

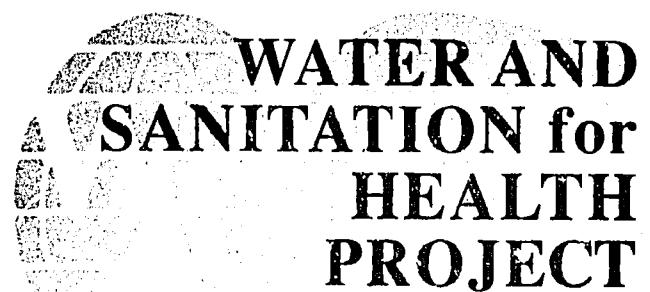
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PN-ABK-291
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IMPROVED PRODUCTIVITY THROUGH BETTER
HEALTH (IPTBH) PROJECT

PHASE ONE OF THE AMENDMENT
TECHNICAL ASSISTANCE AND ASSESSMENT

WASH Field Report No. 356
Vector Biology and Control Report No. 82248
January 1992



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

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PHASE ONE OF THE AMENDMENT
TECHNICAL ASSISTANCE AND ASSESSMENT**

**Prepared for the USAID Mission to Belize
by the WASH Project (Task No. 324)
in collaboration with VBC Project (Activity No. 82248)**

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January 1992

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ACRONYMS

AACP	<i>Aedes aegypti</i> Control Program
A.I.D.	U.S. Agency for International Development (Washington)
API	Annual Parasite Index
BOM	Board of management
CIDA	Canadian International Development Agency
DHC	District health committee
GOB	Government of Belize
gpd	Gallons per person per day
HECOPAB	Ministry of Health, Health Education Unit
IPM	Integrated pest management
IPTBH	Improved Productivity Through Better Health Project
MNR	Ministry of Natural Resources
MOH	Ministry of Health
NGO	Nongovernmental organization
NMCP	National Malaria Control Program
PAHO	Pan American Health Organization
RWS	Rudimentary water system
RWSSP	Rural Water Supply and Sanitation Program
ULV	Ultra low volume (spraying)

USAID	U.S. Agency for International Development (overseas mission)
VBC	Vector Biology and Control Project (sponsored by A.I.D.)
VC	Volunteer collaborator
VCP	Vector Control Program
VHW	Village health worker
WASA	Water and Sanitation Authority
WASH	Water and Sanitation for Health Project (sponsored by A.I.D.)
WHO	World Health Organization

Currency

B\$2 = U\$1

ACKNOWLEDGMENTS

This project is a joint, cooperative effort involving the sponsor—the USAID Mission to Belize, the Belize Ministries of Natural Resources and Health, the Belize Institute of Management, and the Water and Sanitation for Health (WASH) and Vector Biology Control (VBC) Projects, both centrally funded by A.I.D.

EXECUTIVE SUMMARY

The evaluation of the IPTBH Project revealed that a major deficiency in implementing the project was weak community and institutional participation in vector control and water and sanitation programs. To respond to this and other issues raised in the evaluation, USAID developed the 1990 Project Paper Amendment. The amendment reflects the evaluation team's recommendation that the project refocus away from purely physical targets such as drilling wells and installing pumps to institutional development and community participation. To help the project achieve institutional development and community participation, the evaluation team suggested a three-phase process: 1) technical assistance and assessment through collaboration with outside consultants; 2) data analysis; and 3) a program planning workshop to guide the national program for environmental health.

Purpose of the Technical Assistance

Technical assistance is now being provided to government officials by consultants through USAID-funding. The objective of the technical assistance phase is to strengthen institutional capacity at the central, district, and community levels to manage and ensure the sustainability of improved water supply and sanitation and control of vector-borne diseases in rural Belize. The processes developed and practiced in this phase place the starting point with communities—their knowledge, resources, and organizational capabilities. This information will provide government of Belize (GOB) policy makers and operational staff with the information necessary to create responsive policies and sustainable environmental health programs, largely through increased community involvement in both planning and implementation.

Framework and Assumptions

The framework used for defining the technical assistance/assessment phase emphasizes the role of community participation in local water, sanitation, and vector control. Specifically, communities need to be involved in 1) diagnosing their problems, 2) making decisions on how to address these problems, 3) setting priorities for which problems to address, 4) ensuring equitable benefit from the actions taken, and 5) monitoring and evaluating the success of these actions. From this framework should come the crucial link between community understanding and action and policy formulation.

The key to this link is the assumption that the planning process for environmental health should be based on information about community capabilities, resources, and behaviors.

Therefore, the technical assistance phase was designed to serve as a model for and impetus to processes of coordinated policymaking, planning, and program implementation.

Intended Outputs

The three-phase process mentioned above is described in more detail below.

- **Phase One:** Gather data and develop procedures and tools for assessing institutional, technical, and community factors in environmental health status and services, and conduct initial assessments. This phase is being carried out through collaborative work involving USAID consultants and GOB operating officials in the Ministry of Health (MOH) and the Ministry of Natural Resources (MNR).
- **Phase Two:** Continue data gathering for program planning. This process, to be conducted by Belizian staff, will focus on community capabilities, resources, and behaviors in environmental health.
- **Phase Three:** Conduct a program planning workshop. The MOH and MNR will jointly sponsor, plan, and conduct a workshop in February-March 1992 to report on the community data collection and program evaluations and plan for needed changes in the national program for environmental health (water supply, sanitation, and vector control). This workshop will be led by Belizian officials, facilitated by a Belizian consultant, and aided by expatriate technical assistance.

Review of the Current Situation-Key Issues

Water Supply and Sanitation

The cost of improved water supply and sanitation systems is, of course, critical to the ability of the GOB and communities to develop and sustain them.

The current water system engineering design approach reflects reasonable norms and standards. However, there are several areas that potentially could be modified to reduce costs. These include the water consumption level for which systems are designed, tank sizing procedures, and other issues.

In many cases, due to preferences for rainwater, new water systems, especially handpumps, are underutilized. Therefore, reviewing procedures for selecting water sources may prove beneficial. In many cases there will be a fundamental choice between drilling a well in a community or piping water from a surface water source (spring or clear stream). A comparison of these two options, as well as the primary or supplemental role of rainwater catchments, should be made on the basis of community acceptability and preference as well as technical and cost factors.

Another economical option that merits exploration is the possibility of using modern wind or solar pumping systems. Traditional wind pumps have been used in Belize and neighboring countries for many years, though many are in disrepair. Newer models of these technologies have demonstrated their reliability, and their cost-effectiveness can be demonstrated under favorable conditions.

Vector Control

The primary focus on vector control in Belize is, first, malaria; second, the potential for dengue fever; and third, the possible reintroduction of yellow fever and other mosquito-borne virus diseases.

Between 1983 and 1990, reported malaria cases ranged from about 0.3 percent of the population (Belize District) to upwards of nearly 7 percent of the population (Cayo District). In the Americas, although perhaps not specifically in Belize, the ratio of reported to estimated cases is roughly 1 to 2.3. Thus, malaria during this period may have been affected as much as 16 percent of the population in some districts (Cayo).

There have been no documented indigenous cases of dengue fever in Belize since 1982, when an epidemic of 443 cases occurred. However, a small number of confirmed cases occurred in Honduras this summer, and dengue is prevalent throughout much of Latin America and the Caribbean. The GOB has been concerned enough to issue a recent "Dengue Alert."

The National Malaria Control Program (NMCP) is currently conducted solely through domiciliary spraying and anti-malarial treatment of cases. Dwelling spraying is with DDT and is not adequately based on epidemiological or entomological data or surveys.

The *Aedes aegypti* Control Program (AACP), in general, is accomplishing its goal in keeping larval mosquito house indices at acceptable levels (less than 3 percent), particularly in urban areas, the likely focal points of dengue epidemics. In addition, space

spraying (ULV of malathion) is done routinely, but without adequate entomological monitoring of efficacy.

Rethinking Environmental Health Strategies

Normally, after a community-based health committee is formed in Belize, neither its function, authority, nor work plan is clear. At the present time, national and district MOH or MNR staff do not focus on the specific vector- and water-related behaviors needing change so that intended health outcomes can be realized. Given the available resource base, especially the severe shortage of staff, it seems clear that communities will have to play a greater role in the planning and implementation of their health programs, especially regarding changes in health-related behavior.

It is imperative to include community-set priorities as a point of departure. Thus, from data gathering, through action, to monitoring, there should be a dual approach to problem solving. First, the action to be taken by communities themselves (both collectively and individually) should be defined; second, the actions that relevant government agencies need to take to support community action should be determined. This approach will help to define the role of government health staff from one of implementing top-down programs to that of facilitating and enabling.

A community-based approach has implications for policy, programs, training, and resources, and increases the need for effective and coordinated strategic planning. It thereby increases the importance of an active role for district-level MOH and MNR staff and district health committees, and requires that staff of these ministries at all levels be attuned to community data gathering and facilitation and the training of village health workers and other leaders. This broad approach calls for integrated program monitoring from the perspective of overall environmental health, not just specific programs in water or vector control.

To address these requirements, the technical assistance team is working toward phase three of the IPTBH Project: a major action planning workshop. This workshop will be designed to focus the attention of senior and district MOH and MNR staff on the issues raised in this report, especially the links between community health behavior, decentralized planning and program implementation, and policymaking. The workshop will initiate an action planning process that moves from national environmental health objectives to analysis of roles and responsibilities, mechanisms for coordination, specific program strategies that focus on community preferences, and revised plans for staff development and community training that support these strategies. In this way, available internal and external resources can be applied in the context of overall environmental

health priorities. The workshop will also include discussion of a possible village-based, integrated vector control and water and sanitation pilot project which could serve as a learning model for national program change from a vertical towards a more community-based approach.

GOB's commitment to and participation in this workshop will represent an important continuation of the commitment that government staff have demonstrated to the current information gathering and early analysis phases.

Chapter 1

INTRODUCTION AND BACKGROUND

1.1 Historical Background—The IPTBH Project

The evaluation of the IPTBH Project pointed out that one of the major deficiencies in implementing the project's vector and water supply and sanitation components was weak community and institutional participation. The evaluation, which covered the period 1985-89, indicated that training for communities either was inadequate or, in many instances, had not yet begun.

The evaluation team, concerned that village health committees would stop functioning for lack of training and support, urged USAID to refocus the emphasis of the IPTBH Project. It recommended that in place of physical targets (e.g., drilling wells, installing pumps, and building latrines), greater emphasis be placed on community participation, training, and institution building.

To respond to the issues raised in the evaluation, USAID developed the 1990 Project Paper Amendment. Tasks for the amendment period were identified by a team of two consultants, one in vector control and one in water supply and sanitation. The consultant team held a four-day workshop with operational staff from the Ministry of Health (MOH) and the Ministry of Natural Resources (MNR) and met with high level government of Belize (GOB) officials. During the workshop, MOH and MNR staff identified constraints affecting the IPTBH Project and outlined activities required to meet the issues raised by the evaluation. The consultant team then devised a three-stage process to complete the tasks identified: 1) technical assistance and assessment through collaboration between USAID consultants and GOB operating officials; 2) data analysis; and 3) a program planning workshop to guide the national program for environmental health. The first of these is ongoing; the remaining two are to begin early in 1992.

The evaluation also noted that the vector control component of the project reflected a static, vertical program focused solely on spraying activities. An environmental assessment for the Project Paper Amendment, conducted in 1991 by A.I.D./Washington, strongly recommended that the roles of communities and district health committees be strengthened in reducing vector breeding sources and in developing community-managed alternatives (e.g., source reduction, use of bed nets, etc.) to residual chemical insecticides.

Thus, in order both to respond to issues raised by the evaluation and to develop community-based strategies for responding to the environmental concerns of the vector component, the objectives, framework, and assumptions of the technical assistance phase of the IPTBH Project are based on 1) the abilities and practices of communities in taking an active role in an integrated environmental health program, and 2) the abilities of district- and central-level staff to provide the support these communities need.

