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# THE ROLE OF WOMEN AS PARTICIPANTS AND BENEFICIARIES IN WATER SUPPLY AND SANITATION PROGRAMS

WASH TECHNICAL REPORT NO. 11

DECEMBER 1981

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Office of Health  
Bureau for Science and Technology  
U.S. Agency for International Development  
C - Task 51



WASH TECHNICAL REPORT NO. 11

THE ROLE OF WOMEN AS PARTICIPANTS AND BENEFICIARIES  
IN  
WATER SUPPLY AND SANITATION PROGRAMS

Prepared for the Office of Health  
Bureau for Science and Technology  
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under C-Task 51

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## SUMMARY

In this paper based on an extensive review of both the published and unpublished literature, arguments are made that women should be given prime consideration as acceptors, users, managers, and diffusers (change agents) for the introduction of innovative water supply and sanitation technologies. Specific strategies for involving women in each of these roles are recommended with examples given from water supply and sanitation and other related projects in the field.





## ACKNOWLEDGEMENTS

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## Chapter 1

### INTRODUCTION

The importance of community participation for water and sanitation policy and program planning has been raised repeatedly. The role of women is so interrelated with effective community participation that it must be analyzed simultaneously with community participation in order to develop program objectives or to prepare meaningful guidelines (Kalbermatten, 1981).

That women in rural and urban fringe areas around the world understand the urgent need for improved and more accessible water for domestic consumption is well understood and documented. Many women spend from four to eight hours a day drawing, carrying, managing and using water (White et al, 1972; Elmendorf, 1980; O'Kelly, 1978; Russell, 1979; UNICEF, 1976; Whiting and Krystall, 1977). Women themselves are well aware of the time and energy spent in obtaining this basic necessity and thus of the time and energy lost from more productive tasks. Many of them, however, are not aware of alternative sources of water or of how to become involved in improving existing supplies. Only by being included early in the project planning stages will their participation be assured and alternative options realized.

For example, when only "community leaders" are involved in needs assessments and women are not, domestic water is rarely given priority as an urgent community need (Miller and Cone, 1982; Nieves, 1980; and Elmendorf, 1978 and 1982). On the other hand, when community needs assessments include the views of women, water for home consumption seldom fails to be among the top three felt needs.

Women may not be aware of the germ theory of disease or may not be able to see a direct relationship between improved water supply and health but once water is more accessible they quickly evaluate the benefits in terms of improved health and reduced fatigue. The women of Chan Kom in Yucatan noted an increase of diarrheal disease after a pump breakdown and requested repairs to the water system (Elmendorf, 1978).

Women also are well aware of additional time and energy savings, and the possibilities for additional productive activities. This new time may be used in a variety of ways: in income producing activities such as growing food for sale in the market, or cottage industries or other commercial activities, employment as health promoters in agricultural extension, or in water and sanitation service operations and maintenance, or simply better care and nurturing of themselves and their families (Elmendorf, 1981; Isely, 1980; Whiting and Krystall, 1977). No matter the activity, they contribute to improving the quality of life for their families and commu-

nities. Women are also quickly aware of the physical exhaustion they feel when piped water systems break down and they have to return to the old routines of drawing and hauling over long distances.

### 1.1 Women and Sanitation

Just as for water, the perceptions of women are essential in early planning for sanitation. As mothers, caring for and toilet training infants, and as the primary users and caretakers of new latrines, their preferences and opinions must be considered (Elmendorf, 1981; Isely, 1981). Locations and types of latrines should be planned after consultation with women to assure access to water needed for sanitary latrine use. For instance many latrines are still built 15 meters from an abandoned well or kitchen door even after potable water is piped to an accessible stand pipe or patio connection. Such distances diminish latrine use by women and children and reduce the likelihood of post-defecation handwashing (Pineo and Elmendorf, 1978).

### 1.2 An Approach to Understanding Women's Roles

This paper discusses some of the important roles of women as they relate to improvements in water supply and sanitation technology and suggests ways to improve project design and hopefully to diminish failures. The four key ideas include:

- Women as acceptors: considerations for project planning.
- Women as users: factors in project implementation.
- Women as managers: including them in training.
- Women as change agents: implications for project evaluation.

It is important to be aware that women's roles and the degree of community organization will vary greatly from country to country; in fact, from community to community (Krug et al, 1976). Certain generalizations can be made, but models for maximizing participation in group action must be carefully selected, based on respect for and understanding of the social and cultural realities of a community. Formal and informal networks of communication and decision-making, including women's power within households and communities, need to be recognized (Elliott and Sorsby, 1979; Blair, 1980; Dixon, 1980).

### 1.3 Relationship to Primary Health Care

Water and sanitation should be considered in the broader context of "Health for All by the Year 2000" (World Health Organization, 1978). Primary health care, which has emerged as the leading strategy for meeting health needs in developing countries, includes among other elements community participation, universal coverage, and appropriate technologies for improved water and sanitation. The approach places emphasis on health education in the broadest sense. In many instances primary health care workers may be the most apt to provide needed personnel for water supply and sanitation programs at the community level, especially with respect to user education, stimulating community participation and long term operation, maintenance, and repair of facilities. The very fact that health education is already a part of the agenda of many primary health care workers may provide an opening wedge for water supply and sanitation programs (McGarry, 1977).

For maximum project benefits educational components should be related to community members and the key change agents, many of whom are women. In addition, water supply and sanitation improvements are closely linked to reducing the workload of women, a result with profound implications for reaching primary health care objectives (Isely, 1980). Thus, the concept, and methods discussed in this paper are firmly linked to the broad aims of both the Water and Sanitation Decade and the Health for All by 2000 movement.

## Chapter 2

### WOMEN AS ACCEPTORS OF IMPROVED WATER AND SANITATION TECHNOLOGIES: CONSIDERATIONS FOR PROJECT PLANNING

It is primarily women that use new water systems. Their role as household managers means that in food preparation, washing and bathing women are the primary users and mediators between the water source and the household. Any planned change in water availability or excreta disposal should be based on information about their present knowledge, attitudes, and practices. Careful observation and discussion, not just standard KAP surveys, are needed to get at perceptions and beliefs about water preferences and defecation behavior. The choice of water for drinking, cooking, laundry, bathing, and other household functions is a result of women's careful decisions, based on what they have learned from their mothers and grandmothers, and on their observations of the costs and benefits of any change.

