liters per capita per day of safe water and that 75% of urban dwellers have proper sanitation (Warner 1997). These targets mention access but do not mention use, although they assume it.

Bateman and Smith (1991) found that for maximum health impact, a majority of households in a given community (about 75%) should have and use a hygienic toilet or latrine. Programs should strive to increase sanitation usage above the baseline to reach 75% usage in the project area.

In a USAID-supported sanitation improvement project in Jamaica, which facilitated construction of sanitary facilties and promoted their maintenance and use, use of sanitation (defined as presence of a functioning latrine kept free of feces and used by all family members >5 years of age) increased from 21.4% to 52% from the baseline to the follow-up eight months later (Daane *et al.* 1997). While the 75% target had not been reached, considerable improvement was made, and it was anticipated that usage would reach over 60% by the conclusion of the project.

PART 3. Annual Monitoring Indicators for Measuring Water and Sanitation-Related Program Performance

Percentage of households with year-round access to improved water source

Definition of Terms

Access to an improved water source means that the home or compound is connected directly to a piped system or that a public fountain, well, or standpost is located within 200 meters of the home. **Year-round** means that water is available during the time(s) of the year when the water supply is least reliable. No particular level of water quality is implied, but access must be to water used for drinking, cooking, cleaning and bathing. Unimproved surface water sources, such as rivers, lakes, and streams, should not be counted.

Calculation

Number of households in the sample with access to an improved water source

divided by

Total number of households in the sample

Sources of Data

Data are collected by means of a survey of a random sample of households. Again, a cluster survey should not be used because water sources may be location-related. The survey should be carried out at the time of year when the water quantity is lowest or most sources have run dry. The surveyor should visit each house or compound and verify access to a water supply as defined above. In some cases, the distance to the water supply may have to be measured to be sure it is within 200 meters.

Issues

WHO collected data on "reasonable access to safe drinking water" from national governments five times during the International Decade for Drinking Water Supply and Sanitation (1980 to 1990). Such access was defined for *urban* areas as access to piped water or a public standpipe within 200 meters of a dwelling or housing unit. For *rural* areas, "reasonable "is taken to mean that a family member need not spend a "disproportionate" part of the day collecting water. The source may be treated surface water and untreated water from protected springs, boreholes, and sanitary wells. Definitions of "safe" vary depending upon local conditions. (See *World Resources 1996-97*.)

In WHO terms, having "access" to water implies nothing about adequacy. For example, it does not seem reasonable to say that people have "access" to drinking water if the water is barely trickling out of the nearest public standpipe and they must wait long in line to obtain a small amount of water. It may be desirable to set some additional criteria for access based on local conditions to address the issue of adequacy. For example, the amount of time it takes to fill a standard bucket or water receptacle could be used as a criterion: if it takes longer than a given amount of time, the source would be considered by definition to be dry and those forced to rely on

it would not be considered to have access. In some cases, significant storage capability may compensate for interruptions in supply, but stored water should not be considered a source of water for this indicator.

Percentage of households with access to a sanitation facility

Definition of Terms

A **sanitation facility** is defined as an excreta disposal facility, typically a toilet or latrine. **Access** means that the household has a private facility or shares a facility with others in the building or compound.

Calculation

Number of households in the sample with access to a sanitation facility

divided by

Number of households in the sample

Sources of Data

The data can be obtained through a survey of a random sample of households. The interviewers should ask the mother or head of household if the family has access to a sanitation facility and then should visit the identified facility to confirm its existence.

Issues

In the WHO data collection activities mentioned above, "access to sanitation" is defined for *urban* areas as being served by connections to public sewers or household systems such as pit privies, pour-flush latrines, septic thanks, communal toilets and the like. *Rural* access consists of "adequate disposal" such as pit privies, pour-flush latrines and the like.

Local, site-specific criteria should be established so that all persons conducting the surveys use the same criteria for "sanitation facility" and "access." Such criteria will list the types of facilities that can be included and will establish some parameters regarding the maximum number of families that can share a facility. A WHO guide to on-site sanitation (Franceys et al. 1992) lists the following types of facilities: simple pit latrines, ventilated pit latrines, ventilated double-pit latrines, pour-flush latrines, offset pour-flush latrines, raised pit latrines, borehole latrines, septic tanks, aqua-privies, composting latrines, cesspits, chemical toilets, overhung latrines. Bucket latrines are not included in the list. Regarding criteria for "access," a cut-off number of families per facility might be set. For example, if more than five families are sharing a facility, they would not be considered to have "access."

This indicator is not concerned with use of a sanitation facility but only with access to it. A family may have access as defined for purposes of this indicator but may fail to use the facility for practical, cultural, or social reasons.