1.2 Purpose of the Technical Assistance

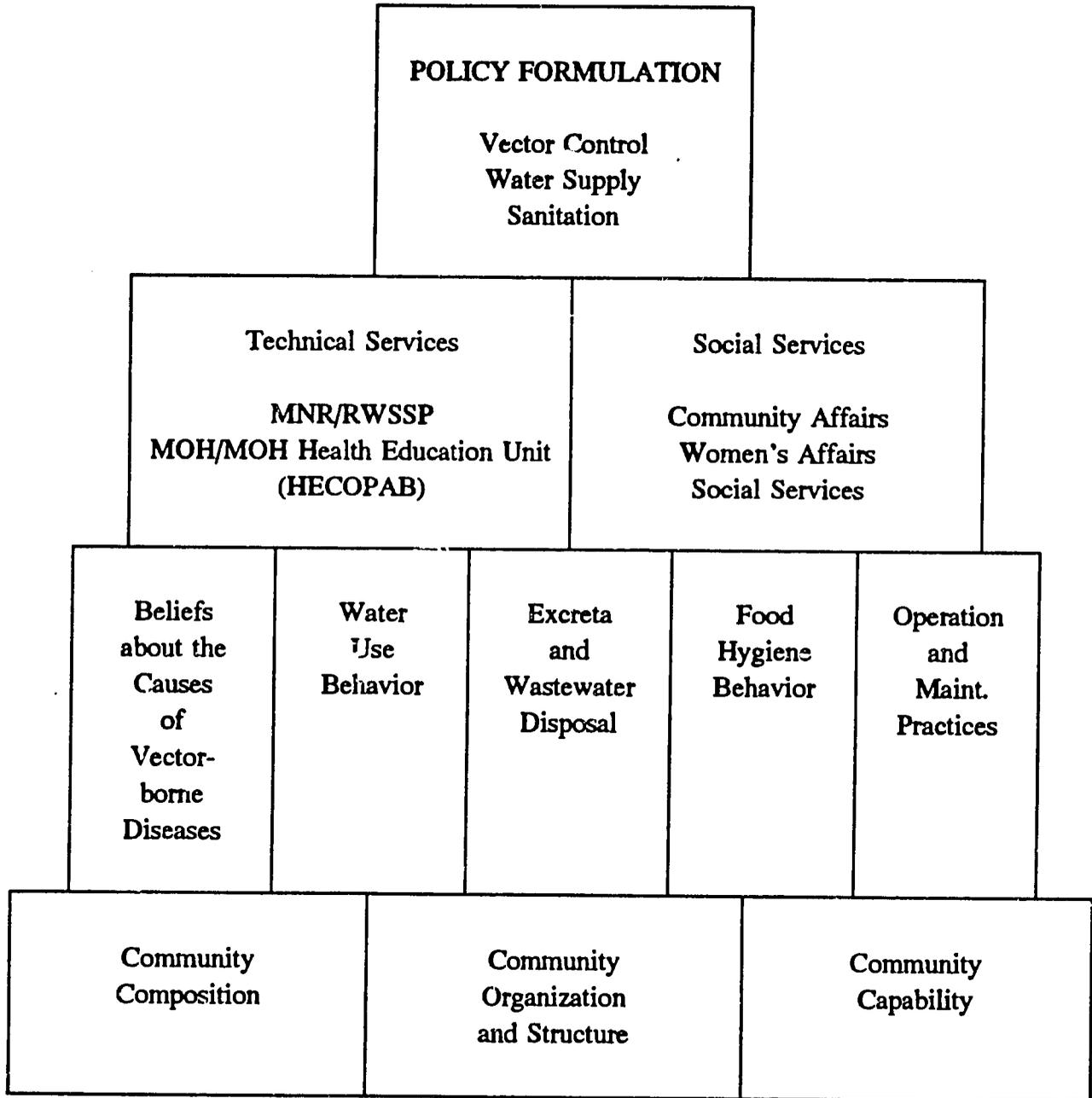
As alluded to above, the 1990 amendment to the IPTBH Project Paper reflects a refocus away from purely physical targets to institutional development and community participation issues. In this context, the broad goal of the technical assistance phase reported here is to strengthen institutional capacity at the central, district, and community levels to manage and ensure the sustainability of improved water supply and sanitation and control of vector-borne diseases in rural Belize. Specifically, the technical assistance phase was designed to involve the Belizian staff of the MOH and the Rural Water Supply and Sanitation Program (RWSSP) of the MNR to plan and conduct baseline assessments for institutional analysis, community capability, operations and maintenance management, and vector control. The objective of these assessments is to provide GOB officials with the data necessary to create the required policy environment and operational modalities to ensure sustainability, especially through increased community involvement. In short, the question posed by USAID and the GOB, given the experience of the environmental health sector over the past decade and the actual resources and constraints in the GOB, is how can the sector be best organized and what needs to be done to improve its performance? Particular urgency is given to this question because of the anticipated phase-out of USAID assistance to the sector over the next two years.

1.3 Framework and Assumptions

The framework used to conduct the baseline assessments noted above emphasizes the role of community participation in local water, sanitation, and vector control. Specifically, communities need to be involved in 1) diagnosing their problems, 2) making decisions on how to address these problems, 3) setting priorities for which problems to address, 4) ensuring equitable benefit from the actions taken, and 5) monitoring and evaluating the success of these actions. This framework, illustrating the link between community understanding and action and policy formulation, is diagrammed in Figure 1.

Figure 1

Framework for Assessing Performance in Water Supply and Sanitation and Vector Control Institutions in Belize



Underlying the work of the consultant team were also several assumptions that emerged during early team planning with Belizian counterparts. These include the following.

- The product of team collaboration with Belizian officials in the MOH and MNR should be GOB commitment to and leadership in the process of integrated planning for environmental health (including relevant information collection and analysis).
- The planning process should be based on relevant data about community capabilities, resources, and behaviors. An objective of the technical assistance team should be to build the capacity of GOB officials to collect and use such data for planning and decision making.
- Key Belizian decision makers should be involved in the work of the technical assistance team from the beginning.
- The consultancy should serve as a model and establish processes for coordinated policymaking, planning, and program implementation.
- As part of the planning process, Belizian officials should formalize/institutionalize any necessary structural coordination.
- The outcome of this process should be a sustainable Environmental Health Action Plan, which GOB officials will prepare and to which GOB senior management staff are committed.
- This planning process will lead to better policymaking and operational decision making.

1.4 Intended Outputs

As described above, the technical assistance intervention represents phase one of a recommended three-phase process for amending the IPTBH Project as follows.

- Phase one: Gather data and develop procedures and tools for assessing institutional, technical, and community factors in environmental health status and services, and conduct initial assessments with GOB operating-level officials. This phase was carried out through collaborative work involving consultants and GOB operating officials in the MOH and MNR. Methodologies

used included review of documentation, interviews with key informants, and site visits and observation, including individual and focus group interviews with village residents and leaders. Investigation has focused on organizational capacities; community knowledge of vector disease risks, hygiene, and sanitation; and willingness to pay for environmental health improvements.

- Phase two: As part of the planning process for improving the national environmental health program, continue the data gathering undertaken in phase one, including the village site visit and interview techniques developed, modeled, and used jointly by consultants and GOB staff. This process, to be conducted by Belizian ministry staff, will focus on community capabilities, resources, and behaviors in health. The data will be analyzed to assess water, sanitation, and vector control activities at the district and village levels and to explore implications for program planning.
- Phase three: Conduct a program planning workshop. The MOH and MPR will jointly sponsor, plan, and conduct a workshop in February-March 1992 to report on the community data collection and program evaluations and plan for needed changes in the national program for environmental health (water supply, sanitation, and vector control). This workshop will be led by Belizian officials, facilitated by a Belizian consultant, and aided by expatriate technical assistance.

The result of the three-phase effort, and specifically of phase three, will be actual development of a coordinated plan for addressing environmental health needs for the remaining life of the IPTBH Project and for sustaining a program of improvements in health status after the project ends. Such a plan should provide a solid base for coordinated problem solving and decision making and discourage decision making based on purely operational or political criteria.

1.5 Preface to Remainder of Report

The remainder of this report is organized in three major sections. The first (Chapter 2) presents a review of Belize's current situation regarding environmental health status and

services from the community, technical, and institutional and program management perspectives. Key issues requiring renewed action planning are highlighted.

Chapter 3 addresses options for rethinking GOB environmental strategies under the umbrella of the IPTBH Project. The roles and responsibilities of actors at the community, district, and policy levels are examined, with a particular focus on the need for coordination, training, and appropriate donor support.

Finally, Chapter 4 provides a detailed plan for phases two and three of the planning process cited above, including milestones, methodologies, resource requirements, and agendas worked out between GOB officials and the consultant team. This section also includes preliminary plans for the structure and process of the action planning workshop. It is important to emphasize, however, that all of these plans are to be refined and completed by Belizians themselves during the coming weeks and months.

Chapter 2

REVIEW OF THE CURRENT SITUATION—KEY ISSUES

2.1 Community Roles

Ultimately, the objective of the technical assistance phase of the amended IPTBH Project is to develop the capability of community health committees to carry out environmental health programs and monitor their own progress. As mentioned in the previous section, the processes developed in this technical assistance place the starting point with communities, their resources, and their organizational capabilities. The process bases future integrated environmental health education on current practices, beliefs, and knowledge of the people in a community.

To date, hygiene education and community participation activities in water supply and sanitation have emphasized the installation and maintenance of water system infrastructure, the collection of funds for it, and the installation of latrines. In vector control, such activities have consisted primarily of district-level teams spraying at three-to-six-month intervals at all locations with 100 houses or more. The "health talks" done by the MOH Health Education Unit (HECOPAB), and to some extent by RWSSP staff, are based on general themes such as latrine use and education regarding malaria and dengue. Discussions with both RWSSP staff and HECOPAB indicate that there is no evaluation or monitoring of any of their activities, except for measuring numerical targets on water system and latrine construction, or number of communities and households sprayed. The relevance of health talks to community health-seeking behavior is viewed as doubtful, most especially to those involved in carrying out these activities.

For vector control, to begin with an assessment of community behavior is a relatively novel approach. Because traditional control methods such as insecticides have not yet yielded the anticipated benefits, the assessment approach, combined with some selective spraying with environmentally safe insecticides, could provide a model for other vector programs and have direct application to control programs for other diseases. Furthermore, the integration of both vector control and water supply and sanitation within an overall community-based environmental health perspective entails an operational approach that begins from the viewpoint of communities rather than that of administrative structures.

2.1.1 Community Capabilities, Capacities, and Resources

The organizational capabilities of communities vary, although ethnicity and leadership capability seem to play an important role in all communities. Each community has a number of organizations, each with a different function. For example, the village council, found in most villages, represents informal political and legal authority in the village. It is "legal" in that it is recognized by the government. It does not, however, have rights to collect funds, impose taxes or user fees, or settle land disputes. Its members generally represent the ruling political party, although this is not always the case. The Ministry of Social Services is actively seeking ways to give more statutory powers to village councils. Some communities have an elected official (mayor) called an "alcalde," whose responsibilities include mediation and dispute settlement. Often the village council and the alcalde work together. For example, the village council leader might propose programs on which the alcalde would have the legal status to take action. The organization and complementarity of these institutions thus empowers communities to take action for themselves.

Water associations or committees are examples of community organizations created by the RWSSP and, sometimes, donors and nongovernmental organizations (NGOs) supporting water supply. In villages where rudimentary water systems (RWSs) have been built, a water management board collects user fees and manages the system's operation. The water committees and boards purely manage system infrastructure; they do not address the health issues associated with installation of the systems.

Another important local committee is the village health committee, the community-based association that represents the district-level health team. It is responsible for addressing broad-based community health issues. The availability and capability of this committee varies enormously across communities, but universally a glaring need exists to strengthen the capacity of this committee to implement and monitor environmental health activities.

Other community committees may also exist sometimes, such as parent-teacher associations for schools, or even, at times, in the larger villages, a housing committee/cooperative for the construction of houses. Another committee, which seems to be rather new and has support from the Social Services Department, is the ladies committee, which involves village women developing income-generation strategies for community-wide needs. Women in leadership positions are a very rare, almost nonexistent phenomenon in all communities visited. Where women are in leadership positions, they are generally either unmarried or widowed. In general, unless one seeks the perspective of women, one will primarily receive male-biased data.

