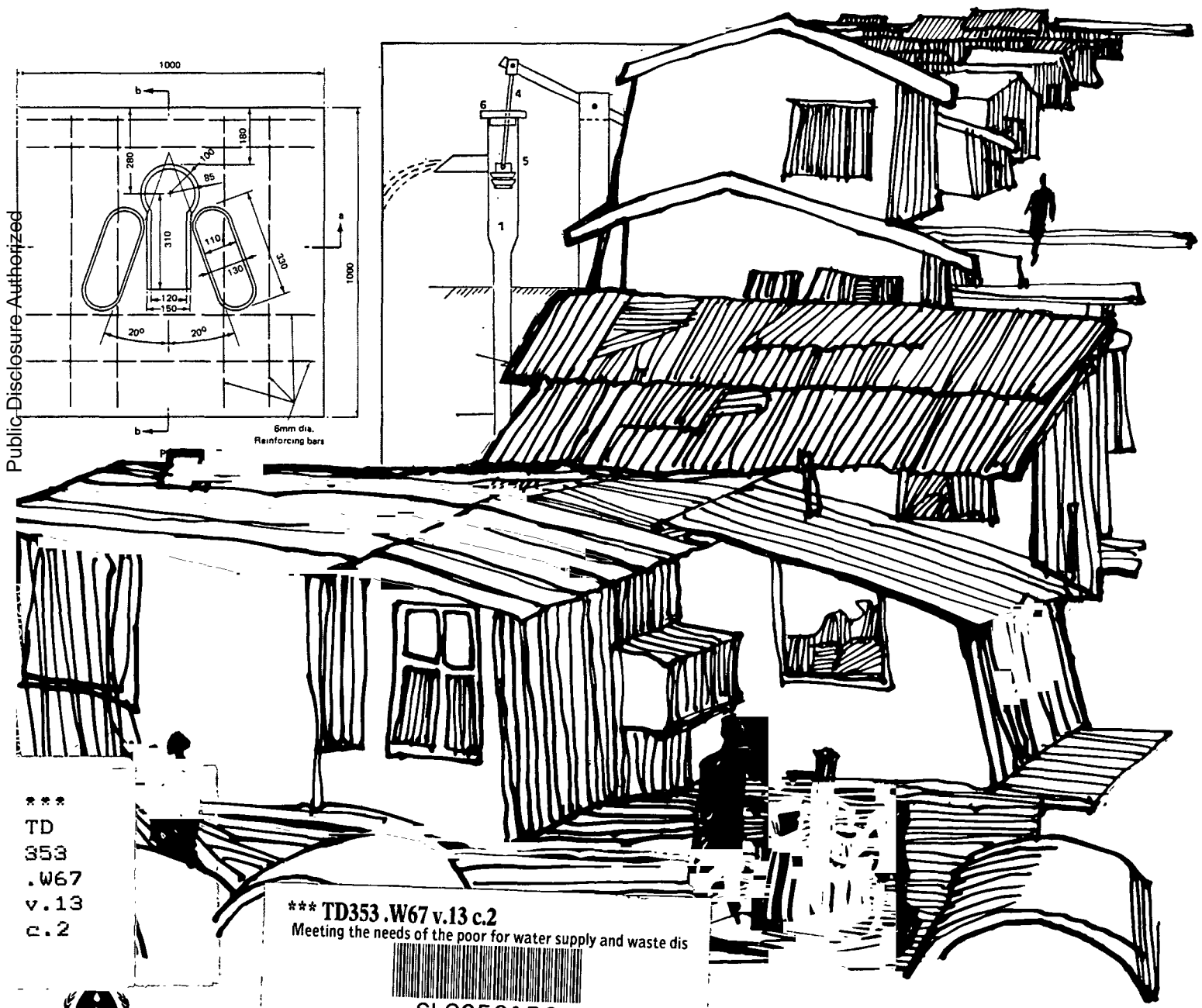


Appropriate Technology for Water Supply and Sanitation

Meeting the Needs of the Poor for Water Supply and Waste Disposal

Fredrick L. Golladay



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A WORLD BANK TECHNICAL PAPER

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Fredrick L. Golladay

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ABSTRACT

This paper examines economic, political, social and cultural obstacles to meeting the needs of low-income people for water supply and waste disposal and it proposes steps to reduce these obstacles. Households are often poorly informed about available options and are unable to allocate resources efficiently among their members. The paper suggests ways in which communications, peer and family support for innovators and incentives can be strengthened. Communities organize and manage resources in order to carry out activities that cannot be profitably undertaken by households, encourage constructive change and sanction undesirable behavior. The paper proposes methods for facilitating the formation and operation of community organizations to carry out these functions. Formal bureaucracies provide professionalized technical and administrative services, and supply policy guidance, goods and financial resources to operating agencies and communities. Largely because of their inherent conservatism, formal bureaucracies often fail to satisfy these needs, especially for innovative activities. Governments must revise legal codes to permit adoption of affordable technologies, and must assist community organizations in dealing with legal, financial, technical and administrative problems and in recruiting and retaining competent technical staff. These demands must be met within the constraints of both practical politics and bureaucratic behavior.

Persons who wish only a summary of the paper's main arguments should consult the conclusions (pages 46-51). The text of the paper, in addition to providing a more complete statement of the paper's ideas, is illustrated by examples drawn from the experiences of the Bank and others, and should be read in order to fully grasp the arguments.

APPROPRIATE TECHNOLOGY FOR WATER SUPPLY AND SANITATION
Volume 14

In 1976 the World Bank undertook a research project on appropriate technology for water supply and waste disposal in developing countries. Emphasis was directed toward sanitation and reclamation technologies, particularly as they are affected by water service levels and by the ability and willingness to pay on the part of the project beneficiaries. In addition to the technical and economic factors, assessments were made of environmental, public health, institutional, and social constraints. The findings of the World Bank research project and other parallel research activities in the field of low-cost water supply and sanitation are presented in this series, of which this report is volume 14. Other volumes in the series are:

- Volume 1. Technical and Economic Options, by John M. Kalbermatten, DeAnne S. Julius, and Charles G. Gunnerson [a condensation of Appropriate Sanitation Alternatives: A Technical and Economic Appraisal, Johns Hopkins University Press, 1982].
- Volume 1a. A Summary of Technical and Economic Options
- Volume 2. A Planner's Guide, by John M. Kalbermatten, DeAnne S. Julius, Charles G. Gunnerson, and D. Duncan Mara [a condensation of Appropriate Sanitation Alternatives: A Planning and Design Manual, Johns Hopkins University Press, 1982].
- Volume 3. Health Aspects of Excreta and Sullage Management--A State-of-the-Art Review, by Richard G. Feachem, David J. Bradley, Hemda Garelick, and D. Duncan Mara [a condensation of Sanitation and Disease: Health Aspects of Excreta and Wastewater Management, John Wiley and Sons, 1983].
- Volume 4. Low-cost Technology Options for Sanitation--A State-of-the-Art Review and Annotated Bibliography, by Witold Rybczynski, Chongrak Polprasert, and Michael McGarry [available as a joint publication from the International Development Research Centre, Ottawa, Ontario, Canada]
- Volume 5. Sociocultural Aspects of Water Supply and Excreta Disposal, by Mary Elmendorf and Patricia Buckles
- Volume 6. Country Studies in Sanitation Alternatives, by Richard A. Kuhlthau (ed.)

- Volume 7. Alternative Sanitation Technologies for Urban Areas in Africa, by Richard G. Feachem, D. Duncan Mara, and Kenneth O. Iwugo.
- Volume 8. Seven Case Studies of Rural and Urban Fringe Areas in Latin America, by Mary Elmendorf (ed.)
- Volume 9. Design of Low-Cost Water Distribution Systems, Section 1 by Donald T. Lauria, Peter J. Kolsky, and Richard N. Middleton; Section 2 by Keith Demke and Donald T. Lauria; and Section 3 by Paul V. Herbert
- Volume 11. Sanitation Field Manual, by John M. Kalbermatten, DeAnne S. Julius, and Charles G. Gunnerson.
- Volume 12. Low-Cost Water Distribution--A Field Manual, by Charles D. Spangler

The more complete, book versions of volumes 1, 2 and 3 have been published -- under the series title "World Bank Studies in Water Supply and Sanitation". Volumes 1 and 2 are available from the Johns Hopkins University Press; Volume 3 is available from John Wiley and Sons.

Additional volumes and occasional papers will be published as ongoing research is completed. Except for Volume 4, all reports may be obtained from the World Bank's Publications Sales Unit.

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PREFACE

The ultimate objective of economic development is to meet human needs. Among these needs, freedom from disease and liberation from ignorance are widely agreed to be among the most basic. However, despite historically unprecedented growth in production over the last quarter century, the number of people living under life-threatening and subhuman conditions has increased. In a few countries, fragmentary evidence suggests that the poorest quarter of the population may have become more impoverished, rather than less, in the period since World War II.

The discovery that poverty is not being overcome contrasts with the recent finding that a few areas with very low per capita incomes have largely conquered disease and ignorance. Sri Lanka and the Indian state of Kerala are prime examples. Both report life expectancies and literacy rates similar to those of North America and Western Europe and yet annually produce goods and services valued at around \$200 per capita. At the same time countries with output per person three to five times as large suffer from much higher rates of premature death and illiteracy.

These insights suggest that development strategies that aim at increasing per capita production and incomes are neither necessary nor sufficient to satisfy human needs. But more importantly, they indicate that the resources needed to provide an acceptable quality of life are available to nearly all of the countries of the World. Thus a search is now underway to identify practical steps toward meeting the human needs of very poor people. These efforts are focusing on means to provide essential goods and services to everyone.

In October 1980, the World Bank assembled a group of 39 people in Easton, Maryland to pursue this task. The group included persons with experience in international agencies, research institutions and private voluntary organizations. The participants brought with them expertise in water supply and sanitation, health care, rural development, nutrition, family planning, shelter, small scale industry, community development, education, development policy and economics. The group included persons with practical experience in most of the developing countries. The agenda for the workshop was to identify practical steps to increase the effectiveness of development activities in meeting basic human needs and, in particular, means to enhance the benefits to human health of investments in water supply and sanitation.

This monograph grows out of that workshop. The presentation reflects not only the discussion that took place at Easton, but also the ensuing correspondence and conversation that the workshop stimulated. In addition, the paper draws upon a report of the proceedings of the workshop on which many of the participants offered useful comments.

A draft of the monograph was also reviewed by a number of people inside and outside of the World Bank. The comments of Irma Adelman, Horace W. Barker, David Bradley, Nat Colletta, Kirby Davidson, Mary Elmendorf, Arlene Fonaroff, Joseph Freedman, Raymond B. Isley, Bruce Johnston, John Kalbermatten, Peter Knight, Maritta Koch-Waser, Bernhard Liese, Patricia Rosenfield, Paul Streeten, Norman Uphoff and Christopher Willoughby have been especially helpful and are gratefully acknowledged. Remaining errors and omissions are nonetheless the author's responsibility.

I. INTRODUCTION

Filth, disease, hunger and ignorance seriously blight the lives of more than one and a half billion persons--a majority of those who live in the developing countries. Life expectancy for this group is only slightly more than half that of persons residing in affluent countries; a third of the children born to the group die before reaching the age of five years. The overwhelming majority of the adults are illiterate and thus cut off from many opportunities to improve their lives. Reducing this staggering waste must be high on the agenda of development priorities.

The experiences of several areas have clearly demonstrated that this tragedy is not inescapable. Millions of people in the Indian state of Kerala, as well as in Sri Lanka, China and several other places, have achieved levels of formal education and a physical quality of life rivaling that of the most affluent countries. Moreover, they have done so with remarkably small per capita incomes. This fairly recent discovery suggests that increasing per capita production is not essential in order to meet the needs of the citizens of even the poorest countries. At the same time, information about the experiences of several middle income developing countries, such as Brazil and Nigeria, suggest that increases in per capita output do not lead inevitably to higher standards of living.

Thus two important questions confront developing countries: How did a few very poor countries succeed in meeting the essential needs of their citizens? And, can those mechanisms be introduced successfully in other countries?

These two questions have recently attracted wide attention. Many investigators have concluded that equitable access to food, and to education and other social services, is the common characteristic of those low-income countries that have met human needs. This conclusion supports the common sense notion that goods and services are needed to improve health and education. But these studies have also signaled the less obvious fact that the value of the goods and services needed to meet human

needs is on the order of \$165 per person annually--much less than generally has been presumed. This implies that in addition to promoting growth in production, development policies should seek to obtain from available resources greater benefits to people. These investigations have underscored the fact that the manner in which scarce resources are used is critically important, and have suggested that the most significant neglected issues relate to achieving efficiency not in production but rather in the consumption of resources.