Decisions about drinking water are often based on sensory or macroscopic perceptions--color, taste or smell--rather than microscopic qualities of technical purity. Decisions not to use improved drinking water facilities such as tube wells or piped water are often related to unpleasant taste or smell such as that given by iron sulfide or chlorine. The processing of water also affects its perceived quality. In many cultures there are beliefs about hot and cold food and drink which influence water use. For example, in some societies cold boiled water is acceptable for daily use, but warm boiled water is just for invalids. Boiled water, even though cool, is considered hot unless specifically designated as cold boiled water after which it is no longer considered medicinal. Understanding these beliefs and practices is likely to lead to more successful attempts to introduce change.

The importance of understanding attitudes toward excreta cannot be overemphasized. The widespread perception that children's feces are "harmless" (Imboden, 1968) can condition a continuous link in chains of reinfection, whether the feces are thrown on a nearby garbage heap or diapers are washed with dishes in an urban home with a newly installed standpipe. In many cultures infant feces, even though not considered "harmless," are not perceived as the harmful germ laden carriers they so often are (Imboden, 1968; Feachem et al, 1978; Elmen-dorf, 1980). These factors should be understood and analyzed and consideration of them should be included in the planning and preparation of educational approaches.

In some areas women and children use the same latrines, but in many places the children defecate just outside because they are afraid of falling through the large opening or because the latrines are far away and the interiors are dark. These two

problems have been solved in a very innovative way in Sri Lanka where especially designed low cost small water seal latrines are available. These latrines are installed near the house for the children. The child-size latrine is placed without any walls under the eaves of the home just outside the kitchen door so that mothers can easily train toddlers to use it, and it can double as an informal bathing area. Bath water is used to flush the latrine.

A commonly held belief in Honduras (that women should not use the same latrine as men lest they become pregnant) limits the use of even household latrines to female members of the family (Eoff, 1977). Fear of menstrual blood also limits male use of latrines. In Tanzania it is believed that the excreta of fathers and daughters should not be mixed (Hall, 1978). In Nicaragua, women did not like to use the new latrines because the metallic sides were 10 inches off the ground so that their feet were visible. Other latrines were not used because the sides came to the ground and made a warm resting place for snakes (Rodriquez et al, 1982).

Such beliefs are very important for planning. They explain in part why a study of 120 villages in Bangladesh showed that latrines were used by only 12.8 percent of the children, while adult use (mostly women) was 59.9 percent (Skoda et al, 1978). A similar study of 525 latrines in India showed that many more women used the latrines than men, whereas children's feces were thrown on garbage heaps.

With respect to the introduction of excreta disposal facilities, limited attention has been given to matters of local pride and aesthetics. A World Bank case study of water supply and excreta disposal in Colombia revealed that families preferred brightly colored cement stools and slabs to drab gray facilities (Rodriquez et al, 1982; Elmendorf and Buckeles, 1980). Similarly, in the Yucatan women expressed a preference for an aesthetically attractive latrine with a shiny porcelain seat or a brightly painted cement floor or stool even if the cost and labor involved were much more (McGarry and Elmendorf, 1982).

One other factor to be discussed with women in early planning is the reuse of gray water for flushing water-seal latrines. Even though more labor is involved in carrying water, such facilities may be preferred. Women are the key agents for acceptance, use and maintenance of new facilities in the home, and planners can benefit from incorporating their beliefs and wishes into programs. As Feachem has noted, it is essential that planners in making "designs take account of user preferences and of the socio-economic setting of the project" (Feachem 1980).

This approach which focuses on the product from the point of view of the consumer has been described as "user-choice" (Kirkby,

1973) and elaborated on in relation to implications for planning delivery systems by Whyte and Burton (1977). Draft guidelines for relating the user choice to national planning for community education and participation have been suggested (Whyte, 1980; Elmendorf, 1981a). Whyte has developed a checklist system for:

- 1) Identifying national experience in community participation.
- 2) Assessing the social and economic potential for community participation.
- 3) Anticipating problems in project implementation.
- 4) Setting program objectives and priorities.
- 6) Manpower for community education and participation.
- 7) Project allocation and initiation.
- 8) Project planning and design.
- 9) Construction.
- 10) Administration, operation, and maintenance.
- 11) The education component.
- 12) Performance evaluation and progress monitoring.

Alastair White (1981) has elaborated the same concept into community participation options for different types of social systems and agencies. Although not enough emphasis is placed on the need to understand women's roles, careful analysis of social organization, formal and informal, is discussed with references to specific cases.

Social and cultural variations in water related beliefs and practices are to be expected from country to country and even from region to region within countries. However, there are a number of similarities with respect to beliefs and practices regarding water and excreta. For example, a recurring theme in many cultures is the idea that the stools of small children are innocuous and therefore need no special handling. Taboos are also common regarding the mixing of the stools of men and women--which is felt in many areas to make either one sterile. Latrines, as a result, are often used only by women. Streams and pools not infrequently are perceived to be the habitations of spirits and thus not to be disturbed. Other cross-cultural examples of fears and constraints are numerous. Because of the similarities in attitudes and perceptions surrounding water and excreta there are often generally replicable knowledge,



attitude and practice survey instruments for certain cultural and geographic areas, particularly those of similar size and environment. Despite these similarities, however, for purposes of effective project design, more detailed information concerning variations is needed at least on a regional basis. Failure to account for variation among populations may lead to inappropriate project design and ultimate project failure.

If communities or households feel that new facilities are theirs, they are much more apt to fully accept, use and maintain them. Simple adaptations at the local level increase potential for adoption. Feachem noted and various studies verify (Elmendorf and Buckles, 1980) that "in general, the design issues that will be improved through user participation are minor in their engineering or financial consequences, but major in the potential effect upon acceptance and correct use of the new facilities."

In some instances effective community participation may slow down or stop a project. In Mexico, the Mazauwas in El Nopal would not accept a water installation connected only to some houses, nor wells accessible to clusters of huts. The community decided that everybody should have a household water supply at once or everybody would continue walking to the rather distant and poorly maintained well (Iwanska, 1971).

A Maya community in Yucatan also delayed the construction of latrines until a model appropriate to their perceived needs and the specific environmental and geological requirements of their limestone soil could be designed and demonstrated (McGarry and Elmendorf, 1982). Even though some may consider these cases failures, both communities were ready to work for what they felt they needed, and unwanted facilities were not installed to fall into disrepair.