2.1.2 Water Use and Preferences

The limited data collected during phase one of the amendment process raised a number of questions that still need further investigation. Some of these issues are raised later on in this report and include, among others, the issue of quantities of water used. For example, is the design of the systems such that it provides a great deal more water than communities actually use? Also related to the question of quantities actually used, what is the complementarity of the different sources, that is, how much is being supplemented from rainwater and traditional wells?

Nonetheless, a number of behaviors and practices that have a direct impact on community health are noticeable. As has been noted in a number of previous assessments, the preferred drinking water of many communities is rainwater. The reasons people generally give for this preference are that rainwater is "not heavy," it seems "lighter" in its digestive qualities, and it "cooks beans better." Where there are RWSs with yard taps for each individual family, women sometimes report using tap water for all uses except drinking and cooking. Interestingly, men interviewed report that only 5 to 10 percent of households use rainwater. Women, on the other hand, report that all women use rainwater for drinking and cooking.

In communities where handpumps are available as a source for approximately 10 families (the GOB standard), numerous households have a hand-dug well, which people seem to prefer to pumped water. Where the improved sources, either pumps or RWSs, are available alongside rainwater catchments or traditional wells, there does not seem to be a shortage in the quantity of water. There are, however, communities in Toledo District where people use contaminated streams because the handpumped water in their community is fouled from animal and human feces.

The issue of alternative technologies and the role communities can play in selecting different options has to be addressed. The opinions and preferences of women are rarely considered, though women are the country's major water collectors and users. Spring catchments, improved rainwater tanks, installation of pumps, or protection of existing family wells will also need to be presented as options.

2.1.3 Wastewater

Wastewater is usually disposed of in different areas around the house. However, the clay quality of much of the Belizian soil does not support the quick absorption of wastewater. Furthermore, in some areas where yard taps are present, the water near the tap tends to collect and become a mosquito breeding site. In the more crowded immigrant-

concentrated settlements, the disposal of wastewater is a serious problem. It is often left to collect in the boundaries of the village, or else disposed of in running streams near the communities. Water used to soak diapers of infants, to wash vegetables, or for laundry purposes is usually disposed of in the house surroundings.

2.1.4 Vector Control

Mosquitoes are accepted in Belize as a source of discomfort. Their association with fevers and malaria, however, seems to be an abstract concept. People, especially community health workers, might identify malaria mosquitoes in posters but cannot do so in reality and hence view all mosquitoes as potentially harmful. Villagers have also come to accept regular spraying as the main remedy. Actions to be taken by individuals and communities based on how and where mosquitoes breed need to be based on better biological and entomological knowledge. For example, in many communities people cut the bushes near streams in the belief that doing so reduces breeding of mosquitoes, when, in fact, the opposite is true. People will also use oil in rainwater containers once a month in the belief that doing so completely stops mosquito breeding. In fact, this practice can only prevent the development of larvae for less than one day.

Belizians do not like spraying but will put up with it. They report that it is harmful, and especially so to infants and children. The screening of houses is, from limited sample interviews, not easily accepted for two principal reasons. The first and primary one is the cost involved in screening the open wood style houses. People seem to prefer to spend money on other house improvements. The second reason is that people prefer the open breeze.

Bed nets, another mosquito inhibitor, are not new. In fact, they are seen as old fashioned and used by elder members of the community. The current reluctance to use bed nets also reflects concern over the logistics of getting bedposts on which to hang them and, as with screens, the fact that they block the breeze.

People generally mention that there are many fewer mosquitoes now than 25 to 30 years ago. They frequently note that at one time dogs and pigs had no hair because of mosquito bites. They tend to attribute the reduction in mosquitoes to spraying.

Clearly there are wide gaps between entomological knowledge, community practices, and current spraying practices. As integrated environmental health education strategies are developed and indicators for their success are determined, a clearer idea needs to be developed on priority action areas. What actions can households take to eliminate

mosquito larvae? Communities are now cutting down trees in order to eliminate mosquito breeding. Can this mistaken idea be reversed, with successful promotion of reforestation?

2.1.5 Excreta Disposal

Latrines in the few household communities visited are all relatively new. However, donor projects notwithstanding, latrines seem to be in use in almost all households. Traditional or improved, the accepted form of excreta disposal is pit latrines. When the pit fills, either men of the household or hired workers close off the old pit and dig a new one.

Children do not use latrines until around the age of three. Potties are used in some households and are then emptied into the pit. The most common complaint of most people seems to be the mosquitoes that collect in the latrines. Some people use kerosene in the pit as a repellent, but that does not last long enough. Experiments using foam beads, an alternative to kerosene, should be disseminated and the results made known to community people. But the environmental impact of foam beads must also be considered.

2.1.6 Hygiene Behavior

Specifics on hygiene behavior will require a longer observational time frame than has been allotted in phase one of the project amendment process. For this reason, Belizian team members have included a 24-hour observation period in their data gathering strategy for phase two. These data will have to be reviewed.

Hygiene behaviors are going to become increasingly important as the threat of cholera gets closer to home. The specifics of transmission in the oral-fecal chain that cause the contamination of food will need to be carefully identified and community actions will have to be monitored. General and clearly visible areas identified in this limited field experience suggest that hand washing is not evident after use of latrines. The nearest soap and water for cleansing are generally placed in the kitchen area and assume that household members will pass through the kitchen following use of the latrine.

Apart from hand washing after defecation, food hygiene seems an important area deserving further questioning and observation. The consumption of raw foods among some of the ethnic groups certainly should be examined as a potential basis for targeted health education.

Related to food hygiene are the perceptions of people as to the causes and sources of diarrhea. Diarrhea is rarely associated with water contamination or sanitation practices. Instead, it is most frequently associated with foods that people eat but are not used to

eating. Adults especially differentiate between diarrhea and "loose stools," associating diarrhea with abdominal pains and loose stools with a "very bad smell." Loose stools, however, do not have this quality. Among children, diarrhea is treated with plants and tree bark, but adults use Alka Seltzer or flour and lime porridge.

As the above preliminary data indicate, the effective training, development of relevant materials, and establishment of monitoring tools for behavioral change leading to health improvements clearly require a starting point keyed to existing community health beliefs and practices regarding relationships between diseases and their causes.

2.2 Technical Operations

2.2.1 Vector Control

The primary focus on vector control in Belize entails first, malaria, and second, the potential for dengue fever.

Between 1983 and 1990 microscopically confirmed malarial Annual Parasite Index (API) measures ranged from a low of 2-4 (Belize District) to as high as 22-68 (Cayo District). The API is the number of cases confirmed by blood-smear examination per 1,000 persons. Recent epidemiological studies reveal APIs in some villages of greater than 175, with numerous villages having APIs in the 20s and 30s. There have been no documented indigenous dengue fever cases in Belize since 1982, when an epidemic of 443 cases occurred. However, a number of confirmed cases occurred in Honduras this summer, and dengue is prevalent throughout much of Latin America and the Caribbean.

The likely vector mosquitoes in Belize are *Anopheles albimanus* (malaria) and *Aedes aegypti* (dengue and yellow fever). National entomological data from Belize on these species during the last several years are scarce. However, the Uniformed Services University of the Health Sciences (USUHS), Bethesda, has a laboratory in Belize and is currently surveying the anopheline fauna. The NMCP should take advantage of this local facility.

Technical vector control operations are under the auspices of the MOH and are separated into two vertical programs, the *Aedes aegypti* Control Program (AACP) and the National Malaria Control Program (NMCP).

In general, the AACP is accomplishing its primary goal in keeping larval *Aedes aegypti* house indices at acceptable levels (less than 3 percent), particularly in urban areas, the likely focal points of dengue epidemics.

Programmatically, the AACP is, as mentioned, currently a vertical program. Its major components are inspecting premises, dispensing Abate (larvicide granules), and conducting routine (nonsurveillance based) ULV space spraying for adult mosquitoes. No systematic entomological surveys for adult *Aedes aegypti* are conducted. Identification of "positive" breeding containers is based solely on the field inspector's observation of mosquito larvae, which cannot be sight identified to species. No samples are taken. Survey forms and premise cards are filled out and the inspector gives sound information to the residents as to how they should reduce mosquito breeding sites and improve general sanitary conditions.

Recent data on mosquitoes' susceptibility to Abate and malathion are unavailable. The AACP personnel interviewed do not believe that routine ULV space spraying is effective on an operational basis, a view supported in many other *Aedes aegypti* control programs as well. Space spraying is concentrated in communities of 100 or more houses without adequate monitoring.

NMCP functions under the MOH, but separately from the AACP. The primary functions of this program are domiciliary adulticide wall spraying with mixtures of 75 percent and 100 percent DDT at a rate of 2 g AI/m² two times a year against *Anopheles*, and coordination of the village-level diagnosis and drug treatment of malaria. No recent physiological or behavioral resistance studies on *Anopheles albimanus* are available. The safety of DDT preparation and consistency of dosage delivery has been questioned in earlier VBC reports.

Belizians do not use preventive chemotherapy. Instead, presumptive and radical antimalarial treatments with chloroquine and primaquine are administered by village volunteer collaborators (VCs), clinics, and hospitals, the large majority being given by VCs.

Examination of blood smears for parasites is routine, and blood smears are mostly taken by VCs from villagers seeking treatment. The slides are sent to a vector control microscopist for analysis, with the results returned to the VC, frequently in 8 to 10 days.

Organizationally, the AACP, under the MOH, consists of a permanent secretary, director of health services, director of vector control, and approximately 25 program-specific subordinate positions, of which 13 are *Aedes aegypti* inspectors.

The NMCP is also under the MOH, with a permanent secretary and director of health services. It has approximately 61 program-specific positions, of which 27 are domiciliary spraymen.

The estimated combined AACP and NMCP annual budget is B \$1.45 million, exclusive of capital expenditures, DDT, and equipment greater than B \$100. Commodities procured with USAID funding since 1986 cost approximately US \$550,000. These materials range from consumable office and laboratory supplies and insecticides to sprayers and trucks.

2.2.2 Water Supply and Sanitation

Costs and Design Issues

The cost of improved water supply and sanitation systems is, of course, critical to the ability of the GOB and communities to develop and sustain them. The higher the initial capital costs, the larger the external support (donor funds) or GOB financial resources that will be needed to provide safe water to all Belizeans. If operating costs are high, communities will have a harder time collecting sufficient funds to conduct good maintenance, leading to deterioration of the water supply and sanitation infrastructure.

Currently, initial capital costs are high. Typical handpumps cost about US \$3,000 to \$4,500 (including well, casing, and pump). For a typical system for 10 families and an average of 6 people per family, the per capita cost is US \$50-\$75. For RWSs, direct materials and (paid) labor costs range from US \$100,000 to \$200,000 depending on the population served, community layout, and so on. Given an average population of 1,000, the per capita cost is US \$100-\$200.

The current water system engineering design approach reflects reasonable norms and standards. However, several areas for potential modification exist that could reduce costs. These include the water consumption level for which systems are designed, tank sizing procedures, and other issues. According to the Water and Sanitation Authority (WASA) design reports, the actual consumption of household standpost RWS-type systems is approximately 10 gallons per person per day (gpd). The RWSSP/WASA integration study estimates water production in the district towns of Orange Walk and Punta Gorda to be 18-48 gpd, with an average of 32 gpd. RWS systems, however, are currently designed for 20-35 gpd. A certain amount of oversizing may be appropriate to account for future toilet and septic systems, but the current design volume appears high, thereby increasing costs for pump systems and storage tanks. In addition, the storage tanks are sized to provide one full day's demand, which exceeds a common norm of 0.3-0.4 day's demand. When combined, these two factors lead to very large storage volumes. Especially in the case of

flat terrain, where storage tanks must be elevated, storage costs can be a major part of RWS capital costs.

An additional issue related to water consumption design is the assumption that users will abandon traditional rainwater catchment systems already existing after the RWS is installed. In many cases, due to preferences for rainwater, this is not the case. In general, the option of cost-effective improvements to rainwater systems has not been considered. Pilot efforts to develop ferro-cement tanks have shown promising results and may well have value for future application.

Modifying pipe network sizing procedures may also reduce costs via the use of computer-based optimal network design programs. These programs have proven useful in some countries and are worth investigating in Belize.

