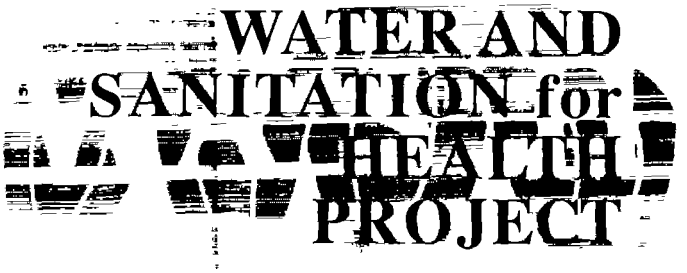
[redacted]

RETHINKING SANITATION: ADDING BEHAVIORAL CHANGE TO THE PROJECT MIX

WASH Technical Report No. 72
July 1992

[redacted]



Sponsored by the U.S. Agency for International Development
Operated by CDM and Associates

[redacted]

WASH Technical Report No. 72

RETHINKING SANITATION: ADDING BEHAVIORAL CHANGE TO THE PROJECT MIX

Prepared for the Office of Health,
Bureau for Research and Development,
U.S. Agency for International Development,
under WASH Task No. 063

by

May Yacoob
Barri Braddy
Lynda Edwards

July 1992

Water and Sanitation for Health Project
Contract No. DPE-5973-Z-00-8081-00, Project No. 936-5973
is sponsored by the Office of Health, Bureau for Research and Development
U.S. Agency for International Development
Washington, DC 20523

CONTENTS

APPENDICES

FIGURES

ACKNOWLEDGMENTS

Conceptual insights and leaps rarely, if ever, occur in isolation. Nor did they here. Consequently, the authors wish to acknowledge the many contributors to this document. We would first like to thank the participants of the April 1991 workshop on Hygiene Behavior Education at Oxford, England, and Dr. Sandy Cairncross, Senior Lecturer in Tropical Public Health Engineering from the London School of Hygiene and Tropical Medicine for organizing this workshop and providing a thorough and insightful review of this document. We wish, as well, to thank the WASH reviewers—Eduardo Perez, Massee Bateman, and Craig Hafner—and also J. Ellis Turner, WASH Project Director, who kept the authors on track and moving. We'd like to also thank Dr. Colette Hopkins and Robert Gearheart for their contributions to earlier drafts of this paper. Finally, thank you to Betsy Reddaway for helping to manage this lengthy development and publication process.

ABOUT THE AUTHORS

Dr. May Yacoob is an applied medical anthropologist with a post-doctoral degree in Health Services Management. She has been with the WASH Project since 1986, and prior to WASH worked on UNDP and World Bank water supply and sanitation projects. The focus of her inquiry is on issues of sustainability, community management, women, and hygiene education.

Dr. Barri Braddy specializes in human resource development psychology at the Research Triangle Institute. She recently completed an assessment of human resource development needs for the health sector in Indonesia. Domestically, she led the evaluation of the Centers for Disease Control's Planned Approach to Community Health (PATCH) program, a community participation approach that uses volunteers to identify health-related risk areas and to design and implement interventions. Dr. Braddy also is leading the assessment of CDC's Behavioral Risk Factor Surveillance System, a state-based survey being implemented nationally.

Ms. Lynda Edwards has a B.A. from the University of Washington and extensive community development work both in the United States and overseas. She worked in health and education services with the Peace Corps as a volunteer and as a trainer. She has written and developed training guides for the American Red Cross for public education on health matters. Her work with WASH over the past four years has been as a writer and editor.

EXECUTIVE SUMMARY

Daily, thousands of people die from diseases relating to inadequate water supply and sanitation. Of the adults who survive, many are so weakened that for extended periods they can neither work nor care for their families. Young children are particularly vulnerable to such diseases. Often, they die; if they do not, their physical and mental development may be permanently affected. One response to these diseases has been the promotion of curative strategies suited mainly to clinical implementation. A *preventive* response is the provision of safe water and sanitation infrastructures, which address both contextual and physical causes of these diseases in communities worldwide. Although such measures have dramatically improved the quality of life for millions, it is clear that potable water alone cannot bring about the health benefits anticipated from the Water Decade (1980-90); sanitation (including personal behavior, hygiene education, and technical options) must move closer to the forefront if better community health is to become a reality.

In examining the sanitation component of water supply and sanitation efforts, the authors explore some of the reasons that certain sanitation projects have failed in the past: one cause of such failures is an overemphasis on technological installations at the expense of behavioral considerations such as latrine usage and upkeep and general hygiene practices. This bias needs to be reexamined in light of evidence from reviews of health impacts: it appears that safe excreta disposal and the proper handling of water may outweigh even the provision of safe water in their effect on community health.

Health benefits associated with water supply and sanitation projects require that changes in hygiene behaviors accompany infrastructure improvements, for without them the facilities are unlikely to be properly used and maintained. However, the consideration of hygiene behaviors as a project input or output is a relatively new concept. This document seeks to introduce project planners and managers to this concept and to the usefulness of hygiene behavioral change. Neither a how-to manual nor a comprehensive guideline, the document discusses the why and how of behavioral change as an element of water and sanitation projects.

Sanitation projects face many constraints. Funds are scarce. The stated priorities or goals often promote installation of facilities or numerical targets. Project planners may give too little scrutiny to the types of technologies acceptable to a given community, or to hygiene education needed to support the chosen option. Behavioral components are often neglected—i.e, baseline information on "what is" and clearly identified areas for improvement. (Examples of "behavioral" areas might be protection of the drinking water source and proper disposal of feces, or understanding of the need for hand-washing before handling food.)

Of these constraints, the two most urgently needing attention are the project priorities or targets and the dearth of behavioral information from communities on which to base project planning. Planners must be persuaded to expand upon the traditional measurement of project

success (i.e., installations completed) by devising ways to measure health improvements brought about by behavioral change, using a baseline of data on community practices.

The authors present a case for using such behaviors as the basis for project design, thereby enabling planners to determine what changes in sanitation can reasonably be introduced within the community and only then choosing the technologies and supporting programming, such as hygiene education, to be implemented. In a similar vein, the authors suggest that planners expand their view of sanitation so that, in addition to including the disposal of feces and the construction of latrines, it encompasses existing hygiene behaviors and practices and also the behavioral changes that community residents must undertake to improve their utilization of facilities and, thereby, their health. It is vital, however, that before developing any behavioral change initiatives, planners understand the cultural and religious context within which promotional activities will take place.

Chapters 3 and 4 address behavioral change directly. Chapter 3 discusses in detail the collection of data on community sanitation practices. Knowledge, attitudes, and practice studies and project experiences reveal the gulf between ideal and actual behavior and between intended and actual outcomes. Background such as this highlights the importance of continuous feedback and project documentation as ways to permit learning from experience. It is not enough, however, to merely obtain a flow of information; it is also necessary that program staff develop the capability to adapt the program to that data as it changes. Only in this way can they tailor project activities to evolving needs.

Chapter 4 presents a behavioral model for the promotion and implementation of sanitation behavioral change; this model features six key phases: community assessment; delineation of areas for change and prioritizing the areas based on epidemiologic surveys and discussions with the community; development of intervention strategies; preparation for subsequent interventions; capacity building; and evaluation. Progressing through these separate phases, the field worker becomes a partner who serves as a facilitator of community change rather than as a functionary who imposes predetermined solutions upon the community. Moreover, in this facilitator role, the field worker gains the acceptance of the community and can better stay abreast of its progress toward project goals.

Recommendations found in Chapter 5 relate to three overall precepts: promote community participation in the design, planning, and execution of WS&S projects; collect sociocultural data before beginning any project; and provide health and hygiene education in all sanitation projects. In essence, the authors advise planners and managers to find out what community members currently do, find out what behavioral changes they will accept, and then help them find ways to make those changes. By following this sequence, staff can strengthen the odds for achieving project sustainability and better community health.

1

INTRODUCTION

1.1 Background

Since the mid-1980s, setting physical project targets has begun to yield to behavioral change as a development paradigm. This shift comes about not so much from new methodologies as from an altered vision of development in which behavioral change is increasingly viewed as a learning process that takes place through communication between development practitioners and community members (Donnelly-Roark 1987). As a result, strategies that focus on more direct and more focused data gathering, based on a dialogue between planners and community people, have become favored over conventional socioeconomic surveys that focus on quantitative formal interviewing, as do knowledge, attitudes, and practice (KAP) surveys.

The conceptual changes taking place in development in general are also occurring in water supply and sanitation. The first such conceptual shift is the growing perception of development as an *adaptive* change: from this perspective, development and change are seen as processes of modification to solve problems relating to what people currently do rather than as a means by which "newer" and therefore better technologies *replace* existing technologies or interventions. Incremental improvements within the sanitation framework usually have a better chance of success than do measures calling for dramatic behavioral change. Also, experience has shown that imposed "solutions" are rarely effective. For example, the ventilated improved pit (VIP) latrine is an excellent technology. Project planners have frequently focused on this option (since it has worked well in many settings) rather than starting with the community or area to be served, and discovering what the existing sanitation practices are. Without an understanding of current behavioral patterns, customs, or beliefs, the imposition of VIP latrines (or any other new technology) is a risky venture. Cost is also a factor. Even if the community is willing to improve its sanitation and seeks the new technology, the cost of materials or upkeep might be prohibitive. In Zimbabwe, where the VIP latrine was invented, the rural VIP program must be heavily subsidized (Brandberg 1985).

Another major change, relating to cognitive models and the nature of perception itself, is the realization that different groups of people have differing models for understanding and interpreting what they perceive to be reality. Community people and development practitioners perceive and understand each other differently. It is not that one perception is wrong and another is right, but simply that they are different, and while the perception of development practitioners may be considered "scientific," that of a community tends to be built upon many generations of experience with its situation. Take, for example, a behavioral intervention as seemingly simple as handwashing. Prior to developing any behavioral-change initiatives, the religious and cultural context within which the practice of handwashing takes place must be clearly understood. A study conducted in Bangladesh on the effect perceptions of cleanliness

and the role of soap had on handwashing showed that ideas and customs about cleanliness were viewed within a larger socio-religious context of purity versus impurity. Washing serves both physical and spiritual needs and is performed according to defined patterns that may not effectively interrupt transmission of microorganisms. Soap, in fact, is regarded as a cosmetic rather than an agent for removing microorganisms (Zeitlyn and Islam 1991). In a similar vein, Henry (1991) reported that Thai mothers recognized 12 types of diarrhea, and the cultural category of each determined its severity and therefore its treatment. This cultural perception determined the type of help that mothers sought. Clearly, it is important to have a broad overview of indigenous knowledge and perceptions before undertaking project planning.

