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**Community Participation
and Vector-Borne Disease
Control in Belize**

**An Assessment of Current
and Potential Activities**

May 15-30, 1990

by

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Introductory Note

This document was written prior to the development of the Project Paper Amendment (1990) to the Improved Productivity Through Better Health Project (Belize #505-0018). Many of the recommendations in the latter document draw upon the observations and suggestions made in Dr. Gordon's work, although the actual project design is somewhat different. In this report, Dr. Gordon provides a great deal of insight that may be used by any person or group in implementing the amended project. It will serve as a good background document for assisting in the development of the community participation component of the project during its remaining 15 months (October 1990-December 1991).

Executive Summary

Belize presents a situation where community participation may have an important impact on the control of vector-borne disease. Rates of malaria are increasing despite active spray programs. The threat of a dengue outbreak is ever-present due to epidemics in the neighboring countries of Mexico, Guatemala and Honduras.

Since community participation constitutes a departure from the norm in Belize's vector control efforts, this consultancy was undertaken to help plan technical assistance in community participation. The information for this report was collected from May 15-30, 1990.

The strategy of the consultancy was to evaluate the current activities in community participation and the potential for future activities in an integrated program to control mosquito-borne diseases. The collection of data relied heavily on key informant interviewing. Interviewees represented a diverse group of supervisors and workers in vector control services, their counterparts in other agencies, and community-based workers and residents. The consultant examined the central- and district-level administration in vector-borne disease control, as well as the community. In each of these arenas, I explored means by which the vector control service could improve or emulate the successes of other programs in Belize. I also identified administrative impediments to innovation and restructuring of vector control services for community-based programs. Finally, I identified needed skills and individuals who might profitably participate in the community.

This report includes a review of findings and a schedule of recommended activities that should be undertaken during the forthcoming year. It also lists activities that would need to be completed in four subsequent years to develop a system of community participation that will be able to sustain itself beyond the initial development efforts.

I spent five days in Belize City, five days in Cayo, two days in Corozal and one day in Dandriga. Special emphasis was given to Cayo because of the seriousness of malaria problems there and the diversity of community types. Field time was spent in the following communities: in Stann Creek -- Red Bank; in Cayo -- Succotz, Benque Viejo, Las Flores (Belmopan), Belmopan City; in Corozal -- Caledonia, Santa Clara, and Corozal proper. In these communities, I interviewed voluntary collaborators, CHWs, members of the health committee, health council officers and residents. The individuals interviewed or consulted are listed in Appendix 1.

Key findings

- o Staff are well-trained, committed and serious, with considerable potential for successfully broadening their activities into community participation.
- o Community participation as a strategy in vector control is only minimally formulated in the minds of administrative and service staff. Some measure of informal orientation on the possibilities and perspectives for community participation would be helpful.
- o There is little evidence of householders acquiescing in vector control efforts. DDT sprays are rendered ineffective because residents choose not to be home at the appointed spraying time, refuse to permit entry of spraymen, or, more commonly, wash off the DDT after it has been applied.
- o There is also no evidence of householders participating in the control of *Ae. aegypti*. Spraying is so frequent that the low container index is probably a measure of the insecticide's efficacy rather than an indication of conscientious source reduction.
- o While there is widespread participation in the appropriate treatment regimens for malaria, in border towns one is likely to find considerable deviation from prescribed treatment. People in these towns commonly use physicians and pharmacists over the border.
- o *Aedes* inspectors' efforts to correct violations of insect breeding laws are undermined by slow enforcement procedures and low fines.
- o When interviewing voluntary collaborators, who perform at a high level in their current job functions, I found them uniformly reluctant to take on other community participation activities, such as source reduction, environmental modification and personal protection.
- o The orientation of community health workers (CHWs) is more toward individual health promotion and disease prevention and less towards group action. They are not currently concerned with vector disease control, and the future of their program looks tenuous because much of their administrative and material support comes from non-governmental organizations (NGOs). In the eventual absence of NGOs, rural health

nurses would have to fill in for CHWs. Rural health nurse activity is now limited by the availability of supplies, transport vehicles, and money for gasoline.