A fundamental issue that will affect cost is the overall level of water service; that is, the current design trend to provide a tap or service connection to each family. Such a design choice greatly increases distribution costs. Dramatic savings could be achieved with standposts shared by groups of families. However, such a "public standpost" approach may have a considerably negative impact on users' willingness to pay and the viability of cost recovery mechanisms. The GOB may have to reconsider its service goals for the next 10 to 20 years and decide if it will be able to find the resources to perpetuate the current RWS model.

While both WASA and RWSSP staff seem to be well attuned to the issues, additional benefit may be gained by reviewing procedures for selecting water sources. In many cases, there will be a fundamental choice between drilling a well in a community or piping water from a surface water source (spring or clear stream). A comparison of these two options should be made on the basis of both community acceptability and cost factors. In any case, there is a need for more flexible source selection guidelines.

Another option that merits exploration is the possibility of using modern wind or solar pumping systems. Traditional wind pumps have been used in Belize and neighboring countries for many years, though many are in disrepair. Newer models of these technologies have demonstrated their reliability, and their cost-effectiveness can be demonstrated under favorable conditions. A study of this option therefore is warranted.

It is worth noting as a final design comment that neither WASA, RWSSP, nor individual households make any attempt to deal with the poor drainage around many household water taps. While good aprons are installed with the India Mark II handpumps,

insufficient provision for drainage is made. Standing water around taps is a common but not well understood health hazard.

Involvement of Communities in Water Supply and Sanitation Operations and Maintenance

Rudimentary Water Systems

Rudimentary water systems (RWSs) are based upon the principle of very strong community involvement. They are currently managed by community boards of management (BOMs), consisting of a manager, treasurer, secretary, additional council members, and several paid staff. These elected bodies supervise staff, agree on tariffs with their community members, collect, disburse, and manage funds, and consider system expansions. The typical system has an operator to run the pump, conduct piping repairs, keep logs, and perform other operation and maintenance tasks. Other paid staff include a billing clerk to manage revenue collection and, in some cases, a paid treasurer to keep the books and handle cash.

Direct flat rate cost recovery is well established and apparently well accepted. Households that hook on typically contribute a US \$12.50 connection fee. Monthly tariffs are typically US \$3.50 per month for basic service, with additional costs if sinks, showers, or toilets are used. Expenditures include electricity or fuel for pumps, chlorine, staff wages, and maintenance costs. The RWS budgets include a budget line item for a sinking fund for the purpose of a replacement pump in the future. All of the RWS systems visited for this assessment have been able to build up a reserve of B \$3,000-\$6,000 for future maintenance and unexpected problems.

The BOMs essentially operate independent of the government, although they benefit from considerable training, technical support, and monitoring. They are responsible for ensuring that all operation and maintenance activities are conducted with their own resources (human, material, and financial). However, in some cases, BOMs have received technical and financial assistance for expensive repairs. This emphasis on autonomy and local cost recovery is a very positive development.

Handpumps

Community involvement is much less with hand systems than with RWSs. Currently village councils organize volunteers to conduct minor "above-ground" maintenance on these systems, or do some of these tasks themselves. No fees are collected, few tools are apparent, and no parts are locally available. In some areas the drainage around the

handpumps is inadequate. District-level maintenance crews spend most of their time chlorinating handpump wells or performing the more complex "down-hole" maintenance tasks.

Although the GOB policy calls for the establishment of "safe water groups" around handpump wells to conduct minor maintenance and ensure cleanliness around the sites, these have yet to be formalized in the areas visited. Similarly, the policy calls for an appointed village pump mechanic (with tools) to perform preventive maintenance and minor repairs, with support and backup from the district maintenance team. This type of three-tier maintenance system operates only informally and sporadically, and is not fully developed or formalized. Fortunately, the reliability of the handpumps has been good to date (especially the India Mark IIs).

While this lower level of involvement may seem disconcerting, it should be noted that the current situation is a considerable improvement over the situation in the early 1980s. At that time the systems were regarded as the property and full responsibility of the MOH and village people had no role whatsoever in handpump operation and maintenance.

The possibilities to increase significantly community involvement in operation and maintenance appear limited. Training and equipping villagers to conduct down-hole repairs would likely not be cost-effective. Given the long period of GOB control of the handpumps, there is no basis or historical precedent for GOB cost recovery for handpump water service or repairs. People have never paid to use them. In some locations, local villages have alternative water sources (hand-dug wells or rainwater), do not like the "heavy" groundwater the handpumps provide, and do not appear to have enough interest in them to be willing to pay anything. It appears that handpumps are the old "second rate" water supply technology.

The potential for private sector involvement in handpump operation and maintenance also appears limited. Because the pumps (especially the India Mark IIs) have been so reliable, the volume of spare parts required is so low and so sporadic as to present a very unattractive market. Trying to establish a private concern to provide maintenance or repairs is hampered by the poor cost recovery potential. The GOB may wish to consider a new policy of cost recovery of repairs to handpumps (whether conducted by GOB or private mechanics), but such a policy would probably run into many barriers.

Effectiveness and Efficiency of RWSSP Operation and Maintenance Activities

It is also worthwhile to examine the possibilities for improving the efficiency and effectiveness of the RWSSP water supply and sanitation operation and maintenance

activities. The probable merger of RWSSP into WASA may facilitate some improvements, but the adjustment period may pose short-run constraints in putting them into place.

The following is a list of current responsibilities for the RWSSP district coordinator, the district maintenance teams, and the central office.

District:

- Assist in installation of RWS and handpump systems.
- Chlorinate wells as needed.
- Execute repairs at handpump systems, and occasionally at RWS systems.
- Provide maintenance and technical training to village councils or RWS BOMs.
- Prepare monthly reports of activities to the central office.

Central:

- Maintain vehicles and well rigs.
- Stock spare parts and distribute them to the districts on an as-needed basis.
- Provide technical support to district operation and maintenance activities.
- Issue work orders for "blanket" tasks at the district level .
- Prepare overall activity reports to the MNR.
- Prepare annual budgets.

In addition, WASA prepares operation and maintenance manuals for each RWS system it is involved in designing.

It is obvious that the RWSSP is an office with dedicated skilled staff, but it has a number of constraints and weaknesses, including the following:

- A lack of staff for the district maintenance teams, such that each team must cover two districts instead of one;
- A lack of reliable vehicles in good condition;
- Difficulties in maintaining vehicles and well rigs;
- A weak parts distribution system at the district level, including poorly organized or nonexistent stores;
- No computer to utilize the present work order system to develop the record keeping required for good maintenance management; and
- A lack of systematic procedures (e.g., preventive maintenance schedules, task lists, etc.).

Most of these issues can be resolved with greater resources, and training and technical assistance in improved maintenance management at the central and district levels.

2.3 Institutional Development and Program Management at National and District Levels

2.3.1 Ministry of Health

Belize is currently facing an environmental health crisis similar to that of many other postcolonial countries. Although Belize emerged from colonial status into statehood comparatively recently, the development and institutionalization of an effective bureaucracy that can deal with the enormous problems of providing health, water, and sanitation services to a widely scattered, semi-educated, and hard to reach population, entails resource and quality problems similar to those of a large number of other postcolonial developing countries.

Looked at in perspective, Belize has made great strides in developing an infrastructure of health services in the decade since achieving independence. Its civil service staff is young, dedicated, and remarkably free of carryovers from the colonial period. Due to a high level

of motivation and considerable assistance from donors, most staff have received some training, although, as will be discussed, there are still important areas in which skills and knowledge need to be improved if the goals of the present plans are to be achieved.

The absence of strong postsecondary educational and technical institutions in public health is a major problem, since there are very few institutions to serve as sources of trained staff. Given the small size and meager resources available to the GOB, even relative to the country's small population, it appears that for the foreseeable future the country will have to continue to send its civil servants to regional, i.e., Central American and Caribbean countries, for management and public health training. The role of donors in this labor development effort is not fully known, but can be suspected to be considerable.

Malaria is at very high levels in some districts (e.g., Cayo), very low in others (e.g., Corozal), and intermediate in still others. The earlier strategy of malaria eradication has been followed until the present moment, that is, massive spraying of houses with DDT by teams of trained sprayers.

2.3.2 Ministry of Natural Resources

The RWSSP is one of two units reporting to the MNR with responsibility for the delivery of potable water. The other, WASA, is essentially an operating utility that focuses on urban water supply. RWSSP's primary aim is implementation of the rural component of the GOB target of "providing by the year 2000, 100 percent coverage to Belizians in the areas of potable water supply and sanitation." Currently, rural water coverage is 53 percent and rural sanitation coverage only 21 percent. To accomplish the 10-year goal, RWSSP focuses on construction (piped water systems and wells), community organization, monitoring, and health education. In various ways, the work of WASA and RWSSP is operationally linked, though each works under a separately approved GOB budget. As stated by the WASA CEO, WASA already "directs traffic." Unlike WASA, the RWSSP depends heavily on donor financing for all but recurrent expenditures.

A plan for integration of the RWSSP into WASA has been prepared for the MNR and is expected to be implemented in the 1992-93 fiscal year. Under this plan, two functional areas would be added to the WASA organizational chart and report to the CEO. These represent new activities currently undertaken by RWSSP. One functional area (labeled "RWSSP") would cover project identification, community development, health education, monitoring, and training. The second (labeled "Water Resources") would cover well drilling, well testing, and well records control. While the engineering and construction aspects of the RWSSP program should fit comfortably into the WASA environment, the consultant team shares the concern of many Belizian staff that the very important

community development aspect of the rural program may lack advocacy and be relegated to a place of secondary priority.

GOB policy calls for the construction over 10 years of 30 rudimentary water systems (RWSs), 710 wells and handpumps, and 12,160 (VIP) latrines. The capital cost of this program (including materials and indirect costs of community organization, education, and project identification) is estimated at more than US \$18 million. If operating costs are included, the total 10-year investment exceeds US \$22.5 million to reach the goal of 90 percent coverage. Donor assistance is expected to cover one-third of the capital cost. A consultant report to MNR has recommended that the GOB commit (with or without donor assistance) to funding levels sufficient to cover fully the costs of operating the rural program and provide also for the needed capital investment funds during the 10-year period. The report recommends consideration of an increase in the urban tariff to help cover the rural deficit, but there is substantial political resistance to subsidizing rural water with the current urban surplus, which, in any case, is only a fraction of the amount needed.

The current RWSSP organization includes units for community development and health education (12 positions, 3 vacant), operations and maintenance (30 positions, 12 vacant), well drilling and hydrology (26 positions, 5 vacant), equipment maintenance (6 positions, 1 vacant), administrative support (7 positions, none vacant), and project coordination (2 positions, both vacant). Thus total budgeted positions are 25 in Belize City (4 vacant) and 58 in the districts (23 vacant). Only five of these positions are permanent civil service. The others, including district coordinators, rig operators and crews, and health educators, are "open-vote," that is, without security or benefits. One of the vacant project coordinator positions is intended for an "appropriate technologist" to look at water supply alternatives such as surface water and protected rainwater catchments which most rural Belizians decisively prefer to pumped well water. This work currently is done by a contracted expatriate. The large number of operation and maintenance vacancies is due to a lack of vehicles.

RWSSP's activities fall into three categories:

- Working with rural communities to identify the need for potable water supply and improved coordination;
- Organizing communities to provide labor and in-kind contributions for water and sanitation systems; and

- **Supervising (with WASA) system construction (for RWSs) and well drilling.**

WASA claims responsibility for water quality testing before pump installation, while the MOH is responsible for subsequent water quality monitoring. There is some confusion on this point, however, as the MOH claims initial water testing is its responsibility. Both WASA and the MOH have water quality testing labs. System maintenance is usually on request and both RWSSP and WASA are involved somewhat in this aspect.

RWS systems, of which there are more than 30 now installed, demonstrate an exemplary degree of community "ownership" as reflected in management by local boards, operational cost recovery through user fees, and some local maintenance. Handpump systems, by contrast, have no cost recovery and little community involvement beyond some labor contribution at the time of installation. Handpump water is generally not highly valued, so the prospect of organizing communities around these systems is poor. Although the RWSSP is looking at alternative (and usually preferred) water sources such as springs, clear streams, and improved family rainwater catchments, GOB and donor programs continue a somewhat inexplicable focus on handpumps for communities too small to meet standards for the relatively expensive RWS option. Assessment of community preferences in this regard has been largely ignored.