Although the number of successful rural water and sanitation schemes is much smaller than that of those that failed or achieved only limited success, there is increasing evidence that the user-preference approach combined with community participation is a viable strategy (Miller and Cone, 1982; Buckles, 1981; Jorgensen, 1980). The hidden participant accepting or rejecting a new water supply or sanitation technology is most often a woman.

## Chapter 3

### WOMEN AS USERS OF IMPROVED WATER AND SANITATION TECHNOLOGIES: FACTORS IN PROJECT IMPLEMENTATION

A central question confronting each new water and sanitation project at the threshold of its execution is whether or not the new facilities, once installed, will be used by those for whom they are intended. Facilities, regardless of the excellence of construction and function, will not achieve their objectives if they are not used. Achievement of program objectives will also be affected by users of the facilities. In the frequent preoccupation with ultimate outcomes of water and sanitation improvements, these questions, like so many other important intervening variables, may be overlooked. Women as the primary users of water the world over and as frequently the first to use sanitary installations may thus not be singled out for the intensive user education so necessary for a project success.

#### 3.1 Education of Women as Users of Water Supply and Sanitation Facilities

New knowledge that results from education or training must be related to local beliefs and behavioral systems as noted in the preceding section on women as acceptors. Linkages between the old and new must be found.

Hygiene education, particularly personal and household programs, therefore, first of all should be focused on women, bearing in mind four primary strategies:

- 1) Increasing knowledge of the water/health and the excreta/water/food/health relationships.
- 2) Promoting positive attitudes toward proper and hygienic use of the water supply, transport vessels, and storage receptacles, and the use and care of latrines by women and their children. It will also be necessary for such vessels, receptacles and cleaning materials or supplies to be locally available and at prices within reach of the population.
- 3) Promoting water handling, excreta disposal, and food preparation practices that contribute to better health: use of clean covered transport and storage vessels, hand washing after defecation and before food preparation, toilet training of toddlers, proper disposal of infants' stools, and covering left-over food.

- 4) Promoting, where possible and acceptable, the appropriate reuse of wastewater and excreta and building linkages between the two by careful planning based on use of space and existing practices.\*

Although these emphases would be the same for any other group, women alone are in a position to realize the cognitive, attitudinal, and behavioral outcomes desired. During project implementation certain conditions make it more likely to achieve these outcomes among women including:

### 3.2 Women as Water and Sanitation Promoters

Women themselves have been found to be the most effective peripheral agents in family planning, nutrition, home extension and other programs where women are the primary targets (Storms, 1979). Women workers generally understand more intuitively the problems and issues faced by other women and related more naturally to other women. In Ghana effective use has been made of home extension agents to deliver combined nutrition, family planning, agricultural extension, and child health education services.\*\* So in the promotion of proper use of water and sanitation facilities, women should be recruited as health inspectors, assistant sanitarians, agricultural extension workers, and primary health care workers who deliver these educational services.

### 3.3 Attention to Supportive Social Structures

Secondly, if women are to benefit from user education services, the program should focus not only on information and motivation for individuals, but on the strengthening of existing women's groups or the creation of new ones as necessary to build peer support for desired change. Savings and loan associations, family planning groups, religious organizations, tribal societies, and kinship and friendship networks need to be identified and be recipients of program inputs (Buckles, 1982). In addition to the enhancement of women's groups, other ways should be found to mobilize the more general community

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\* Study of two Egyptian provinces revealed that families preferred to use the same water for washing clothes, vegetables, and finally dishes in that order. It seems that it is not so much the reuse of water that is detrimental to health as the sequence of its reuse. Also significant is the fact that multiple uses were directly related to scarcity of water and to the arduous task of transporting it. (Simpson-Hebert, 1979)

\*\* Personal communication, Elizabeth Brabble, American Home Economics Association.

organization in support of user education of women. Where necessary and feasible, women should participate in community-wide organizations in order to forge those supportive links.

Certain sites may also lend themselves to more effective delivery of services than others: markets, clinics, hospitals, washing sites, grain grinding sites, etc. (Colle and Colle, 1977). Schools may well serve as an effective vehicle for reaching young girls who are already intensely interested in motherhood and household management and long experienced in hauling water. At each of these sites where women gather, user education can be delivered to a group which will provide the individual woman with peer support. In addition, school children, both boys and girls, can become teachers of their younger siblings, leading to changed customs and behaviors in the home and giving further support to their mothers.

### 3.4 Communication Through Explanation and Demonstration

When field workers from the Diarrheal Disease laboratory in Bangladesh were contemplating their hygiene education program as a part of a new water and sanitation effort at Teknaf, they tested specially prepared educational materials among the local population, mostly women, but found that most were unintelligible to the target audience.\* Objects in the designs were not even recognized for what they were. In the Cameroon Isely et al (1980), in testing materials, found nearly a 25 percent rate of non-comprehension of visual images. At present, it is not known what proportion of rural populations, and particularly women, in developing countries do not perceive the meaning of visual representations. The implications for water and sanitation user education are extremely important. Instead of heavy initial investment in educational materials, efforts should be directed at developing locally pre-tested materials, demonstration models, and communication skills among field workers (Srinivasen, 1977; Clark, 1979). The water and sanitation facilities and their proper use, can all be developed as demonstrations. Mass media campaigns can be used as reinforcements (Smith, 1980).

If the above modes of project implementation can be adopted in one form or another in water and sanitation projects and in water and sanitation components of other projects, the chances of project success may be enhanced, at least to the extent that health, economic and social benefits are dependent on proper use of improved technologies.

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\* Dr. Mujibur Rahaman, personal communication, Dacca, Bangladesh, International Center for Diarrheal Disease Research.

## Chapter 4

### WOMEN AS MANAGERS OF WATER AND SANITATION FACILITIES: INCLUDING THEM IN TRAINING

It has become overwhelmingly clear from both research and field observations (Warford and Saunders, 1976; Elmendorf, 1978; Burton, 1979) that the main obstacle in the use and maintenance of improved water and sanitation systems is not the quality of technology, but the failure "in qualified human resources and in management and organization techniques, including a failure to capture community interest" (Nieves, 1980). An appalling 35 to 50 percent of systems in developing countries become inoperable after five years (Imboden, 1977; Warford and Saunders, 1976; White et al, 1972).

#### 4.1 Women as Managers

Women are, of course, managers of household water supplies. Whether it is recognized or not, they also have a strong potential role as managers of community water supplies. Women are far more bound to the household than their male counterparts who must often leave the community in search of work. Women are usually responsible for either obtaining water or seeing that it is available for daily use and deciding how and where it is to be used and for what. In addition, in many diverse areas of the world women select water sources, and some play key roles in seeing that funds and/or labor are available to maintain them. Women thus make ideal candidates for training in water supply and sanitation management and maintenance.