- o Communities that finance CHW primary care have active, self-sufficient CHW programs, as well as active village health committees.
- o In all other communities (that is, outside of the Punta Gorda region), village health committees become dormant soon after the major, concrete projects providing potable water and latrines are finished.
- o A program of community participation is likely to be constrained by administrative factors: centralized decision-making, a lack of job definition where lines of responsibility are blurred in top management, failure to fully integrate *Aedes* and malaria programs, an MIS/HIS that conserves the *status quo*, and a number of patterns that may perpetuate the vertical character of the vector control program. These patterns include the lack of coordination between the vector control program and environmental health in the MOH, the Ministry of Natural Resources, and Primary Health Care in the MOH. Contrary to the envisioned plan of the vector control program, the lack of coordination that exists at ministerial and community levels is not offset by district-level committees, which appear diffuse in their concerns and generally unempowered because of lack of authority and funds.
- o Other potentially fruitful alternatives in community participation in vector control, aside from community health committees, are found in women's groups, church organizations, and most important, the village council. The observations of this researcher and the work of CARE-Belize suggests that community participation should be recruited from representatives of natural geographical subdivisions in communities. These subdivisions tend to overlap with family, friend and ethnic networks. This subdivision would emulate the *vecindad* and *fajina* arrangements that have served as the primary unit of superfamilial organization and collective action since pre-Columbian times.
- o Vector control personnel display fatigue and perceive diminishing returns from consultant visits. When I changed my style of interaction from a fact-gathering to a mutual planning mode, their attitudes improved favorably.

Key recommendations

This section is divided into primary and secondary recommendations. The primary recommendations refer to the scope and planning of a program of community participation in vector-borne disease control. Secondary recommendations refer to the structural changes in the vector control services that will be important to address to ensure the success and sustainability of a program in community participation.

Primary recommendations

- o Establish a one-year project to be initiated in Cayo with eight different communities that reflect the ethnic mix and community types found in Belize.
- o The pilot project should be overseen by an intersectoral, district-level working group, focusing on all environmental problems, but emphasizing vector-borne disease control, at least insofar as vector personnel are concerned.
- o Communities should develop cadres of individuals who are geographically dispersed to be responsible for initiatives in community participation.
- o The community environmental group should be involved in maintaining the collection and periodic dissemination of information on issues relevant to community efforts in vector control: infestations, source reduction, control activities and epidemiology of malaria.
- o The community environmental group should be trained in the identification and reduction of breeding sources, personal protection and community organization.
- o The community environmental group should conduct a KAP study with assistance from the evaluators. The study would address methods of treatment, perceptions of causes and cures, and means of personal protection.
- o At the end of the first year, the pilot project should be evaluated.

Secondary recommendations

- o Integration of dengue and malaria staffs.
- o Increased planning and decision-making at the district level.
- o An administrative policy for increased emphasis in source reduction supplanting, in part, reliance on spraying.
- o Increased horizontal integration of vector control services with primary care and other ministries involved in health at the national level.
- o Development of an HIS/MIS that will keep account of efforts in community participation.
- o Definition and clarification of the roles of central administration.
- o Reform of laws and enforcement procedures to empower *Ae. aegypti* inspectors to induce compliance with insect breeding statutes.
- o Increased professionalization and decision-making authority of malaria and dengue control staffs so as to include evaluation of their own efforts in community participation. This should involve the continuation of attempts at biological control as had been practiced previously in the *Ae. aegypti* control program and as might be initiated in control of anophelines.

I. Introduction

Rationale of the consultancy and the use of community participation

This consultancy addressed community participation. Community participation increasingly occupies a central place in integrated vector-borne disease control programs. Such programs incorporate a variety of vector-borne disease control strategies such as education, treatment, chemical interventions, source reduction and community participation. Community participation has become attractive because of the financial burdens placed on control programs by the extensive labor and capital costs associated with chemical interventions. Furthermore, the need for community participation is now stressed in light of the apparent limitations on effectiveness of spraying, particularly in *Ae. aegypti* control. The potential for insecticide resistance increases the attractiveness of community participation in source reduction and personal protection.

Community participation in mosquito-borne disease control occurs, roughly speaking, in one of three levels of intensity of effort;

- Level 1** Engagement by only a limited number specifically designated community members:
- Level 2** Engagement by the community members that is reactive to specific promotion efforts or coercion: and
- Level 3** Engagement by the community that is proactive and self-sufficient.

Level 1. Engagement by specific members of the community

This is the most common level at which vector control programs currently operate. Health education is a part of these programs to the extent that people are advised about the need for medication, the significance of malaria and the appropriate course of treatment. Community members usually work as volunteers and their efforts are often supervised by a malaria or vector disease control program (See 1-7). Community workers have also been active in *Ae. aegypti* control in the dissemination of Abate and larvivoracious fish (8) and, in some instances, in the application of insecticide. At this level, community participation tends to be more curative in orientation and less concerned with promoting

awareness of environmental causes. This sort of community participation tends to strengthen an insular, vertical flow of information, services and training from the national headquarters to the community.