These investigations have frequently emphasized the role of enlightened public policy in assuring equitable access to essential goods and services. Thus political will has been cited as an important factor in meeting human needs. The political will needed to implement programs that assure broad access has appeared principally where the overwhelming majority of the population is enfranchised. But it must also be recognized that broad political and social participation is itself an indicator of high levels of human and social development. Thus, there is no clear basis for asserting whether human needs are met by popular governments or participatory government is nurtured by a literate society.

Moreover, the finding that governments which are committed to broad access to goods and services contribute most to meeting needs provides little guidance on development policy. Consultants, development assistance agencies and even sovereign governments rarely have opportunities to create the political reforms that would be necessary in order to radically increase access to essential goods and services. Hence it is necessary to look for alternative approaches to the challenge of improving health, education, shelter and opportunities.

This paper examines the options for more fully meeting these essential human needs through better use of resources. It begins with the premise--already confirmed by the experiences of the several countries noted above--that the inputs required to meet these needs are available to economies producing goods worth as little as \$165 per capita a year (1982 prices). Thus the paper focuses not on how to expand output but rather on how to improve consumption of available resources. (This is not to say that greater production is undesirable, however.)

The first step is to ensure that production is distributed so that everyone has access to required quantities of

essential goods. The considerable success over the past decade of programs to improve the earnings of both the rural and urban poor indicate that this goal is achievable without serious political upheaval or forcible redistribution of income and wealth. The continuity of these policies appears to have promoted development of a constituency and clientel for them, thus strengthening both the program and its effectiveness. Rural development projects have succeeded in improving the productivity of small farmers; investments in small scale industry now promise to do the same for the landless, rural and urban poor. These efforts are not likely to raise incomes dramatically but nonetheless they are capable of providing the resources required to satisfy human needs.

The second, and far less thoroughly explored, step is to ensure that new opportunities to consume are used effectively. Consumption choices are either made or shaped by households, firms, communities and governments. However, even the most superficial examination of the facts reveals that these institutions have failed to use available resources as well as possible in meeting human needs. Thus the immediate task is to understand why these decisions frequently are poorly made and then to devise policies and action programs to improve them. This is the goal of the present paper.

II. THE ROLE OF THE HOUSEHOLD

The household more than any other decision making unit determines what individuals consume. Nonetheless, scant attention has been given to the question of how it carries out this function. Most past thinking--and most public policies-- have presumed that the individuals comprising a household share both economic resources and fundamental goals. According to conventional theories, choices are made in such a way as to maximize the collective well-being of the household's entire membership. Economists have generally compounded the error by proclaiming that the choices of households are optimal in the absence of monopoly and external effects of production and consumption activities.

However, the evidence indicates that the households often do not use their resources to the greatest advantage. For example, each year several hundred thousand children are blinded by a vitamin deficiency that can be avoided by eating green, leafy vegetables which instead commonly are discarded. Similarly, closely spaced pregnancies deplete the physical capacities of women and thereby unnecessarily endanger the lives of both mothers and children. Urination and defecation in surface waters or in open fields maintain the transmission of a large number of diseases including schistosomiasis, hookworm and cholera. A host of other examples can be identified where the quality of life as reflected in nutritional status, good health, literacy and social participation is severely limited by misuse of consumption opportunities. In many of these instances human welfare could be sharply improved at little or no cost.

These problems in the past often have been argued to reflect cultural barriers to development or the inherent conservatism of the poor. However, research during the 1970s into the management practices of peasant farmers demonstrated that observed behavior is often rational, particularly if evaluated within the framework of the values and opportunities of the poor. The decisions of peasants appear to reflect a more comprehensive assessment of costs and benefits than has typically entered into "experts'" calculations. In addition, the poor value various consequences of production and consumption differently than do expert advisers and academic researchers. In particular,

the poor generally avoid risks that might prove calamitous and stress quick returns from efforts and investments.

But the discrepancy between the behavior of the poor and the professional judgments of how they should act also reflects the neglect of the interworkings of the household. Even casual observation reveals that few household decisions result in uniformly shared benefits or costs. Age, sex and occupation, in particular, ensure that individual members view and experience the household differently. For example, children produce relatively little and at the same time place extraordinary demands on the family budget for schooling and health care. Women of child bearing age also have needs for nutrition and medical care. These special requirements compete with the family's ambitions to invest in productive capital or to increase consumption. Persons working outside the home typically have distinctive needs for clothing and for food. The increased sensitivity to the roles and needs of children and women has underscored the fact that rivalry, conflict and injustice infect households.

A number of explanations are now being offered for the failure of the household to use its consumption opportunities fully. The following subsections examine the ones most commonly advanced. The purpose of the discussion is not so much to provide a rationalization for observed behavior as to illuminate the opportunities for community organizations and governments to enhance the performance of the household.

A. Misinformation as an Obstacle to Efficient Consumption

Households' most apparent economic handicaps derive from their limited command of crucial information. The consequent ignorance frequently results in seriously inefficient use of the resources available to the family. This ignorance assumes several forms. First, in many instances people hold views that have been contradicted by modern science. These views when acted upon are often harmful to their physical health. For example, in many parts of Africa, people believe that if a mother consumes animal-based foods during pregnancy, her child will acquire characteristics of the animal. As a result, pregnant women are not allowed to eat milk products, eggs or meat, and thus consume too little protein. The consequent undernutrition combined with close spacing of pregnancies results in serious depletion of physical reserves. Similarly, sharing defecation sites is thought by many people to cause infertility. This belief promotes casual defecation and hence the spread of excreta-related disease.

Dracunculiasis--a severe, disabling parasitic disease transmitted exclusively by contaminated drinking water--has proved difficult to control in some highly endemic areas because it is believed by many to be a hereditary problem. People have observed that the disease is peculiar to some families but not others. Transmission could be stopped by simply filtering drinking water through finely woven cloth, sand, charcoal or other media. But victims have refused to adopt this low-cost solution on the grounds that the disease is not "caused" but rather is "in the blood."

Alternatively, in some highly traditional parts of West Africa, households have refused to use an improved water supply intended to interrupt transmission of disease. Local religious teachings prohibit drinking water which has a "strange taste." This commandment, which is probably rooted in an ancient discovery that contaminated water is dangerous to health, has been used to justify continued reliance on familiar, traditional sources. Thus efforts to control diseases transmitted through unsafe drinking water have been frustrated. Scientific explanations of the causes of disease have had little impact on traditional practices.

Second, lack of consumer information frequently takes the form of competing understandings of reality which crowd out or contradict modern approaches to problems--especially efforts to control disease. The idea that disease is caused by microscopic creatures that invade and parasitize victims is often viewed with amusement by people who believe instead that curses and ill winds are the true causes. Efforts to control tetanus among new borns has been difficult for this reason. Traditional people have been reluctant to abandon the practice of controlling bleeding of the umbilicus by applying dung, in response to what appear to them to be preposterous explanations for occurrence of disease. In such instances, entire systems of beliefs rather than individual "facts" guide behavior. Notions of organic growth based upon analogies with agriculture, or of balance between hot and cold or male and female often undergird understanding.

People are especially reluctant to abandon long-standing beliefs about the causes of disease where immediate results are not obtained from adopting a new practice. Several programs have reported that people are more willing to doubt traditional beliefs if the severity or prevalence of a disease changes sharply. A community in Oyo State in Nigeria with a long history of dracunculiasis repeatedly dismissed attempts by health authorities to control the disease. Nevertheless, it sought professional help when a drought forced a much larger part of the population to resort to a contaminated water source and hence the prevalence and severity of the disease in the community escalated. The sudden appearance of new facts that were clearly inconsistent with

traditional beliefs increased the community's willingness to consider alternative explanations and to explore alternative solutions.

Lack of information about affordable technical options for meeting a recognized need is a third distinct form of inadequate information. For example, many households (and public authorities) are unaware of the variety of options for safely disposing of excreta. Most have seen modern flush toilets and unpleasant pit latrines. However, few are familiar with the range of affordable and esthetically acceptable intermediate solutions such as vented and/or water-sealed latrines. Even where people have been informed of these options they have doubted that the facilities were affordable, acceptable and more healthful. Only by observing these alternatives have people been convinced of their acceptability.

B. Development Communications

Professionals in health care, family planning, water supply, nutrition and the like have sought to bridge the information gap through a variety of development communications activities. Mass media have been used to teach poor people the germ theory of disease and the biochemistry of malnutrition, for example. Radio has been the most successful medium; while the client group is often illiterate, radios are widely owned. Printed media have been effective in a relatively small number of cases. Sketches have replaced the written word in several instances in order to extend the reach of communications to illiterate persons. However, the achievements of posters have been especially modest, either because the symbols being used were unfamiliar, or because the message was simply too complicated to be conveyed at a glance.

Multimedia approaches to development communications are now being widely employed. "Distance learning" programs are being developed based on radio broadcasts and group discussions. The groups are organized to listen to the broadcasts, then to discuss the contents with trained leaders. Written materials are provided to assist the groups in organizing their deliberations. Advocates of the approach maintain that it offers a structured environment

in which questions and misunderstandings can be quickly resolved. In addition, they argue that listening groups provide community reinforcement for new ideas and social support for changes in behavior. The group dynamic is believed to make change less risky socially, and hence more attractive.

The health and nutrition campaigns conducted by the government of Tanzania are often cited as successful examples of this approach. With the aid of the local organizations of the national political party, an estimated 90 percent of the country's population was informed about latrine construction, improvement of water supply, basic hygiene, food preparation and child care. A formal evaluation of the campaigns revealed that a large percentage of participants were able to recall principal messages. About half of the participants initiated construction of latrines. However, longer term follow-up has revealed that only a small number were completed and used. The success of the campaigns in promoting construction appears to have reflected the influence of the political party rather than a commitment to newly acquired ideas. In the absence of individual commitment to the new technology, longer-term use was disappointing.

The impact of development communications typically has been disappointing. This failure appears primarily to reflect a tendency of professionals to present new information in ways that are intellectually satisfying to them, but unconvincing to low-income people. Efforts to improve hygiene through education and communications have typically sought to convey the elements of the germ theory of disease. The underlying notion has clearly been that once people are made aware of how gastroenteric diseases are transmitted, they will be willing to modify their sanitary habits. Excessive reliance on media technology has also compromised the effectiveness of communications activities.

However, most clients have not responded as predicted. As noted above, the most important explanation for failure has been that the audience does not understand reality in the manner that underlies, say, the germ theory of disease. Disease is believed to result from "bad blood," the evil eye, ill winds, ancestral curses, etc. Thus, adoption of the modern scientific explanation frequently requires that the individual reject an entire system of beliefs. Moreover, this system of beliefs often impinges not only upon physical health but also on the mechanisms that regulate social relationships and on the culture's understanding of the relationship between man and nature. Thus it is not surprising that wholesale adoption of new ideas does not occur.

The reluctance to embrace new theories of disease causation is also rooted in part in the fact that they must be accepted on faith. Even with widespread adoption of a new practice, improvements in health will appear only after a delay of months, or perhaps even years. Hence direct confirmation of the new practices' superiority is difficult to obtain. Few people are willing to abandon their traditional beliefs about the causes of misfortune simply because an outsider offers an alternative explanation.

Finally, failure to adopt better practices in response to communications activities also reflects a widespread human reluctance to admit that older practices were harmful. Older adults are particularly unwilling to concede that their ignorance has contributed to the poor health or unhappiness of people they love. As a consequence, people are typically conservative in embracing these new ideas. The reluctance is still greater for health-related changes which require that some part of the person's system of beliefs must also be abandoned.

Lack of valid information about the role of excreta and water in the transmission of disease is unquestionably a major factor in the persistence of this group of diseases. The assertion is confirmed by the fact that better informed persons can and do live in areas of very high disease transmission without becoming ill themselves. For instance, the staff of the Dacca Cholera Laboratories (now known as the International Centre for Diarrhoeal Disease Research) work daily with cholera victims without contracting the disease. Similarly, international businessmen and civil servants frequently travel to areas without adequate water supplies or waste disposal systems, and yet only occasionally contract locally endemic diseases.