Several tasks in the maintenance and repair of new water supply and sanitation facilities must be learned by someone in the community. Among these tasks are monitoring systems for leaks and other defects, keeping stock of spare parts, overseeing a small budget, doing routine maintenance and minor repairs, maintaining liaison with local authorities and district and regional technical services, and training other community and household members in maintenance and repair techniques. Women, as those who already exercise considerable influence over water sources and uses, should be in a good position to benefit from training for such tasks. In Angola, where women have been recruited as water source monitors, the breakdown rate has fallen decidedly.\* As an adjunct to an agricultural development project in Bolivia, bi-lingual indigenous women 17

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\* Dr. Nimi Divengele Ambrosio, personal communication, Directorate of Maternal and Child Health Services, Ministry of Health, Luanda.

to 25 years of age were trained to administer immunizations, provide information on child nutrition, and lecture on the proper maintenance of water and sanitation facilities. A number of these young women are now in complete charge of repair and maintenance of the facilities (Stein, 1977). Armed with such skills and with information about alternative water sources, women can plan for more accessible and more reliable water sources for their households and communities. Other results of training would be an increased sense that a water source or a sanitation facility belongs to the community and a greater willingness to change from an old water source to a new one managed by the community or from defecating in the bush to using a latrine built and maintained by the household.

It has often been suggested that when people participate in planning and/or implementation of a project they will collectively consider the project theirs and have a sense of responsibility for its care and maintenance. Feachem et al (1978) have questioned whether people always feel this way. In fact, it is suggested that in some instances some villagers have felt that they made their contribution at the construction stage of a project so it was more than ever the responsibility of the government to maintain it. Alastair White notes that outsiders' expectations about community participation are based on what they themselves would or think they would respond to. But communities are not individuals. To speak of a community having a commitment to a project can only be a metaphor for a range of attitudes among individuals, none of whom may value the project highly in relation to their own private affairs (White, 1981). If we accept this concept, however, and recognize at the same time that a large proportion of the participants are women, for whom the importance of the project has understood value, the chances for collective approval and continued support is much greater.

These latter considerations have implications for both the substance and the form of training. In the first place improved facilities, while they should be appropriate, need not be crude or even simple. The idea that the technology is too complex for simple rural folk of developing countries is a myth and a rather unconvincing one at that. Broken and inoperative water supply schemes and abandoned latrines are to be seen in environments where village skills extend to maintaining and repairing bicycles, transistor sets, irrigation pumps, ceiling fans, air conditioners and a variety of small industrial machines and tools (Feachem, 1980). We could add sewing machines, ancient pedal models and electric ones, that are kept running by women.

Of course the new skills required for the effective management of improved technologies must be added to these existing skills, but most women are eager for any information or skill that promises to make life better for themselves and their families.

## 4.2 Women as Trainers

The Bolivian women mentioned earlier could easily add household and community water management to their repertoire of training skills. Since women have main responsibility for the young, they are also valuable as trainers of others in the use of water and sanitation facilities. The central role that women play in socialization and in health education and health care networks as well as their permanence within the household makes them more suitable as managers and trainers for water and sanitation projects at the community and household level.

In many cultures women both as trainers and as trainers of trainers are more effective and are sometimes required if females are being trained. Every effort should be expended to recruit women for these roles. The key is task specific training which includes information necessary for women to practice, teach and supervise others.

Learning all the skills mentioned earlier, but particularly those related to training and liaison work, will be more effective if training is experiential rather than merely didactic (Steuart and Rull, 1981). In other words, training should be treated as an opportunity for trainees to acquire needed skills in a real-world context while supervised and supported by technical staff with a minimum of time spent merely acquiring information. This approach has proved to be effective in a number of programs for training community level workers (Austin, 1979; Isely, 1981).

Many people have pointed out the need for putting desired changes within the world view and the political realities of local communities (Foster, 1973; Paul and Demarest, 1979; Pillsbury, 1978; Freire, 1970; Srinivasan, 1977; Clark, 1979 and others). Roark (1981) has suggested that the mobilization of local systems of learning may be a key to finding useful combinations of effective and appropriate water and sanitation technology with community participation. And the training period should not be looked upon as all that is necessary for a woman to function as a manager of water and sanitation services. Effective training, in fact, adopts methods, content and length of the program to the needs and capacities of the target audience. Such training focuses on introducing trainees to problem-solving skills in the training period, while foreseeing the necessity of support and supervision as the trainee continues to learn in subsequent periods (Austin, 1979). In fact, this follow-up training can serve several purposes, including increased status for the trainee and as a basis for later evaluation and monitoring of systems. In Upper Volta, for example, animatrices (female extension workers) will be the major collectors of data for evaluating a rural water supply project (Roark, 1981).

Since 1972 communities in Paraguay have been selecting local literate people, many of whom are women, for special training to carry out basic surveys including assessment of attitudes toward water, excreta and garbage. The communities choose the kinds of services and school sanitation education they want as well as help in the actual construction of the water supply systems. After special training, the responsibility for management and maintenance of the system is assumed by an elected water board (Cardenas, 1978).

There needs to be a critical look at costs and benefits of all training programs including those for water and sanitation, as decentralization, coordination, and regional planning of integrated development programs move forward. Use of existing cadres of trained female community workers (such as animatrices rurales in Francophone Africa) should be promoted. Special modules on water and sanitation and environmental health, including technical aspects, can be introduced into their training. This type of integration can lead to reduced costs and more nearly integrated field programs, and can focus on priority areas as defined by communities: health, education, nutrition and water supply areas which often cut across disciplinary boundaries (Government of Sri Lanka, 1980).

Such expansion of training programs does not, as Feachem, writes, "always require the government to increase its overall program costs by the employment, training, supervision, and transportation of the teams of community level workers that are necessary for successful community involvement." The key to success seems to be flexibility, combined with decentralization at the regional, district, and village levels, and carefully planned coordination with various departments and agencies--governmental and private (Warren, 1980).



## Chapter 5

### WOMEN AS AGENTS OF CHANGE IN WATER AND SANITATION: IMPLICATIONS FOR EVALUATION

The roles of women as diffusers of improved water and sanitation technology and as agents of behavior change must be taken into account in evaluating project effects. This contention holds true whether one is concerned with household or community-wide effects and needs to be incorporated into both external and self evaluations (Elliott and Sorsby; 1979, Dixon, 1980; Feuerstein, 1979).