Level 2. Reactive engagement by the community

This level is quite common in *Ae aegypti* control when there is enforcement against violations of insect breeding laws by homeowners and property managers. A high degree of motivation on the part of *Ae. aegypti* investigators and householders may also be attributable to clear cases of epidemics of yellow fever and dengue with sufficient health education to justify the enforcement of laws (9-10). Another form of reactive control occurs in campaigns targeted at *Ae. aegypti* and anopheline breeding sites (11-14) with the use of larvivorous fish and other simple measures. This level of community participation requires a substantial commitment of voluntary labor at the community level.

Level 3. Pro-active programs

These necessarily involve a variety of functions in vector control that have been incorporated into community activity. These functions could include diagnosis of the problem, maintenance of epidemiologic records in the community, and collection of data on beliefs, practices and environmental modifications. To one degree or another, these initiatives have been reported in China and Brazil (15, 16, 17). Level 3 comes closest to an integrated program, stressing prevention and incorporating many lines of attack against the disease and the vector. Community participation at this level is potentially more attuned to the environmental bases of vector-borne disease and more likely to integrate vector control with environmental concerns, such as waste management, water supplies and environmental safety. When the horizons of environmental awareness and action widen, they also promote intersectoral collaboration.

Belize has made substantial progress in achieving the first level of community participation and it has made some progress in the second. Achieving step three is still an elusive goal. Moreover, level 3 is an ideal type to which governments might aspire and thereby reduce dependency on chemical interventions, share the burdens of control with its citizens, and, above all, reduce morbidity and mortality.

Belize is in an excellent position to match the aspirations of this third level of community participation and stand as an ex-

ample for others. The country is small and politically stable. Its vector control program has a number of competent, committed staff members. The country would prove to be an important illustrative case for development of community participation because of the variety of distinct ethnic communities, which offers an opportunity to measure the effectiveness of policy and plans in challenging conditions.

II. Findings

Staff potential

The commitment and interest of the vector-borne disease control staff are impressive. Throughout the vector control program, individuals are, on the whole, knowledgeable about their job, often with far more knowledge than they can currently use. Any frustration or disaffection that was expressed came from perceived obstacles to doing a good job. This suggests enormous capacity for growth into new areas.

The findings and recommendations below should not be interpreted as placing responsibility for problems on any individual or group. The comments are made to suggest ways to enhance the capacity of vector control services through added efforts in community participation.

Understanding of community participation

Throughout the vector control service all identify themselves as being very enthusiastic about community participation. When asked which aspects of community participation they were eager to see take place, they were vague and without any concrete suggestions. One administrator candidly said that most donors insist that health projects include a community participation component, but local officials still do not know how such components are to be implemented.

Those I interviewed expressed two reasons why the general concept of community participation had some appeal. The first was that it was a good idea to have the community take up some of the burden because the government alone cannot reasonably support a successful vector control program. The second issue dealt with a frustration that people do not take malaria seriously. It was presumed that through community participation, people would become more serious about taking their malaria medications and seeking treatment.

In concrete terms, district personnel understand community participation largely through their activities in schools, where they give lectures on mosquito-borne diseases to supplement the SHEP (School Health Education Program -- given in all pre-high school grades). A district worker assessed the situation -- correctly, I believe -- by remarking that school-age children have been chosen as a vector control audience largely because education of adults had proved so difficult. Husbands were off at work and wives were otherwise oc-

cupied with housework when education sessions were attempted. In addition to school education programs, district personnel point to clean-up campaigns, which tend to be limited to urban settings and major towns. These campaigns provide a good example of inter-sectoral coordination, with participation from the Department of Public Works, merchants, schools and the district health committee, but interest flags quickly after an initial campaign.

In other ministries apart from the vector control service and the Ministry of Health, there is a greater consciousness of community participation. For instance, in Belize City, a group of leaders of community development groups meets monthly to discuss community development problems. It includes representatives of Women in Development, the national development foundations, Breast is Best and the Urban Development Corps. This group is affiliated with a branch operation of the University of the West Indies, located in Belize City.

The experience that Belizean professionals have gained in community development programs as a result of affiliation with NGOs may prove to be a worthwhile resource in vector control. During my brief visit, I was able to identify specific personnel who had gained a great deal from their association with CARE and UNICEF.