C. Opportunities to Improve Communications and Education

For the reasons discussed above, the short-term impacts of communications and education activities are likely to be modest. Nonetheless the foregoing discussion suggests a number of concrete steps that might be expected to increase the effectiveness of such activities:

First, communications/education activities should be targeted on those persons within the household who make decisions and/or act upon new information. Often it is necessary for the

information to be supplied to the entire family. However, in some cases this is not true; teaching adult males how to prepare green, leafy vegetables is probably a waste of effort, for example. (Convincing them of the value of eating such foods would be useful, however.) Focusing educational activities on those who in point of fact make the related choices permits savings of program resources. In addition, concentration of promotional efforts allows more opportunities to tailor programs in order to reflect the people's initial knowledge and understanding, to increase motivation and to mobilize social pressures to promote change. Nonetheless, one should recognize that mobilizing a community-wide network of support for change may be necessary to adoption of new ideas.

Second, programs should seek to increase the rewards for adopting a new practice and at the same time should attempt to minimize sanctions against its adoption. Mass communications campaigns appear to have reduced desired family size in several Asian and Latin American countries and thus have promoted family planning. Private advertising has created the notion (no doubt false in some settings) that infant feeding formula represents modern and superior child care. School teachers have successfully associated better hygiene and use of latrines with progressive, modern practices. By enhancing the subjective gains from adopting a new practice, these efforts have increased acceptance and retention.

Third, the social risks associated with innovation should be minimized (or insured against) through appropriate public policies. Studies of the West African family suggest that superior social status conferred by formal education has permitted young women to reject safely the instructions of traditional healers and older family members. Adoption of better child rearing practices (relating to immunization, hygiene, or nutrition) has been greater where mothers were better educated than their husbands or mothers-in-law. Education probably redefines the peer group from which the innovator depends for assurance and acceptance. Broad improvements in employment opportunities and more equitable laws regarding inheritance and ownership of property also have increased women's willingness to risk innovation.

Agricultural development schemes in semi-arid sections of Kenya have provided insurance against drought so that farmers could withstand a crop failure. The insurance has permitted development of land that was previously regarded as economically marginal by local farmers. It must be stressed that even with a thorough understanding of the mechanisms that link new

practices with improved conditions, people will not innovate unless they are prepared to bear the economic, social, and religious sanctions against deviation from traditional practices.

Fourth, messages should be fitted into local beliefs if possible. As noted above, many health education messages have been couched in the language of modern science. Often the elements of a health education message can be communicated without challenging traditional beliefs. If the local cosmology can be left undisturbed, the audience is more likely to accept suggestions for change. For example, the successful campaign against dracunculiasis in the Nigerian village noted earlier was launched when the incidence and severity of the disease rose sharply. The people were then prepared to consider an explanation for the unusual outbreak of the disease. Indictment of a water supply was not inconsistent with the view that the customary incidence of the disease was due to hereditary transmission. Use of agricultural imagery and analogies has been used effectively to convey family planning concepts. Similarly, introduction of oral rehydration therapy for diarrhea has been more successful where it was presented as the cure for the dryness that may accompany water stools. In this way the intuitively appealing, traditional rule that one withholds liquids from persons with acute diarrhea could be left unchallenged.

D. Allocation of Resources within the Household

The household is made up of people with competing needs and aspirations. The manner in which these differences are resolved significantly affects the well-being of individual members. At the most elemental level, household members compete for the limited resources of the family. While the issue of income distribution among households has received widespread attention, the important question of how the household divides its resources among its members has been largely ignored. Competition for resources within the household presents peculiar problems because the competitors are unevenly matched--they range from newborn infants to adult males. The claims that can be made effectively are consequently varied.

Allocation of resources within the family is further complicated by the fact that the needs and interests of the individual members both diverge and compete. For example preschool children are especially susceptible to infectious diseases because their immune systems are immature. They therefore need greater medical attention than older children and adults. In addition, small children require diets high in both protein and calories because they are growing rapidly and because they often suffer diseases that impair absorption of nutrients. Pregnant and lactating women have similar dietary requirements.

In contrast, male adults have modest needs for protein but high requirements for calories to support heavy physical exertion. However, the division of a family's supply of food rarely recognizes each member's needs. In relatively wealthy households this does not present serious problems because nutritional minimums are generally over-satisfied. However, very poor families need to budget their food carefully to meet everyone's needs.

The allocation of food resources is illustrated by a study of nutrition in the State of Tamil Nadu, India. It suggests that at least three different rules exist for allocating scarce food within the family. Some households divide scarce food in roughly equal amounts. Others distribute food in proportion to perceived needs. (These needs may not correspond to those prescribed by nutritionists however.) Third, households frequently rely on a triage system in which the most important family members are served first and less important members are fed whatever remains. The triage system is often defended as being rational to the extent that it maximizes the productivity of the main bread winners. Obviously, none of these rules for allocation of scarce food is ideal in the sense of minimizing the effects of malnutrition on the family.

The needs of children for socialization and training also compete with consumption and other investments by the household. Sending a child to school not only requires the family to buy uniforms, books, etc. but also reduces a family's income if the child could have been employed. Thus a conflict arises between the short run interests of the family and the longer-term interests of the child: the household is confronted with a choice between current consumption and investment in the future earnings capacity of a child. Furthermore, it is faced with a choice between expenditures that benefit it and those that will benefit the families of its children.

The disadvantaged positions of children and women in particular have been highlighted in recent years in discussions of the role of women in development. In addition to being granted a less than ideal share of the family's resources, often women have been assigned some of the most dreary tasks. Collecting water and fuelwood are two notable examples. On the other hand, adult males (in part because of greater strength and physical mobility) tend to assume substantial roles outside the home especially in earning cash incomes.

Voluntary, market exchange cannot be depended upon to resolve competition for the resources of the household nor to assign tasks and responsibilities among members. Differences in control over resources and in capacity for decision making confer greatest authority on adult males, especially in traditional, agrarian societies. But more commonly a system of mutual expectations and responsibilities has developed that determines the allocation of both goods and work.

Because conflicts over the use of a household's resources could easily assume disastrous proportions, every society has established customary methods for settling differences. Most frequently, the eldest male member of the family is recognized as the ultimate arbiter of differences. Not surprisingly, in most situations he renders judgements consistent with his own broad interests or with those of his immediate heir.

However, many important household decisions are simply prescribed by custom or religion. The transfer of property on the death of a father or the manner in which a bride is chosen are examples. These decisions are widely regarded as being so important that they should not be left to haggling and debate. These customs are often exercised under the shroud of religion in order to enhance their authority and legitimacy. They are further reinforced by a host of social sanctions and rewards. Reinforcements may range from being recognized as a "good wife and mother" to being invited to become a member of the Council of Elders. Violation of these customs is widely believed to invite misfortune. Ancestral curses and the wrath of God are invoked against deviant or disrespectful behavior throughout the world.

Because of these influences on decisions, important changes sometimes are not made on a rationalistic basis. For instance, a young mother is usually reluctant to challenge the wisdom and social position of her mother or mother-in-law, or of the traditional midwife. Thus, she may be convinced intellectually of the dangers of stopping the bleeding of a baby's umbilicus by applying dung, but nonetheless be unwilling to risk her position by contradicting traditional wisdom. To assume such a grave responsibility in the face of the host of dangers of later complications or illnesses within the family is frequently too great a risk for the woman to take.

Hence programs that seek to improve the way that the household meets a basic need should recognize that they are meddling with a complex and finely balanced system of reciprocal obligations and entitlements. For a program to succeed it will be necessary for new alliances to be forged and for new agreements to be struck. Water supply, child care and excreta disposal are among the most difficult activities to influence because their importance to the survival of the household and the community have produced deeply entrenched solutions to the needs. For example, fetching water has been defined as "woman's work" in most of the world; to reduce sharply the effort required to satisfy this need will upset the allocation of tasks within the household. Indeed, in rural areas men have often refused to maintain pipes and pumps on the grounds that women will use the idle time for frivolous or socially disruptive purposes.

E. Opportunities for Influencing Household Choices

The role of custom and intrahousehold choice in shaping acceptance and use of an innovation suggests the following for programs to meet human needs.

First, particular efforts should be made to promote the interests of small children and women. Because these two groups presently have modest direct influence over the decisions of the household, efforts should be made to reduce the cost to the family of satisfying their needs. Food subsidies have been used to encourage better feeding of small children. By providing inferior-quality foods, the problem of misappropriation has been limited. Legal sanctions have been provided in numerous places against families that fail to construct a proper latrine and/or that permit children to defecate at random.

Second, behavioral change should be facilitated by either convincing existing leadership to support the change, or by encouraging their substitution by new, more modern influential persons. Because much of the behavior that needs to be changed is sanctioned by the larger family, community or religion, change occurs slowly and at great risk to the innovator. Efforts to co-opt traditional leadership have not been exceptionally successful. By focusing persuasion on a fairly small number of people--midwives, chiefs, etc.--greater effort and attention can be given to convincing them of the virtue of change. In addition, their positions of authority can be exploited to give greater

credibility to reforms. However, traditional leaders have displayed predictable reluctance to accept the view that old ways should be abandoned. Introduction of a new, attractive technology may provide a graceful way for traditional leaders to justify a new approach to problems.

A more frequently successful approach has been to displace traditional authority. Advertisers have promoted the notion that people can affiliate with a more modern, successful group by adopting new practices; advertising for tobacco and infant formula has followed this strategy. Installation of water supplies and latrines at schools has sometimes facilitated improvements in hygiene by associating their use with the esteemed, modern role of the teacher.

Third, programs should be designed to minimize the redistribution of responsibility within the family. Innovations that substantially affect the distribution of costs or benefits are likely to encounter problems of acceptance. The easiest way to accommodate this problem is to design interventions in such a way that the individual who has traditionally met the need can continue to do so. For example, water supply projects that rely upon handpumps have frequently failed because males have refused to accept responsibility for maintenance; water supply was viewed as women's work. Efforts are now underway to construct light-weight pumps that could be both pulled from the shaft and repaired by women. This is expected to link incentives and capacity to maintain the pump. And perhaps as importantly, such a development would preserve traditional lines of authority and responsibility. Commercialization of water supply is an alternative. An organization (public or private) might be established with responsibility for those aspects of operations or maintenance that are beyond the strength or skills of the person(s) traditionally responsible for fetching water.

Legal reforms may also prove useful. These reforms should increase the authority or power of winners or diminish the role of opponents of change. Women may be permitted to hold legal title to and to inherit land, for example. Expanding education opportunities may increase women's employment opportunities making them more independent financially. These changes are likely to increase the status and decision-making authority of women.

F. Household Goals and Choice

Experts frequently have been dismayed by the refusal of the household to adopt new ideas and practices that professional judgements indicate are in its interests. The failure of the poor

in particular to adopt an innovation is commonly attributed to stubborn conservatism. However, the speed with which peasant farmers have adopted better agricultural practices suggests that the poor generally are rational at least when confronted by immediate economic opportunities. Thus it is worthwhile to inquire further into the question of why the poor and needy, when well informed about opportunities, still fail to adopt innovations. Several explanations are available.

First, outside experts have often not fully understood or have even neglected important factors or issues that in practice influence the attractiveness of an option. Local people, with their long-standing, intimate knowledge of a situation often analyze an issue more thoroughly and marshal facts more fully than the experts. For example, villagers have been unenthusiastic about construction of pit latrines behind their homes because most family members defecate during the day while away at school or in the fields. The proposed latrines would not meet the true need. Operation and maintenance of village wells have been undermined because villagers refused to cooperate with other families who were of a different caste or religion. Sharing of community water supply has also been frustrated by family rivalries that prohibit sharing. West Africans frequently have been reported to have refused to use a well located near a neighbor's house for fear that the neighbor would poison the well.

Efforts to improve excreta disposal have been frustrated by planners' neglect of small but important design issues. The location of latrines has been a particularly notable problem. For example, even where potential beneficiaries were aware of the benefits to health of using latrines, they have refused to do so because of the embarrassment attached to using a facility plainly visible to neighbors. Others have refused to employ a latrine because it faced a religious shrine. What has been interpreted as conservatism on examination often has emerged to be a rational response to a more complete set of facts.

Second, experts commonly misjudge trade-offs among the household's objectives. Especially in programs to meet physical needs for shelter, food, water supply or health care, designers neglect the importance that people attach to recognition, hope and variety. Thus carefully designed, economical but unpalatable diets have been rejected. Funds that might have been invested in immunizing children have been spent instead on radios or electric

lighting for the home. Low-cost housing in both developed and developing countries has often been rejected because it provides shelter but does not facilitate socializing with neighbors or expressing individuality. An unexpected consequence of Bank-financed slum upgrading projects has been that families frequently have spent much more on upgrading their properties than experts felt the poor could afford. Part of the explanation lies in an underestimation of incomes and in families' drawing on the resources of the extended family. But it now appears that people are willing to sacrifice a larger share of income for good housing than preliminary analyses suggested.