#### 5.1 Household-Level Effects

To a large extent the achievement of household level benefits, both health and social, are dependent on the ability of women to diffuse information, attitudes, and water and sanitation related behavior to other household members. As carriers of water where household taps do not exist, women influence directly the volume consumed (White et al, 1972) and thus the possibility of achieving health effects related to increased volumes of water (i.e., decreased diarrheal morbidity, diminished skin infections, trachoma, and other so-called water washed diseases). As the selectors of water sources, women determine the quality of water delivered to the house based on their perceptions of what is a good and acceptable source. As those who select the transport and storage vessels, wash them, and cover them, women influence both the volume of water consumed (size of container) (White et al, 1972) and its quality. Finally, as those who feed and care for infants and small children they determine decidedly the hygiene of their eating and drinking utensils and the quality of the water they drink and thus are responsible to a considerable degree for the recovery of the infant or toddler with diarrhea (Smith, 1980).

All potential health benefits of improved water and sanitation are in turn influenced by the woman's behavioral change in response to perceived dangers inherent in excreta, unclean hands, leftover food, uncovered water, and flies (Smith, 1980). It is she who forms a constant link in the chain of contamination from feces to fingers to food, and she who in turn can break the chain by latrine use, hand-washing, and protection of left-over food.

#### 5.2 Community-Level Effects

In the vast majority of communities where a single water source serves from 30 to 200 or more persons, the achievement of health and socio-economic benefits and their evaluation also depends a great deal on the role of women. Women as the

drawers of water control to a great extent the possible contamination of the source through the manner in which they use the installation. For example, in the case of open wells, the use of a clean bucket and the prevention of spilt water running back into the well depends on the positive actions of women. The prevention of Guinea worm transmission requires, in part, the cooperation of women in order to prevent water running over hands and feet back into the well. Women are also among the first to notice defects in the structure of the well or breakdowns in the pump or other lifting mechanisms; and therefore, they are frequently in a good position to call attention to these problems, apply simple solutions, or arrange for repairs if possible. In these and other ways the role of women must be accounted for when one attempts to evaluate the community level outcomes of introducing improved water technologies.

Regarding sanitation, although most installations for excreta disposal are at a household rather than a communal level, the crucial role of women as the most frequent users of such facilities (Belcher and Vazquez-Calcerrada, 1972; Elmendorf and Buckles, 1980) should be remembered where communal sanitation blocks and other forms of public sanitation installations are the prevailing pattern. The installation of handwashing facilities and the provision of soap may depend for their effectiveness on focusing user education efforts at women.

### 5.3 Implications for Evaluation Design

Warner (1975) has suggested that evaluation of water and sanitation improvements should be viewed in three stages (see figure).

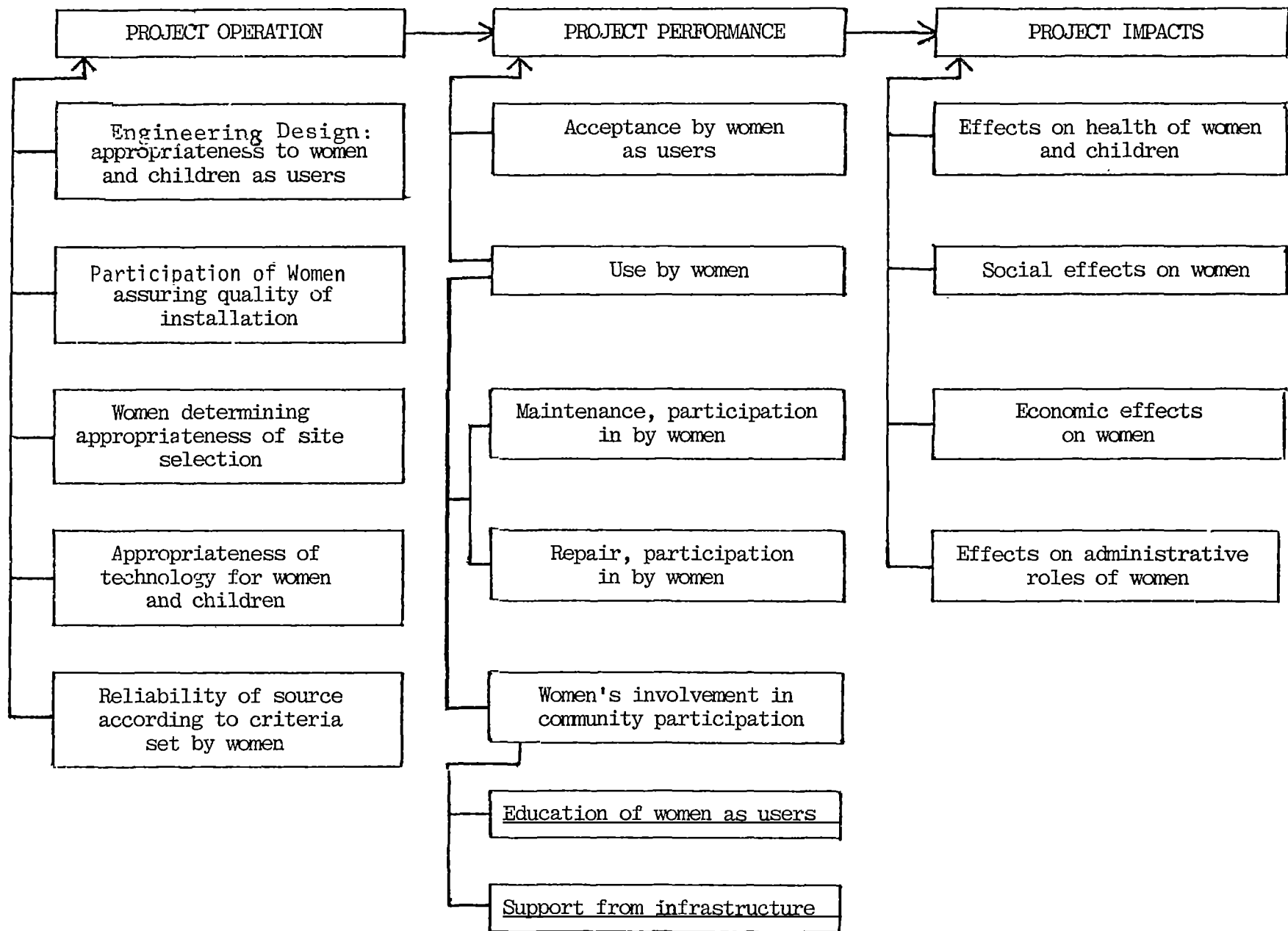
#### Stage 1 - Project Operation

In this phase the functional or engineering aspects of the project are assessed and the system itself is the object for evaluation by the potential users for appropriateness to their needs and their ability to operate and maintain it.