Control efforts and community participation

A. Malaria

In many communities, malaria program sprayers find little compliance with their efforts. Sprayers in Cayo report that in many areas the spray is washed off the same day it is applied in about 60 percent of the houses. This occurs frequently in communities where painted walls are common because DDT apparently bleaches the walls. Others fear the spray is injurious to health. The practice of washing walls is reportedly common elsewhere, such as the Corozal/Orangewalk district. Sprayers are also stymied in their efforts when residents absent themselves when they know sprayers will arrive. I found the highest levels of compliance in refugee communities, where one rarely finds painted walls. Level of compliance with spraying routines is hard to determine from district to district, but by all accounts, it is not encouraging.

Community attitudes towards the dangers of DDT is a topic covered in other VBC reports (AR-124-5, AR-124-5B). Negative attitudes toward DDT spraying have been attributed to informa-

tion from Peace Corps Volunteers, but the chorus of negative comments has been joined by environmental reports transmitted through cable television and activist Belizeans who are sensitive to what they perceive as dumping of toxic chemicals in less developed countries.

B. *Aedes aegypti* control

Spraying for *Ae. aegypti* control presents different questions. Nationwide, the house index is generally lower than five percent and sometimes far under five percent. But there is so much ULV and perifocal spraying that it may be difficult to discriminate the effects of householder's source reduction from the effects of insecticide. Spraying cycles call for repeated application of sprays once every seven to 10 days and this goes on at least eight months a year in all cities and in villages with more than 100 houses.

Community perception of the risk of malaria

Because of people's failure to comply with sprayers, personnel in the vector control service are inclined to think that people are somehow not serious about malaria. In the villages surrounding Cayo, Corozal and Dandriga, I found nothing to suggest that people minimize seriousness and discomfort of malaria. Most would count malaria as a leading health problem. What residents do not take seriously is the effectiveness of spraying DDT.

Community participation in malaria treatment regimens

It appears that Belizeans of all ethnicities understand the importance of treatment with chloroquine. I did not discover any beliefs that chloroquine prejudices one's health or that it is injurious to pregnancy. The ways people go about obtaining malaria therapy differ vastly, and this may suggest to the staff that there is a lack of concern about malaria. In border areas, where one finds an absence of voluntary collaborators in towns, individuals will avoid going to clinics and seek treatment from pharmacist and private physicians on the other side of the Mexican and Guatemalan borders instead. In other areas, private physicians are frequently consulted and the practice of malaria treatment may depart from prescribed norms. Other people follow a tendency, common in developed as well as less developed countries, to discontinue treatment as symptoms disappear.

There may well be a widespread lack of awareness of the importance of completing treatment and of the sequelae of untreated malaria. A variety of caregivers in the community may be profitably engaged in a program that seeks to disseminate information on radical treatment.

Aedes aegypti larvae inspections and community participation

Aedes inspectors report that they find it difficult to elicit cooperation with education as their only tool for encouraging compliance. Although insect breeding laws are on the books, they are difficult to enforce. The three-step process of enforcement is rarely completed. It takes too much time for an initial notification (Step 1), a revisit and citation by the Public Health Inspector (Step 2), and a court appearance (Step 3). Fines are small and the process is slow, so laws have little deterrent effect.

Voluntary collaborators

Voluntary collaborators were asked about their interest in taking on a broader set of responsibilities, such as providing education about source reduction and personal protection, and facilitating environmental modifications. The collaborators know their current work routines well and express considerable satisfaction in being able to acquit themselves adequately. They express no great desire to enlarge their scope of responsibilities.

CHWs and Community Participation

Community health workers (CHWs) are being trained and supervised by NGOs (MSF-Holland, Care, Project Concern International and UNICEF) in all five districts of the country. Generally, their training addresses preventive practices and focuses on the individual patient or family. There is little instruction or orientation on environmental problems, malaria or dengue. It is hard to judge the potential involvement of CHWs in vector control work because the fate of their program is also in question. With the removal of NGOs, presumably over the next several years, the sustainability of the CHW program will depend on the support provided by rural health nurses. The effectiveness of CHW supervision and training by rural health nurses is, in turn, dependent on other factors, including the availa-

bility of transport, vehicles, supplies of needed first aid materials, and money for gasoline, transport and per-diems.