The third major change in thinking comes from experience with KAP studies, which reveal the gulf between ideal and actual behavior and between intended and actual outcomes. Thus, a system that uses feedback as a continuous process to permit learning from experience is critical to the success of long-term behavioral changes. From a programmatic point of view, it is not enough to obtain a steady flow of information: it is also necessary that program staff develop the capability to adapt the program to that information so that project activities respond to community needs.

Taken together, these three elements contribute to a development paradigm that (a) accepts the reality and interconnectedness of change and stresses the need for technologies and changes that can be adapted to solve locally felt needs, (b) bases itself on an existing body of knowledge, and (c) employs constant feedback.

1.2 Purpose of This Report

This document, intended for project planners and implementors, promotes behavioral change as an important component of WS&S programming, one, moreover, that does not require a complete revamping of operations. The authors have three objectives in mind. One is to emphasize and support an expanded view of sanitation that extends beyond latrine construction to encompass the hygiene behaviors that affect family and community health. Another is to examine the relationship of existing behavior to health initiatives and discuss some of the ways project staff can identify unsatisfactory behaviors and facilitate their change as a means to improve community health and ensure project sustainability. An understanding of existing behaviors is a step that must precede the construction of latrines or the design of hygiene education, for it is on the basis of existing behavior that preferences for technological interventions should be defined and the content of hygiene education developed. A final objective is to provide a behavioral change model that project planners and managers may use as a tool for project design.

2

SANITATION AS A PROJECT COMPONENT

2.1 Overview

Despite the gains of the Water Decade (1980-90), over 15,000 people die each day from diseases relating to water and sanitation (Walsh 1990). Countless others struggle through their daily lives weakened by repeated bouts of diarrhea and other diseases that leave their bodies wasted and their minds clouded. Sometimes overlooked, because of the prevailing emphasis on disease *incidence*, is the significance of *severity* (Esrey et al. 1990). For example, one or more serious cases of diarrhea or another disease are likely to exact a greater lifetime toll on the bodies of its victims than will more numerous but less severe cases of the same disease. Short-term considerations are also important. A young mother who is mildly or even moderately ill could probably see to her own survival and that of her family; the same woman could find herself and her family in peril if she were too weak to gather fuel, acquire and prepare food for herself and her children, or nurse an infant. Economic implications for the community are found in overall productivity levels that reflect the incidence and severity of diseases that attack village residents.

Although the 1980s saw the provision of safe water to thousands of communities worldwide, health benefits have not lived up to expectations. One reason may be that sanitation efforts have failed to keep pace with water provision. However, a review of 144 studies on the relationship between water and sanitation conditions and six diseases[1] indicates that safe excreta disposal is the most effective intervention against such diseases (Esrey et al. 1990).

Yet in developing countries, sanitation efforts, even those defined by latrine construction alone, face serious constraints. Funds are scarce. The stated priorities or goals often promote installation of facilities or numerical targets. Behavioral components are often neglected—i.e, baseline information on "what is" and clearly identified areas for improvement. (Examples of "behavioral" areas might be protection of the drinking water source and proper disposal of feces, or understanding of the need for hand-washing before handling food.) Project planners may give too little scrutiny to the types of technologies acceptable to a given community, or to hygiene education needed to support the chosen option. Partly because of such constraints, sanitation components of water supply and sanitation (WS&S) projects have traditionally lagged behind the water supply components. In projects where sanitation was even addressed, efforts have focused primarily on latrine construction, failing in the process to include existing behaviors and practices as the basis for either selecting technological interventions or targeting behavioral changes to be supported by hygiene education. Too often, project managers have chosen to define project success according to readily measured

[1] Diarrhea, ascariasis, guinea worm, hookworm, schistosomiasis, and trachoma.

indicators, such as sanitation installations, rather than finding ways to assess community health improvements brought about by behavioral change.

Thus, in the sanitation component as in the water component, coverage goals instead of behavioral considerations (usage and upkeep, hygiene practices) have often dominated project thinking. Just as operations and maintenance and community participation may be neglected in favor of the installation of water supply hardware, so too may hygiene behaviors be overlooked when priority emphasis rests on sanitary installations.

Critical to the lag in implementing sanitation components has been the issue of defining just what elements the term *sanitation* encompasses. Generally, the operational definition of sanitation has included only the disposal of feces and the construction of latrines. Besides ignoring existing behaviors and practices, this definition also fails to take into account the behavioral *changes* that communities must undertake to bring about health benefits. Such changes, promoted through hygiene education, might be any or all of the following: proper disposal of fecal matter (whether by constructing low-cost latrines or improving methods already in existence), proper disposal of excess water and of solid wastes, and improvement in personal and food hygiene. These and similar behaviors will determine whether a sanitation project yields a health benefit or fails the test, leaving behind an imposed technology that is misused, underused, or even ignored altogether.

Another implementation difficulty arises because unlike water, which people will learn to use more of and for a greater variety of purposes, sanitation innovations are much harder to carry out; issues of belief, culture, and change all come into play here. And because sanitation projects appear to be essentially technical by virtue of their construction inputs, such sociocultural issues may be overlooked if the implementors (often technicians) receive little guidance or support in uncovering such information. Also frequently overlooked in sanitation projects that emphasize technology is the importance of specific hygiene education to help community members learn how to use the latrines properly and how to keep them clean.

2.2 Behavioral Factors

Hygiene improvements are essentially the changes in peoples' behavior that, over time, produce improved health. One way behavioral change is demonstrated is by the ways people use improved infrastructure. Usage and sustainability are critical to the success of sanitation projects. Why do some installations achieve community acceptance and others remain largely ignored? Why are some installations "successful" for a period of time and later abandoned? Why, after the latrines are in place, do disease rates sometimes remain unchanged or perhaps briefly drop, only to rise again? Ultimately, these are problems that relate more to behavior than to technology and their solutions found merely by focusing on more or better latrines. Unless facilities are suitable for the people using them and unless the technologies are affordable and efficient, the facilities will remain unaccepted and underused.

Planners must find ways to bring project technology into balance with community knowledge, attitudes, and behaviors relating to health and sanitation. Thus, the starting point of any sanitation project should be an inventory of community health knowledge, attitudes, and practices relevant to water supply and sanitation improvements; these data will give planners an idea of technologies the community might accept—although even then the technology must be chosen by the community itself, if there is to be any hope of successful implementation and sustainability. Project planners and staff will want to look at the proposed design: is it the best solution for the context? Is it too sophisticated for the users to relate to, perhaps, or will it require such extreme behavioral changes that the community will ultimately reject it? If latrines are chosen, do they accommodate traditional postures used by community members? Have seated models been selected (and perhaps already installed) when squat-types would be the only design acceptable to the majority of the community? Can the units be maintained, cleaned, and emptied by community members? Or if not, can the community afford the cost of having these tasks done for them? Can training ensure that the skills required to construct and operate the improved facilities remain within local capability—whether private or public? Have the latrines been located to conform to both hygiene considerations and community attitudes and preferences?

Donors and project staff must move carefully when presenting technological options to avoid the choice of a technology that fits neither the community's sociocultural context nor its ability to use and maintain the installations. A technology that functions appropriately within one context may be impossible to transfer to another. In a review of sanitation programs, Cairncross and Macoun (1990) suggest that the best way of assessing the acceptability of technology is through pilot programs offering more than one technology option.

The following example illustrates the long-term effect of a poorly thought-out sanitary installation.

Compost Latrines in Guatemala

The Centro de Estudios Meso Americanos Sobre Tecnología Apropiada (CEMAT), a local nongovernmental organization in appropriate technologies, developed a compost latrine that produces fertilizer using human waste. Originally identified as a viable technology in Vietnam, this technology was introduced nearly 14 years ago in Guatemala.

In a recent evaluation surveying approximately 3,000 households, only 42 percent were found to be using the latrines. Of these, only 55 percent used the latrines correctly. Thus, only 23 percent (690 households) were using the latrines properly, despite intensive efforts over the years by CEMAT staff.

A review of the CEMAT study revealed no prior experience of night soil use in the area, so that a major behavioral change program was needed to accompany this technology.

Climatic conditions also influence the appropriate transfer of composting latrines from one context to another, especially the levels of dryness and humidity. In this case study, the anaerobic process of the composting latrine appears a slow and unreliable method of pathogen destruction. In addition, the process of composting is a behavioral issue that differs from one community to another. It is behavioral especially in how and where people like to urinate and defecate and separate the two.

This technological review attributes the latrines' lack of success to a number of factors, chief among them the human behavior factor ("the biggest wild card of them all").

(Extracted from personal correspondence between CEMAT and Eduardo A. Perez, Associate Director for Engineering, WASH Project.)

3

BEHAVIORAL CHANGE AS A PROJECT GOAL

Increasingly, medical epidemiologists concerned with the spread and persistence of diseases related to water and sanitation are recognizing the role that behavior plays in disease transmission. Prevention of diarrheal disease through improved personal and domestic hygiene is now recognized as an important addition to technological interventions—be they oral rehydration therapy or water supply and sanitation (Henry 1991).

The studies which have used behavioral interventions, notably those by Stanton and Clemens (1986, 1987), show that people can and do change their behavior. In the Stanton and Clemens studies, the intervention group showed an increase in the practice of improved behavior, specifically handwashing. This translated into a 26 percent reduction in diarrheal disease. The intervention group also received information about improved sanitation behaviors and a better understanding of the relationship of sanitation to health. However, what is not known is the extent to which the intervention groups will continue practicing the new behaviors after a project ends.

While policy implications clearly favor establishing behavioral change programs as part of any health-related program, how best to design suitable interventions to enhance these changes remains unclear. Two basic reasons have been suggested for this difficulty: (a) a lack of basic information about existing hygiene practices and beliefs in almost all areas where improved WS&S facilities—latrines, taps, jars, buckets, etc.—have been used as interventions; and (b) a gap between research and field experience with effective hygienic processes and practices (Levine 1989).

3.1 Importance of Behavioral Change to Health Improvements

Literature on health impacts in water supply and sanitation abounds. With a decade of studies on health impacts behind us (see Appendix C for all studies and their findings), one lesson is clear: proper water and sanitation can reduce the incidence of diarrhea by at least 25 percent; the incidence of other diseases—guinea worm, trachoma, schistosomiasis—is also positively affected by improvements in water supply and sanitation and behavioral change. Cairncross (1988) argues that whether urban or rural, the best documented health impact is on intestinal worms. He also suggests that these health impacts have been underestimated, as the studies have considered only the prevalence of worms and not the intensity. The important point for either water supply or sanitation is that, without a behavioral component, the facilities constructed are unlikely to be properly used and maintained and the program is unlikely to be self-sustaining (Boot 1984; Burgers et al. 1988). Although frequently plagued by methodological problems, epidemiological studies have not been lacking. There is also no

shortage of literature reviews (Esrey et al. 1985; Feachem et al. 1983; Blum and Feachem 1983; Esrey et al. 1990; Cairncross 1990).