RWSSP community organizing is severely hampered by a shortage of staff, training, appropriate educational literature, and transportation. Dependence on donor resources limits RWSSP flexibility and tends to shift attention to easily measurable physical targets for such things as pump installation and latrine construction. Political interference also serves as an occasional constraint to community organizing, as powerful individuals can often override both community wishes and RWSSP technical preferences on issues such as pump siting. The sheer logistics of reaching many communities and the lack of transportation is a further hindrance to effective community work. Finally, the tendencies of the RWSSP or donors to decide for people what their water system will be rather than allowing community input into possible selection of alternatives is a constraint to a sense of local system ownership.

RWSSP "health education" focuses mainly on community organization for system operations and water management. Informal coordination with MOH staff is good locally, as the field staff know each other well. Structured coordination is lacking, however, and this exacts a substantial opportunity cost in effectiveness of the limited field resources of the two ministries, which, with proper training, could each carry a much broader message.

2.3.3 Donor Roles

Several international donors, most notably USAID, CARE, and UNICEF, have been involved in the water and health sectors in Belize. There has been a general geographical distribution of rural focus, with CARE running projects in the northern districts of Orange Walk and Corozal, USAID active in the central areas of Belize Rural, Cayo, and Stann Creek, and UNICEF focusing on the southern province of Toledo. There also is considerable interaction reflected in USAID support for the CARE program and CARE's planned role in contract implementation of a new UNICEF project in Toledo. UNICEF and PAHO are working on a computerized water and sanitation monitoring system based on a generic model from outside Belize. Overall, however, there is not much evidence of operational coordination among donors, and the approach of each donor vis-à-vis the GOB varies considerably. CARE, for example, hires its own staff for health education and community organizing activities, establishing coordinating links to GOB agencies. Several other smaller NGO programs operate in a similar way. USAID and UNICEF work more directly through existing government structures but sponsor overlapping training programs. USAID has been the most active donor in financing equipment costs and technical assistance for institutional development.

Significantly, both the CARE project in the north and the USAID IPTBH Project are winding down. While UNICEF and Canadian (CIDA) assistance is expected for programs in Toledo District in the south, the GOB appears to be dependent on new external capital to continue new installations elsewhere.

All the above programs emphasize well/handpump and latrine construction, health education, and some community organizing. USAID and CARE also have supported RWS systems.

Evaluations of these projects have echoed similar themes, including

- The need to strengthen GOB's capability, especially in coordinated program planning and monitoring;
- The importance of health education activities;
- The importance of community participation for sustainability; and
- The need for interagency coordination and a strategic GOB sector plan.

Implementation of the current projects and designs for future ones tend to reflect "business as usual" rather than much innovation to address these needs. For example, none of these projects has seriously considered alternative water supply sources to the standard well and handpump approach.

In the area of vector control, PAHO has been active in Belize for more than a decade, in part with A.L.D. grant funds. PAHO has carried out training and research activities and provided commodities complementary to the USAID-supported vector control program. The USUHS laboratory working on anophelines in conjunction with the MOH has been mentioned earlier in this report (Section 2.2.1). Primary health care in Belize has been supported by many donors, including UNICEF, Medicins sans Frontiers (MSF)/Holland, Project Concern International (PCI), and several smaller NGOs and church-related organizations. NGOs pioneered and nurtured the community health worker concept in Belize but several major players, including MSF/Holland and PCI, no longer operate in Belize.

2.3.4 Coordination Issues

Most of the institutional problems found in the assessment are of a vertical rather than horizontal nature, meaning that the flow of information from the villages to the district and national levels is of little use since it is not used by decision makers as a basis for support to carry out the purposes of the system.

There is too little contact between senior staff and the district health committees, and when contact occurs it is primarily of a technical, short-term, problem-solving nature that does little or nothing for the basic processes needed to keep the wheels of environmental health services turning.

Senior managers spend so little time in the field and visit district health committee members so briefly that neither group is able to get much of a feel for the needs and goals of the other. There are of course alternatives to solving this problem, most of which will suggest themselves to the senior managers if they are convinced that this is a problem.

One solution to this would be to create, as recommended in the 1989 IPTBH evaluation but not yet implemented, a position of deputy director for vector control. This should be filled with an individual at the national level who has considerable technical knowledge of malaria, who can act as a liaison between the district health committees and the director.

The present cholera scare is an excellent opportunity to build on the coordination that has occurred among different parts of the environmental health system for defense against serious outbreaks of the disease. While malaria or dengue fever can just as easily break out in Belize, there is not the same urgency about the problem.

There is an urgent need for the MNR to advise or ask its staff at the district level to participate actively in the meetings of the core district health committee. In several districts, e.g., Toledo, the MNR has no participation in the committee, with the result that important information on the health impact of water projects gathered by the health inspector is not brought to the attention of those who design and implement water projects throughout the district.

Coordination at the national level is still an idea in search of a mechanism that will make it viable. The MOH, having lost control of the implementation of water project design and development, retains a strong interest in the health impact of water projects and would like to have more control over designs and sitings. MOH officials have the perception that the MNR is less interested in coordination. In fact, field coordination is often quite good but the bureaucratic system provides limited institutional support. Options for addressing this problem include the following.

- The technical and managerial staff of both ministries must have a fuller and clearer understanding of the issues involved in monitoring water for health. Both staffs tend to think that their concern ends when water coming out of a tap tests free of unacceptable bacteria and minerals. Neither ministry addresses the major issues about creation of vector sites, such as the design of rainwater catchments which, in some cases, are prime breeding areas.
- The introduction of such large amounts of water to villages and houses, without at the same time planning for gray water or wastewater disposal and treatment, will rapidly create a much more serious problem that needs to be studied by a high-level, technically competent group.
- Institutional mechanisms must be created to capture and apply expertise to guide both MOH and MNR on some of the problems of environmental health associated with water projects. A coordinating committee could be re-formed but would only be viable if it met with expert advisors who were not attached to

either ministry but were either donor supplied, or from a higher education institution or a different ministry.

Chapter 3

RETHINKING ENVIRONMENTAL HEALTH STRATEGIES

3.1 Role of the Community

After a community-based health committee is formed in Belize, neither its function nor its work plan is clear. At the present time, neither national nor district MOH or MNR staff are aware of the specific vector- and water-related behaviors needing change so that intended health outcomes can be realized. As mentioned earlier, given the resource base, especially the severe shortage of labor, it seems increasingly clear that communities will have to play a greater role in the planning and implementation of their health programs. It is unrealistic to expect communities to monitor health impacts on their own. Facilitating health behavior changes, on the other hand, is an activity in which communities can play an active role.

Following the collection of data on community risk behaviors, district and national staff/facilitators will review the results of the focus groups and observation with the community health committee and, where possible, the village council and alcalde. For example, using the data from the focus group and observations conducted by the HECOPAB and RWSSP team, the areas that might be considered and prioritized for action include

- Protection of existing sources of rainwater;
- Hand washing after defecation; and
- Drainage of standing water near taps or wastewater dumping areas.

This list will then be reviewed with committee members who will help decide which activity they may want to implement. The protection of rainwater might consist, for example, of the following actions:

- Covering rainwater containers with clean net or other suitable covers;
- Cleaning out containers monthly;
- Treating rainwater for mosquito larvae as often as necessary;

- Chlorinating water;
- Using a dipper to get water out of containers; and
- Placing dippers in a safe place where they will not be contaminated.

These behaviors and the reasons for their selection can be explained to community people.

In this way, working with the facilitators, the village health committee can make a list of what it wishes to address. Based on both the public health hazard that existing behaviors might cause and consideration of what village people feel is important to them, the list is then prioritized. For example, one reason for addressing the sanitary conditions of the rainwater catchments might be the threat of cholera.

The facilitator and the village health committee determine the indicators that they wish to develop to measure progress locally. For example, by a certain date so many members of the community will have covers on their rainwater containers, so many will have dippers installed, and soon. The health committee will monitor progress, with the facilitator from the district/national health committee acting as a promoter. Similarly, the role of the national and district-level coordinators will be to work with communities to monitor overall progress being made in environmental health in their area of responsibility.

Some of the indicators that district-level staff may use include the following:

- Community health committees are organizing focus groups.
- Community health committees are reviewing focus group results.
- Community health committees are developing a prioritized health plan.
- Community health committee members are making a predetermined number of house calls to talk about specific behaviors.
- Community health committees are developing their own educational and training materials, songs, or stories.

In any case, it is imperative to include community-set priorities as a point of departure. Thus, from data gathering through action to monitoring, there is a dual approach to problem solving. First, the action to be taken by communities themselves (both collective and individual) is defined; second, the actions that relevant government agencies need to take to support community action are determined. This approach will help to redefine the role of government health staff from one of implementing top-down programs to that of facilitating and enabling.

3.2 Role of the District

Perhaps the most daunting problem facing the environmental health institutional structure of Belize is the lack of financial resources with which to carry out needed programs. Nowhere is this felt more than at the level of the district health committees (DHCs), whose roles and responsibilities include training for village health workers (VHWs), volunteer collaborators, and village health committees.

The long-term solution to this problem, which is being studied under another USAID-supported effort, is undoubtedly the creation of more wealth and income and the taxation of the same. At the present stage, there is no health insurance scheme and virtually no budgetary support for any outreach activities anywhere in the country.

DHCs and some village councils carry out their work by raising funds locally, through fairs and dances. In Toledo this provides some US \$1,000 annually with which to pay for transportation and food costs for the training of VHWs and volunteers. In Cayo a similar pattern was found, where bake sales, with labor and ingredients supplied by the civil servant members of the council, subsidize what should be paid for by the government.

This approach, while noble in conception, virtually guarantees that the effort to reach out and train the villagers will fail since the amount of money, at least in Toledo, is so little that, given the present training model, it would take at least four or five years to reach the remaining villages with even one training program.

If, however, US \$1,000 is to be the only resource, and the goal is to reach as many villages as possible, district councils may need to explore other, more cost-effective ways of planning and implementing educational programs in the villages. Their present training model costs US \$250 for each cluster of villages and takes about two months to implement. The transport of so many villagers to a central point for training on numerous occasions could largely be avoided, for example, if a different strategy of training a number of selected village health workers as trainers, e.g., "training of trainers strategy,"

were carried out centrally, followed by supervision of their training by district professional staff.

Some of the roles to be carried out by the districts are already in place and functioning, although they may need expansion and modification; others need to be created from whole, through training and structural changes.

The key roles and responsibilities district health teams need to play to expand community activities are described below.

Training of Village Health Workers, Volunteers, and Health Committees

This function needs to be continued. The momentum gathered by the Project Concern activities should not be allowed to lapse, since there are so many villages that have not yet been reached. In addition, there are many villages that, although they have been reached, have not yet established many activities of their own.

To make this activity sustainable the MOH should consider establishing a "matching funds" proposal. Under such a plan, DHCs and communities would continue to raise funds as before, but every dollar raised would be matched by a dollar from the government. If the government is unable to fund such a program, donor organizations might be approached. This system could stay in operation until each village, in each district, has a trained and functioning health/water committee, or until three years have passed, whichever comes first. This is a concept worth considering during the action planning workshop.

Training of community health workers should include the following:

- How to collect community behavioral and needs data through "focus group" meetings and behavioral observation techniques
- How to analyze and use the data in planning training and other interventions with villages
- How to record, collect, and use positive slide data to identify malaria endemic areas
- How to analyze the risks of disease from water projects and naturally occurring water

All malaria workers need to absorb this training in order to become integrated into the full health team. These workers need all of the training listed above, as well as the following:

- Training in how to analyze district and village data to target areas at highest risk of vector-borne disease transmission
- Training in entomology to enable MOH workers to assist villagers in understanding malaria transmission and the need for vector control
- Expanded training in first aid and primary health care services so that other district health workers view malaria workers as full members of the district health team

In order to conduct this training and to support expanded community-level participation, district health staff themselves need upgrading in such areas as facilitation and supervision, training-of-trainers methodologies, planning and monitoring, community finance and management, and educational materials development.

3.3 Technical Operations

3.3.1 Vector Control

During the 20th century, malaria control has evolved through three major phases: 1) vector-host separation and drug (quinine) intervention, 2) eradication, and 3) control/management.