The CHW program appears to be a clear success in Punta Gorda, where community members purchase minor medications and supplies for personal use from the CHWs. This has created an incentive for CHWs and a steady flow of supplies keeps them in demand. Until other districts institute a system of self-financing of community care, the potential contribution of CHWs to a program of community participation in vector-borne disease control is not at all sure.

One potential strategy under consideration is for CHWs to assume the duties of the voluntary collaborators. Given the evidence, this would seem to be a plan to replace a system that is in place and functioning with one that has a precarious future.

Administrative problems in the vector control service and community participation

- A. The process of reorganization that has begun in vector-borne disease control is not yet complete. Therefore, the findings in this section may simply describe the problems of transition. Nevertheless, they are highlighted because they impede innovations in community participation. The following are covered:

1. Upper-level management

The division of responsibility in upper-level management (Director, Deputy Director and Administrator) is not yet clear. Depending on whom one is talking about, this leads to responsibility without authority, a title without clearly defined job functions, and compensation inappropriate to the job performed.

2. The separation of *Ae. aegypti* and malaria control

Ae. aegypti workers and malaria workers are very much separate and see themselves as such, despite a plan to integrate the two services. Conserving two supervisors in the district programs, one for malaria and one for *Aedes* control, impedes any integration of services and reduces the service's capacity to promote an integrated program in community participation.

3. Integration with primary care

At least as regards community participation, the integration of primary health care and vector-borne disease control has not taken place. There is no perceptible coordination between CHWs and voluntary collaborators. There was also no apparent coordination between water and sanitation (WASA) health educators, malaria workers and the Public Health Inspector at the district level.

4. Management information system and health information system (MIS/HIS)

Currently, the MIS/HIS performs the important functions of setting expectations and driving activity in the absence of day-to-day central administrative contact. District personnel report that this system leaves little room for departure from the prescribed scope of activity: passive case detection, *Aedes aegypti* investigation, treatment and spraying. The strength of this system precludes any innovation or improvisation. Consequently, without some adjustments, it will impede allocation of staff time to community participation.

5. Division of Environmental Health

Since the government's work in vector control activities has been removed from the Division of Environmental Health and placed under Health Services, the contact between environmental health and vector-borne disease control personnel has been almost non-existent at the national level. At the district level, contact between the two is only sporadic, when the District Public Health Inspector plays a role by issuing citations for violation of *Aedes aegypti* control laws. According to the previous Director of Environmental Health, the districts also have environmental health committees. I saw no evidence of exchange or participation with the environmental health committee on the part of vector control staff.

Environmental health is likely to become a distinctive focus in health in the future as solid and liquid waste disposal problems mount in Belize. As a result, communities suffer -- and will need to grapple with -- the burdens of infestations of rats and *Culex* mosquitoes. In addition, as population density increases, residents of villages grow increasingly concerned about the movement of livestock, pigs and goats into their residential space. In other words, the future promises increased community-based concern about environmental health.

6. Relations with Water and Sanitation

Water and sanitation used to be part of the Department of Health and was more recently switched over to the Ministry of Natural Resources. Since then, there has been little contact with WASA at the ministerial level. The separation of both WASA and environmental health from vector control reflects a compartmentalization at the upper echelons of administration that separates environmental causes from health outcomes. This administrative separation is supposed to be counterbalanced by the district and core committees, where all health personnel exchange information and formulate plans. These committees have little decision-making authority and rarely spend much time on vector-borne disease problems. The result is a set of vertical programs separated at the ministerial level, converging occasionally at the district level and separating again once activities are undertaken in the community. At the village level, evaluators and supernumeraries attend to cases of malaria, sprayers visit the community and, in parallel fashion, health educators for Village Level Water and Sanitation (VLWS) held out with problems of latrines and potable water systems. The groups do not talk to one another and the vector control staff misses an opportunity to benefit from the experience of the VLWS health educators, who are skilled in bringing together community members to complete projects.

7. Centralization of Administration

A grievance commonly expressed about the administration of vector control was the degree to which day-to-day activities are regulated in Belize City and not in the districts. Since community participation programs require adaptability to local situations and rapid shifts in tactics to facilitate local progress, decision making is most effectively based in the districts. A tendency towards centralized administration is also apparent in environmental health, where similar procedures of centralized authority regulate activities in the districts.

8. Transport allowance and transport

As suggested by the work of the NGOs in Belize, community participation is travel-intensive. Availability of transport facilities and allowances for gasoline could be a limiting factor in the development of community participation programs.