Third, the benefits and costs of an activity often affect individual members of the family in ways that analysts do not fully anticipate. The notion that external benefits and costs will generally discourage efficient use of resources is widely understood. For instance, if an individual or household inadvertently benefits neighbors by improving their property, maintaining good health or eliminating waste water and trash from their lots, the value of the effort is greater than the individual or household would be willing to pay. This conclusion provides the rationale for public undertakings to remove storm water, provide police protection or maintain street lighting. However, a similar process appears within the household: in parts of West Africa, urban migrants are obligated by custom to help relatives seek health care and training in the city. In addition, they are expected to provide shelter and advice to other family members moving to the city. Villagers seek to increase this obligation by contributing to the cost of improvements to the urban cousin's house. Thus the costs of improving his dwelling--and to some extent the benefits--are shared by the extended family. A partial explanation for the "irrational" expenditures on housing in a slum upgrading scheme is that the costs are not being borne entirely by the home owner.

Finally, low-income people frequently assess risks and temporal choices differently than relatively affluent experts do. Poverty compels people to focus on the near term, and to neglect less immediate problems, say of the probability of infection or infertility. This preoccupation with immediate effects diminishes the attention given to preventive medicine, hygiene, education and immunization. Yet these are all highly cost-effective methods of improving the physical quality of life. These highly subjective discount rates cannot be readily changed. Instead, benefits must

be made to appear larger and more immediate while costs are minimized or deferred. Providing political or social rewards for desirable behavior may also increase support for a scheme.

G. Household Production

Many services or products being offered by a government program have no beneficial impact unless they are further "processed" by the household. This observation is the basis for studies of the "new household economics." Briefly the assertion is that households purchase goods from the market (or obtain them from public agencies) which must then be combined with households' labor and assets to meet more concrete needs. For example, raw vegetables, meat, fire wood and water must be combined with a mother's efforts and a family's pots in order to produce stew.

Public programs intended to meet human needs typically supply only one of several inputs needed to improve life. For example, a protected rural water supply generally requires that the family allocate some of its labor supply to operating a handpump and carrying buckets of water to the home. Since most handpumps are designed to serve several hundred people, considerable queuing occurs; hence families must also allocate part of their labor supply to the task of standing in the queue. Moreover, in order to enjoy a safe supply of drinking water, containers must be kept clean and the storage container protected from animals and from children's dirty hands. To benefit fully from an improved water supply, families must also invest further efforts in food preparation, housekeeping, laundry and bathing. Each of these activities takes not only time and water but also other inputs such as rags, brushes and containers. Providing a water supply alone does not meet a human need; the water must be further "processed" by households to reduce disease transmission and to promote hygiene.

Neglect of such pedestrian truths has played a major role in the failure of water supply and excreta disposal projects to improve health. The point was made most forcefully by a widowed Guatemalan mother of eleven. After the local sanitarian had lectured her on the importance of cleanliness she complained that in order to support her family she had to work twelve hours a day. At the end of the day, she said, she was pleased with herself if she could remove the "seen" dirt in her house; she had no time for the unseen.

Probably the most scarce household resource is the time of the person--usually, the mother--who produces the consumable good for the family. Low-income families often do not have time to bathe, scrub or cook in a way that would meet with the approval of inspectors, educators and promoters. Even more importantly, the families often do not recognize the potential value of adopting particular improvements. Hence they are reluctant to reallocate their limited capacities and assets to the recommended task.

Many water supply projects were expected to deal with the problem of time by relieving women of the drudgery of collecting water from a distant natural source. By installing a handpump or standpipe supply near the home, distances traveled to obtain water could be slashed. However, women have instead frequently been reassigned to still more onerous tasks. They have been required to cultivate more land or expand other income-earning activities. Often the now lighter task of fetching water has been reassigned to children in order to free the older children or women to assume heavier tasks.

These redistributions of responsibilities have often frustrated program-designers' attempts to improve the lives of women. Rather than providing the mother with additional time for leisure or home-making, often the improved water supply has instead enabled the family to increase its income. This experience illustrates how the internal household economy exploits new opportunities. It, in addition, underscores the fact that the household, with its peculiar methods of decision making, will use new resources in ways that advance its goals.

If a program is confident that its aspirations are superior to the uses that families will make of a new opportunity, then it must provide incentives and additional opportunities in order to influence the choices of households. For example, simultaneous introduction of an improved water supply and a handicraft project might encourage families to allocate the time saving to cottage crafts. This might support the objectives of improving child-rearing as well as reduce the burden on women of collecting water.

However, one should always recall that the household has a more thorough grasp than the program's designers of both the family's goals and the objective facts, and hence is better

equipped to make decisions about its welfare. Thus experts should be very cautious in interfering with the choices of households.

The new household economics also stresses the fact that households often must adopt new methods ("production technologies"), and manage them well, in order to realize the potential benefits of an innovation. Families vary widely in their command of particular inputs and in their skills in home production. Information alone is not likely to transform the behavior of the household. Flannelgraph presentations on crop production will not make successful farmers; neither will exhortation transform homemaking skills. For example, an improved water supply generally requires that new techniques be adopted in order to launder clothes. Women (at least ideally) would no longer congregate along the bank of a river or shore of a lake to pound the wash on rocks. Rather, wash tubs and scrub boards might be required.

The willingness of people to learn new ways of satisfying a need is much greater when natural calamity or modernization cut them off from traditional solutions. Drought, flooding, epidemics, urbanization and irrigation of agriculture have provided powerful impetus for innovations. These environmental changes have often dramatically affected the cost or even feasibility of continuing to rely on old ways.

H. Opportunities to Enhance the Operation of the Household Economy

An appreciation for the household as an economic unit suggests the following about the design and implementation of projects to meet human needs.

First, where the inputs needed for adoption of a new technology are not presently available to the family, they may need to be provided if the scheme is to succeed. The time required to use the improvement is often ignored or underestimated in designing projects. For example, a village handpump may reduce the distance to a water supply but because large numbers of people share it, queuing may take inordinate amounts of time. Village water supply projects are often designed in such a way that handpumps must operate sixteen or more hours a day. Thus users must be able to go to the well at all hours of the day, which conflicts with farm work. Similarly, halting the transmission of

excreta-related diseases will be very difficult if families cannot afford diapers, and the floors and walls of their houses cannot be scrubbed clean. Soap is perhaps the most homely example of a missing input. Even with an ample supply of safe water, fecal contamination of living areas by small children may continue unabated.

Second, projects that reduce the time required to meet family needs should consider the uses that are likely to be made of the saved time. If improving the role of women is an objective of the project, then components designed to employ this labor well may be appropriate.

Third, innovation should be introduced, if possible, when changes in the environment are forcing people to devise new ways of satisfying their needs. Urbanization and changes in agricultural practices due to, say, introduction of irrigation, are examples of changes that are likely to facilitate adoption of new household production technologies.

III. THE ROLE OF THE COMMUNITY

Meeting many basic human needs requires collective action. Often, production of the necessary goods and services can be undertaken at reasonable cost only if a single producer responds to the demands of the entire community. For example, urban water and sewerage services can be produced at roughly two-thirds the cost if the demand is met by a single installation rather than two. Similarly in small communities, education, medical care and extension services can be provided at much lower cost and higher quality if a single organization is responsible for their production and can therefore fully employ specialized staff and equipment, and maintain larger stores of supplies and drugs. A large part of the explanation for the success of Kerala, Sri Lanka and other low-income areas in meeting human needs lies in the communities' abilities to mobilize public programs. These people are politically articulate and thus able to place demands on governments. They are also skilled in undertaking community activities themselves.

These economies of production also imply that large initial investments are generally necessary. Moreover, operations that are subject to economies of scale are more economical if the "market" can be fully exploited. In the case of water supply and sanitation, investments are not only large but long-lived, implying the need for considerable finance. Rarely is an individual or private company willing to mobilize the resources necessary to meet these needs, largely because of the very long period necessary to recover the investment, and the consequent risks (which are often exaggerated by political instability).

Monopolization of supply is encouraged by economies of scale since large, early entrants into the sector encounter lower unit costs and thus can underprice potential competitors. However, possession of a monopoly is likely to provoke efforts by governments either to regulate or to take-over the enterprise. This threat further reduces potential profitability to private investors. Thus unless reliable assurances can be obtained from governments that firms will be allowed to operate freely, private capital is not likely to flow into these sectors. Geographically dispersed small communities are often simply unattractive to profit-seeking firms. The practical response to these problems is some sort of collective public undertaking to provide the service.

Communities of low income people must deal with most of their problems in developing countries without help from regional or national governments because at present the latter are incapable of providing assistance: Most governments in the developing world have not yet succeeded in creating an administrative system that penetrates low-income communities. The absence of a functioning bureaucracy is most notable in rural areas and low-income urban neighborhoods. Governments are consequently poorly equipped to minister to the needs of the poor. They are frequently unable to advise communities of new opportunities or programs, and often they cannot effectively administer the implementation or operation of projects. This weakness severely limits the role of official development assistance organizations which do not maintain field staff in the countries and cannot rely on the bureaucracy for outreach activities. National governments are not likely to fill this gap in the near future, even if that were desirable; few have the financial resources to pay for such a bureaucracy. Moreover, even if the financial constraint could be overcome, civil servants generally resist postings to isolated areas that lack basic social services and amenities.

Thus communities must organize themselves if they are to meet collective needs. Local responsibility is probably desirable in any event because it facilitates greater responsiveness and accountability. But involvement of the community in the design, execution and operation of projects is often confounded by the lack of developed organizational resources in needy communities. A major part of the explanation for underdevelopment is that the community is unable to act collectively to define priorities, identify the implications of alternative course of action, and resolve amicably internal conflicts.

The representation of villages as idyllic, is increasingly being recognized as inaccurate. Rather, traditional societies are typically wracked by dissensions and divisions that are compounded by poverty. Interfamily and intercaste strife has often outlived even the memory of the conflict or insult that provoked it. Furthermore, in stagnant economies, most gains are achieved at the expense of other community members. This fact both heightens and hardens divisions. For such communities to undertake cooperative ventures spontaneously would require that they deny their traditions and problems.

Nonetheless communities can participate in development in a variety of ways that both stimulate and shape programs. The following subsection explores the major forms of participation. Later subsections examine devices for promoting community participation.

A. Community Participation

Participation by entire communities in new programs is difficult to obtain, especially where the activities are being promoted from outside. Ideally the community should choose the range and quantity of services that are to be provided and devise a means of mobilizing the resources needed to develop and then to operate the scheme. In addition, the community should establish mechanisms to control the scheme in order to ensure that resources are used properly, and that operations and maintenance are carried out. Rural areas--except those with lengthy experience in managing irrigation water--rarely possess such mechanisms. Squatter settlements and low-income urban neighborhoods are still less likely to have effective community organizations.

1. Community Consultation

Community participation has been sought at a variety of stages. These include consultation to determine priorities and preferences, mobilization of resources and control of programs. These topics are explored in the following paragraphs.

The most extensive efforts by program sponsors have been designed to solicit the views of the community regarding priorities, standards of service and affordability. This level of community participation might be described more aptly as "community consultation." Where consultation is seriously attempted, program sponsors offer several distinct options from which the community is invited to choose. However, the range of options presented is typically quite narrow. For example, a housing scheme does not generally entertain the possibility that potential beneficiaries might prefer instead to invest scarce resources in education; rather, it might present alternative floor plans and construction standards for consideration.

The process of consultation is typically initiated by the sponsors. A public meeting is scheduled at which the program is described and the options elaborated. The opinions of the group are solicited and often an effort is made to obtain a consensus, or a vote is taken. Whether attendance at the meeting is representative or whether people feel bound by the choices made at a meeting is often controversial.

Community consultation is in effect usually a form of market research. The importance of assessing the level of interest in a proposal and of determining the detailed preferences of the community is obvious. However, the ability of public meetings to achieve this objective is sometimes open to dispute. In traditional societies and in poorly organized urban settlements, the spokespersons for the community are likely to be representatives of the elite (often land-owning) group. Their leadership role often derives from their economic power in the community. This fact in turn taints their views and judgements. Furthermore, the presence of elites at public meetings may also have a chilling effect on frank discussion and on expression of preferences by poorer members of the community. Nonetheless, the elites frequently have the recognized authority to admit outsiders to the community; thus their acceptance must be obtained if the views of the community are being sought.