Some studies that have reported little or no change in morbidity and mortality from water-borne diseases attribute the lack of progress to other sources of environmental contamination that remain unchanged during the intervention. A recent study in Malawi found that improved water supplies had no impact on diarrheal disease, even though overall morbidity was significantly reduced. The author attributes this to continuing contamination from poor water-storage practices and continuing use of traditional water sources that are more accessible during the rainy season (Lindskog 1987). In Guatemala, the provision of unlimited potable water to homes increased water consumption but had no appreciable effect on morbidity, a phenomenon attributed to poor water-storage practices within the household (Shiffman et al. 1978).

In urban Gambia, Pickering (1985) suggests that modern water and toilet facilities have had no impact on the duration of children's diarrheal episodes because of the high level of contamination throughout the neighborhood in which they played. Feachem (1983) also notes neighborhood contamination and the apparent failure of different types of excreta-disposal facilities to alter parasitic infection rates in urban Africa.

Recent studies have focused on more limited behaviors, i.e., handwashing; there are about six such studies, some focusing on handwashing alone and others also including appropriate disposal of wastes and feces. (For a discussion of study findings, see Esrey et al. 1990.)

An important study on the connection between improved facilities and economic development argued that improved water supply or excreta disposal may have little impact at the lowest levels of socioeconomic development (Shuval et al. 1981) because in such circumstances nutrition and personal hygienic practices are so poor that single interventions may not produce measurable results. In fact, a recent preliminary study conducted in Thailand showed that when latrines were installed among extremely poor people, with neither resources nor information about latrines, the rate of diarrheal disease actually rose.

An analysis using secondary data gathered under the Demographic and Health Surveys Project (DHS) in Guatemala was carried out recently by the WASH Project (Bateman and Smith, 1991). The study examined three hypotheses important to policymakers: (1) improved sanitation (sanitary disposal of feces) has greater impact on child health than does improved water supply; (2) improved sanitation is more strongly associated with improved child health in urban settings than in rural settings; and (3) *community measures* of sanitation are better indicators of child health risk than is *individual access* to improved sanitation.

Analysis of the third hypothesis, which is relevant to this discussion and also closely related to the two previous hypotheses, showed that a low level of community sanitation was associated with a higher risk of stunting (correlated with diarrheal disease) in children than was lack of individual access to a toilet. Stated another way, children who lived in a community with a high level of sanitation were found to have lower risk of stunting, whether or not they had individual access to a toilet.

The foregoing examples suggest that an understanding of existing hygiene behaviors is critical to determining the kind of changes necessary for producing health impacts. The examples also suggest that single interventions, either in the form of water improvements or latrine installation, cannot be effective unless they are part of an overall improvement in that community. But to design interventions that promote such improvement, planners must first understand the behaviors that create contaminating conditions within a given community.

3.2 Health Behavior Model

Figure 1 shows the relationships between health conditions, behaviors, and the programming of activities. Health conditions within a community can be either conditions that communities themselves have identified as those affecting them or conditions that have been identified epidemiologically as negative health conditions. Sometimes such a list might evolve from discussions with community people or from an epidemiological survey to which community people have contributed. The list might include such items as odor, flies, water with high fecal contamination, worms, and diarrhea—possibly even delineated into different types.

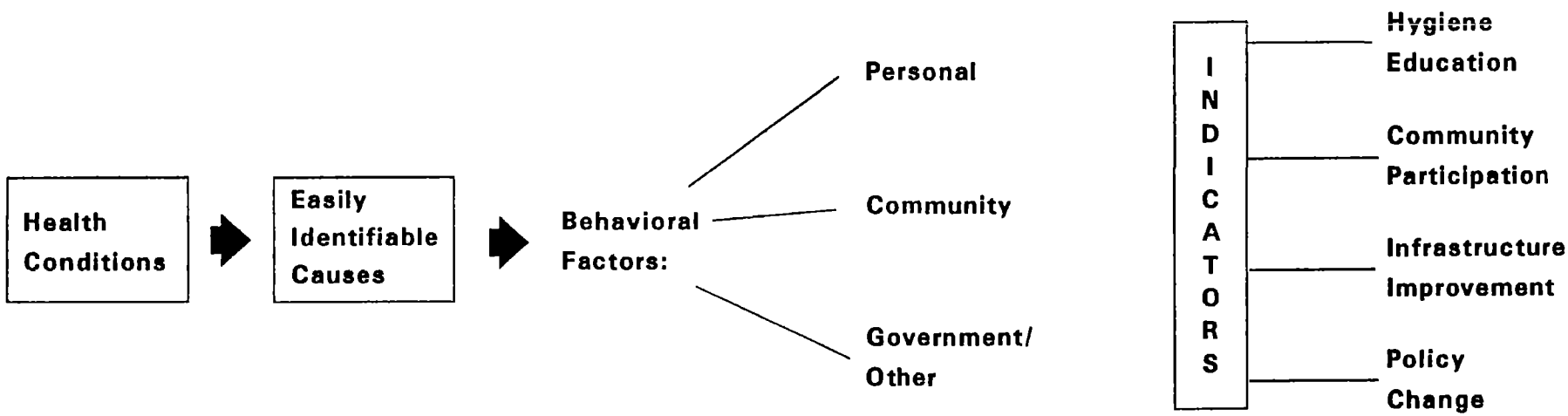
The second area that can be discerned from observational data, from epidemiological analysis, and from community people themselves are the causes of poor health within the community. Such identifiable causes might be indiscriminate defecation practices, excessive solid waste, or grey waters improperly disposed of.

The third area comprises behavioral factors, which can be at a personal level, a community level, or a governmental level. At a personal level, one might note that the sequence in which water is used causes contamination, or that children defecate indiscriminately because they fear the latrine pit, or that during the night animals are kept near the water containers used for drinking. A community-level behavior may be the dumping of solid waste near a water intake. At the government level there might be no logistical support or skilled staff available to implement hygiene and community health programs. Or budgets might be sorely underestimated or nonexistent for such programs.

Measurement indicators for the successful implementation of hygiene education programs will emerge from the data collected on the behaviors. At the community level, this data would include the nature of children's latrine usage, numbers of households sorting solid wastes, and number of people covering water containers. At the government level, an indicator might be adequate budgets, skilled staff, and ongoing training programs by the ministries of health and of water and sanitation. The content and processes for hygiene education, community participation, choice of technology, and specifics of policy change will result from the data-collection task.

Figure 1

HEALTH BEHAVIOR MODEL:
RELATIONSHIP OF BEHAVIOR TO PROGRAM INTERVENTIONS



3.3 Collecting Data on Community Sanitation Practices

No methodology is free of problems, and its applicability to the overall context is an important first step in selecting any investigative methodology. Since the focus of the sanitation component of WS&S projects is to change behaviors so that health ultimately improves, one must first understand what those behaviors are.

Within the hygiene and sanitation context, all of the anthropological methods in use today boil down to one basic concept: going out to communities to observe and record behaviors that cause contamination (see Appendix B for a suggested guide to data collection). Various methods provide effective ways to learn about community behavior, but researchers must also carefully plan how they will bridge from gathering information to writing about it and making sense of it.

The first step is to gather the information, and a convenient way to do this is to take notes according to category. Categories for a hygiene education program might be the following: feces disposal, household hygiene, water use and management, and food handling. Using a separate section of a notebook for each of these areas, the field worker lists all of the activities taking place and then notes how each is being done.

By observing a number of representative households—rich and poor, near to and far away from the water source, and drawn from each ethnic group—the field worker can draw conclusions on how different people carry out the various sanitation activities.

Analysis takes place continuously. At the end of each day the field worker looks for consistencies in the data, but most of all notes the inconsistencies: Where are the gaps? Why are some people doing things differently? After identifying and pursuing the variations, the researcher then identifies variables and begins to identify indicators for key variables. These provide the evaluation indicators and also the basis for the design of interventions. A study carried out in New Guinea provides an example of focused data collection that required relatively short periods of time at each site (see box on next page).

This case and the one that follows (see box on page 13) suggest that behavioral data can be observed in a number of ways, depending on cost, time available, and the use to which the data is to be put. Extended household observation at various times can outline the range of activities conducted. Then, structured observations will focus only on how that specific activity is carried out. Another possibility (especially for sensitive behaviors like latrine use) is to do spot checks to note whether the latrines are used or not. Or, young children could be asked to demonstrate latrine use (Hurtado and DiPrete 1992).

Although a section on data analysis would be incomplete without addressing the issue of qualitative versus quantitative data-gathering techniques, these techniques do not belong at opposite poles. Quantitative research tends to enjoy a mystique as the more scientific of the two; however, data validity arises not from a method but from the techniques of data collection and the management of that data. Greater or lesser validity depends upon the precision and accuracy of the data gathered. In measuring human behavior, we move into

A Study in Highland Papua New Guinea

The study set out to define behavioral risk factors for the transmission of diarrheal diseases among children under three. It aimed at defining risk factors and designing a method that would be adaptable to other disease-transmission problems and would not require anthropological study.

Spending a month each in one urban and two rural areas doing a study of a particular behavior in great detail, the researcher confined her observations and notes to those activities or thoughts concerned with child care, water use, sickness and curing, food preparation and serving, bathing, and defecation.

The researchers and observers (young women with appropriate language skills and between 10 and 14 years of education) explained to each of the 32 communities that they were interested in child care and children's illnesses in general.

Observers were trained in pairs, with each successive pair trained by the one that came before (under the researcher's supervision). In all, 199 families were seen, and 330 days of observation took place. The first 50 mother-child pairs were observed for two consecutive 8- to 10-hour days, with the second day's observation maintained only if either feces-handling or a meal had not taken place on the first day. The problem of observing adult defecation practices was solved by a simple observational proxy: each day the observer simply asked to go to the latrine, upon which the mother would reply either that she had one or did not. If a latrine was available, the observer went to use it and recorded whether it appeared to be in use. (Unused latrines generally had overgrown paths leading to them.)

Of utmost importance in this study was the ethnographic component, as it provided the basic information upon which the instrument was developed and took less time than did the structured observational component, which spanned over a year. Living in the community allowed observers to assess the sensitivity associated with particular hygiene, sanitation, and child-care practices and the range of variation likely to be encountered. Ethnographic observations provided a measure against which the observers could assess the direction of the behavioral alteration due to the presence of observers as well as additional information on beliefs and practices related to sickness and curing. Finally, ethnography provided a more complete understanding of the economic and social reasons for the behaviors observed, a level of understanding impossible to gain from structured observational data or survey techniques, and also provided the interpretive basis upon which realistic recommendations could be based.