During the first phase, before World War II, when adult mosquito pesticides were not generally available, drug intervention, house and cistern screening, larviciding, and source reduction of larval breeding areas were employed.

In the second phase, two important tools developed just prior to and during World War II radically changed the approach to malaria control—DDT and chloroquine. DDT became available during World War II (for military) and later for civilian use.

In 1955, the World Health Organization (WHO) formally adopted the goal of worldwide malaria eradication, and implementation was begun in 1957. Although there were dramatic successes in temperate areas, success in the tropics was short-term and the

eradication approach was mostly abandoned by the late 1960s. By the early 1970s, when the third phase of control began, it became apparent that instead of a vertical campaign against malaria, an integrated approach had to be adopted.

IPM or integrated vector control (IVC) simply refers to using multiple control methods in concert. Some of the elements involved include:

- Biological control
- Environmental control
- Chemical control
- Health education
- Community participation

There is no "right" combination of these elements, as different environments produce different requirements. Operational research and experience will produce the proper "integrated" approach from a given area. *Aedes aegypti* was successfully eradicated in the 1950s-1970s in 20 Latin American and Caribbean communities. However, it has become reestablished in almost all of these due to changing patterns of urbanization and water-use patterns due to poor services and population pressures.

Dengue (and DHF) first surfaced as a health problem in the Americas in the 1970s and has now become one of the major urban problems of the hemisphere.

Successful IPM requires a thorough understanding of the epidemiology of the disease, the ecology and biology of the vector, as well as the needs and cultural practices of individual communities.

3.3.2 Water Supply and Sanitation

The following paragraphs outline recommendations for improving the sustainability of the rural water supply and sanitation program in Belize. This section outlines basic recommendations.

Review, revise, and formally adopt the policies on construction and maintenance of water supply and sanitation systems: The policy document from July 1989 was never formally adopted. It should be reviewed by RWSSP, WASA, and MOH, updated as necessary, and formally adopted. A clear formalized policy framework is needed for policy implementation and planning. Long-term service goals should also be reviewed and incorporated into the policy framework.

Review and revise RWS design procedures: RWSSP and WASA should review and revise as necessary procedures for source selection, design consumption, tank sizing, and network design.

Evaluate and apply alternative technologies: Ferro-cement rainwater tanks, and low-cost surface water treatment offer interesting possibilities to reduce overall water supply costs and minimize maintenance requirements. RWSSP should explore commercialization possibilities for these approaches, especially the rainwater tanks. The use of wind and solar energy looks promising, but will require a feasibility study.

Consider increased community financial contribution to RWS systems: The GOB could increase overall financial resources for its water program by asking RWS communities to pay the full cost of GOB-executed repairs and some portion of capital costs, perhaps via a revolving fund for development of water and sanitation systems in other communities.

Promote the development of a district- or national-level association of boards of RWS systems: Such an organization could buy parts at attractive prices, exchange experiences, set up "twinning" arrangements, provide training, set norms and standards, and lobby the GOB. It could be sustained by contributions from member BOMs.

Strengthen ongoing monitoring and support to RWS systems, handpump systems, and latrine programs: The GOB should continue to play the role of motivator, facilitator, trainer, and evaluator, phasing out direct subsidies to communities. A performance-based incentive program for RWS could be an effective part of such a monitoring effort.

Improve maintenance management at the central and district levels: Introduction of improved maintenance planning, preventive maintenance schedules, work order systems, cost accounting, and system records, as well as parts storage and distribution, will improve efficiency and effectiveness. This will require an input of human, material, and financial resources but will be cost-effective in the long run.

3.3.3 Integration

Vector control and water and sanitation are integral to each other. A striking example of this is the Tennessee Valley Authority (TVA) Project of the 1930s. Without initial design teamwork between the civil engineers and public health vector control sector, this extensive damming and water diversion hydroelectric project would have created tremendous malarious areas in the middle and mid-south portions of the United States. What actually happened was a decrease of anopheline breeding and near elimination of malaria. Although the methods used are not applicable in Belize, the integration of economic sectors is a good model.

In Belize, there appears to be a genuine desire at all levels of MOH and MNR to work together to couple the common points of public health (vector control and water-borne diseases) in design and public education. To be effective, public and private water projects must be jointly planned and executed.

3.4 Building Effective Environmental Health Institutions

The following describes some of the strengths, weaknesses, and policy options the baseline assessment found concerning institutional capacity, all of which would be discussed as policy alternatives in the action planning and policy workshop proposed for early 1992.

3.4.1 Planning

Planning is currently carried out as an incremental exercise; that is, the programs and achievements of the past year are examined, and, depending on the amount of money available from the MOH, budget items are added to by a small percentage, or are not funded, depending on priorities. No evidence was found that the MOH is engaged in an analysis of the needs of an alternative program, or is considering the steps required to make a radical shift from one strategy to another.

Having noted this, it should be said, as indicated below, that the MOH is currently preparing to develop its five-year plan; the ministry may want to consider using the proposed policy planning workshop as an assistance in this effort.

As suggested by the goals of the action planning workshop cited above, and as found by the baseline surveys, the absence of comprehensive planning at virtually all levels of

institutions makes it very difficult for the GOB to consider a major policy change such as proposed in the 1990 Project Paper Amendment.

District health committees and most of the village health committees or village councils consulted reported that their planning has primarily consisted of the submission of lists of resources to the MOH of what they need to carry out their work. Experience soon proved, however, that few if any of their requests for resources for training of village health workers, or spare parts for equipment and vehicles, or other tools and resources, were met.

The development of alternative strategies, plans for raising resources, or research to demonstrate the effectiveness of alternative approaches, have been neither tried nor considered at either the national or district levels.

Technical data on positive cases of malaria are rarely used, as they might be, to trace actively the cases to their source, where radical intervention by malaria staff, working closely with the local population, might have relieved or eliminated the problem.

Supervisors and other field staff, for the most part, are aware that the present government policy of "ULV spraying of every village with more than 100 houses" is wasteful and can only exacerbate the problem by hastening the day when resistant strains of *Aedes aegypti* evolve in Belize, but they lack a dialogue with which to explore the alternatives with senior management.

Most DHCs also reported that they had very little interaction with the director of vector control or with the director of primary health, both key officials as far as planning, resource allocation, coordination, and support of efforts at district and community levels are concerned.

In order to have more effective targeting of vector/disease sources at the district and community levels, and to improve overall planning for resources to support district/community programs, there is a need to create a simple and effective management information system that will enable staff and village committees to reduce risks of disease by tracing sources of active cases to the point where they can easily be contained through local action.

3.4.2 Staff Development and Training

As indicated above, the environmental health institution, composed as it is of both public health and water units, along with the government of Belize as a whole, suffers from the lack of public health, engineering, and other postgraduate training.

Much of the staff training that has been done, particularly at the critical intermediate levels of program supervisors, is not being employed. For example, staff members were recently trained at Tulane University and USUHS in stratification and surveillance, so critical for cost-effectiveness in vector control. Few of those receiving training are still in the system.

Senior managers may want to consider taking advantage of short, intensive exposure to management skills, especially those in planning, supervision, and labor development and monitoring of programs. Lack of awareness of the role and importance of these factors would be serious handicaps not only in managing the present programs, but in bringing about changes needed in strategies and directions.

Some senior managers may want to take the opportunity to understand more fully the implications of alternative, integrated strategies of vector and disease control as currently being developed and tested in major institutions abroad, before committing the country to radical alterations of long-standing strategies.

At present it is assumed by some senior managers that district managers can recruit and train new staff by themselves, using only on-the-job training, without further support or training for themselves. Yet, without at the same time upgrading the supervisors with new technical and managerial knowledge, it is unlikely that this system can introduce any innovation or change of course. It is of course impossible to train others in what one does not oneself know.

In light of the action-oriented objectives of this consultancy, it is recommended that the issues of staff development and training be incorporated into the phase three policy planning workshop in order for the GOB to become fully involved in the design and implementation of the training. Such interaction would form a closely linked component of an overall strategy for moving in the direction of supporting more community-based and cost-effective delivery of services.

3.4.3 Use of Staff Resources

Malaria workers, particularly inspectors and supervisors, should be considered as a potential, but highly underdeveloped resource, for the health services. This is particularly important if the vector control program is to be rationalized into a more targeted approach, thus freeing many of the NMCP staff for other functions. Among the functions to be considered and discussed during the workshop are the following.

- To be able to carry out all of the functions of *Aedes aegypti* inspectors, whose functions they could assume when A.I.D. funding is no longer supporting the latter group.
- To expand skills in first aid and primary health care since in isolated areas NMCP staff are often the "barefoot doctors" on the scene. (In some districts they have been trained on the Werner manual, *Where There Is No Doctor: A Village Healthcare Handbook* [c. 1977, Hesperian Foundation, Palo Alto, California]; this should be the minimum level, as many should be trained in a more advanced course.)
- To have skills enabling them to work actively in educating communities on how to use alternative methods to reduce risks of vector-borne diseases once these have been proven effective. This would include showing villagers how to use data from positive cases to trace sources of infection, and simple and effective methods of eradicating vector breeding sites. It would also include educating villagers on inspecting rainwater catchments as vector breeding sites, looking at drain-aways from pumps and other water projects to determine if they are creating vector hazards, and working with teachers and children as sentinels for finding and eliminating vector breeding sites or reporting active malaria cases in the family or village.
- To increase skills in learning, with villagers, what behaviors constrain disease control and to learn how to plan with the villagers using data collected to increase community action against risks of disease.

3.5 Institutional Coordination

With the encouragement of the IPTBH Project and also, in part, as a response to the UNICEF-inspired goal of water and sanitation for all by the year 2000, the GOB formed a National Coordinating Committee on Water and Sanitation that functioned briefly in the mid-1980s. The committee's major output was a set of National Policies for the Operation and Maintenance of Water Supply and Sanitation Systems. These policies, dated July 1989, also incorporated certain HECOPAB roles and thus provided a rather detailed and well-thought-out road map for operational coordination in community health. They never received formal government approval, however, and have thus had limited influence.

The coordinating committee also ceased to function in mid-1989, although participants generally recall it as serving some useful functions. Representation on the committee was broad; in addition to the MOH and MNR, it included officials from the Ministry of Social Services, the Ministry of Education, and representatives of donor agencies active in the sector. While the committee was active, it met monthly in USAID facilities in Belize City. It was chaired by the CEO of WASA or the MNR assistant permanent secretary.

There are a number of reasons why this well-intentioned coordinating effort foundered. Perhaps the greatest was a certain artificiality in that it was a very top-down effort not directly rooted in community needs or administrative realities. As a result, the current consultancy hopes to create a more bottom-up dynamic of coordination so that specific agendas requiring policy-level coordination can be identified before a committee is called into existence. Thus, although all donor projects recommend the re-creation of this committee (and, in some cases, an interministerial policy committee in addition), the consultancy suggests that energies are best put initially into operational coordination and that a decision regarding the merit of a top-level coordinating committee should be deferred until the phase three action planning workshop is convened. In this way it will become a Belizian response to need (if any), rather than a donor idea based on an abstract belief in coordination.

Specific reasons why the coordinating committee failed, as cited by Belizian members, are instructive:

- The membership was too large.
- Attendance was sporadic, especially on the part of donors.

- **Members (appointed by position rather than name) often sent other staff to represent them so that each meeting started with little institutional memory.**
- **Goals and objectives were unclear beyond a vague mandate to “coordinate.”**
- **There was no consumer or operational input from community residents or operational staff.**
- **A certain continuing suspicion lingered between the MOH and MNR following transfer of the rural water program to MNR from MOH in 1986.**

An interesting contrast is provided by the currently active Cholera Committee, which has arisen in response to a specific recognized need and therefore has a clearer mandate and *raison d’etre*. As this report has highlighted throughout, however, there is a need for coordination across a broad front. A summary list of categories of necessary MNR-MOH coordination for effective environmental health would include at a minimum the following:

- **Community assessment and feedback of that information into program planning;**
- **Health education—strategies, materials, delivery;**
- **Staff training and development;**
- **Community mobilization and organization, especially village health and water committees;**
- **Water quality testing and feedback of information;**
- **Other information sharing, including a comprehensive data bank of water and sanitation activities;**
- **Linking water system planning to vector control strategies;**
- **Resource management—prioritizing and allocation; and**

- **Integrated program monitoring and evaluation.**

Consideration also should be given to Ministry of Agriculture involvement in any coordinating committee, in view of evidence of increasing toxicity in rivers from agricultural pesticide run-off and possible birth defects resulting from this chemical contamination. For example, a very high number of spina bifida cases is being reported in Toledo District. Cayo also reports increasing levels of toxicity in its rivers, also from citrus plantation chemical use.