Frequently, the options being presented are unfamiliar and hence difficult for local people to evaluate. The need to present new, "appropriate" technologies compounds the problem. In addition, hypothetical economic choices are notoriously poor predictors of people's actual willingness to pay for a new service or product. Especially when a financial or political commitment is being offered by government, communities are likely to overstate their willingness to contribute to the cost either of construction or of operations and maintenance of a scheme.

The process of collective choice is likely to be poorly developed and thus to provide only a very rough approximation of a community's views. The use of voting to express preferences is not fully accepted in many societies. Villagers are more likely to resolve differences by submitting to traditional leaders or custom. Moreover, the moral obligation to accept a collective choice obtained by balloting is not universally acknowledged. Program designers must, therefore, be careful not to misinterpret politeness and apparent enthusiasm for genuine interest and support. They should try to determine how important community decisions are made and rely more heavily on those mechanisms.

Community consultation may also serve a political function. By encouraging people to air their views and by obtaining open commitments to a proposal, the process may serve to enhance commitment to the program and to mobilize community-wide social pressures to support its implementation and operation.

The hazards of community consultation are vividly illustrated in this story told by Aziz Tannous:

"As Village Welfare Workers we had been summoned by Ilat, a nearby community, to cure their children of fever. When we visited the village,

We found several cases of typhoid, malaria, and dysentery plus a high incidence of infant mortality.

"We traced the probable source of trouble to a tiny spring which flowed into a stagnant pool in the middle of the village. Though this pool provided drinking water for the villagers, they waded in it and shared it with their animals.

"So we thought that our line of action was clear and simple. Dig the pool deeper, cover it with a stone structure and install a hand pump. It was as simple a project as that.

"One evening we called the elders to a meeting and informed them of our plan, requesting them to render as much help as they could. There seemed to be general agreement. In our lack of experience, however, we had not yet learned the subtleties by which a 'yes' may mean a 'no' in certain cases. The following morning, when we came to the village, ready to begin the project, we found the place practically deserted. They had all gone to their fields. The mukhtar (headman, a government official) made his appearance to tell us that the people refused flatly to let us install the pump. Let us install the pump! That made us pause and think. So that was how they felt about it; that we were imposing on them something they did not really want. And all the time we took it for granted that we were satisfying their urgent need. Something was certainly wrong.

With much difficulty we were able to bring them to another meeting a few days later. In the course of the discussion we did our best to make them talk freely; and they told us a great deal! The following are more or less direct quotations;

"Our fathers, grandfathers, and great grandfathers drank from this water as it is, and I don't see why we should make a change now.

"You say that you want to install a pump at the spring; but I for one have never seen a pump, nor do I know what might happen if it should be put there."

"I tell you what will happen. The water will flow out so fast that the spring will dry up in no time."

"Not only that, but the iron pipe will spoil the taste of the water for us and for our animals."

"You have told us that the water is the cause of our illness and of our children's death. I do not believe that, and I can't see how it could be. To tell you the truth, I believe that the matter of life and death is in Allah's hands, and we cannot do much about it."

"One more thing. We don't understand why you should go to all this trouble. Why are you so concerned about us?"

"You say that the pump will save our women much effort and time. If that happens, what are they going to do with themselves all day long?"

At the close of the meeting we realized that we had blundered. We had to begin from the beginning, taking nothing for granted."

2. Mobilization of Community Resources

The second stage of participation is in mobilizing resources. Rural development projects, especially, have relied upon community contributions and self-help to produce affordable social services and housing. Typically, local contributions of materials and unskilled labor have been required from beneficiaries.

Participation in providing resources has been largely successful in instances in which the benefits of a scheme accrued

directly to those who contributed. Housing and slum upgrading projects that require self-help construction have been quite successful, for example. However, in other sectors where the rewards are widely distributed--such as education, health care or road maintenance--contributions of materials and labor have often been difficult to mobilize. In a few instances, a major landlord or employer has compelled his dependents to contribute to community projects with the effect that the poorest have borne a disproportionate share of the costs of the scheme. For example, in Nepal, the poor have been found to bear an unfair share of the costs of supplying irrigation water. Nonetheless, local contributions reduce the budgetary cost of projects and should be sought wherever practical.

Mobilization of resources by the community has been most successful at the stage of the initial investment. Efforts to sustain a program through periodic contributions have generally failed. The greater difficulty in meeting recurrent costs from local contributions may be explained by a variety of factors. First, as time passes, any inequities in the distribution of either benefits or costs become more evident. These inequities promote resentment and undermine popular support for the scheme. For example, persons who no longer have school-aged children will often object to assisting in the maintenance of schools. Cooperative health care programs have been disrupted because the majority of the community did not obtain services during the year and thus withdrew support from the scheme, crippling its finances.

Many self-help activities have produced disappointing results because too much had been expected. In addition to imposing an economic burden on beneficiaries, self-help taxes the technical and organizational capacities of the community. The Malawian Self-Help Water Supply Program discovered that the people could carry out only the simplest of tasks and then only with careful supervision. Organization and supervision of such efforts generally must be provided discreetly by the project team. After the community has developed skills in operating collective enterprises, less outside assistance will be required.

Recovery of operating costs has been most successful where charges were clearly related to benefits. User-charges for water supply, solid waste disposal and drainage are widely accepted for example. In addition to being at least roughly fair, these charges often have been legally enforceable. Health care cooperatives in Korea succeeded in meeting their costs by imposing

a tax collected by rice milling cooperatives. But reliance on voluntary contributions generally has proved disappointing. Staffing health posts with unpaid volunteers failed after a brief initial period of success in Tanzania because the workers had hoped to be absorbed into the government service but were not. Success has been greatest where a small number of people of similar status were collaborating and thus could apply social sanctions to those who failed to contribute. Maintenance of irrigation works in the Philippines, Korea, Thailand and other places has followed the latter pattern.

Local contributions, intended to defray the cost of operations and maintenance, have been especially difficult to collect in areas where the service is regarded as a national government responsibility. For example, throughout Africa and the Indian sub-continent, rural water supply schemes have floundered because the beneficiaries refuse to provide direct financial support, arguing that government should provide the service. The unwillingness to pay is reinforced by the fact that in some of these countries for many years the services were provided to the wealthy without direct charge. Governments introduced the notion of direct cost recovery from beneficiaries only when policies were adopted to provide rural and low-income people with services. The latter groups are now frequently holding out for equitable treatment.

3. Community Control of Programs

The third stage of participation is in management of a program. As noted above a central problem of programs to serve the rural poor is that the formal bureaucracy does not reach effectively to this level. Difficulties in recruitment of competent staff, resistance to posting to rural areas and poor communications make it very difficult for governments to provide effective oversight. Local communities that are interested in the success of a program and aware of the bureaucracy's capacities to oversee programs can ensure greater accountability for resources and for performance. This level of participation obviously requires a fairly high level of awareness among the beneficiaries and a willingness to work with and through the formal bureaucracy. In addition, it demands that the higher levels of bureaucracy are competent and responsive to local complaints. Responsive bureaucracies typically evolve only after communities have acquired significant political power.

B. Promoting Community Participation

The literature on community participation offers few examples of successful attempts to create effective local organizations. This failing in part no doubt reflects the widespread view that participation is costless to beneficiaries and yet yields significant benefits. However, such a view implies that community organizations should have emerged spontaneously as opportunities for collective action appeared. This has not been the case, largely because joint action does impose costs on participants. Where community efforts must be complemented by support activities from government, the style and content of the bureaucracy's contributions also influence the process of community organization.

1. The Costs of Participation

Involvement in a community organization that seeks to meet a priority need imposes four kinds of costs on participants. First, joining an organization entails sacrifice of individual freedom. In order to reap the benefits of collective action, the members of a group must subordinate their individual interests to those of the group as a whole. This is a sensible thing to do only as long as participation in the group yields benefits that outweigh the costs of this loss of personal freedom. (The most compelling argument for arms-length, market exchange is that it permits individuals to satisfy needs without such a sacrifice of sovereignty.)

Second, participation in a group requires that at least part of the membership invests time in the organization's management. Priorities must be established, the implications of alternative courses of actions must be evaluated and the benefits and out-of-pocket costs of the effort must be distributed among the members. Especially in instances where the organization is pursuing several objectives simultaneously, the tasks of setting priorities and distributing costs and benefits are likely to generate conflict and thus require substantial expenditures of time for negotiation and discussion.

Third, individual participation, in most cases, requires an outlay of scarce resources. Beneficiaries/members are usually expected to contribute labor, materials or money to carry out the functions of the group. These outlays are additional to the effort that must be spent in organizing the group. Equitable mechanisms for collecting these resources are difficult to devise. Hence efforts to finance the scheme often produce conflict.

Finally, participation in a group carries with it the risk that failure of the group will jeopardize the member's ability to meet his needs. A common problem of local organizations is that unresolvable conflicts emerge that destabilize the organization and thus cripple its ability to function.

In addition to the costs to the community, wherever higher level organizations must be established to assist or supervise community activities, the costs of operating these organizations should be recognized. The unplanned, random development of local demands places great stress on government's finances and manpower resources as well.

2. Benefits of Collective Action

The sacrifices enumerated above must be overshadowed by the benefits to individuals if they are voluntarily to become members or to maintain participation in a local organization. Mobilizing participation can thus be considered in terms of efforts to reduce these sacrifices or to enhance benefits as they impact individual members.

A review of the history of community development suggests that the successful efforts to create local organizations have generally been devoted to dealing with serious production problems. The very long history of collective efforts to develop and maintain irrigation works in South and South East Asia are the most notable examples. The frequently cited Anand Milk Producers' Union is another model of successful community organization. However, few consumption-oriented local organizations have succeeded. It appears that groups which distributed tangible benefits in proportion to individuals' efforts are more attractive than those offering intangible benefits according to need or demand.

3. Enhancing Benefits

Several means are available for enhancing the perceived benefits of participation in local groups. The first is to increase popular awareness of the value of the benefits of a program. A rash of burglaries has motivated suburbanites in advanced economies to organize private police patrols, for instance. Unhappily, most consumption-oriented development programs respond to needs that are not clearly recognized by the target population. Preventive health care and improved sanitation are under-appreciated, especially by poor people, probably because

these programs respond to risks of disease, while the people are aware that they already have a variety of significant problems. As one Tanzanian put it, "don't talk to me about the dangers of dirty water; my problem is what to feed my family tomorrow morning."

The perceived importance of a benefit can be enhanced through education, marketing and politicization. Health and hygiene education have been widely promoted as a means of improving use of health care, water and excreta disposal. These efforts probably should be viewed, in addition, as means of enhancing perceived benefits and thus mobilizing community support for programs. Broad, public information/marketing efforts appear to be the most promising devices for increasing demand. For example, mass media might be used to enhance the image of piped water supplies or of improved latrines. Such efforts should first identify possible motives for adopting the improvement (status, health, privacy, esthetics, etc.) and then stress the contribution of the innovation to meeting this "need" or group of "needs."

In highly politicized societies, broad social and economic sanctions can often be mobilized by political authorities. The party can present issues in relationship to political ideology and thus give a reform greater legitimacy. In addition, it often can stigmatize political "deviance" in order to motivate socially desirable behavior. China, Cuba and Tanzania have made noteworthy efforts in this regard in promoting literacy, sanitation and child spacing. In other societies, social pressures provide additional incentives to fulfill community goals.

4. Reducing the Costs of Community Participation

The second broad strategy for promoting community organization is to reduce the costs--and risks--of participation. In small communities, the largest deterrent to collective efforts is usually fear of socially disruptive conflict. Community organizations must choose objectives, priorities and tactics, and must mobilize resources and distribute benefits. Each of these decisions and actions presents opportunities for conflict to emerge. Thus if the group is to remain effective, it must be able to surface and resolve these conflicts before they become divisive and endanger the survival of the organization. The ease with which conflicts are resolved depends upon their seriousness and upon the organization's skills in identifying and mediating differences.

The degree of conflict likely to emerge can be minimized by keeping organizations small, restricting membership to persons with harmonious objectives, narrowly defining objectives, and distributing net benefits equitably. Large organizations are more susceptible to conflict than small ones simply because the larger number of participants increases the diversity of objectives, expands the opportunities for disagreement over objectives and explodes the number of one-to-one comparisons of individuals' gains from the organization. In addition large numbers complicate the process of conflict resolution by demanding that more information be amassed and greater numbers of people induced to accept the inevitable compromises. However, very large organizations may achieve an impersonal character similar to that of competitive markets and thus escape the need to resolve conflicts openly.