Adapted from Methodological Issues in the Measurement of Hygiene and Sanitation-related Behavior: Lessons from Papua New Guinea, *by Carol Jenkins, research fellow in medical anthropology at the Papua New Guinea Institute of Medical Research.*

a domain in which efforts to increase precision often involve intrusive techniques; correspondingly, the more intrusive we become, the more likely we are to sacrifice overall accuracy. This paradox applies to almost every human activity, but presents the greatest problem when the behavior is particularly sensitive. The example of Burkina Faso on page 15 is a case in point.

A Study in Nigeria

In their study of guinea worm transmission in Idere community, researchers used relatively simple prototype water-contact checklists developed by WHO in relation to schistosomiasis transmission. A version of a stick figure was made with the letter "o"; five could fit on a sheet of paper. Not only would the observer be able to mark the body, but also record time, sex, and purpose of visit to the pond.

Conducting the actual observations were medical students, who stationed themselves at ponds where transmission is known to take place. The researchers were naturally skeptical about whether the community members would behave "normally" with students observing, a realistic concern. Ideally, local community members would conduct the observations and could possibly record the section of town the water user came from. In this instance, the students were told to dress similarly to the local people and to be patient; after a day, people paid little attention to the observers.

Qualitative observation was needed not only to prepare for the structured observation, but also to complement it. In this case, the students were not free to sit by the pond all day, so it was necessary to determine the periods of maximum use prior to formal data-gathering. By making spot checks at the ponds and conducting informal interviews with community women, the students discovered that significant use occurred from dawn to about 8:00 a.m. and again from about 4:30 p.m. until dusk. Consequently, the structured observation was scheduled for these times.

During the intervening hours, occasional visits were conducted also. The bulk of activity at dusk and dawn consisted of domestic water collection by women and children. During the remaining time, men would often come to the pond to collect water for baths (which they would have in a small cluster of bushes about 6 meters from the pond), or to wash their clothes. An interesting observation near several ponds was the knotted palm frond, which interviews revealed to be traditional warning signs reminding community members not to do "dirty" things (such as defecation or refuse disposal) in or near the pond.

Informal observation over a period of months was also valuable in determining likely periods of peak transmission. During the height of the dry season (February–March), for example, so little water was seen in the ponds that transmission could not have occurred. Women literally scraped the bottom of the pond to encourage a little seepage and then had to fight off thirsty bees that had gathered.

Observation of these desiccated ponds made more understandable community resistance to filtering their water: "Why should we buy your filters when we have no water to filter. Government should provide us a well."

Adapted from material by William R. Brieger, of the Department of Preventive and Social Medicine at the University of Ibadan, Ibadan, Nigeria.

3.3.1 Variability

Behavior in water use and sanitation practices has a variability and seasonality that needs to be understood. Some behaviors may vary from day to day whether or not an observer is present. Some behaviors vary throughout the day, and observations limited to early morning, for example, may produce a particular bias. A single observational period may show a higher proportion of mothers throwing stools outside their living areas rather than in latrines because latrines are being used heavily during those hours and so the feces must be disposed of elsewhere. One approach to assessing behavior variability would be to observe at least some households for longer periods.

Seasonality must also be taken into account when conducting observational data gathering. During "hungry season" (planting time in Sierra Leone), behavioral activities around water use, food hygiene, and sanitation practices are different from those of the harvest season. Similarly, in Moslem communities during the fasting month of Ramadan, behaviors around food, domestic hygiene, and defecation are different from those one observes during the rest of the year.

3.3.2 Who, How Long, and How Much?

These are hard questions to answer, but some estimate of time and level of effort is an important aspect to consider. The length of time that the collection of behavioral data will take depends on the experience and capability of the individuals involved. A professional social scientist, for example, might spend about three working months, preferably spread out so that seasonal variations and related behaviors can be recorded as accurately as possible. This time estimate does not mean three months in each village; rather, it is a "ball park" estimate for a social scientist setting up the processes for behavioral data collection in the first year of the project. Optimally, during subsequent years, the same level of effort should be maintained to address issues emerging as methodologies are implemented. When less-experienced people are hired to carry out the assessment function, they will need more time. This input is not needed in each new village or shanty town; but it is needed to map out the process.

3.4 Documenting the Steps Toward Behavioral Change

The concept of process documentation arose within the irrigation and agriculture sector as a way to aid in the development of applied research methodologies that captured experiences, yet were useful enough to integrate into project operations as the projects moved from pilot to national scale. Because the processes for implementing behavioral change programs are unique, other sectors have begun to see the importance of documenting programmatic decisions and the reasons they are made. In this way, the lessons learned from these decisions are not lost.

The role of social science and social scientists is to provide detailed information on community-level project implementation, a type of documentation that involves a systematic account of the activities and concerns of users and project/government personnel. Such documentation is done through meetings and observations of project-specific activities. For example, when a community decision is made to form a committee to take action on where soiled baby diapers are kept and washed or even on building latrines, one might document the specific steps that the field agent and communities took. Care must be taken, however, that such documentation does not become merely a chronological list of events, with little utility. Field staff need careful training in how to note and document the subtleties of behavioral change—to assess whether the intervention can be sustained within a specific context. Such reports can then be shared with ministry-level decisionmakers.

An Observation in Burkina Faso

A researcher collecting data on disposal of children's feces paid an early-morning visit to the young mother of a one-year-old child. Arriving at 6:00 a.m., the researcher found the mother up, having lit the fire and swept the terrace in front of her house. When the mother noticed that her child had defecated on the ground, she covered the feces with sand, swept them up, and threw them into the dry drainage channel behind the courtyard. The mother dressed the child in a pair of light cotton pants, in which the child again defecated. (In Burkina Faso cotton pants are used as diapers). The mother rinsed off the child with plain water and rinsed the pants in plain water, as well. The dirty water was then thrown on the ground in a corner close to the cooking area. The mother then went to wash herself with soap, dressed herself in clean clothing, and bathed the child with medicinal soap.

The same mother, in an earlier questionnaire survey, had responded to a question about children's feces disposal by saying that the child defecated in a pot, whose contents were thrown in the latrine.

Source: Paper presented by V. Curtis and B. Kanki of Centre Moraz in Bobo-Dioulasso, Burkina Faso.

As an organizational tool, the data could group together the activities carried out to effect changes in a specific behavior, with a narrative accompanied by key problems and issues that arise from the activities. Eventually, two categories of information may emerge: the first might be what people say they should do based on belief (children should be bathed and clean at all times); the second might be what people actually do. The issues then fall into two distinct categories—the behaviors now being observed and the changes that people are making as part of a process that will move them to where they feel they need to be.

3.5 Organizational Context of Behavioral Change Programs

Community-wide environmental sanitation, when based upon a behavioral change program within the WS&S sector, has many difficulties to overcome. For example, if placed under ministries responsible for infrastructure construction, behavioral change programs and hygiene education may be overshadowed by latrine construction because herein lies the strength of these ministries. Such institutions may not view WS&S activities focused on behavioral change as an appropriate element of health improvement projects.

As noted, the collection and synthesis of existing hygiene behaviors is not a simple task and requires trained and experienced professionals. Because project managers responsible for WS&S projects are often personnel with technical training, the collection of data on people's existing sanitation behaviors may be outside their realm of experience. It may also be outside the experience of field workers, who are not infrequently asked to collect such data. Sometimes the external consultants and researchers hired to direct this component view their role as one of research only, which may lead them to do the work themselves, leaving host country project staff as bystanders. Instead, external consultants should train staff in behavioral-data collection.

Very few countries have a cadre of experienced social scientists and epidemiologists who are familiar with the function of behavioral change in health and also experienced in methodologies for identifying such behaviors. Among many social scientists, a "scientific" mystique surrounds questionnaires and computer-based data analysis. Because of this, social scientists often see observational data gathering as generally less rigorous and therefore less scientific. Such an attitude has resulted in data from self-reporting (which is often inaccurate), rather than observed behavior. Data regarding a community's perspective on hygiene behavior cannot be gathered with the traditional questionnaire and quantitative methods alone.

Another difficulty is that while promotion of hygiene behavior is a preventive approach, the concerns of national ministries of health may be more clinical or curative than preventive. Also weighing against behavioral components are the greater political rewards reaped from building a hospital as opposed to developing and implementing suitable hygiene education programs. Unless planners make themselves aware of these and other factors during the early stages of planning, while some flexibility still remains, their projects may yield few lasting benefits to the community.

4

THE BEHAVIORAL CHANGE MODEL

When promoting changes in community sanitation practices, it is useful to consider the process as a series of six key phases, as shown in Figure 2.