Addressing these issues is the goal of the phase three workshop and the phase two information gathering and analysis that is to precede it. Out of that workshop is to come an action plan that details the coordination mechanisms that are necessary and desirable and the resources to support those coordination activities.

Chapter 4

PHASE TWO AND THREE OF THE PLANNING PROCESS

4.1 Road Map and Milestones

Information Gathering

The purpose of phase two community-level information gathering is to support appropriate organizational coordination between the RWSSP and MOH (HECOPAB) to develop a more effective and integrated health strategy. Specifically, this means to

- Better understand behaviors, practices, and preferences of people in vector control and water and sanitation; and
- Better understand the capability of community-based organizations to implement community-based training and planning for improved vector control and sanitation practices.

To support this information gathering process, RWSSP and HECOPAB staff worked with the consultant team to develop preliminary instruments (interviews, focus groups, and observations) to identify community behaviors—both organizational and environmental health related. These instruments were field tested in Cayo, Orange Walk, and Corozal districts and then modified and simplified based on those experiences. The revised instruments then were tested in Toledo District with Belizian staff taking the lead.

On the basis of this experience, the above staffs developed a plan of action to continue testing and application of the instruments and to develop an inventory of relevant health behaviors for integrated, community-based planning for vector control and environmental sanitation. The next steps in establishing coordinated operations between the RWSSP and HECOPAB include the following:

- RWSSP and HECOPAB staff will test at greater depth the observational instruments by spending 24 hours in a household in a village.
- These staffs then will review and finalize the instruments with MOH and MNR colleagues.

- **MOH and MNR staff will train district-level coordinators and staffs of RWSSP and HECOPAB in methodologies of community needs assessment.**
- **District-level staff will work with representatives from one or two villages to develop community planning and training arrangements.**

The proposed date for review of lessons learned and development of an integrated, community-behavior-based health plan is February 20, 1992.

Roles and Responsibilities Analysis

At the central level and extending to include district staff, an exercise to define roles and responsibilities is recommended. Effective coordination can only occur if roles and responsibilities are defined and overlaps and gaps identified. While this mainly concerns the MCH and MNR, other ministries, such as Environment, Social Services, and Education, have certain roles to play as well. A preliminary list of key functions as a basis for this analysis includes the following items.

- **Policy Formulation**
 - **Water Resource Management**
 - **Water Supply and Sanitation**
 - **Water- and Vector-Borne Disease Control**
- **Resource Allocation**
- **Policy Coordination**
 - **Interministerial Committee**
 - **Environmental Health Sector Policy Statement**
 - **Reporting and Other Communication**
- **Operational Coordination**
 - **Technical Coordinating Committee**
 - **Donor Management and Coordination**
- **Health Education**
 - **Health Issues**
 - **Community Organization/Empowerment Issues**

- **Training**
 - Supervisors
 - District/Local Staff
 - Community Leaders/Volunteers
- **Community Outreach**
 - Assessment
 - Mobilization/Facilitation
- **Monitoring and Evaluation**
 - Water and Sanitation
 - Water- and Vector-Borne Disease Control (Health Statistics)
 - Community Participation
 - Water Quality Control
- **Water Supply and Sanitation Systems**
 - Site Selection
 - System Design
 - Construction and Installation
 - Maintenance

The analysis should consider 1) who is now responsible, 2) what overlaps and gaps exist, and 3) what reallocation of responsibility might be beneficial. The analysis could go beyond definition of primary responsibility to consider also who has the necessary authority, who provides needed support, and who possesses important information. With the help of a consultant from the Belize Institute of Management, senior MOH and MNR officials will go through this exercise as preparation for the action planning workshop to be held in the February-March 1992 period.

4.2 Methodology

As noted above, the methodology for assessing community health behaviors in vector control and water supply and sanitation was developed by MOH and MNR staff with the consultant team. It includes the following key elements.

Organizing a Focus Group

- District- and central-level MOH and MNR staff visit the community and meet with village leaders to explain the purpose of

the exercise and request recommendations of several men and women over a representative age range. MOH and MNR staff randomly select four to six women and four to six men.

- The village leader along with facilitator(s) from the MOH and MNR visit homes of the proposed focus group participants and decide on a convenient date and place. The facilitators also should determine whether any proposed focus group member is uncomfortable about participating and allow for the selection of the next person on the list.
- During this process, facilitators can gain insight on leadership styles in the community and perceptions of local interaction with district-level staff.

Guide for Focus Group Questions

- Diseases in the community: What are they? Where do people think they come from? What do people call them, and what do they do about them? (Depending on what people select, the line of questioning can be directed either toward water and sanitation practices or vector control practices.)
- Vector control: What about mosquitoes? Can they make people sick? During which seasons and at what times of day? Do people do anything as a community or as individuals to stop mosquitoes? What are community perceptions of spraying operations? What treatments are used for malaria?
- Water supply and sanitation: What are water sources and preferences? What is clean and what is dirty water? What is tasty? What willingness to pay exists for improvements of preferred sources?
- Sanitation: What are practices regarding latrine maintenance and willingness to pay for future latrines? What other methods of excreta and wastewater disposal are used?

Observation (24 hours with a family)

- **Water use:** Where is it located? Is it covered? Where are dippers kept? Are mosquito larvae present?
- **Wastewater disposal:** Where does used water go—from laundry, from washing vegetables and tubers, from cleaning house and latrine?
- **Excreta disposal:** How are latrines used and maintained? Are hands washed after using latrines? Where, when, and how?
- **Good hygiene:** Are raw foods eaten? If so, what types, and how are they handled?

4.3 Resource Requirements

No major resources are required to fund phases two and three of the action planning process beyond what already has been programmed in the IPTBH Project Paper Amendment. This is true even though phase two information gathering is a new activity and the purpose of the final workshop has shifted somewhat from policy discussion to a more product-oriented action planning exercise. Plans for the study tour envisaged in the Project Paper Amendment should be reexamined at the action planning workshop and such a tour continued only if it serves a very specific purpose agreed to by the participants.

Various potential opportunities for use of GOB and/or project resources over the remaining life of the IPTBH Project have emerged during the phase one work. However, the emphasis of this report is that decisions about such investments (whether from donors or from the GOB) should be made as part of a planning process that moves from a statement of broad goals to shared commitment to strategic objectives, and only then to detailing of actions and resources required. This will be the intent of the action planning workshop of phase three. (See Appendix A for draft workshop schedule.)

4.4 The Action Planning Workshop

4.4.1 Objectives

Since the vector control division of the MOH is currently charged with the development of a new vector-control plan and strategy, the action planning workshop with senior MOH and MNR senior staff proposed for early 1992 may come at an opportune time for linking and integrating USAID assistance in institutional development and strategic change with the ministry's own planning cycle.

This workshop should serve the critical purpose of focusing the attention of senior and district staff of both MOH and MNR on the following.

- Debate among donors about use of insecticides
- Data on health behaviors at the level of the health services participant, i.e., the people in the towns and villages of Belize who are being involved in the process of protecting their own health through disease prevention and safe water and sanitation practices
- Systemic changes and staff development, which will need to be made by the bureaucracy in order to support the efforts at decentralization and more coordinated health/water services at the levels of the towns and villages of Belize
- Producing commitment and action plans that would set in motion a long-term effort to introduce a new and more sustainable strategy for environmental health
- Support for planning at the district and village levels that would increasingly involve the large number of villages in forming health committees as instruments by which services can be planned and provided based on the actual needs and wants of the villages
- Improved teamwork between, as well as within, the different units of the environmental health system, composed as it is of several ministries, and the respective layers within those ministries

4.4.2 Format

Major Issues To Be Addressed

From Behavioral Assessments (Focus Groups)

- **What are the values and behaviors that reduce and increase risks of disease and illness in the community?**
- **How can these values and behaviors be affected by program interventions?**

From Institutional and Technical Assessments

- **How do present program strategies and interventions in the communities promote and/or constrain health?**
- **How can interventions be (re)structured to better target and modify health-related values and behaviors?**
- **How can we improve the cost-effectiveness of interventions through targeting of key community values and behaviors?**
- **How can roles and responsibilities of different actors in the system best be allocated to achieve synergism and cost-effectiveness?**

Chapter 5

CONCLUSION

Belize, like most other developing countries trying to suppress the risk of vector-borne and water-based diseases, is currently facing a serious crisis in attempting to find and institutionalize sustainable, alternative approaches to the enhancement of environmental health through vector control and water and sanitation improvements. The alternatives available to Belize appear to be few and very stark:

- To continue on the present course while seeking the resources to continue water system construction and massive malaria/dengue spray programs in the absence of donor support, a case of "pay me now, or pay me later" in terms of the environmental consequences and future costs of combatting resistant varieties of vectors.
- To strengthen and decentralize Belize's capacity for controlling diseases by leading the way for other developing countries toward the establishment and testing of a less harmful, more participatory environmental health integrated strategy. Such a strategy would entail the following:
 - Obtaining better information on communities' behaviors, needs, and capacities for overall environmental health, and using this information to improve planning and to ensure that diseases would be controlled in less costly and more effective, preventive ways.
 - Developing the capabilities of village-based institutions to plan and monitor health-related behaviors and actions, including vector control alternatives to spraying, such as source reduction, bed nets, and appropriate health education, as well as the unanticipated health consequences of water development projects.
 - Organizing and training communities for collective and coordinated action, particularly by raising awareness about the role of water, and water project development, in health and disease.

- **Better coordinating vector control with water development projects carried out by MNR and other governmental and nongovernmental units at the district level, including development of the abilities of district-level health teams to assist communities to plan and monitor coordinated environmental health activities.**

- **Developing an effective and supportive case policy framework to enable communities to take the lead in defining their needs and selecting from options for water supply and other environmental health interventions.**

Appendix A

DRAFT WORKSHOP SCHEDULE

Day One

Opening Remarks Minister(s)

Introduction Staff

- Goals/Purposes
- Project History
- Expectations and Introductions
- Schedule/Activities of Workshop

Perspectives of Policymakers MIN/PS MOH/MNR
(fishbowl)

Perspectives of Districts/Villages DHCs, VHCs
(fishbowl)

Perspectives of GOB/USAID Assessment Team Team Members

Plenary and Discussion/Questions for Next Day

Day Two

Plenary

- Recapitulate Day One, Expectations
- Review List of Behaviors/Values to Modify
- Review Group Composition and Tasks
- Guidance/Exercise on Teamwork/Coordination in Groups

Task Force Group Exercise: Describe Practices and Values, Indicators for Program Goals
(Attached)

Group Reports to Plenary—(Capture Data on Charts)

Plenary Discussion

Preparation for Day Three: "How Do You Want To Integrate What We Have Done With Your Planning?"

Day Three

Plenary: Look at Present GOB Planning Processes and Ask What Can Be Done to Incorporate What We Now Know into Strategic Planning Processes.