Establishing groups with homogeneous membership is also a means of reducing conflict. If the participants in an organization share common problems and capacities for resolving them, then the likelihood of serious differences in priorities emerging is smaller. The early failures of the Bangladesh Rural Advancement Committee illustrate the problem. Under the initial design both landowners and landless laborers were expected to collaborate in resolving community problems. The experiment encountered serious conflicts among members because the concerns and interest of the landowners were competitive with those of the landless. After the scheme was reorganized to include only the landless, it developed into an effective organization.

Conflict appears most likely to appear when the membership of the group includes people with grossly different incomes and wealth. Variations in family status, sex, age and caste or tribe are also important sources of differences for groups providing social services, since these characteristics largely determine needs.

Setting up groups with limited membership may create new elites and diminish the ability of communities to resolve the problems of all their members. Since the early innovators are by definition the best qualified to perform organizational tasks, those who are not included will generally be left with the most difficult problems and the least effective leadership. This fact argues for focussing public programs on the poor who are least able to meet their needs without assistance.

The third device for limiting conflict is to simplify goals as much as possible. Organizations with multiple objectives not only accumulate the conflicts peculiar to each objective but also raise problems of allocation of resources among the numerous

objectives. For example, a dairy marketing cooperative that extends itself to offer family planning services jeopardizes its original successes by increasing the potential for conflict.

Finally, establishing organizational goals so that all the membership sees itself as obtaining net benefits from the venture enhances the group's commitment to preserving it. Environmental improvements often entail providing services to everyone in an area regardless of their perceived need or demand. Inclusion of unwilling participants then creates tensions that threaten the survival of the organization. This problem can be reduced by broadening the organization's objectives to include activities such that all participants perceive themselves as net beneficiaries. Water supply, drainage and sanitation might be undertaken by a single group, for example. However, as noted in the previous paragraph, this strategy carries with it serious risks in that it complicates the process of conflict resolution and expands the scope for conflict. The alternative is to reduce the membership of the group to include only willing participants.

C. Organizational Processes

The processes that are employed in organizing the group and in carrying out its functions should be as simple and acceptable as possible. The continuum of options ranges from the individual acting alone in his own interests to community organizations with inclusive membership acting for the common good. The individual relies upon voluntary exchange to effect his goals and obtains all the benefits of his choices. At the other extreme, collectivities must rely upon more complex techniques of decision making and enforcement.

Community organizations must secure the broad support of their membership for any decision that is taken. This task is made more complex by the fact that incentives are diluted by large numbers. Moreover, the complexity of these calculations and choices expands with the size of the organization and the diversity of the goals it is pursuing. The mechanisms for resolving differences include resort to traditional, hierarchial authority (the African system of chiefs), negotiation and bargaining, and various forms of polyarchy. As the management task grows more complex, it becomes increasingly important that the technique of collective decision-making be as simple as

possible and that it command support of the membership. Introduction of formal (though inevitably arbitrary and imperfect) modes of organization and decision-making can reduce opportunities for conflict to appear. This issue of what constitutes a socially satisfactory resolution of a conflict is probably the most difficult aspect of community participation since it must be determined for each setting.

D. Developing Organizations

External organizations can assist communities in forming workable organizations. Extension agents can be provided to aid in setting up meetings and in outlining the opportunities that will be afforded by collective efforts. However, because established bureaucracies have often acquired reputations for poor performance, it is important to consider the credibility of the organization offering help. New institutions may be more successful in fostering community organizations. Model bylaws and structures can be developed and supplied to formal local organizations that are expected to hold assets or conduct financial operations. Legislation can be enacted to give properly constituted local organizations legal authority to carry out specific functions. For example, the Philippines rural water supply program has relied extensively on community-organized Local Water Authorities. In addition, Women's clubs, organizations of school children, and farmers groups may be encouraged in order to provide community members with experience in developing and operating local organizations. Malawi's rural water supply program has provided a limited range of engineering designs for possible adoption by communities.

Community participation may be incubated in some circumstances. The highly successful Malawi rural water supply program achieved fairly high levels of popular participation by first developing a felt need through government-operated demonstration schemes. Initially, improving water supplies was not a high community priority. However, after the officials of the project developed and operated a successful gravity water supply system, community interest increased markedly. The clear lesson of this experience is that schemes that offer significant net benefits can be successfully promoted by showing the potential beneficiaries the scale of the advantages. Under such circumstances, the initial problem is not one of establishing a formal organization but rather of promoting interest.

E. Relationship of Community Organizations to the Bureaucracy

The foregoing discussion has focused on local organizations. Community participation, as discussed thus far, has referred to indigenous groups organized to deal with a

community's needs. However, many functions require larger organizations either because the problem being addressed requires investments that are beyond the community's capacities to finance, affects a number of communities, or requires resources that cannot be effectively employed at the community level. Major investments in transport, water supply or drainage for example, typically must be financed from borrowings from financial markets and may require special provisions for supply of foreign exchange. Exploitation of water resources often affects down stream users and hence should be planned with an awareness of the external consequences. Hospitals, machine shops, specialized physicians, highly skilled craftsmen and engineers are examples of specialized resources that often cannot be used effectively at the level of a neighborhood or village.

In order to deal with problems that require such inputs, a multi-level organizational structure is often needed. At community level, the simple, routine functions are carried out. Support and perhaps referral are offered by more formal, professionalized organizations located in the regions. Planning, policy formulation and resource mobilization are provided at the national level. Generally these support organizations are parts of the formal bureaucracy.

The Indian three tier system for the operation and maintenance of village water supplies illustrates this notion. The community organization provides for recovering part of the costs of the system and operates and maintains the physical equipment. Assistance is provided by the formal bureaucracy in planning and executing works, procuring spare parts and supplies, and carrying out heavy maintenance. The national government sets targets for coverage and levels of services, offers policy guidance and mobilizes local and foreign resources.

IV. THE ROLE OF GOVERNMENTS IN MEETING BASIC NEEDS

The failure of developing countries to meet the basic needs of all their citizens is often attributed to a lack of national political will. The fact that these needs have been satisfied by some of the poorest economies lends some credence to this accusation. On the other hand, detailed reviews of successful attempts to meet needs strongly suggest that grass-roots initiative is the critical input. If this is the case the role of government at national and even regional level may be fairly limited. However, despite the fact that communities may be able to meet many of their own needs, people have not often spontaneously seized these opportunities. This failure implies that some external impetus or facilitation is required.

This section examines the possible roles of government in promoting activities to meet basic needs and outlines some specific functions that governments can undertake. It begins with a discussion of the politics of meeting basic needs, then explores legal reforms and support activities that governments can pursue.

A. Political Will

Governments are often reluctant to implement major programs to meet needs, particularly among the rural poor, for health care, water supply and sanitation because these programs typically have few tangible, short run benefits but significant short-run costs. In particular, improvements in water supplies and waste disposal typically require large initial investments. Thus, if they are funded, they significantly diminish governments' ability to pursue other objectives. Education, nutrition and crisis medical care, in contrast, require relatively modest front-end outlays.

The political attractiveness of programs can be increased to some extent by adopting technologies with low capital costs. Thus a major attraction of simple water supply and sanitation options is that they permit governments to address an important need without seriously depleting their revenues and hence their ability to cultivate support from the electorate. Ideally the benefits from a program would appear within the same electoral cycle as the major outlays.

Investments in water supply and sanitation are also unpopular with governments because the services often are not highly prized by the electorate. Many other social services including education, nutrition supplementation, and crisis medical care are more popular; hence providing them yields greater political advantage. Clients generally place high priority on improvements in water supply only when seasonal shortages are commonplace. Even then, governments obtain credit primarily for construction of civil works--the visible manifestation of concern--rather than more mundane functions such as leak detection or water treatment. Thus efforts are needed to increase public awareness (and enthusiasm) for such projects and to delay private costs to beneficiaries. Such efforts will enhance a project's political appeal and thereby increase its likelihood of being implemented. Unfortunately, those who are worst off generally are least aware of the importance of safe water and of sanitary disposal of excreta.

The political calculus outlined above applies principally to single projects but also infects entire programs of public expenditure. Authorities are likely to lose political support if a project imposes greater sacrifices than benefits on any citizen. However, the injured group often can be mollified by providing it with greater advantages under another project.

Integrated development projects are for this reason generally much less attractive to governments than to development specialists. For example, a project that provides irrigation, drainage, distribution of fertilizer and pesticides, small-holder credit, extension services, primary schools, health clinics, roads, marketing facilities, etc. to one group but offers nothing to a second is politically provocative. Hence, governments usually prefer to provide a balanced program which offers some benefits to all politically significant groups rather than to attempt to maximize impacts by focusing efforts.

Governments can sometimes violate the interests of particular groups and yet retain their allegiance if they enjoy the electorate's goodwill. Goodwill is garnered first by maintaining a positive balance of benefits and costs with a group and second by adhering to a shared ideology. Abstract political and economic theories generally allow governments greater scope of

action than do bread-and-butter projects. For example, freedom from hunger is an almost universally shared value; governments are permitted by public opinion to provide food even to the undeserving poor in order to avoid starvation. Disaster relief also enjoys very wide political appeal. In contrast, subsidization of higher education is usually controversial.

However, even within a single country various political ideologies may be supported by different groups. Opportunities to generate additional goodwill by embracing a set of beliefs or customs are then modest. International initiatives such as the International Drinking Water Supply and Sanitation Decade have had a significant impact on political ideology and thus have reduced the financial and political costs of policy reforms. These initiatives provide a practical means to strengthen governments' ability to deal with problems of the very poor.

B. The Politics of Poverty

Governments' enthusiasms for dealing with the problems of the poor are also constrained by the fact that the potential beneficiaries are generally politically inarticulate. Most of the very poor reside in scattered villages or recently settled slums and hence are not visible to governing elites. Moreover they are not well organized and thus are not usually able to express clearly their views to government. Divisiveness among villagers and the absence of recognized, authoritative spokespersons for them often further diminish their political importance. The exceptional performance of Sri Lanka and Kerala in meeting human needs reflects to a large extent the fact that their poor have become politically articulate.

Even governments with a sincere desire to meet the needs of all citizens must recognize that leaders of organized religion and educated elites must be cultivated. If officials are to remain in power they must accommodate concentrations of influential and the well-organized people. Moreover the political systems of many developing countries are severely strained by tribal, ethnic and religious divisions. Thus they are much more fragile than those found in economically advanced countries. The orderliness and predictability essential to economic and social progress can often be maintained only by skillful political maneuverings.

An essential step in meeting human needs is to ensure that the people can effectively communicate to government and that they are able to impose sanctions on public officials if their needs are not addressed. Grass-roots organization and the development of effective community leadership provide two means by which the poor may increase their political importance. These devices confront governments with blocs of influence and provide clear lines of communication between the people and government. The needs and desires of the people must then be taken more seriously. These forms of community organization are fostered by successful experiences in dealing with governments.

C. Prospects

On the whole, the immediate prospects are bleak for funding massive public programs that respond to the needs of the poor. Only if the interests of the non-poor are balanced with those of the poor and/or the ideological climate for meeting the needs of the poor improves sharply is rapid progress likely to occur.

In the short term at least, the most promising public initiatives are for governments to encourage and facilitate local programs to meet basic needs. This option presents small political risks and in addition both reduces demands on national government finances and promises to mobilize non-governmental resources. However, even where credit arrangements, extension services and other resources have been offered by government sponsored programs, people have often chosen instead to try to outwait government in order to gain the same treatment as their wealthy neighbors had obtained earlier. For example, low-income communities in such diverse places as Tanzania, Brazil and India have protested having to pay for their needs for improved water supplies from meager private resources.

D. Establishing a Role for the Private Sector

Medical care, food, shelter, water supply, waste disposal and education all are produced and distributed in various countries by both private enterprises and public institutions. A major political issue confronting governments is, thus, the extent to which the private sector should be allowed or encouraged to respond to needs, and in what capacity. The major question affecting the role of the private sector in providing basic

services relates to its ability to allocate the goods efficiently and to distribute them in a socially desirable manner.