#### Stage 2 - Project Performance

This stage concerns a process evaluation of the use of facilities in which individuals and communities as users form the object for evaluation. In fact, it is important to distinguish between the kinds of usages and various treatments from the source to the ultimate use. Women as carriers, managers and manipulators of water merit key consideration at this stage of evaluation.

A Model for the Evaluation of Water Supply and Sanitation  
 Projects in Developing Countries: Illustrating the Broad Role of Women



Source: Adapted from Warner, D.B. (1975)

### Stage 3 - Project Impacts

This final or end-stage evaluation encompasses measurements of the health, social/organizational, economic, and administrative effects of the facilities on individuals, households and communities. At this point outside evaluators and techniques are important, but eliciting participatory evaluation by women as well as men adds needed insight into community and personal perceptions of the project impacts as meaningful additions to the quantitative data.

At each stage of evaluation, whether one is describing the function of a pump or its use by villagers, if one is to effectively evaluate results one must account for the role of women as diffusers of knowledge, attitudes, and behavior associated with new water and sanitation technologies. (See figure for an evaluation model incorporating women's roles.) In effect, if one has not included the role of women as a key moderating variable, one is likely to miss a large share of the factors explaining the end-products of a given project.

#### 5.4 Implications for Evaluation Methodology

Externally administered evaluations of water and sanitation projects have the obvious advantages of expert design, use of valid measures, and access to facilities for data management. Achieving interpretable results, however, in the case of water and sanitation projects may involve sharing a part of the responsibility for carrying out the design, execution, and interpretation of the evaluation with the users themselves (Cole-King, 1980; Aller-Atucha and Crone, 1980). Valid explanations of results of water and sanitation projects demand that women be entrusted with the responsibility of identifying criteria for each stage of the evaluation, for the collection and recording of data, and for a share in the interpretation of results. Only thus will reliable collection of evaluation data be achieved. With a stake in the outcome of the evaluation, women will be more likely to see that the necessary care is taken to select feasible data items and to collect them reliably. At the same time they will feel responsible for suggesting modifications or changes in the facilities themselves based on interpretation of the data gathered. In Honduras, the women not only collected the survey data but organized a workshop to analyze it and prepared a final evaluation document (Feuerstein, 1979; Cardenas, 1978).\*

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\* See also Heather Clark, presentation at the Workshop on Water Supply and Sanitation co-sponsored by the National Council for International Health and WASH, Washington, DC, November 2-4, 1981.

## Chapter 6

### RECOMMENDATIONS

#### 6.1 Planning, Implementation and Evaluation

There appears to be sufficient evidence for assuming that the success of water and sanitation projects in developing countries depends to a significant extent on the role of women as participants in improving technologies as well as beneficiaries of such technologies. Furthermore, there is already sufficient experience on which to base women's participation in the concrete planning, implementation and evaluation of projects. Some of these concrete ideas have been discussed above. They can be summarized as a series of program guides that may be useful in project design and redesign in the field. These guides are organized under three subheadings: water supply and sanitation planning (i.e. project identification and project paper generation), implementation (contractor and technical resource selection, work plan development, etc.) and evaluation (continuous monitoring and mid-project and end-project evaluations).

##### 6.1.1 Project Planning Guides

- Project planning should include the gathering of information on women's perceptions of what constitutes acceptable standards vis-a-vis quantity, quality, reliability, and accessibility of water. If such information is not already available, then primary data gathering may be necessary. Information is also needed about women's perceptions of appropriate management of excreta disposal, including the management of the feces of infants and small children.
- To the extent feasible, standard surveys should be used for regions with intra-community variations.
- Such information can be used in siting water sources (distance, reliability, etc.), selecting of sources (taste, color, smell), and selecting of technology (i.e. whether operable by women and children or not).
- Based on such information, separate latrines for men, women and small children may be needed, or latrines may have to be designed with certain preferred colors, materials, etc.
- Use should be made of Anne Whyte's "Guide for Design of a National Support Programme for Community Education and Participation in Water Supply and Sanitation" as a framework for planning for women's participation at the national level. Another useful manual has been produced by

the UNICEF East Asia and Pakistan Regional Office entitled "Toward a Programmer's Guide." It provides a succinct treatment of many of the planning issues basic to women's participation.

#### 6.1.2 Project Implementation Guides

- Women should be made the primary focus of user education accompanying water supply and sanitation programs, with implications for selecting women as health promoters, designing educational programs which address groups of women in markets, clinics, at bus stops, etc. Educational materials should be designed for non-literate women using women in illustrations and should be based on women's preferences for water characteristics and excreta disposal facilities.
- Themes of education programs should have specific behavioral objectives relevant to women, such as changes in practices relating to water handling, excreta disposal, and food preparation and storage.
- Water and sanitation user education for women should also take advantage of women's social support systems composed of friends and kin so as to reinforce behavior change.
- Women, where culturally acceptable, should be participants in the structures of community participation such as village health committees. Where women are restricted socially, specific women's groups may be a viable alternative, especially since the same women may share water gathering and child care activities.
- Where culturally feasible women should be trained in the technical and managerial aspects of local water supply and sanitation facilities as standpipe guardians, as water caretakers, as latrine inspectors, with concrete responsibilities for operations, maintenance and simple repairs.
- Some of the above women could be trained as the trainers of other women in job specific skills.
- Some women should also be trained as supervisors at district, regional and national levels. They could be recruited from the ranks of nurses, midwives, and laboratory personnel.

#### 6.1.3 Project Evaluation Guidelines

- Both continuous and periodic evaluations of water supply and sanitation programs should deliberately examine both the role women have played in the program and the benefits

that have accrued to women as a result of the program. For example, questions should be asked about water transport, storage, and use in the home that reflect a comprehension of women's role. Likewise questions about latrine use should focus on who uses the latrine (women? children?) and on whether women as food-handlers wash their hands. Thus the true benefits of proper programming may be uncovered. These considerations pertain whether one is designing an evaluation at the household or at the community level; whether one is assessing project operations, project use by the community or project benefits.