4.1 Community Assessment

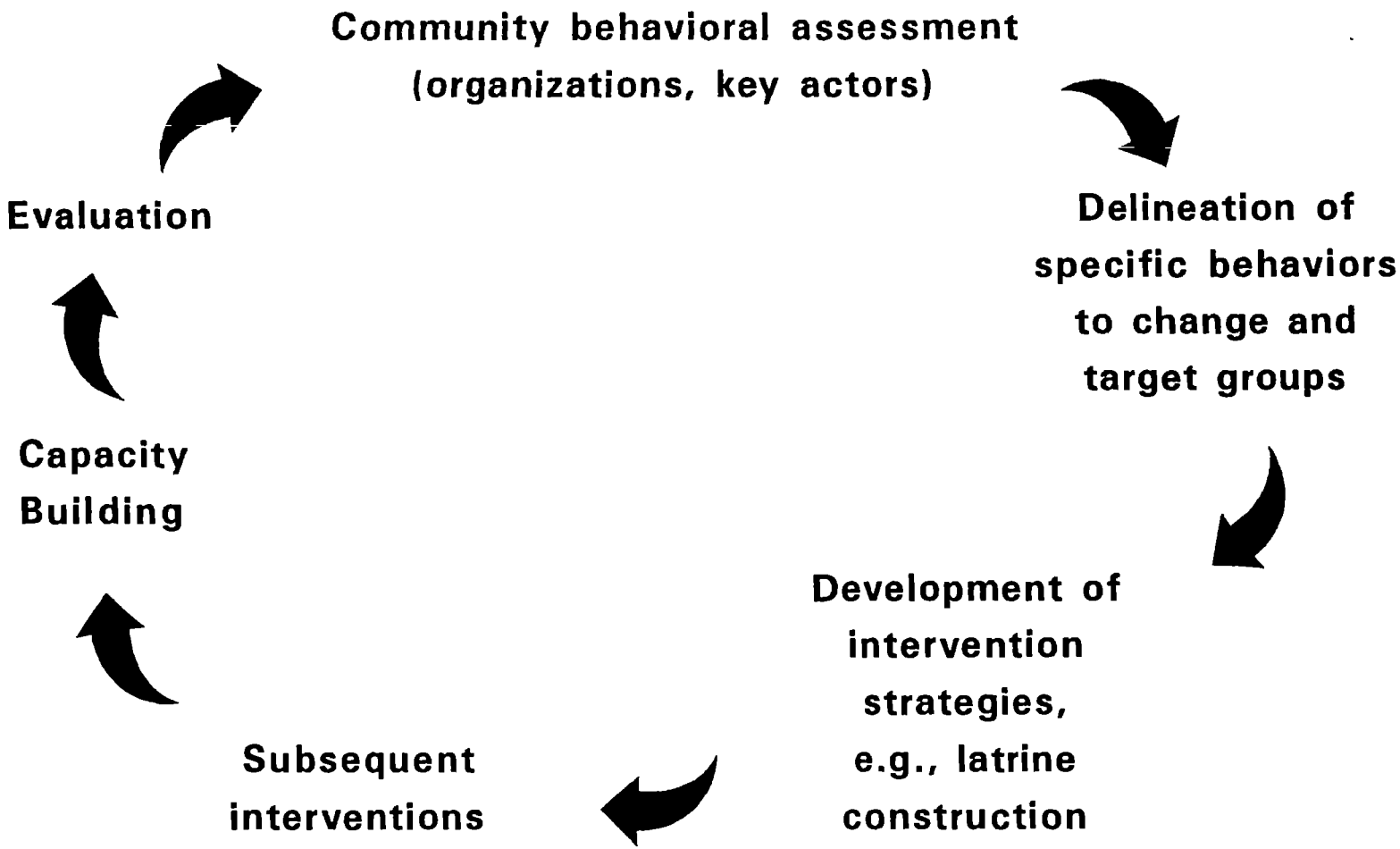
When implementing a program targeted directly at changing community behaviors, it is critical to understand the cultural environment of each community. Properly conducted, a community assessment will yield the background that such an understanding requires. It will also determine the critical health conditions in a community, define the behavioral causes for these conditions, and develop the indicators for measuring changes in the conditions. Such an assessment, moreover, can be done by project staff familiar with their areas and need not be a prolonged exercise. Several specific types of information may be collected through the community assessment process:

- *Cultural norms and beliefs*

  Before embarking upon predetermined solutions, project planners and managers must identify and understand existing norms and learn why people deal with their social, economic, and environmental circumstances as they do. Social norms regarding defecation, behaviors that define the boundaries of the individual and the home, and personal concepts of health, well-being, and cleanliness are all important realities to understand when developing a program of behavioral change. For example, women of a culture in which people traditionally defecate privately would likely hesitate to use a communal latrine sited in full view of village dwellings. Another society, in which people use such occasions as a chance to visit with friends, would find an isolated single-hole latrine uninviting and might reject it in favor of their traditional and more-congenial practice. Some societies decree that men and women not use the same latrine. Another example, broader in scope, is peoples' preference for rain water. How this drinking and cooking water source is used, who manages it, and how it is cared for are all important areas of sanitation behavior that need to be understood prior to embarking on a project. Without an understanding of deeply rooted cultural values and practices, efforts to change community sanitation behaviors will be at best haphazard.

Figure 2

THE BEHAVIORAL CHANGE MODEL



- *Current educational level and, specifically, knowledge of sanitation issues*

  Based on its current level of knowledge, the community may not recognize the value of latrines or even see the relationship between health and infrastructure improvements and, if this is the case, would possibly be reluctant to use them. Sanitation-borne disease is an abstract concept that is not directly seen: where diarrhea comes from, for example, and what people see as its cause. Because the effects of poor sanitation are often delayed, it can be difficult for the community to recognize the relationship between behaviors and consequences. Thus, residents may be unmotivated to change their behaviors, particularly if the new, desirable behavior is more difficult to perform or goes against existing cultural norms and sanitation practice. Nonetheless, learning what people consider to be the origins of sanitation-related diseases is an important first step in the educational programming.

- *Current sanitation practices for adults and children, combined with an analysis of why these practices have emerged and, more specifically, why community residents view them as efficient or effective*

  If, for example, current practice is to defecate close to the home, this may be driven by the fact that there are snakes in the area and the villagers are reluctant to leave the household in the dark of night. By understanding the environment in which these behaviors developed, inducements for change can be produced that are in line with the social, ecological, and economic context.

- *Existing community structures*

  Communities with a history of organizing will probably be more receptive to the introduction of community participation models, water committees, etc. Existing structures can be built upon in community organizing efforts.

- *Leadership analysis*

  It is important to identify leaders early because they can provide leadership for community organizing efforts and can also serve as role models for adopting the new behaviors. Leadership identification should not be limited to political leaders; traditional birth attendants, older women with status in the community, teachers, and religious leaders should be considered as well.

4.2 Defining Change Areas and Prioritizing Sanitation Objectives

After the community assessment, the next step involves organizing a community health group for action. This group should include community leaders and others that the assessment

identified as significant forces in the community. The role of this group will be to develop a set of existing sanitation issues in need of modification and to prioritize areas for change (i.e., sanitation knowledge, attitudes, and behaviors). Thus, intermediate objectives can be considered initially (prior to latrine construction) as a means of establishing trust in the community. An additional advantage to this staged approach is that it is simple and allows for early community development. For example, a number of areas may be targeted as warranting change: knowledge about good hygiene practices may be inadequate, soap may be unavailable, and latrines may be lacking. The community health group itself could identify each of these needs. In prioritizing them, the group might conclude that obtaining soap should be the first step; then, educational activities directed toward proper uses of soap (e.g., handwashing techniques) could be the second priority. Latrine construction would come at a later point, after the community had successfully undertaken the soap initiative or others and had learned good organizational skills through this process.

Field staff can play a critical role in helping the community identify and prioritize practices for change and then develop realistic objectives. However, it is important that the actual planning process remain within the community to the greatest extent possible.

4.3 Developing Intervention Strategies

4.3.1 Identifying Interventions

The purpose of this phase is to develop strategies for implementing the targeted sanitation changes. In conjunction with a facilitator (e.g., a health educator), the community health group will develop interventions to produce the desired changes. (The term *intervention* is used here to describe any set of activities designed to produce changes related to targeted sanitation issues.)

Prior to designing the intervention, an analysis is of paramount importance.[2] Suppose, for example, that handwashing after defecation is the behavior targeted by the health committee. Existing behaviors should first be examined to provide baseline information that describes what is currently done and, by extrapolation, what changes need to occur. Much of this information will be available through the community assessment, but further investigation should be done of the particular area targeted. Specifically, the following questions should be asked:

---

[2] In his article entitled, "When People Don't Come First: Some Sociological Lessons from Completed Projects," Conrad Kottak (1991) presents evidence based on a review of 68 evaluations of completed rural development projects. He shows that appropriate sociocultural analysis significantly affected the chances for project success, returning an average economic rate over twice that of projects based on inadequate sociological analysis. It is safe to assume that the same would hold true for health benefits.

- *Why does the current practice exist?*

  Why, for example, do the community residents not wash their hands? Or, if they do wash their hands, perhaps they fail to use soap. Do they not recognize, perhaps, that disease is transmitted through fecal matter via the hands after defecation? Perhaps residents take a very literal approach: they have been told to wash their hands after defecating, and they do so. Possibly, however, they do not wash their hands after contact with young children's fecal matter. Each of these reasons would call for different intervention strategies.

- *What impediments to new practices need to be addressed?*

  If the environment is such that one cannot perform a given behavior, it is useless to talk about change unless factors preventing the new practices are altered. Lack of soap, for example, clearly limits handwashing ability, as does lack of a clean water source. Another limiting factor would be an inadequate understanding of proper handwashing techniques, which would allow the behavior to be performed but limit its effectiveness. Each of these possible impediments, as well as others, would need to be examined to effectively change handwashing behavior.

- *Is the community motivated to adopt the new practice?*

  Behavioral change occurs only if there is motivation to change. In the handwashing example, costs are clearly associated with the practice: both water and soap must be readily available. If water is at a premium, handwashing may be viewed as an extravagance. To motivate people in performing the new practice, the potential benefits must appear to outweigh the costs. Several approaches are possible.

4.3.2 Motivational Approaches

Innovative and creative approaches will help motivate people to overcome the obstacles to new hygiene practices. The health risks (costs) associated with not washing one's hands can be expressed through various information networks to different groups in communities. People are also motivated to follow the behavior of role models; thus, if community leaders can be persuaded to perform the new practice, others are likely to follow. Similarly, if the new practice is perceived as a community norm, people are more likely to adopt it. Another way to increase the likelihood of a behavior is to provide incentives or rewards for its performance. If, for instance, the goal is to encourage people to attend classes, certificates for completing a series of classes may provide the level of reinforcement needed. Similarly, if the behavior or activity is perceived to have status associated with it, people are more likely to be motivated to perform it. Although it may initially sound trivial, small, inexpensive decorative touches to latrines, for instance, may be cost-effective ways to encourage use and maintenance.

As noted, experience in the social sciences has shown it to be easier to get people to modify a behavior than to eliminate it. Incremental changes and modifications rather than total, drastic changes show themselves to be more realistic. Also, offering choices among alternative options has proven to be a very important way to promote acceptable change.

Communities at risk because of poor sanitation are unlikely to change their ways at once. For example, people accustomed to defecating in the field will not immediately build and use latrines within their living areas; gradual and incremental steps in proper fecal-matter disposal are more likely to succeed. Since many communities already use pits to dispose of fecal matter, making improvements to the pits for smell and flies will likely be more effective than moving to water-sealed or pour-flush technologies.

These are but examples of the issues that should be considered in planning an intervention. The specific intervention needs to be tailored to the particular objective targeted, as well as to the particular community in which it will be implemented. Involvement of the community health group and other interested persons in the development and implementation of the intervention strategies should be useful for ensuring well-focused and effective interventions.

4.4 Preparing for Subsequent Interventions

After the first intervention is in place, the health committee can begin planning for the second targeted priority. Here, the role of the field worker is critical to maintaining committee interest and motivation, for without it the group's interest can easily fade. Thus, specific attention should be given to ensuring that the other prioritized tasks will also be attended to. Various strategies can be used to encourage the committee's continued efforts: formal recognition or certificates can be given, for example, followed soon after by a committee planning meeting regarding approaches to attack the next item on the priorities list. As before, the specific activities used as motivators will need to be tailored to the particular group; the point to be stressed from a generic perspective is that this step clearly should not be overlooked.