Carry Out Day as Decided By Group

Closing and Evaluation of Workshop

Appendix B

PERSONS INTERVIEWED

MNR

D. Aguilar, PS
Winston Michael, CFO WASA
David Wright, Appropriate
Technologies,
RWSSP
Doug Wilson, Director RWSSP
Anthony Nicasio, Health Educator
Donnald Bennett, Chief Well Driller

MOH

Kathy Bottaro, HECOPAB Director
Fred Smith, Permanent Secretary
E. Vanzie, Director of Health Services
H. Linares, Principle Publ. Health
Inspector
G.P. Flores, Sr. Publ. Health Inspector
Albert Roches, Sr. Public Health
Inspector
Roguel Rivera, Vector Control Program
Jorge Polanco, Director Vector Control
Program
Francis Westby, Director, Malaria
Control Program
Javier Chan, Health Inspector

District

Louise Neal, Chairperson, DHC Cayo
Ernest Borland, Health Inspector
Alexander Firser, Health Inspector
Dr. Baldomino Barboze
Corozal District Medical Officer
Sister Marian Joseph Bairdy
Punta Gorda

Cayo District

Louise Neal
Ernest Borland
Alexander Fraser
Alfonso Ayala
Carmen Dacak
Martha Sasa
Moira White

Toledo District

Thomas Tent, Public Health Inspector
Harry Johnston, Aedes inspector
Ronald Manager, P.H.C. Coordinator
Arleen Archer, Microscopist
Orlando Chan, Malaria Evaluator
Deborah Rascascio, Rural Health Nurse
Hazel Cayeteno
Dr. B. Raju, District Medical Officer

Other

J. Neal, Acting PS, Soc. Dev. Dept.
E. Dekas, Soc. Dev. Dept.
Kathy Kasprisin, UNICEF
Estilito Laria, WS&S Project
Coordinator, CARE
Larry Holtzman, Country Dir., CARE

Appendix C

DISTRICT HEALTH EDUCATORS

Corozal District

Ms. Lupita Quan
Dist. Coordinator
CARE Office, Orange Walk
158 Sibun St.
Belize C.A.

Orange Walk

Ms. Sanchez
Dist. Coordinator
CARE Office, Orange Walk
158 Sibun St.
Belize, C.A.

Orange Walk

Mr. Fausto Chan
Health Educator
CARE Office, Orange Walk
158 Sibun St.
Belize C.A.

Cayo

Mrs. Lourdes Hales
Dist. Coordinator
Primary Health Care Office
18. Hudson St. San Ignacio
Belize C.A.

Cayo

Ms. Miora White
Health Educator
Primary Health Care Office
18. Hudson St. San Ignacio
Belize C.A.

Stan Creek

Ms. Regina Neal
Dist. Coordinator
Primary Health Care Office
Dangriga Hospital
Belize C.A.

Toledo

Mr. Mangar
Dist. Coordinator
Primary Health Care Office
Punta Gorda, P.O. Box 15
Belize C.A.

Toledo

Ms. Cherry Mae Auilez
Health Educator
Primary Health Care Office
Punta Gorda, P.O. Box 15
Belize C.A.

Appendix D

SCOPE OF WORK

OBJECTIVE

The purpose of this PIO/T is to provide USAID/Belize with technical assistance needed to strengthen the institutional capability at all levels—central, district and community level, in order to ensure sustainability of improved water supply and sanitation activities and control of vector borne diseases.

SCOPE OF WORK

Background:

In order to accomplish USAID/Belize objectives, this PIO/T shall require technical services for three discreet but interrelated tasks. These tasks were identified during a two week technical assistance mission requested by the Mission in July of 1990 to assist in the design of activities which will respond to the issues identified in the evaluation of the Improved Productivity Through Better Health Project (IPTBH) and will provide the basis for the Project Paper Amendment for the same IPTBH. Two consultants, one specializing in water supply and sanitation and the second in vector control, met over a period of days with high level GOB officials from Ministry of Natural Resources (MNR) and Ministry of Health (MOH).

The consultant team held a four day workshop with operational staff from both Ministries in order to identify constraints for implementation of IPTBH and outline the activities required to meet the project's overall objectives as well as address the issues raised by the evaluation. What was proposed is a three part technical assistance activities over a period of four to six months. The following tasks were identified:

1. Baseline assessments for institutional analysis, community capability, operations and maintenance management and vector control.
2. A study tour to LAC countries for 6 to 10 high level government officials.
3. Policy dialogue meeting to identify needed policy and institutional change and to outline action plans for needed institutional changes.

A formal briefing and debriefing to USAID and GOB officials will be an integral part of each of the activities.

I. Baseline Assessments

In the project paper amendment, there are separate technical assessments outlined in the course of the first year. The initial technical assistance activities outlined in the Amendment focused on institutional assessment to be followed by a policy dialogue meeting. The danger exists that with only institutional analysis assessment done, a policy dialogue meeting will not have sufficient information with which to formulate the project workplan and ensure the necessary resources and commitments. Other assessments, namely, that on operations and maintenance management, community capacity and vector control are scheduled to take

place at various times during the period of the amendment. In reviewing the sequence of the technical assistance activities, the Mission suggested conducting these different assessments at the same time. The policy dialogue meeting, which will include permanent secretaries, their assistants, and ministers from both MNR and MOH, will be more meaningful to people at this level if more detail generated from the assessments is provided.

The objective of these assessments is, therefore, to provide GOB officials with the data to create the needed policy environment that will ensure sustainability. Each assessment will require a consultant and national counterpart to spend three weeks in country. An experienced facilitator and a national counterpart will help team members develop the action plan for the technical assistance.

A team planning meeting will be held in country with consultants and national counterparts. A staff member from the Belize Institute of Management (BIM) will be part of the team. It is hoped that this will help strengthen BIM to carry out technical assistance preparations and act as the institutional memory needed in carrying out PIO/T activities.

A debriefing at the end of the assessment for GOB officials, USAID, donors and NGOs staff active in the water supply and sanitation sector will outline the findings and implications of the assessments.

The assessments will be carried out in the following areas:

A. Institutional Assessment

1. General Background

The purpose of this consultancy is to identify the institutional changes and specific areas of strengthening needed for the effective management of the village health committee.

This consultancy is in response to evaluation of 1989 as well as other documents and reports which suggest that there are no clear lines of reporting and responsibility for community management and hygiene behavior implementation at the community level.

Based on existing reports and an assessment of needs and constraints in Belize, the institutional analysis will result in a final report that will include:

- identification of appropriate institutional structures to support sustainable vector control and water and sanitation programs between MNR and MOH. This will include identification of staffing needs, roles, and responsibilities needed to create this structure.

- recommendations for procedures to implement such an institutional structure.

— an assessment of the financial well-being of the institutions to implement such a program.

2. Tasks

The following tasks will be completed under this assignment.

- a. The consultants will review the various institutional arrangements used by various donors to implement community based programs—CARE, Breast Is Best, CIDA, etc., and outline the cost, benefits, and implications for each of the approaches.
- b. The consultants will visit district offices of the pilot project in Cayo to further understand the district level coordination required for implementation.
- c. The consultants will maintain a dialogue with, and will include, central level key managers. The consultants will identify the following:
 - 1) the number of community management and hygiene education specialists required per district to ensure the formation and supervision of sustainable village level organizations for both vector control and water and sanitation.
 - 2) outline strategies for cohesive and sustainable Inter- ministerial and central level committees relevant to the implementation of water and sanitation and vector control.
 - 3) define areas required for management and supervision at central, district to community level.
 - 4) define roles, responsibilities and reporting mechanism for all level of staff needed to support community based institutions.
 - 5) outline the financial well-being of institutions involved and assess their ability to undertake the required support for sustainable water and sanitation and vector control efforts.
- d. The results of the consultancy will be written in draft and reviewed by GOB central and district level staff.

B. Community Capacity Assessment

1. Background

A key aspect of the current amendment and a basic comment of January 1989 evaluation for vector control and water and sanitation is the need to rely more on communities. The basic emphasis is to rely less on government and shift more responsibilities on to communities. Clearly, this strategy is one that will need to be based on realistic assessment of what communities can support and their ability and willingness to pay for improved facilities.

2. Tasks

- a. In collaboration with HECOPAB and MNR, the consultant and national counterpart will form a team that will develop the instruments needed to assess the ability of communities to undertake sustainable development.
- b. Visit institutions with community based approaches to assess their methodologies and lessons learned.
- c. Use only where appropriate, the relevant willingness to pay valuation methodologies.
- d. The consultant will prepare a descriptive and analytical report that assesses achievements and reasons and challenges for effective participation from communities.

C. Operations and Maintenance Assessment

1. Background

An important aspect of the maintenance of rural water systems is the division of operations and maintenance (O&M) responsibilities between communities, district level staff and central level. The current O&M guidelines place the largest part of the responsibility with government. The present situation, except for rudimentary water systems (RWS), the greatest part of the responsibility rests with the government. Discussions with MNR staff suggest that more of O&M responsibilities, can, with additional training, be transferred to community committees.

Furthermore, preliminary discussions seem to suggest that, given the dispersed nature of project communications, the cost of systems seem rather high. The cost for a well and handpump are estimated at USD 9000 for an approximate population of 50-100. While the cost for RWSs are at USD 200,000, serving a population of approximately 500 people.

Reasons for these high costs need to be assessed, as well as the viability of other types of technologies, specifically those that might be built and managed with household current small communities, financing.

The heavy financing from government seems to suggest to communities that the infrastructure is government property and as such, should be the government's total responsibility to maintain. This type of attitude might involve an approach whereby little maintenance is carried out, with communities waiting until a major breakdown happens and then expecting the government to provide needed support.

2. Tasks

- a. Review existing policy and practices for operations and maintenance.
- b. Collect data on maintenance requirements, staffing, organization, budgets, costs, etc.
- c. Evaluate the needs, the availability, and the existing demand for spare parts.
- d. Evaluate experiences and lessons learned from various donors and NGOs, especially as they involve more than one ministry. Also of interest will be the forms, management tools (work orders, inventory forms, operator logs, etc.) developed by WASA and MNR.
- e. Discuss policy and technology options with relevant members of inter-ministerial committees, and district level sub-committees.
- f. Based on data collected, discussions carried out on various options, help amend/expand existing document on O&M for training to be conducted in 1991.
- g. Prepare a detailed report on findings.

II. Study Tour

Background: There are a number of countries throughout the LAC and Caribbean region, where national governments have begun implementing a decentralized institutional approach to rural water operations and maintenance, focusing on beneficiary participation. Paraguay, Ecuador and Costa Rica all offer an excellent opportunity which shows the role that communities can have in sustainable water and sanitation, and other health activities. Such a study tour will provide Belizean officials with a broader understanding of the type of

national and community level issues which support a strategy based on improving sustainability of programs. Such a tour will also provide a comparative framework within which to measure accomplishments.

The purpose of this activity is to provide high level government officials from MNR and MOH with the field level experience from Latin American countries who have implemented different types of institutional arrangements. The study tour will also stress, where possible, countries where vector control and water supply and sanitation activities are coordinated. Approximately 6 to 10 senior officials will participate in the tour and will visit at least 2-3 countries during a period of two weeks.

Two consultants will be responsible for this tour. A Belizian consultant will act as the coordinator and make all the arrangements, schedules, set up meetings. The second consultant, familiar with issues of sustainability at community and government level will facilitate the tour and accompany the team.

The consultant shall be responsible for the following tasks:

1. A two day preparation of issues to investigate will take place before the start of the tour. At the end of the tour, two days will be spent reflecting on the lessons learned. A plan of action for implementing some of the learning acquired on this trip will be developed at the end of these two days.
2. The coordinator will write a final trip report, synthesizing lessons learned by participants about issues relevant to this strategy.

III. Policy Dialogue Meeting

Background: The data and the recommendations provided in the assessments, the field debriefing that took place provided the context for reviewing these recommendations, and the experiential learning acquired through the study tour. This will all provide the information necessary for high level GOB officials to plan out the type of policy and institutional changes needed for sustainable community based programs in vector control and water supply and sanitation. This meeting will result in a plan of action that will be developed by GOB staff, outlining the activities needed in order to realize the objective of this project paper amendment. Other donors and implementing agencies active in the water supply and sanitation vector control sectors will be part of this meeting and will enter into a discussion as to how best the transition from one donor to another can take place.

The meeting will take three days and will involve three consultants: A Belizian institutional development/trainer, a consultant specializing in community management and a consultant who is a skilled facilitator.

The objectives of the workshop will be:

- 1. Clearly identify the policy and institutional changes necessary for implementation**
- 2. Outline the roles and responsibilities of different actors in bringing about these changes in both vector and water supply and sanitation. The focus here should primarily be on a more realistic and operational arrangement between these two ministries.**

The consultants shall be responsible for the following tasks:

- 1. Interview program people at operational level to identify the type of support they require in implementing inter-ministerial strategy for sustainable community based programs.**
- 2. Design the meeting.**
- 3. Facilitate the meeting taking into account all the learning that had taken place in the course of the preceding activities.**
- 4. Draft the outcomes of the meeting for review by USAID.**