Percentage of recurrent costs for water supply services provided by the community served

Definition of terms

Recurrent costs refer to all operations and maintenance costs of the water supply system which services the community including preventive maintenance and repairs.

Calculation

Monthly recurrent costs for water supply services provided by the community
divided by
Total monthly recurrent costs for water supply services

Sources of data

Information for this indicator may be obtained from community bank accounts and payment records. The full operations and maintenance costs should be determined for a specified period, usually a year. That should be the basis for determining monthly costs.

Issues

The NGO is usually responsible for working with the community to set user fees. The larger the percentage of costs borne by the community the greater the sustainability of the system.

If in-kind contributions are to be taken into consideration, as they often are, a practical means for valuing them must be determined. Labor should be valued by determining the time required and multiplying it by the local minimum wage. Materials should be priced at local market rates. It is important to account for all community contributions; often they are not reported because it is difficult to estimate their monetary value.

Percentage of constructed water supply systems adequately operated and maintained by the community they serve

Definition of terms

Constructed water supply systems refers to those water supply systems constructed by the NGO or project. Such systems are typically for villages or urban or peri-urban neighborhoods. Criteria for community operations and maintenance need to be developed by the NGO and might include the following:

- Existence of a functioning operations and maintenance committee that meets regularly
- Designated people responsible for operations and maintenance who can articulate (or demonstrate) procedures followed to operate and maintain facilities
- Appropriate tools in good working order
- Up-to-date accounts
- Water system operational and in good repair

Calculation

Number of constructed water supply systems operated and maintained by the community
divided by
Number of constructed water supply facilities

Sources of data

Data would be collected from each community with a constructed system through review of project and community records; interviews with community leaders, maintenance by committee members, consumers, maintenance persons; and observation and inspection of the water supply system.

Issues

Water supply systems operated and maintained by the community served are likely to be more sustainable than those maintained by persons outside the community or centralized services.

PART 4.

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Appendix 1: Title II Generic Indicators

CATEGORY	LEVEL	INDICATOR
Health, nutrition and MCH	Impact	% stunted children 24-59 months (height/age z-score)
		% underweight children by age group (weight/age z-score)
		% infants breastfed w/in 8 hours of birth
		% infants under 6 months breastfed only
		% infants 6-10 months fed complementary foods
		% infants continuously fed during diarrhea
		% infants fed extra food for 2 weeks after diarrhea
	Annual monitoring	% eligible children in growth monitoring/promotion
		% children immunized for measles at 12 months
		% of communities with community health organization
		% children in growth promotion program gaining weight in past 3 months (by gender)
Water and Sanitation	Impact	% children < 36 mo with diarrhea in last two weeks
		Quantity of water used per capita per day
		% child caregivers and food preparers with appropriate hand washing behavior
		% population using hygienic sanitation facilities
	Annual monitoring	% households with year-round access to improved water source
		% households with access to a sanitation facility
		% constructed water facilities maintained by community
		% recurrent costs for water supply services provided by community
Household food consumption	Impact	% households consuming minimum daily food requirements
		number of meals/snacks eaten per day
		number of different food/food groups eaten
Agricultural productivity	Impact	annual yield of targeted crops
		yield gaps (actual vs. potential)
		yield variability under varying conditions
		value of agricultural production per vulnerable household
		months of household grain provisions
		% of crops lost to pests or environment
	Annual monitoring	annual yield of targeted crops
		number of hectares in which improved practices adopted
		number of storage facilities built and used

CATEGORY	LEVEL	INDICATOR
Natural resource management	Impact	imputed soil erosion
		imputed soil fertility
		yields or yield variability (also annual monitoring)
	Annual monitoring	number of hectares in which NRM practices used
		seedling/ sapling survival rate
FFW/CFW roads	Impact	agriculture input price margins between areas
		availability of key agriculture inputs
		staple food transport costs by seasons
		volume of agriculture produce transported by households to markets
		volume of vehicle traffic by vehicle type
	Annual monitoring	kilometers of farm to market roads rehabilitated
		selected annual measurements of the impact indicators

Acronyms

AED	Academy for Educational Development
BHR	Bureau of Humanitarian Response
CDC	Centers for Disease Control and Prevention
CS	Cooperating Sponsor
DHS	Demographic and Health Survey
DHS-III	Demographic and Health Survey (third phase of DHS surveys conducted in the country)
EHP	Environmental Health Project
FANTA	Food and Nutrition Technical Assistance
FFP	Food for Peace
MCH	Maternal and child health
NGO	Non-governmental organization
PVO	Private voluntary organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization
WS	Water and Sanitation