4.5 Capacity Building in Hygiene Behavioral Change

Although expert anthropologists and other social scientists cannot be used forever at the project level, their experience and expertise is very important and should be used in an effective manner. Carrying out observations at the household level and then developing an effective behavioral change program within a development context requires a great deal of skill. In addition, expatriate and host country social scientists must train country nationals to carry out applied research, in the process fostering awareness and appreciation of the effectiveness of observational data gathering in behavioral change programs.

Capacity building is not confined simply to subject-matter training; true capacity building requires that community-based organizations, urban or rural, develop the capability to generalize the learning gained in one area to other areas as well. If the ultimate objective of

behavioral change programs is to develop the capability of community-based groups to identify harmful behaviors and draw up action plans for their implementation, those skills developed in WS&S behavior can also be applied to nutrition or to diarrheal disease. The objective is not to solve a problem of one disease in one sector, but to develop problem-solving skills that can be broadly applied over the long term. Thus, to the extent possible, the behaviors to be changed and the indicators developed to monitor these changes must be as simple and clear as possible (See, for example, Simpson-Hebert and Yacoob 1987).

Often, social scientists devote their efforts to community people, giving less attention to national-level planners. For their own part, program planners at central and national levels plan community-level interventions with very little understanding of what goes on in a particular community. It is, therefore, imperative to include all levels in the exercise of developing behavioral change programs.

4.5.1 The Role of Field-Level Staff

Field workers play a critical (and sometimes detrimental) role in the implementation and continued support of behavioral change programs. WS&S projects recruit extension agents mainly from the sanitation ranks, whose approach may be to enforce sanitation and food-hygiene laws and either levy fines or imprison offenders. Education, training, and community participation may not be seen as strong points by such staff. Some evidence suggests that health professionals, as well, sometimes act negatively and condescendingly toward communities, particularly if the communities are poor and nonliterate.

In many health programs, field-level staff assume a directive, top-down role with an underlying assumption that information is being poured into empty vessels. The most basic method of behavioral change tends to be the "targeting" of messages, i.e., loud lectures as frequently as possible. However, when field staff discover—from conversing with and listening to community people—that they are very capable, the process and approach often change. To be effective, field staff must function as facilitators rather than teachers, assuming an approach that is nondirective rather than authoritarian.

Based on findings and indicators developed during the focused ethnography exercise, the field staff role is to mobilize the human resources of the communities, work with community people in developing priorities, and identify local resources to help carry out health priority interventions. (This includes building on existing committee or leadership structures.) The objective here is to prepare community people to assume full responsibility for carrying out sanitation and hygiene activities over the long term.

4.5.2 Training and Organizing Field Staff to Carry Out Behavioral Change Programs

The WASH hygiene training manual (Frelick and Fry 1990), which is based upon principles of adult learning, uses an experiential approach that includes the content areas that field staff will need to address:

- Entry into the community
- Collection and analysis of information with the community
- Identification of program priorities and development of a community program
- Evaluation of the program

The workshop is meant to serve as an overall orientation training, and is only the preliminary step. An interactive process between community people and field staff must be developed, which evolves not out of one workshop but from a continuous process of learning and implementing in which both sides identify problems and explore solutions. In other words, it is a learning process between field staff and community.

Organizational details for training field staff are outlined in *Tech Pack* (Yacoob and Roark 1990), a WASH document that facilitates a process whereby training and extension activities used in the construction of WS&S projects become a process of learning by doing.

The approach stresses planning and, to the extent possible, predictability. On the same day every two weeks, the field worker meets at an appointed place with village committees. These can be committees that already exist in a community (the same group that takes care of community resources, perhaps) or, where they do not exist, committees would be set up by the project and trained to manage the improved infrastructure. Given the constraints in developing countries that make planning difficult, having a fixed regular schedule has many advantages: for one thing, it develops a routine. Because of this routine, the community knows when the field worker is coming, and there is no need to reschedule every month. The extension agent, also, knows when and where the meetings for training and project business are to be conducted. Finally, the supervisor knows where all the field agents are on a given day.

These meetings between the community and field worker feature a problem-solving approach in which the village committee members develop a plan to address a hygiene or sanitation problem, and the extension agent provides guidance. The specific behavioral-change activities, emanating from discussions and observations with the community people themselves, were identified in the data gathering. At the biweekly meetings, the field agent offers skills and content required for activities that will take place during the following two weeks. The agent also reviews what actions were taken in the preceding two weeks, listens to the comments of committee members, and takes note of problems that arise.

Meetings between field agents and their subdistrict or district supervisors should also be regularized. Field staff should meet with supervisors for a full day every two weeks to report on progress and problems, exchange information, plan the next community sessions, and review training modules for additional areas. These meetings also serve as important vehicles for moving information up the line from community to project.

4.6 Evaluation

Hygiene behavioral interventions are unsuccessful and unsustainable unless developed within the overall context of a community's existing beliefs and practices; such data is possible to collect and analyze. In fact, a number of project practitioners have successfully implemented methodologies that based a hygiene education program on people's actual practices. These practices, or the variables for program implementation, are also the basic variables to use in evaluating a hygiene education program.

In theory, when a hygiene education program is based on ethnography that maps out people's actual behaviors, the indicators for each of the behaviors will provide a measure for progress in that particular behavior. For example, when an important behavior in the transmission of disease happens to be that dogs licking fecal matter also lick leftover food off plates, the indicator might be the number of the people who build and use a dish rack, with the inference that dishes are washed and stored away from dogs or other animals.

Over the long term, the success of the hygiene education program depends on local groups who have the interest and capability to train community people on a continuous basis; thus, leadership is critical. Formal and informal local leaders will be needed to organize work groups, follow up on what happens, and note behavioral changes that are (or are not) happening (see box on page 26.) In addition to the formal evaluators, project staff, and government representative, the evaluation team should include such community people as school teachers, retired government workers, and women's association leaders. The team will need to address the following questions:

- Was enough time and care taken to identify the people's actual hygiene behavior and perceptions prior to developing a hygiene education program?
- Are there community-based committees and/or institutions that are beginning to identify a role for themselves as trainers for the rest of the community?
- Are there any indications that the appropriate national ministries recognize the role that behavioral change plays in disease prevention? Are there any moves within such ministries to prepare a legal and policy framework that will continue support to communities?

A Thailand Example

A project evaluation by WASH revealed that despite enormous efforts to provide messages about the importance of latrines and appropriate disposal of human feces, people did not practice the recommended behaviors because the messages seemed like public announcements that had little to do with the people themselves. In this instance, the challenge became one of reinforcing the messages through personal communications and at no added cost to the program. The consultant recommended that the village health team—consisting of birth attendant, school teacher, and traditional priests—become the focal point for dissemination of the messages. Because each of these village actors regularly came into contact with specific groups of villagers, a network was created in the village whereby people from the same family would receive messages on latrines and handwashing from each of these different channels.

From Hygiene Education Strategies for Region 1 for the Ministry of Public Health in Thailand, *by M. Simpson-Hebert.*

- Is there clear delineation of roles and responsibilities from national to regional (or other sublevels) outlining who will provide what resources for sanitation-related disease prevention and behavioral change activities over the long term?
- Are there enough resources to carry out such activities? Is there provision for training? Are vehicles available to carry out behavioral change activities?

Great care must be taken to avoid evaluating the success of behavioral change programs only in terms of the reduction of disease prevalence. Health indicators, such as mortality and morbidity data, census indicators, and services utilization, do not lend themselves to community-level planning and evaluation. From the processes of both implementation and evaluation of hygiene education programs, in addition to the content of behavioral changes, one must clearly track how resources should be distributed to reflect local needs. It is not enough to look merely at disease prevalence or willingness to pay for improved infrastructure, because these are top-down approaches that exclude the community's recognition and perceptions of what it needs. Above all, the evaluation must be seen not as an end in itself, but as an opportunity for project review and modification.

4.6.1 Sustainability Issues

Communities cannot by themselves sustain hygiene education programs over the extended period required for behavioral change. Governments and even private voluntary organizations have an important role to play in such programs, and an evaluation will need to focus on outside contributions to sustainability, without which long-term program continuity and behavioral change are nearly impossible to achieve.

A second point is the issue of whether community participation rather than decentralization plays the major role here. Decentralization, when interpreted operationally, has frequently resulted in a shifting to communities of the government's role and responsibilities (often with little or no follow-up support provided). Community participation, on the other hand, calls for community members to receive the training that will develop their capacity to aid the implementation of a health improvement project targeting behavioral change. In this way the skills acquired in this project can also be applied to others. With either decentralization or community participation, accountability to local communities becomes more real as the management and planning processes become more visible.

4.6.2 Evaluation Methodology

As with implementation, evaluation will require a multidisciplinary team, and community people should play a central role in planning and evaluating the health improvements they achieve through hygiene behavioral changes. However, involving community people in evaluations can be time consuming, and their involvement may deliver intangible results. Because this involvement tends to be limited at best, it often fails to significantly affect policy making or the planning process because health projects are generally centrally controlled. The curtailment of community influence becomes particularly apparent during evaluations. Thus, the challenge facing evaluators is to find an approach that can be used effectively even when time is limited, that can translate findings into planning, and that can involve local communities in the process. Such an approach is based on an understanding of community health priorities and on the principles of equity, participation, and multisectoral cooperation. In terms of equity, the evaluation would focus on whether only certain segments of a community or communities received improved facilities or interventions. Community-level participation takes place through the use of key informants. Multisectoral cooperation is ensured by the formation of a team of individuals from various ministries and other organizations. Each team member represents a skill area and resource base needed to do the investigation and plan for corrective action.

Because the evaluation and planning processes are built upon community involvement, the evaluation team must understand the composition of the community—how it is organized and the extent of its capacity to act. The next level of information concerns the behavioral factors that influence health in that community (this is the data generated for the ethnography). Next are the data on project inputs, namely, the facilities constructed, the training programs developed, the support materials developed, and the material and financial support provided by government and ministries; these data form the basis by which to evaluate the effectiveness of present inputs and provide indicators for future changes. The fourth and final level of information comprises national, regional, and local policies concerning preventive health programs and how these policies relate to community-based programs.