District-level coordination and community participation

The two district-level committees involved in health, the district health committee and the core committee, address a diversity of topics. The committees have orchestrated several clean-up campaigns near or in localities where they meet, but otherwise there is little discussion of vector-borne disease control and little apparent interest in community participation. The district health committee is only marginally a decision-making body. Recommendations need to be passed through the core committee, where plans are formulated, and then approved by the Director of Primary Care. Beyond \$800 Belizean dollars in discretionary funds, district health committees have few resources. The membership of this committee is quite fluid, as evidenced by the inconsistent attendance of meetings by sectors of the community. Furthermore, the district health committee's orientation with regard to community participation often does not extend beyond the locations where the committee meets. For instance a clean-up campaign may be planned, but it will be just for the district capital.

Community-level organizations and community participation

Community health committees

Community health committees have proved vital in a wide variety of communities. Their effectiveness, however, lasts as long as the projects for which they were initially created -- usually potable water and latrines. Afterwards, they are dormant. The need for a focus on a discrete problem to keep the group alive suggests that it may be difficult to rely on village health committees for source reduction efforts because mosquito infestations are a recurring problem. Mosquito control is unlike building a school, a water system or latrines, where community members provide a concentrated effort and afterwards are satisfied that the job is once and for all done.

Community health committees have stayed vital in only one locale in Belize, Punta Gorda, where the self-financing of community care promotes villagers' concern and active participation in order to maintain the quality of the care they purchase themselves. Since the policy of Primary Care in the Ministry of Health is clearly encouraging the formation of community health committees, they will be established throughout the country.

Community councils

The community council is another community-based organization. It continues to play a vital role as community challenges or aspirations arise in areas such as roads and schools. In several communities, council members said that they saw no real purpose for a community health committee since they already had a council.

In areas where NGO plans have not first included the participation of the community council, NGO workers have found their efforts subverted from the start. This suggests that however a community health committee is involved, the community council will need to be a gatekeeper prior to beginning new efforts.

Other community groups

Women's groups exist in some communities and have been involved in activities such as clearing playing fields. Information from interviewees suggests that the Catholic and Adventists church organizations tend to be most active in clean-up campaigns, more so than Evangelical and Pentacostal organizations.

Diversity of community types

Given the different ethnic communities (Mayan, Creole, Mestizo and Hispanic Central America) and different community types (urban, rural, company towns, mixed ethnic communities, very new settlements and traditional settlements) found in Belize, it is not possible (and may not be necessary) to generalize about any particular approach to involving communities, save the need to involve community councils. However, a meaningful level of activity may be found in the importance of involving sub-community units in collective activity.

Sub-community organizational units

There is a tendency for different ethnic groups to cluster geographically within the segments of a community and a tendency for community committees to be more represented by one ethnic group, usually by representatives of informal cliques or family groups residing close to one another. The failure to achieve diverse geographical representation may be a limiting factor in community participation in source reduction activities. Breeding sources are often present throughout the community.

Individuals who monitor these problems and recruit assistance might be best drawn from different geographical sectors.

The director of the CARE office reports that conceptualizing the community in terms of its geographic subunits has proved helpful in organizing and mobilizing community-based activities and selecting representatives from the community. This approach has been applied in Mestizo communities, where 90 percent of CARE's projects are undertaken. The model by which the CARE staff has organized individuals is based on the *vencindad* or *barrio* system, a pre-Columbian community-based unit that discharged various responsibilities, such as the *fajina*, or community work project. Some interviewees related that in traditional communities, the *alcalde* system was a key to recruiting and deploying labor for community projects. The *alcalde* is basically a strong central leader.

Acceptability of further professional development in the area of community participation

Currently, the *Ae. aegypti* staff is responsible for a highly routine set of duties. A program of seminars, professional development workshops, and experiments with biological control using larvivoracious fish has fallen out of use. Engaging the *Aedes* staff in an expanded scope of activities will enhance flagging morale and commitment to the job. Many in the malaria staff are highly trained, having attended courses at the University of South Carolina's Wedge, in Panama and Guatemala. I observed widespread eagerness for additional knowledge.

Consulting and community participation

Despite extremely gracious assistance from all Belizeans with whom I had contact, I sensed a palpable fatigue with consultants representing a variety of organizations. The perceived relevance of questions and problems was not an issue. The uses to which information gathered by consultants would be put was the issue. My working relationships improved when my involvement approximated a counterpart relationship in which staff members would be responsible for developing programs in the absence of the consultant. The tenor of discussion changed and staff members actively considered planning options.