1. Economic Efficiency

The principal economic argument for government interference in the market has been that markets cannot allocate certain goods efficiently. The problem arises whenever consumption by an individual necessarily affects the well-being of others. If the spill-over effects are positive, less tends to be spent on the item than the interests of society dictate. The immunization campaign against smallpox is perhaps history's most vivid example of this phenomena. By deciding on behalf of individuals rather than allowing them to elect to be immunized, the world's governments were able to interrupt the transmission of this disease long enough to eliminate the reservoir of the virus; immunization and treatment are hence no longer necessary. The present value of future benefits from this program are estimated to be on the order of 100 times its costs. Had individuals continued to choose for themselves whether to be immunized, it is improbable that the disease would ever have been eradicated. Indeed the vaccine had been available for three-quarters of a century with little progress being made, before the concerted public program was initiated.

Sanitation is a second example of an activity which must be pursued by entire communities if major benefits are to be obtained. Research has demonstrated that gastrointestinal diseases are transmitted not only within the house but at schools, work places, markets, restaurants and other public places. As a consequence, community-wide improvements are necessary if health benefits are to be obtained.

"Externalities" or "neighborhood effects" argue for community-wide participation in the decision to consume. In most instances the community organization selected to make the collective choice will be an established unit of government. Exceptions do exist however. Where a relatively small, compact group with harmonious interests expects to share in the benefits and costs of a decision, local associations, neighborhood organizations, cooperatives or condominiums may be established instead. The function of the group, however formed or operated, is to include all major beneficiaries in the process of decision-making in order to maximize the gains over costs.

As discussed earlier, the organization and operation of informal groups is time consuming and thus costly. These efforts also frequently unearth rivalries within the group that threaten its success. Collective decisions rarely impose identical burdens or confer similar benefits on everyone. The inequities that result from such collective efforts threaten cooperation even when everyone is on net a beneficiary; if some community members are on net losers, the possibilities for voluntary collaboration are indeed dim.

Thus collective decision-making should only be attempted where the net gains are substantially greater than those that would accrue if individual community members acted independently, and where these benefits are very widely shared. Community organizations that have already established themselves, and have developed methods for resolving conflicts and managing opportunities are more likely to be able to withstand conflict than those organized for a particular purpose.

2. Government as Advocate for the Poor and Handicapped

A second justification for governments' becoming involved in a sector is to ensure that all citizens obtain minimal quantities of essential goods or services. The argument for intervention is that for reasons of poverty, mental or physical handicaps, dependence or ignorance, some members of society consume less in free markets than the public interest dictates.

For example, governments, even in economically conservative countries, support free, compulsory primary education in order to ensure that children are equipped to occupy adult roles in society. This choice is often in conflict with the short term economic interests of individual households, especially in rural areas. Similarly, maternal and child health services are often provided to citizens without charge in order to ensure that those members of society who have relatively little authority over the expenditure of family incomes nonetheless are assured access to important services.

Water supply and waste disposal projects funded by the Bank generally provide that households are charged a basic, "life-line" rate for a quantity of water judged necessary for

essential domestic requirements. This policy may serve to redistribute a modest amount of income if the life-line rate is less than that charged for additional amounts. However, its more important functions are to encourage households to consume an amount of water sufficient to protect health and to ensure that women and children receive minimal amounts of these essential goods and services.

3. Redistribution of Income

The third reason for governments to become involved in consumption decisions is to redistribute opportunities to consume. While this motive is often cited, in practice it rarely is the reason for government intervention. The major exception is Sri Lanka which provided subsidies on a wide range of commodities until the mid 1970s. Redistribution of selected essential goods such as food and clothing is generally more acceptable politically than direct redistribution of wealth or money incomes. Government intervention in the provision of education, health care, water supply, sanitation, nutrition and shelter is instead motivated principally by the belief that reasonable choices are not likely to be made by individuals.

E. Public Production

Government involvement in decisions to consume particular goods does not imply that governments ought to produce them as well. Production by public agencies generally entails excessive levels of accountability to political authorities and thus preoccupation with achieving numerous and often conflicting targets. Moreover, political accountability also implies that public enterprises are severely disciplined for failing to meet targets yet not rewarded for over-achieving them. This discourages innovation and assumption of risk, and hence undermines the dynamism of public enterprises. Especially over lengthy periods of time, the economic efficiency of public enterprises typically erodes.

Public enterprises also assume the burden of employment and personnel policies established by civil service regulations.

These practices were typically instituted to fend off accusations of favoritism in hiring and of undue enrichment of employees from public resources. However, their additional effects are to reduce flexibility in recruitment and hiring, thus undermining the competitiveness of public agencies as employers. As a result, public agencies are often burdened with disgruntled and underproductive workers who cannot be easily discharged.

The accounting and financial practices of public agencies rarely provide timely management information. These practices are instead primarily concerned with achieving accountability for cash resources allotted to an agency and for facilitating budgeting. The effect of non-commercial accounting procedures is to reduce sharply the usefulness to management of accounting reports.

The principle argument in favor of public production is that some services are subject to large economies of scale in production and physical distribution. As noted earlier, the total cost of supplying water on average increases by about two-thirds with a doubling of output. Similarly, large hospital facilities are able to utilize more fully sophisticated staff and equipment. Specialized services can thus be provided at lower cost in large, monopolistic institutions. Analogous economies appear in education and development of land for housing. These economies of large scale production give initial entrants into the business a decided cost advantage over potential entrants and thus permit considerable control over prices, quality and availability. Public production at least places these temptations in the hands of politically accountable managers.

Alternatively, these natural monopolies can be disciplined through public regulation of prices and services, while retaining private ownership or at least private operating authority. However, the franchises, contracts and regulations must be carefully drafted in order to ensure that these organizations function in the public interest.

F. Legal Environment

Inappropriate legal restrictions on adoption of affordable technologies have been major obstacles to meeting basic human needs, especially in urban areas. This observation applies

with particular force to water supply, sanitation and health care.

Many countries at the time they achieved political independence, adopted the construction, sanitation and professional codes of the metropolitan country. These laws had been developed under different economic, climatic and social circumstances, and were not adapted to local requirements. Moreover many of the details had been specified prior to the emergence of a scientific basis for such judgments and have since been rendered obsolete.

Public officials seeking to emulate advanced economies have generally pursued international standards particularly for health care and sanitation. While the folly of this policy is now widely recognized, the legal constraints persist. Plumbing and sanitation codes for example, often prohibit on-site disposal of excreta and, where on-site methods (pit latrines and septic tanks primarily) are allowed, building codes require that the facilities be located at distances from wells and houses which effectively prohibit their construction in established neighborhoods. These excessively conservative requirements also exaggerate the cost of on-site disposal in new developments.

Governments should carefully review the laws affecting adoption of low-cost solutions to needs for water supply, waste disposal and health care. Particular attention should be given to construction and plumbing codes, zoning restrictions, material requirements, licensure of craftsmen and health workers and accreditation of other professionals. For example, plumbing codes frequently prescribe the materials from which pipes and fixtures may be made. These prescriptions often prohibit the use of recently developed plastics which are both cheaper and, more readily manufactured and serviced domestically. Revisions of laws and codes should not seek to force adoption of alternative technologies but rather should broaden the range of options from which designs may be selected.

Land-use and plumbing codes should be revised to permit the use of methods of excreta disposal such as the composting toilet, and the double vault latrine. The use of on-site septic tanks, should be permitted. Small-bore sewers should also be allowed, to collect sullage and effluent from the tanks, where soils do not permit on-site absorption. (Small bore sewers allow construction of lines at lesser depth than with conventional sewers.) Health codes frequently must be revised to allow sewers to be constructed at these alternative standards.

V. CONCLUSIONS

The aim of this paper has been to identify practical steps that governments might take to meet the needs of their citizens for water supply and waste disposal. The current interest in meeting human needs was stimulated in large part by discovery in the mid 1970s that Sri Lanka, Cuba, the Indian State of Kerala and China, among others, appeared to have achieved a high physical quality of life with very limited resources. At the same time, evidence was accumulating that several of the most rapidly growing economies had failed to improve significantly the physical well-being of their citizens.

Most of the studies that have sought to explain these startling facts have taken a broad, aggregative approach. They have revealed that those areas which have been especially successful have been characterized by equitable distributions of incomes but more importantly have afforded equitable access to education, food and social services. Thus many investigators have concluded that broad political participation and enlightened public policies have been the most important underlying factors; this suggests that political will is the key to meeting human needs. However, the conclusion offers little practical guidance to governments on how to transform political will into action.

This paper has sought to fill this gap by providing a deeper understanding of the reasons for some countries' having met human needs. It argues that the explanation lies in the ability of successful countries to use available resources and opportunities more effectively. The major participants in this process are the household, the community and the formal government. The paper has argued that in most developing countries the performance of each can be considerably improved through enlightened programs.

A. The Household

The household is the most important unit influencing the use of resources. However, it often fails to exploit to greatest advantage its opportunities to consume and it frequently consumes in ways that are inimical to the interests of its members. These deficiencies are due to lack of consumer information, traditions and religious beliefs that produce less than ideal behaviors, failure to allocate resources--especially food--to the most needy family member, and lack of skills for adopting and exploiting new products and processes.

In addition, households frequently reject the steps recommended by experts to satisfy needs because the measures are poorly adapted to their perceptions and aspirations and to the constraints they face.

Efforts to communicate development information to the poor should be further strengthened by the following:

- o Messages should be targeted on the person(s) within the household who will make the decision or act upon the information. This would both concentrate communications efforts and permit more precise tailoring of messages and methods. However, communication should also seek to build support for change among those whose approval or consent is needed for wide adoption of improved practices.
- o Communications should be devised to improve the image of affordable innovations and to reduce popular resistance to their adoption. Stress on technical adequacy and low cost can stigmatize an alternative as being an inferior option.
- o Attempts should be made to minimize the economic and social risks attached to adopting new ideas through such activities as improving women's access to education and employment; if social risks of adoption are not reduced, change often threatens the innovators and even livelihood and social position. Encouraging people to think of themselves as members of more modern innovative groups can also provide peer support for change.
- o Messages should be made congruent with local, traditional beliefs and should be presented in the local idiom in order to facilitate understanding and acceptance.

Acting upon both old and new information is often frustrated by custom and by traditional patterns of decision-making within the household. These obstacles to advancement should be minimized by the following activities:

- o Programs should be designed to minimize shifts in responsibilities, and in the distribution of costs and benefits within the household. Transforming a task that has traditionally been the responsibility of women and children into "men's work" is likely to evoke social resistance from both groups.

Community and religious leaders and such local "authorities" as birth attendants should be enlisted to support improved practices or, if this is not possible, efforts should be made to associate the new practices with other respected persons.

- o The capacity of affected groups such as women and children to adopt changes should also be promoted. Subsidies, direct assistance and legal reforms that enhance economic and political power should be considered.

The capacity of households to exploit new opportunities depends first on their having the necessary time and complementary goods, and second, on their being able to master new techniques for meeting needs. Thus the following measures should be pursued:

- o Programs should assist households in securing complementary inputs (soap, wash tabs and scrub boards) where these are needed in order to exploit a new opportunity (an improved water supply).
- o The value of resources that are freed by adopting a new technology (such as the time of women and children) should be enhanced through activities to promote their employment in alternative uses.
- o Innovations should be introduced if possible at the same time that changes in the social and economic environment such as urbanization or introduction of irrigated agriculture are forcing people to devise new ways of meeting their needs for food, shelter, water and waste disposal

B. The Community

Community participation in devising a plan of action, mobilizing resources and managing programs should be sought. The values, institutions and support mechanisms of the community influence the opportunities and actions of the individual household. Moreover, many needs require collective action and cannot be carried out economically either by individuals or private firms. Consultation with the community can reveal the level of interest, preferences and constraints and can build support for an innovation. However, the frequent failure of efforts to promote community participation suggests that community participation should not be regarded as a panacea.

Consultation should be regarded principally as a form of market research. While the process of consultation can shape demands, the central issue is nonetheless one of determining the priority of a program and the depth of individuals' commitments to it. Attention should therefore be given to the representativeness of participation in the consultation, and to the group's authority to speak for the community and to obtain compliance with its decisions.

Contributions of funds, materials and labor by the community in mobilizing resources can reduce the cost to government of meeting a need. In addition, contributions demonstrate commitment to the program's goals, and promote self-reliance and local accountability. Such involvement is most likely to be successful where participants see themselves as being treated equitably by the scheme. Capital contributions are generally less controversial than contributions to operation and maintenance since inequities in the incidence of benefits have grown more apparent with the passage of time. Payments related to benefits received are generally most acceptable.

Community control of programs can supplement bureaucratic control. Because the formal bureaucracy is often ineffective or even non-existent in many low-income areas, accountability to the community is especially important as a means of ensuring that resources are properly used and that work is carried out in a timely manner.