Such an evaluation methodology, attempting to discover not "how many" but *why* certain actions worked while others did not, can provide an indicator of how community people feel about certain actions. The penning of animals, for example, is an important behavioral change but one that creates an added burden for the women who must feed, clean, and water

them—activities these women have very little time for. An evaluation should be able to uncover this information and then work with community women to identify possible alternatives. The findings and prioritization done in collaboration with community people are then reviewed at a meeting attended by evaluators and community people. The priorities of community members and their ideas of what works, what did not work, and why are taken as a departure point at which plans are jointly formulated to remedy or change any action. Unfortunately, this point is frequently overlooked by evaluators, leaving community people frustrated and disillusioned.

While the ethnographic assessment is a vital first step in identifying hygiene behaviors, the processes of implementation and subsequent evaluations require an understanding of what the community views as priorities. These must then be translated into actions that link community and resource holders or planners who are capable of instigating organizational changes. When qualitative data concerned with community views and health needs are added to quantitative data on changes in epidemiological trends, use of services, and trends in mortality and morbidity, evaluations can produce a powerful picture of accomplishments and of planning and design modifications needed.

Such evaluations, which integrate both quantitative and qualitative project data, are the final element of the behavioral model. In following the six steps of this model, project staff forge a partnership with the community that allows staff to benefit from community knowledge and trust and, in so doing, to facilitate changes in community behaviors.

5

RECOMMENDATIONS

Evaluation recommendations for past sanitation projects by NGOs, WASH, and the World Bank[3] have consistently suggested that sociocultural data be collected to guide project development and implementation. Such information covers several aspects of community attitudes and behavior:

- Community perceptions of current sanitation and the need for change
- Reasons community accepted or rejected previous sanitation efforts
- Community's degree of hygiene education
- Religious, cultural, and social factors that affect hygiene practices and should influence technology choices
- Attitudes toward location of facilities and who uses them
- Attitudes toward the facility design

Until recently, guidance in the collection and use of this data has been limited to assessing community participation and increasing the use of predetermined sanitation technology; health education has been largely overlooked, as the assumption has been that improved health statistics would result automatically. Regrettably, this has not occurred.

More-recent recommendations calling for the use of sociocultural data within the context of social marketing theory focus on improving health status through health education. This shift in focus from technology and user participation to health/hygiene education is commendable; however, it assumes the need to create and/or teach new behaviors. Behavioral theory, when coupled with the study of sociocultural behaviors, suggests that baseline studies prior to project planning would show the existence of desired behaviors in a malleable form within a replicable cultural context. Lessons learned from previous work suggest that the relevance and use of sociocultural data must be broadened in order to ensure project success.

---

[3] Hopkins, Collette M. 1990. *Rethinking Latrines: Specific Lessons Learned. "The Safe Disposal of Wastewater, Human and Other Solid Waste Reconsidered in the Context of a Comprehensive Hygiene Program." Part I: Annotated Review of Selected Sanitation Project Literature* and *Part II: An Annotated Review of Selected Academic Literature*. Atlanta University. A review of documented projects and articles on sanitation, spanning the first decade of WS&S with an analysis of the lessons learned from the experiences. Bibliography available from WASH upon request.

The following recommendations are based on the lessons learned from a decade of sanitation intervention.

- Collect sociocultural data before beginning any sanitation project.
- Consider target recipients and beneficiaries of health/hygiene education relative to their role in sanitation projects. People who already have a prescribed role in sanitation or community hygiene, such as religious leaders, teachers, and birth attendants, should serve as trainers at the village (community) level.
- Incorporate community participation during all phases of sanitation project development.
- Ensure that collection and use of sociocultural data is integral to the development of health/hygiene education.
- Explore the expanded use of sociocultural data in the development of health/hygiene education projects.
- Provide health/hygiene education whenever sanitation facilities are installed.
- Create health/hygiene education materials that can better promote sustained changes in health-related sociocultural behaviors.
- Explore knowledge bases beyond those typically associated with the sector as new mechanisms for health/hygiene education are developed.

In short, find out what community members do, find out what behavioral changes they will accept, and help them find ways to make those changes. By heeding the above recommendations and following the behavioral model described in Chapter 4, planners can move their projects beyond the technological preoccupations of the past and into a new era of better community health and enhanced project sustainability.

Appendix A

BIBLIOGRAPHY

Bateman, O.M., and S. Smith. 1991. A comparison of the health effects of water supply and sanitation in urban and rural Guatemala. WASH Field Report No. 352. Arlington, Va.: WASH Project.

Bentley, M.E., R. Stallings, and J. Gittelsohn. 1990. Guidelines for the use of structured observations in health behavior intervention studies. *Draft* for WHO CDD Program.

Blum, D. and R.G. Feachem. 1983. "Measuring the Impact of Water Supply and Sanitation Investments on Diarrhoeal Diseases: Problems of Methodology." *International Journal of Epidemiology* 12, 357-365.

Boot, M. 1984. *Making the Links: Guidelines for Hygiene Education in Community Water Supply and Sanitation.* (OP 5) The Hague: International Reference Center.

Brandberg, Bjorn. 1985. "Why Should a Latrine Look Like a House?" *Waterlines* 3(3), 24-26.

Briscoe, J., R.G. Feachem, and M.M. Rahman. 1985. Measuring the impact of water supply and sanitation facilities on diarrhea morbidity: Prospects for case control methods. Geneva: World Health Organization. Environmental Health Division.

_____. 1986. Evaluating the health impact of water supply, sanitation and hygiene education. Ottawa: IDRC.

Burgers, L., M. Boot, and C. van Wijk-Sijbesma. 1988. *Hygiene Education in Water Supply and Sanitation Programmes: Literature Review with Selected and Annotated Bibliography.* (TP 27) The Hague: International Reference Center.

Cairncross, S. 1990. Health Impacts in Developing Countries: New Evidence and New Prospects. *Journal of the Institution of Water and Environmental Management.* 4(6), 571-577.

Cairncross, S. 1988. "Health Aspects of Water and Sanitation." *Waterlines* 1(1), 2-5.

Cairncross, S. and A. Macoun. 1991. "Implementing Water and Sanitation Programmes: Some Lessons from the Decade." Washington, DC: UNDP-World Bank Water and Sanitation Program and London School of Hygiene and Tropical Medicine. *Draft.*

Cernea, M. 1992. "The Building Blocks of Participation: Testing a Social Methodology." Paper presented at the Workshop on Participatory Development. Washington, DC: World Bank.

DiPrete Brown, L., and E. Hurtado. 1992. *Development of a Behavior-Based Monitoring System for the Health Education Component of the Rural Water and Health Projects*. CARE: Guatemala. Wash Field Report No. 364. Arlington, Va: WASH Project.

Donnelly-Roark, P. 1987. New participatory frameworks for the design and management of sustainable water supply and sanitation projects. WASH Technical Report No. 52. Arlington, Va.: WASH Project.

Esrey S.A., R.G. Feachem, and J.M. Hughes. 1985. Interventions for the control of diarrhoeal diseases among young children: Improving water supplies and excreta disposal facilities. *WHO Bulletin* 63(4): 757-772.

Esrey, S.A., and J.P. Habicht. 1986. Epidemiological evidence for health benefits from improved water and sanitation in developing countries. *Epidemiologic Reviews*, 8, 117-178.

_____. 1988. National literacy modifies the effect of toilets and piped water on infant survival in Malaysia. *American Journal of Epidemiology* 127:1079-1087.

Esrey, S.A., J.B. Potash, L. Roberts, and C. Shiff. 1990. Health benefits from improvements in water supply and sanitation: Survey and analysis of the literature on selected diseases. WASH Technical Report No. 66. Arlington, Va.: WASH Project.

Feachem, R.G., M.W. Guy, S. Harrison, et al. 1983. Excreta disposal facilities and intestinal parasitism in urban Africa: Preliminary studies in Botswana, Ghana and Zambia. *Transactions of The Royal Society of Tropical Medicine and Hygiene* 77 (4): 515-521.

Feachem, R.G., D.J. Bradley, H. Garelick, and D.D. Mara. 1983. *Sanitation and Disease: Health Aspects of Excreta and Wastewater Management*. Chichester: John Wiley & Sons.

Frelick, G., and S. Fry, 1990. A training guide on hygiene education. WASH Technical Report No. 60. Arlington, Va.: WASH Project.

Griffiths, W. 1972. "Health education definitions, problems and philosophies." Health Education Monographs 31, 12-14.

Henry, Fitzroy J. 1991. "Combating Childhood Diarrhoea Through International Collaborative Research." Editorial review in *Journal of Diarrhoeal Disease Research*. 9(3):165-167.

International Reference Center. 1991. *Just Stir Gently: the Way to Mix Hygiene Education with Water Supply and Sanitation*. (TP 29) The Hague: IRC.

Isley, R. and D. Yohalem. 1988. Community Participation Training Guide. Vol I and II. WASH Technical Report No. 33. Arlington, Va.: WASH Project.

Kottak, Conrad P. 1991. "When People Don't Come First." In *Putting People First*, second edition. Michael Cernea, ed. Washington: World Bank.

Levine, N.E. 1989. The determinants of personal and domestic hygiene: A review of the literature. *Draft.*

Lindskog, U. 1987. Child health and household water supply. An intervention study from Malaria. Linkoping, Sweden: Linkoping University.

Loevinsohn, B. 1990. "Health Education Interventions in Developing Countries: A Methodological Review of Published Articles." *International Journal of Epidemiology.* 19(4), 788-794.

Pickering, H. 1985. Social and environmental factors associated with diarrhea and growth in young children: child health in urban Africa. *Social Science and Medicine* 21(2):121-127.

Shiffman, M.A.; R. Schneider; J.M. Faigenblum; et al. 1978. Field studies on water, sanitation and health education in relation to health status in Central America. *Progress in water technology* 11:143-150.

Shuval, H. et al. 1981. Effect of investments in water supply and sanitation on health status: A threshold-saturation theory. WHO Bulletin 59:243-248.

Shuval, H.I. 1978. Nightsoil composting. Energy, Water and Telecommunication. Department Research Working Paper Series. Washington: World Bank.

Simpson-Hebert, M. 1987. Hygiene education strategies for Region 1 for the Ministry of Public Health in Thailand. WASH Field Report No. 210. Arlington, Va.: WASH Project.

Simpson-Hebert, M., and M. Yacoob. 1987. Guidelines for designing a hygiene education program in water supply and sanitation for regional/district level personnel. WASH Field Report No. 218. Arlington, Va.: WASH Project.

Srinivasan, L. 1990 *Tools for Community Participation: A Manual for Training Trainers in Participatory Techniques.* New York: PROWWESS/UNDP.

Stanton, B.F., and J.D. Clemens. 1986. Soiled saris. Dialogue on Diarrhoea 26 (Sept. 86):5.

_____. 1987. An educational intervention for altering water sanitation behaviors to reduce childhood diarrhea in urban Bangladesh. *American Journal of Epidemiology* 125: 292-301.