IV. Recommendations

The recommendations below are presented in the form of a plan of action, specifying the tasks to be accomplished and how they should be accomplished. The recommendations are divided into three parts: 1) consultant assistance in the first year, 2) the activities to be implemented by Belizeans in this first year, and 3) activities to be implemented over a longer period of four years.

A. Summary

Part 1. Consultant assistance in the first year

Consultant technical assistance should become as collaborative as possible. For different tasks, Belizean staff should be involved as counterparts, depending on their position and expertise. First, the vector control staff would profit by adopting new orientations and skills in community participation. This will be effected by vector staff engaging in all phases of planning of the pilot program in the first year. As a result, the values, orientation and necessary skills in community participation are more likely to be assimilated. The model might profitably be a closely coached practical experience. The presence of a consultant as collaborator may have a reinforcing effect, particularly in light of the inevitable setbacks that are likely to discourage innovation.

Experience in Belize reflects that the constant presence of an advocate for change has been necessary for innovation in health care and environmental improvement. Although this constant presence has generally been provided by NGOs, at least at the inception of a program, a Belizean familiar with consultant operations might serve as an intermediary between consultant technical assistance and vector control services. This individual should be called a project coordinator, as he or she would coordinate the work of consultants, facilitate the implementation of plans, serve as a resource for the vector control program and be a conduit of information between vector control services and the cadre of consultants. I identified a number of Belizeans currently operating within NGOs who could meet the requirements of this job description.

Part 2. Review of the first year's activities

A pilot program in Cayo is suggested as opposed to making nationwide changes. Undertaking innovations in community

participation will involve learning new skills, appreciating their benefits and modifying these plans according to experience. For this reason, I recommend starting small in a limited area in the Cayo district. This district has adequate staff, diverse communities, and a serious malaria problem. It has the added advantage of being close to national headquarters for vector control. Changes made on the back doorstep of administration will have a greater chance of being accepted and adopted nationwide.

Part 3. Long-term recommendations

This part discusses proposed activities in the four years after the first year of the pilot program. The intention is to extend the innovations made in Cayo into other districts. Administrative changes at the national and district levels would be very helpful in sustaining these innovations in community participation.

B. Recommendations and chronology

Part 1. Technical Assistance

Consultant activities in community participation during the first year should take place in three phases: 1) start-up, 2) implementation and 3) evaluation and observation. Each phase should begin with intensive technical assistance and, at that time, consultants and vector control program personnel should establish goals and activities for the phase.

First Segment (Month 1)

- A. Technical assistance in the creation and operation of an advisory/coordinating group for the district level in environmental health (Deputy Director or Director of Vector Control as a counterpart).
- B. Technical assistance in identification of breeding sites, source reduction and personal protection, conducted in the community. The emphasis should be on anophelines, for which there are not, as yet, efforts in source reduction (with the entomology staff as counterpart).

- C. Technical assistance in program management to reallocate staff time for dengue inspectors, sprayers (both for *Ae. aegypti* and malaria) and evaluators so that they may initiate community-based projects (with district supervisor as counterpart).
- D. Technical assistance to develop a system of reporting that will provide a balance between information on houses inspected and sprayed, and information on community participation and health education activities in the MIS/HIS (with Deputy Director and Director as counterparts).

Second segment (Month 4)

- A. Technical assistance to enable communities to understand, feel responsible for, and decide on remedies for their vector-borne disease problems. This will involve establishing community-based communication about the number of malaria cases, number of breeding sites, efforts in source reduction, and community organizing (with the WASA health educator as the consultant's counterpart).
- B. Technical assistance in health education on treatment regimens and the importance of compliance (with HECOPAB staff as counterpart).
- C. Technical assistance on design and conduct of a KAP study. The KAP study would address methods of treating malaria, perceptions of the environmental causes and remedies for malaria, *Aedes aegypti* breeding sites and personal protection (with district supervisor in the vector control program as a counterpart).

Third segment (Month 10)

Technical assistance in the observation and evaluation of interventions in the selected communities of Cayo.

Part 2. First year's activities

Start-up, Months 1-3

Month 1: Develop a working group at the district level for attention to environmental health problems.

In light of the experiences with the core committees and district health committees, a working group should be dedicated solely to environmental problems. In addition to the district supervisor in vector control, the membership should include the WASA health educator, the public health inspector, the rural health nurse and the district medical officer. The purpose of this working group would be to share information on community structure and strengths and weaknesses in community participation. Because this group should be involved with varied environmental health issues, commitment from diverse sectors will maximize productivity. In addition, the group may make it possible to share resources and equipment that may be used in source reduction.