If these rough guides can in fact be used in Agency project design, implementation, and evaluation, their impact may be far-reaching for achieving objectives, sustaining results and replicating or spreading benefits.

## 6.2 Possibilities for Future Research

Several important questions remain unanswered, some of which appear critical for future research and/or program planning and evaluation.

1. How can local learning systems in which women play a key role be tapped so as to enhance the adoption of new water and sanitation technologies?
2. Under what conditions (time, place, circumstances) are women most receptive to water use education, and/or sanitation-use education? Which approaches result in specific behavioral outcomes? How can mass media reinforce and support local efforts to change behavior?

Many of the approaches suggested above have been tested only with special pilot projects where careful and sometimes charismatic leadership or generous funding have been the rule, both of which are unlikely in ordinary circumstances. Concerted efforts at more general user education aimed at women need to be mounted and systematically evaluated.

3. How can the participation of women in the repair and maintenance of water and sanitation installations be linked to opportunities for income generation?

This research question has important implications for both off-farm employment and water and sanitation programs. It calls for immediate exploration of such possibilities as utilizing existing skills of women in leatherwork, (cups, valves), pottery (pour flush toilets, puddled clay for well encasements), weaving (latrine enclosures), pipe fitting, chlorination (Rodriguez et al, 1981), and commerce.

4. What are the differences in the results of evaluation, whether mid-term or at project completion, where women's participation is accounted for, as opposed to where it is overlooked? The response to this question has important policy implications not only for the design of meaningful evaluations but also for water and sanitation programs that can be influenced by evaluation results. Unless such questions are asked in the evaluation of a project, conclusions about the effect of such participation cannot be drawn and policy and program changes will not be successful.

Women's central and primary roles in food preparation, water use, socialization and health care, as well as their roles as the mainstays of the household, demand their recognition in future research design and program implementation.



## BIBLIOGRAPHY

- Aller-Atucha, L.M., and C. Crone, "A Participatory Methodology for Literacy and Health Education: The IPREFA Integrated Project in Choloma, Honduras," Assignment Children, UNICEF, Vol. 51/52, 1980, pp. 141-162.
- Austin, J.H., "How Will Developing Nations Train Their Manpower for Quality Water Management?" Proceedings of Dialogue in Development: Towards the 21st Century, Tel Aviv, 1979.
- Belcher, J.C., and P.B. Vazquez-Calcerrada, "Cross-Cultural Aspects of Sanitation Norms," Proceedings of the Third World Congress of Rural Sociology, Baton Rouge, LA, 1972.
- Blair, P., "Programming for Women and Health," Agency for International Development/Office of Technical Resources, 1980 (mimeo).
- Buckles, P.K., "The Introduction of Potable Water and Latrines: A Case Study of Two Rural Communities in Guatemala," M.L. Elmendorf, editor, 1982.
- Burton, I., Policy Directions for Rural Water Supply in Developing Countries, Agency for International Development Program Evaluation Discussion Paper No. 4, Washington, DC, 1979.
- Cardenas, M., Community Participation and Sanitation Education in Water Supply and Sanitation Programmes in Rural Areas of Paraguay, UNICEF/World Health Organization, Joint Committee on Health Policy, Geneva, 1978.
- Clark, N., "Tracing the Learning Approach," World Education Reports, November, 1979.
- Cole-King, S., "Health and Development: Anatomy of Decision Making," Proceedings of the International Health Conference (NCIH), Washington, DC, 1980.
- Colle, R., and F. de Colle, The Communication Factor in Health and Nutrition Programs: A Case Study from Guatemala, World Health Organization, Geneva, 1977.
- Dixon, R.B., Assessing the Impact of Development on Women, Agency for International Development Program Evaluation Discussion Paper No. 8, Washington, DC, 1980.
- Elliott, V., and V. Sorsby, An Investigation into Evaluations of Projects Designed to Benefit Women (mimeo), Agency for International Development, Washington, DC, 1979.

Elmendorf, M.L., "Community Participation: A Human Dimension with Promise and Problems," Safe Water and Waste Disposal for Health: A Reference Manual. National Demonstration Water Project, Washington, DC, 1981.

\_\_\_\_\_, Field notes from Sri Lanka, Excerpts in Decade Plan for Water Supply and Sanitation, American Public Health Association, Washington, DC, 1980.

\_\_\_\_\_, "Public Participation and Acceptance," Environmental Impacts of International Civil Engineering Projects and Practices, American Society of Civil Engineers Publications, New York, NY, 1978.

\_\_\_\_\_, editor, "Seven Case Studies of Rural and Urban Fringe Areas in Latin America," Appropriate Technology for Water Supply and Sanitation, Vol. 8, to be published in 1982 by The World Bank, Washington, DC, 1982,

\_\_\_\_\_, and P.K. Buckles, Sociocultural Aspects of Water Supply and Excreta Disposal, World Bank, Washington, DC, 1980.

Eoff, G., "Las Catanas: A Case Study of a Traditional Subsistence Oriented Peasant Community" (mimeo), United States Agency for International Development, Honduras, 1977.

Feachem, R., "Rural Water and Sanitation," Proceedings of the Royal Society, London B 209, 1980, pp. 15-24.

Feachem, R.G., et al, Water Health and Development: An Interdisciplinary Evaluation, Tri-Med Books, London, 1978.

Feuerstein, M., "Participatory Evaluation: An Appropriate Technology for Health Education Programmes," Proceedings of the 10th International Conference on Health Education, London, September, 1979.

Foster, G.M., Traditional Cultures and Technological Change, Harper, New York, NY, 1973.

Freire, P., Pedagogy of the Oppressed, Seabury, New York, NY, 1970.

Government of Sri Lanka, Plan for the Drinking Water Supply and Sanitation Sector in Sri Lanka for the Decade (1981 - 1990), Ministry of Local Government Housing and Construction, Colombo, 1980.

Hall, B.L., Mtuni Afya: Tanzania's Health Campaign, Clearing-house on Development Communication Publication 9, Washington, DC, 1978.