Walsh, J.A. 1990. Estimating the burden of illness in the tropics. Chapter 25 in *Tropical and Geographic Medicine*, second edition. K.S. Warren and A.A.F. Mahmoud, eds. N.Y.: McGraw Hill.

World Bank. 1976. Measurement of the health benefits of investments in water supply. Report No. PUN20. Washington: The World Bank.

Yacoob, M., and P. Roark. 1990. Tech Pack: Steps for implementing rural water supply and sanitation projects. WASH Technical Report No. 62. Arlington, Va.: WASH Project.

Zeitlyn, S., and F. Islam. 1991. The use of soap and water in two Bangladeshi communities: implications for the transmission of diarrhea. *Reviews of Infectious Diseases* Supplement 4:S259-64.

Appendix B

OBSERVATION FORMS FOR COMMUNITY SANITATION BEHAVIORS

A. DEFECATION AND BEHAVIORS ASSOCIATED WITH FECES

Behavior	Place	Time	Who	Methodology
Presence of Feces	in water in house in wrapping outside			
Child's Disposal of Feces Method of disposal Soiled diapers Latrine use				
Water Used for Fecal Cleansing Types of cleansing materials Presence of cleansing materials in environment Flies Cleaning responsibilities				

B. WATER USE AND PERSONAL HYGIENE

Behavior	Place	Time	Who	Methodology
Water Handling				
Types of storage containers				
Location of containers				
Covers of containers				
Presence/absence of dipper				
Container for collection				
Cleaning of container				
Water Treatment				
Herbs, plants				
Filtration				
Chemicals				
Boiling				
Water Management				
Total consumption				
Container dimensions				
Number used				
What for				
Reuse from soiled diapers				
Conservation practices				
Practices in changing water in container				

Behavior	Place	Time	Who	Methodology
Water Use in Personal Hygiene Hands Face Body Infants (following defecation) Cleaning of diapers Blood Urine, birth, and death				

C. FOOD HYGIENE

Behavior	Place	Time	Who	Methodology
Preparation Hand-washing Washing of raw food Cross-contamination Length of cooking **Storage of Food** Time Temperature Location Utensil Protection				

D. HOUSEHOLD HYGIENE

Behavior	Place	Time	Who	Methodology
Cleaning floors Cleaning of eating surface Washing clothes Storing clothes Play objects of children Use of multipurpose cloth Cooking utensils—cleaning Storage of cleaning utensils Animal control Wastewater disposal				

E. WATER SOURCES

Behavior	Place	Time	Who	Methodology
Irrigation use Drinking Cooking Bathing Food-processing Animal consumption Recreation Industrial use				

Appendix C

A DECADE OF STUDIES ON HEALTH IMPACTS*

Location, Sector (source)	Type of Study	Problems	Conclusions
Mirzapur, Bangladesh: Rural WS, Sanitation and health education	Longitudinal, children under 5	Difficult to distinguish between effects of different interventions.	Combined package of WSS and health education resulted in significant decrease in diarrhoea and dysentery; relative proportion of children suffering from diarrhoea at any one time fell by 46% in intervention area. Closeness to handpump and use of latrine for disposing of children's faeces also significant.
Mohale's Hoek, Lesotho: Rural sanitation	Case control, children under 5	Water use not studied in detail. Private water source associated with 38% reduction in diarrhoea, but this may be largely a socio-economic effect. Surprisingly, significant improvement in children's height-for-age associated with latrine ownership arouses suspicion that results may be due to latrine owners being unrepresentative of population.	Latrine ownership appears to be associated with 24% reduction in children's diarrhoeas, but this is not quite statistically significant at 5% level. Impact of water supply seems likely to be connected with increased use and better hygiene, rather than improvements in water quality. Preliminary analysis of data showed no apparent difference between VIP, pit and bucket latrines, in respect of health impact.
Kurunegala, Sri Lanka: Rural WS	Case control, children under 5	Apparent impact varies widely between the 5 hospitals at which cases and controls were recruited, ranging between 90% reduction in diarrhoea incidence and no significant reduction at all.	No association between childhood diarrhoea and sanitation, access to water or quantity of water used. Quality of water used has an impact: use of protected sources resulted in about 35% reduction in the risk of diarrhoea on average, even among people claiming to boil their water. Hygienic disposal of children's faeces was also associated with 34% less diarrhoea.

* Source: "Health Impacts in Developing Countries: New Evidence and New Prospects," *Journal of the Institution of Water and Environmental Management* 4 (December 1990). This list summarizes all the major published studies of water supply and sanitation (latrine installation) programs, with specific reference to diarrheal disease reduction as a measure of success.

Porto Alegre and Pelotas, Brazil: Urban WS	Case control, infant mortality	Small sample leads to few statistically significant results after correcting for confounding factors. No measurement of factors such as water consumption or quality.	Infants in houses sharing a tap with neighbours are 50% more likely to die of diarrhoea (even after adjusting for confounding factors) than those from houses with in-house piped water (but this result is not statistically significant). Infants from houses using a public standpipe or well are 4.8 times more likely to die of diarrhoea than those from houses with in-house piped water (significant at the 1% level).
Location, Sector (source)	**Type of Study**	**Problems**	**Conclusions**
Villa Carlos, Fonseca, Nicaragua: Rural WS	Case control, children under 5	Relationships between distance to source and water consumption not studied, despite finding that distance liked to diarrhoea incidence.	Wide variations in level of faecal contamination. Relationship with proximity to water source (especially during dry season) detected, and just significant.
West Zomba, Malawi: Rural WS	Longitudinal, children under 5	Problems in implementing the intervention to be evaluated.	Inconclusive.
East Zomba, Malawi: Rural WS	Case control, children under 5	Sample too small to provide significant results. Distance to both improved and traditional water sources almost the same so water consumption (as reported) did not vary much.	No significant association was found between risk of diarrhoea and type of water source or presence of latrine. Improved water supply and possession of a latrine might reduce diarrhoea risk by 23% but this conclusion is not statistically significant due to small sample size (15% probability it arose by chance).
Cebu, Philippines: Urban WS	Case control, children under 2	Sample too small to provide significant results. No direct measurement of water consumption.	No consistent relationship was found between type or quality of water supply, presence of a latrine and risk of diarrhoea (note that adjustments were made for effects of boiling and proper storage of water).

Imo State, Nigeria: Rural WS, sanitation, health education	Longitudinal study: mainly diarrhoea in children under 6; nutrition in children under 3; and Guinea worm for entire population	Emergence of a new spring in the control area confounded water source comparisons. Improved water supply still not very accessible (median distance 500 m). KAP changes also detected in control area, probably due to exposure to project monitoring.	No consistent reduction in diarrhoea was found, nor any relationship between water source quality and diarrhoea (adults had higher incidence of diarrhoea with improved water quality). Time spent collecting water was linked to diarrhoea incidence: if the collection time was 2 h children aged between 0-4 are 2.9 times more likely to have diarrhoea in any week (for children aged 5-14, 2.0 times). Distance to a borehole is also important: children aged 0-4 from houses more than 250 m from a borehole were 23% more likely to have diarrhoea (but this is not statistically significant).
Lesotho: Rural WS	Longitudinal, children under 3	Detection of impact required comparison of households within the improved villages, contrary to the original intention of conducting a randomized controlled trial.	Children in villages without improved water supply grew better and did not have more diarrhoea than in those which had one. They did however, have less Giardia and *E. coli*. In the improved villages, growth rates (but also diarrhoea rates) were higher among exclusive users of the improved supplies. Giardia infection rates were lower and diarrhoea rates among infants higher, among those using more water *per capita*.
Teknaf, Bangladesh: Rural WS and health education	Longitudinal, children under 2	Lack of baseline data prevents distinction between impact of hygiene education and possible difference between areas. Hygiene observed for only one day, not in peak diarrhoea season.	Provision of 1 handpump to 4-6 households plus hygiene education associated with 17% less diarrhoea. Within both intervention and control areas, diarrhoea rates were significantly lower when good hygiene practices were observed: - no faeces in yard - hands washed before serving food - ash/mud used for handwashing after defecation - use of handpump water for washing These practices were reportedly more than 9% more common (the last two over 27% more common) in the intervention area.
Bakau, Gambia: Urban WS	Retrospective child mortality under 3	Probable confounding at household level.	Risk of death in households using public taps twice as high for those with yard connection.

Camp Dresser & McKee International Inc
Associates in Rural Development, Inc
International Science and Technology Institut
Research Triangle Institut
University Research Corporatio
Training Resources Grou
University of North Carolina at Chapel Hi

WASH Operations Cente
1611 N. Kent St., Room 100
Arlington, VA 22209-211
Phone: (703) 243-820
Fax: (703) 243-900
Telex: WUI 6455
Cable Address: WASHAI

THE WASH PROJEC

With the launching of the United Nations International Drinking Water Supply and Sanitation Decade in 1979, the United States Agenc for International Development (A.I.D.) decided to augment and streamline its technical assistance capability in water and sanitation an in 1980, funded the Water and Sanitation for Health Project (WASH). The funding mechanism was a multi-year, multi-million doll contract, secured through competitive bidding. The first WASH contract was awarded to a consortium of organizations headed by Cam Dresser & McKee International Inc. (CDM), an international consulting firm specializing in environmental engineering services. Throug two other bid proceedings since then, CDM has continued as the prime contracto

Working under the close direction of A.I.D.'s Bureau for Science and Technology, Office of Health, the WASH Project provides technic assistance to A.I.D. missions or bureaus, other U.S. agencies (such as the Peace Corps), host governments, and non-government organizations to provide a wide range of technical assistance that includes the design, implementation, and evaluation of water and san tation projects, to troubleshoot on-going projects, and to assist in disaster relief operations. WASH technical assistance is multi-disci nary, drawing on experts in public health, training, financing, epidemiology, anthropology, management, engineering, communi organization, environmental protection, and other subspecialtie

The WASH Information Center serves as a clearinghouse in water and sanitation, providing networking on guinea worm diseas rainwater harvesting, and peri-urban issues as well as technical information backstopping for most WASH assignment

The WASH Project issues about thirty or forty reports a year. WASH *Field Reports* relate to specific assignments in specific countrie they articulate the findings of the consultancy. The more widely applicable *Technical Reports* consist of guidelines or "how-to" manua on topics such as pump selection, detailed training workshop designs, and state-of-the-art information on finance, community organiz tion, and many other topics of vital interest to the water and sanitation sector. In addition, WASH occasionally publishes special repor to synthesize the lessons it has learned from its wide field experienc

For more information about the WASH Project or to request a WASH report, contact the WASH Operations Center at the above addres