Month 2: Choose eight localities for interventions.

These localities should reflect different village types: border villages where ties to border towns in contiguous countries result in utilization of several health care systems; refugee communities; Mestizo, Mayan and Creole communities.

Months 2-3: Set up an environmental health working group.

Given the variety of community types, the membership of this group should be variable in composition and may involve individuals drawn from the village council, CHWs, the health committee, voluntary collaborators, and other interested members of the community. The criteria for selection will be interest and competence. Given the tendency of elected and self-elected committee members to be concentrated in certain geographic areas, it is important for a working group in environmental health to draw its members from throughout the community. These individuals might be thought of as section leaders. This geographical representation will facilitate recruitment of work units and provide individuals who may initiate and monitor progress in source reduction. Such subunits have proved successful in

Africa, particularly in Moslem countries, and Southeast Asia, where lineage-based social organization expresses itself.

Implementation, Months 4–9

Month 4: Establish community-based activities in environmental health.

These activities will involve potable water and sanitation (latrines and waste disposal), as well as mosquito vectors, but the major contribution of the vector control staff will be in malaria and dengue control activities. However, vector control staff may share, with mutual benefits, information and resources with individuals from other ministries.

Month 4: Develop a system for maintaining and sharing community-based information.

This system should include a means for displaying records for community consumption. Areas of information to be covered include number of malaria cases, identification and reduction of breeding sites, and methods of self-protection.

Month 5: Survey of breeding sites.

Month 6: Train cadres of community representatives from the different geographic sectors in source identification and reduction, personal protection and community organization.

Months 7:9: KAP survey.

The survey should be conducted in collaboration with district evaluators (malaria) and inspectors (*Aedes aegypti*). A KAP survey of communities should determine: 1) methods of treating malaria; 2) perceptions of the environmental causes and cures of malaria; and 3) means of personal protection.

Observation and evaluation, Months 10–12

The remaining three months will provide an opportunity for consultant evaluation, observation of progress by other district supervisors, and modification of strategies for community participation before implementation of community participation initiatives in other districts.

Part 3. Long-term recommendations for the following four years

These long-term recommendations are proposed with the principal objectives of extending the innovations begun in Cayo to the other districts and ensuring their sustainability. They are designed to provide administrative support and increase the capacity of staff to meet the challenges of diffusion of program innovations throughout Belize.

A. Administrative reforms at the national level

- o Re-evaluate the chain of command and distribution of authority to enable district programs to expand into community participation. This re-evaluation ought to involve defining the functions of the Program Director, the Deputy Director and the Administrator. In the absence of clearly defined authority, the management information system runs everything and this system will conserve the current pattern of activity. Vesting specific individuals at the district level with decision-making power and eliciting some commitment for change may allow the system of activity to change as well.
- o Revise job requirements for the vector control staff so that expectations for case detection, spraying and investigation of *Aedes* breeding sites may be embellished to include health education, community participation and reduction of anopheline breeding sites.
- o Revise the HIS/MIS to include health education, community participation and community undertakings in source reduction.

B. Administrative reforms on the district level

- o Create one supervisor, not two, in the district program. A second in command should adopt a distinct job description that includes community participation, health education and source reduction.

- o Develop district environmental teams based on experiences in Cayo.

C. Community-based programs

- o To increase community participation, laws should be established giving *Aedes* inspectors authority to write out fines when local house indices reach five percent or more.
- o The program of experimental biological control should be resumed in the *Aedes* program. Judging by its success as least insofar as motivating the staff, it should be initiated in anopheline control efforts. Individuals to be involved in the project should include community members, preferably the geographical section leaders in the communities, evaluators, *Aedes* inspectors, voluntary collaborators and CHWs.
- o Community-level environmental working groups and activities should be inaugurated and developed nationwide, modeled on the experiences of the first year in Cayo.
- o Workshops should be held with district vector-borne disease control staffs in community participation in the following substantive areas of concern:
 - community organizing
 - mapping communities for breeding sites
 - examination of the effectiveness of source reduction and biological control
 - evaluative KAP research on the utilization of health services and malaria remedies, understanding of bionomics and disease transmission, efforts in personal protection, and analysis of community structure through social networks.

Based on the experience of the pilot program, the geographical section leaders and interested voluntary collaborators and CHWs should be given the above training in a more abbreviated form.

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Appendix 1. Persons Contacted

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