- Imboden, N., Induced Change in Health Behavior: A Study of a Pilot Environmental Sanitation Project in Uttar Pradesh, Publication No. 356, Planning Research and Action Institute, Lucknow, 1968.
- \_\_\_\_\_, "Planning and Design of Rural Drinking Water Projects," Experiences in Rural Development, Occasional Paper No. 2, Organization for Economic Cooperation and Development Centre, Paris, 1977.
- Isely, R.B., "Targeting Sanitation Programs Where It Counts: Mothers of Small Children," Proceedings of the Congress of the World Federation of Public Health Associations, Calcutta, 1981.
- \_\_\_\_\_, "The Relationship of Accessible Safe Water and Adequate Sanitation to Maternal and Child Health," Water and Management, 1981, (in press).
- \_\_\_\_\_, et al, "L'image en tant qu'auxiliaire éducatif: comment l'adapter au milieu desiré," Africa Health, 1981, (in press).
- Iwanska, A., Purgatory and Utopia, Schenkman Press, Cambridge, MA, 1971.
- Jorgensen, K., Water Supply Problems in Rural Africa: The Implications for Women, Centre for Development Research, Copenhagen, 1980.
- Kalbermatten, J., "Guidelines for Project Monitoring and Reappraisal," Proceedings of the Annual Meeting of the American Society of Civil Engineers, New York, NY, 1981.
- Kirkby, A.U., "The Development of a User-Choice Approach in Rural Water Supply," Rural Water Supply and Sanitation, Working Paper 7, International Development Research Centre, Lausanne, 1973.
- Krug, R.E. et al, "Measuring Village Commitment to Development" in Values and Development: Appraising Asian Experience, MIT Press, Cambridge, MA, 1976, pp. 104-132.
- McGarry, M.G., "Village Water, Health, and a Potential Role for Family Health Care," Proceedings of the Fourth International Health Conference, National Council for International Health, Washington, DC, 1977.
- McGarry, M.G., and M.L. Elmendorf, "What is Appropriate Technology? A Maya Village Asks," in Elmendorf, editor, 1982.
- Miller, F.C., and C.A. Cone, "Latrines in Valuc: A Twenty Year Perspective," in Elmendorf, editor, 1982.

- Nieves, I., "Beyond Survival Skills: Providing Basic Services to Satisfy the Needs of Poor Women" (mimeo), Paper prepared for the United States Agency for International Development, 1980.
- Nieves, I., and W.T. Farrell, "Behavioral and Social Aspects of Technology Diffusion and Decisionmaking in Marginal Urban Communities in San Salvador," in Elmendorf, editor, 1982.
- O'Kelly, E., Rural Women, Intermediate Technology Development Group, London, 1978.
- Paul, B.D., and W.J. Demarest, "Intercultural Health Programs: The Problem of Community Participation" (mimeo), Stanford University, Palo Alto, CA, 1979.
- Pillsbury, B., Reaching the Rural Poor: Indigeneous Health Practitioners are There Already, Agency for International Development Program Evaluation Paper No. 1, Washington, DC, 1978.
- Pineo, C. and M.L. Elmendorf, "Observations of Rural Water Supply and Sanitation Programs in Eight Developing Countries," in Elmendorf, editor, 1982.
- Roark, P., The Role of Women in Successful Water Supply Projects, Agency for International Development, Washington, DC, 1981.
- Rodriguez, R.I., C. Pineo, and M.L. Elmendorf, "Nicaragua: Country Report" in Elmendorf, editor, 1982.
- Russell, A., "Report on the Situation of Women in the Target Villages of the UNICEF Domestic Water Supply Project in Dahr El Ghazal Province, Sudan" (mimeo), UNICEF, 1979.
- Simpson-Hebert, M., "Sociocultural Factors: Implications for Project Design" (draft), UNDP Global Project, Egypt, 1979.
- Skoda, J.D., J. Medis, J. Bertrand and M. Chia, A Survey in Rural Bangladesh on Diarrhoeal Morbidity, Water Usage, and Related Factors, UNICEF/World Health Organization, Geneva, 1978.
- Smith, W.A., "Media and Health Practices Results of Honduras Field Investigation, Academy for Educational Development, Report No. 14, Washington, DC, 1980
- Srinivasan, L., Perspectives on Non-formal Adult Learning, World Education, Boston, MA, 1977.
- Stein, J., Water: Life or Death, International Institute for Environment and Development, Washington, DC, 1977.



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- Steuart, G.W., and C. Rull, Training of Rural Development Workers in Health Education, Water and Sanitation for Health Project, Technical Report No. 1, Arlington, VA, 1981.
- Storms, D., Training and Use of Auxiliary Health Workers: Lessons from Developing Countries, American Public Health Association, Washington, DC, 1979.
- UNICEF, "Alleviating Women's Burdens," Assignment Children, Vol. 34, 1976.
- UNICEF East Asia and Pakistan Regional Office, "Toward a Programmer's Guide: Report of a Regional Water and Sanitation Workshop," Bangkok, 1981.
- Warford, R.J., and J. J. Saunders, Village Water Supply, The Johns Hopkins University Press, Baltimore, MD, 1976.
- Warner, D.B., and J.S. Dajani, Water and Sewer Development in Rural America, Heath, Lexington, MA, 1975.
- Warren, D., "Primary Health Care Training for Indigeneous Healers in Ghana" (mimeo), Proceedings of the meeting of the Society for Applied Anthropology, Denver, 1980.
- White, A., Community Participation and Education in Community Water and Sanitation Programmes: Methods and Strategies, World Health Organization International Reference Center for Community Water Supply, The Hague, 1981.
- White, A.U., and G.F. White, "Behavioral Factors in Selection of Technologies," American Society of Civil Engineers, 1978, Reprint 3453.
- White, G.F., D.J. Bradley, and A.U. White, Drawers of Water: Domestic Water Use in East Africa, University of Chicago Press, Chicago, IL, 1972.
- Whiting, M., and A. Krystall, "The Impact of Rural Water Supply Projects on Women" (mimeo), CARE, Nairobi, 1977.
- Whyte, A., Extension of Community Participation in Water and Sanitation in Developing Countries, Institute for Environmental Studies, Toronto, 1979.
- \_\_\_\_\_, Draft Guide for the Design of a National Support Programme for Community Education and Participation in Water Supply and Sanitation, World Health Organization/International Reference Centre, The Hague, 1980.
- Whyte, A., and I. Burton, "Water Supply and Community Choice" in Feacham, R., M. McGarry and D. Mara (editors), Water, Waste and Health in Hot Climates, Wiley, London, 1977.

World Health Organization/UNICEF, Primary Health Care, Report of the Conference on Primary Health Care, Alma-Ata, USSR, 1978.