Community participation can be encouraged by reducing costs and increasing benefits to the individual participants. The costs of participation include a) the losses of welfare that result from subordinating individual interests to those of the group, b) the time invested in organizing and managing the group, c) the contribution of resources to carry out the work of the organization, and d) the assumption of the risk that the organization may at some time fail to satisfy a basic need.

Benefits must overshadow these sacrifices if individuals are voluntarily to join an organization. It is also important that they recognize that gains represent benefits; expert judgements of persons' needs are not sufficient. The perceived benefits can be enhanced by promoting awareness of the value of the effects of a program; this may be achieved through education, mass marketing and political or social sanctions.

The cost of participation may be reduced by limiting an organization's membership and goals. This not only ensures individuals that their interests are well represented, but also reduces the efforts that must be expended to keep the group organized and functioning. A similarity of interests among homogeneous members also limits the likelihood of conflict. The advantages of small groups can often be obtained by forming base groups that are related formally to larger organizations which perform technical and higher-order administrative tasks.

Governments and other groups can promote local organizations by encouraging formation of clubs and interest

groups in order to develop organizational and management skills. They may also devise model legislation, bylaws, organization charts, systems of accounts, etc. to simplify establishing a local organization that must have formal, legal responsibilities such as ownership of a water supply system or collection of charges.

Many activities will require a broader range of skills than are available at community level or could be used effectively by small groups. The formal bureaucracy may then need to offer technical assistance, skilled craftsmen, policy and planning advice, etc. These functions generally can be provided best through a multi-tiered structure operated by government.

C. The Government

Governments must develop balanced programs of public expenditures if they are to remain in power. These expenditures must provide constituents with net benefits, at least in total. Programs aimed exclusively at meeting the needs of the poor often provoke resistance among the more influential and well-organized elements of society. These political calculations can be softened to some extent if a political ideology can be developed that places high value on meeting the needs of the disadvantaged. The underserved are relatively unimportant politically because they are poorly organized and lack articulate spokespersons. Their needs would receive greater attention if they were to become better organized. Without such an improvement, governments are limited in what they can do to meet human needs. Meanwhile, the most promising public initiatives are for governments to encourage and facilitate local self-help efforts and programs.

Governments should carefully review the roles of the public and private sectors. Public intervention is needed to ensure that external effects of consumption are recognized in allocations of resources, protection of the very poor and the handicapped, and (often) in redistribution of income and wealth. However, these are problems of consumption choice, and do not imply that governments should produce the goods and services. Public enterprises are faced with excessive accountability to politicians, interference in day-to-day management and employment decisions, and inappropriate procurement and accounting requirements. Thus, they are frequently unable to function efficiently. Granting franchises and/or contracting with private firms is often an attractive alternative. This permits governments to avoid criticisms for unduly benefiting some groups, and generally reduces costs.

Finally, governments should review the legal environment to make certain that innovation is not being thwarted by obsolete regulations of construction, plumbing, land use and craftsmen. Laws should be rewritten to permit the introduction of technologies that satisfy performance objectives; these laws would replace detailed specifications of materials and designs in many countries.

D. Summary

As this report points out, the problems underlying the failure to meet the basic needs of the poor are only in part a reflection of indifference among governments and elites. They are also consequences of a tangle of social obligations, cultural practices and family traditions. These socio-cultural factors are often intertwined with religious beliefs and elaborate explanations for the events of the natural world. These complex problems will not vanish with investments in water supply or health care.

Yet if development authorities approach these problems and issues with a realistic understanding of what must be done, progress can be made. However, that progress is not likely to be dramatic. This report has set forth what now appear to be the most promising steps toward that goal. Their introduction should be monitored and carefully analyzed to form a still more detailed and effective strategy for meeting human needs in developing countries.

APPENDIX. FURTHER READINGS

Clarke, William c. and Bruce F. Johnston, Redesigning Rural Development: A Strategic Perspective, Baltimore: Johns Hopkins University Press, 1982.

Glennie, Colin, "A Model for the Development of Self-Help Water Supply", World Bank Technical Paper, No. 2, Washington: The World Bank, 1982.

Knight, Peter (editor), "Implementating Programs of Human Development," World Bank Staff Working Paper, No. 403, Washington: The World Bank, 1980.

Rifkin, Susan B., "The Human Factor: Readings in Health, Development and Community Participation," Contact, Special Series No. 3, Geneva: Christian Medical Commission, June 1980.

Rogers, Everett M. and D. Lawrence Kincaid, Communications Networks: A New Paradigm for Research, New York: The Free Press.

World Bank Publications of Related Interest

Laboratory Testing, Field Trials, and Technological Development

Contains results of laboratory tests carried out on twelve hand pumps for the World Bank and presents recommendations for improvements in performance, safety, and durability.

Rural Water Supply Handpumps Project Report Number 1. March 1982. 122 pages (including 3 appendixes).

Stock No. WS-8202. \$5.00.

Municipal Water Supply Project Analysis: Case Studies

Frank H. Lamson-Scribner, Jr., and John Huang, editors

Eight case studies and fourteen exercises dealing with the water and wastewater disposal sector.

World Bank (EDI), 1977. ix + 520 pages. (Available from ILS, 1715 Connecticut Avenue, N.W., Washington, D.C. 20009, U.S.A.)

\$8.50 paperback.

Village Water Supply

Describes technical aspects, costs, and institutional problems related to supplying water for domestic use in rural areas and proposes guidelines for future World Bank lending in this sector.

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A World Bank Paper. March 1976. 98 pages (including 4 annexes). English, French, and Spanish.

Stock Nos. PP-7602-E, PP-7602-F, PP-7602-S. \$5.00.

Village Water Supply: Economics and Policy in the Developing World

Robert J. Saunders
and Jeremy J. Warford

Addresses the problem of potable water supply and waste disposal in rural areas of developing countries where the majority of the poor tend to be found. Emphasizes the economic, social, financial, and administrative issues that characterize village water supply and sanitation programs.

The Johns Hopkins University Press, 1976. 292 pages (including 4 appendixes, bibliography, index).

LC 76-11758. ISBN 0-8018-1876-1, \$21.00 (£12.70) hardcover.

French: L'alimentation en eau des communautés rurales: économie et politique générale dans le monde en développement. Economica, 1978.

ISBN 2-7178-0022-0, 45 francs.

Spanish: Agua para zonas rurales y poblados: economía y política en el mundo en desarrollo. Editorial Tecnos, 1977.

ISBN 84-309-0708-4, 575 pesetas.

World Bank Studies in Water Supply and Sanitation

The United States has designated the 1980s as the International Drinking Water Supply and Sanitation Decade. Its goal is to provide two of the most fundamental human needs—safe water and sanitary disposal of human wastes—to all people. To help usher in this important period of international research and cooperation, the World Bank published two volumes on appropriate technology for water supply and waste disposal systems in developing countries. Since the technology for supplying water is better understood, the emphasis in these volumes is on sanitation and waste reclamation technologies, their contributions to better health, and how they are affected by water service levels and the ability and willingness of communities to pay for the systems.

Number 1: Appropriate Sanitation Alternatives: A Technical and Economic Appraisal

John M. Kalbermatten,
DeAnne S. Julius, and
Charles G. Gunnerson

This volume summarizes the technical, economic, environmental, health, and sociocultural findings of the World Bank's research program on appropriate sanitation alternatives and discusses the aspects of program planning that are necessary to implement these findings. It is directed primarily toward planning officials and sector policy advisers for developing countries.

The Johns Hopkins University Press, 1982. 172 pages (including bibliography, index).

LC 80-8963. ISBN 0-8018-2578-4, \$12.95 (£9.10) paperback.

Number 2: Appropriate Sanitation Alternatives: A Planning and Design Manual

John M. Kalbermatten,
DeAnne S. Julius,
Charles G. Gunnerson, and
D. Duncan Mara

This manual presents the latest field results of the research, summarizes selected portions of other publications on sanitation program planning, and describes the engineering details of alternative sanitation technologies and how they can be upgraded.

The Johns Hopkins University Press, 1982. 172 pages (including bibliography, index).

LC 80-8963. ISBN 0-8018-2584-9, \$15.00 (£10.50) paperback.

Appropriate Technology for Water Supply and Sanitation

Volume 1: Technical and Economic Options

John M. Kalbermatten,
DeAnne S. Julius, and
Charles G. Gunnerson

Reports technical, economic, health, and social findings of the research project on "appropriate technology" and discusses the program planning

necessary to implement technologies available to provide socially and environmentally acceptable low-cost water supply and waste disposal.

December 1980. 122 pages (including bibliography).

Stock No. WS-8002. Free of charge.

Volume 1a: A Summary of Technical and Economic Options

John M. Kalbermatten,
DeAnne S. Jullus, and
Charles G. Gunnerson

A summary of the final report on appropriate technology for water supply and waste disposal in developing countries, a World Bank research project undertaken by the Energy, Water, and Telecommunications Department in 1976-1978.

December 1980. 38 pages. English, French.

Stock No. WS-8003. \$3.00.

Volume 1b: Sanitation Alternative for Low-Income Communities—A Brief Introduction

D. Duncan Mara

Describes, in non-technical language, the various low-cost sanitation technologies that are currently available for low-income communities in developing countries and presents a general methodology for low-cost sanitation program planning.

February 1982. 48 pages.

Stock No. WS-8201. \$3.00.

Volume 2: A Planner's Guide

John M. Kalbermatten,
DeAnne S. Jullus,
D. Duncan Mara,
and Charles G. Gunnerson

Provides information and instructions on how to design and implement appropriate technology projects based on the findings reported in *Volume 1: Technical and Economic Options*.

December 1980. 194 pages (including references).

Stock No. WS-8004. \$5.00.

Volume 3: Health Aspects of Excreta and Sullage Management—A State-of-the-Art Review

Richard G. Feachem,
David J. Bradley,
Hemda Garelick,
and D. Duncan Mara

Provides information on the ways in which particular excreta disposal and reuse technologies affect the survival and dissemination of pathogens. It is intended for planners, engineers, economists, and health workers.

December 1980. 303 pages (including 14 appendixes, references).

Stock No. WS-8005. \$15.00.

Volume 4: Low-Cost Technology Options for Sanitation—A State-of-the-Art Review and Annotated Bibliography

Witold Rybczynski,
Chongrak Polprasert, and
Michael McGarry

A comprehensive bibliography that describes alternative approaches to the collection, treatment, reuse, and disposal of wastes.

A Joint World Bank/International Development Research Centre publication. 1978. Available from International Development Research Centre (IDRC), P.O. Box 8500, Ottawa K1G 3H9, Ontario (Canada).

Volume 5: Sociocultural Aspects of Water Supply and Excreta Disposal

Mary Elmendorf and
Patricia Buckles

This report was prepared as part of the World Bank research project concerning appropriate technology for water supply and waste disposal. Social and cultural factors influencing responses to water supply and excreta disposal technologies are investigated in seven case studies of communities in the rural and urban fringe areas of Latin America.

December 1980. 67 pages (including 3 annexes, references). English and Spanish.

Stock No. WS-8006. \$3.00.

Volume 10: Night-Soil Composting

Hillel I. Shuval,
Charles G. Gunnerson,
and DeAnne S. Jullus

Describes a safe, inexpensive treatment method for night-soil composting that is ideally suited for developing countries because of its simplicity in operation, limited need for mechanical equipment, low cost, and its effectiveness in inactivating pathogens.

December 1981. 81 pages (including bibliography, 2 appendixes).

Stock No. WS-8101. \$3.00.

Volume 11: A Sanitation Field Manual

John M. Kalbermatten,
DeAnne S. Jullus, and
Charles G. Gunnerson

December 1980. 87 pages.

Stock No. WS-8007. \$3.00.

A Model for the Development of a Self-Help Water Supply Program

Colin Glennie

Presents one version of a practical model for developing, with high community participation, water supply programs in developing countries. Consideration is also given to sanitation program development and practical guidelines for program development are included. One of a series of Informal Working Papers prepared by the Technology Advisory Group, established under UNDP's Global Project, executed by the World Bank.

Technology Advisory Group Working Paper Number 1. October 1982. 45 pages (including 2 annexes, references).

ISBN 0-8213-0077-6. \$3.00.

World Bank Research in Water Supply and Sanitation—Summary of Selected Publications

A bibliography summarizing the papers in the Water Supply and Sanitation Series, as well as the World Bank studies in Water Supply and Sanitation published for the World Bank by The Johns Hopkins University Press.

November 1980.

Stock No. WS-8000. Free of charge.

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