

Community Participatory Approaches to Dengue Prevention in Sarawak, Malaysia

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This paper covers preliminary findings from a participatory action research (PAR) project into dengue prevention in Sarawak, Malaysia, which formed one part of a national, multisite study. The objectives of the project in Sarawak were to reduce a high *Aedes* mosquito index and associated risk of dengue in two coastal Malay villages, using behavior modification strategies through a community participatory approach. The approach has achieved a reduced *Aedes* index as well as both material and nontangible benefits for the communities under study. These benefits may be calculated in terms of reduction of identified health risks and physical well-being of the community as well as in terms of more effective networking and self-advocacy with government agencies and the wider community.

Key words: dengue, participatory action research, Sarawak

Dengue and its more virulent form—dengue hemorrhagic fever and shock syndrome—are regarded as severe health hazards in many tropical and subtropical regions. This paper offers a preliminary overview of community participatory approaches to dengue prevention in Sarawak, one of the two Malaysian states on the island of Borneo.

Dengue is a vector-borne virus spread by the mosquitoes *Aedes aegypti* and *Aedes albopictus*. It is found in both urban and rural areas and is estimated to infect 20 million people annually (Okanurak, Sernmani, and Indaratna 1997). Dengue, and particularly its more severe form, is on the increase and has spread alarmingly in the last 30 years—it can now be found in 44 countries, up from 9 in the 1970s. In Southeast Asia the disease has reached pandemic proportions, badly affecting Thailand, Indonesia, and Malaysia (Economist 1998:38). In 1995 there were 6,520 cases of dengue reported in Malaysia and 370 people were diagnosed with dengue hemorrhagic fever. Despite preventative campaigns, the number of cases continues to rise (Ahmad et al. 1997:139; Rigau-Perez et al. 1999:375).

The major symptoms of dengue include abdominal pain, headaches, rash-like flushes, vomiting, and nausea; symptoms that resemble influenza in many respects and can

unfortunately be mistaken for it in dengue's early stages. Hemorrhagic fever takes its name from the additional symptoms of bleeding from the gums, nose, and internal organs. Dengue therefore represents a significant health risk in affected countries, and various attempts have been made to tackle the problem from traditional top-down health campaigns to more innovative means, such as an ethnographic approach.

In Malaysia a national dengue-prevention project has been initiated in Sarawak, Kuala Lumpur, Penang, and Johore Bahru. Intervention at the Peninsular Malaysian sites (Kuala Lumpur, Penang, and Johore Bahru) relied on a combination of action-orientated approaches as well as conventional health education methods, such as pamphlets and exhibitions. In Sarawak, the only site not on the peninsula, a participatory action research (PAR) model has been utilized.

Intervention with Communities at Risk

Dengue has been described as a disease of communities in transition and the result of rapid urbanization in tropical areas and associated problems of rapid acquisition of consumer items, without a sufficient infrastructure to manage the consumer lifestyle (Torres 1997). In Latin America dengue is increasing because of the breakdown of municipal services, which are unable to adequately cope with high levels of solid waste and general refuse. Consequently, government control strategies, including compulsory spraying of infected sites and fining of householders, have had little impact on the disease (Yasumaro et al. 1998:210). In Malaysia, health campaigns valuing public education, fumigation, and punitive measures against the general public have not produced a significant reduction of the *Aedes* index (Gordon

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1998). The *Aedes* index indicates the density of *Aedes* insect populations.

Although conventional strategies are not obsolete, the Malaysian Ministry of Health moved to investigate the benefits of community participatory approaches to initiate behavior modification in communities at risk of dengue transmission. To this end, the Sarawak health authorities enlisted the help of the authors, three social scientists based at the local university (University Malaysia Sarawak), to initiate, design, train, and oversee the PAR approach throughout the study.

In Sarawak, three coastal control villages (*kampungs*) were identified as having a high *Aedes* index, although as yet no cases of dengue had been recorded in them. The importance of these particular *kampungs* lies in their geographic proximity to Kuching, the capital city of Sarawak, combined with rapid development in the communication infrastructure. This situation represented a considerable health risk, which could erupt into an epidemic at some point in the near future. The three *kampungs* have similar physical and ethnodemographic characteristics, and in a controlled experiment two were exposed to PAR intervention and observation over the course of many months. The third *kampung*, Sg. Aur, would not receive intervention and would be used for comparison. The two intervention *kampungs*, Beradek and Semilang, are fairly close to the city, but are difficult to access, being linked to the mainland by tidal riverine networks. Beradek and Semilang are neighboring communities and a narrow strip of pavement links them. Despite their proximity, land and community-level administration are clearly demarcated between the two areas.

Agriculture, largely paddy farming and to a lesser extent fishing, forms the basis of the economy in these communities. Youths and secondary-school students are generally away at government-run boarding schools or employed as casual laborers in Kuching. Despite proximity and the sharing of some community resources, such as the local school, Semilang has twice the population of Beradek. In both communities, 40.9 percent of the total population is under 15 years of age and 51.4 percent is between 16 and 55 years old.

Beradek and Semilang had a significant problem managing refuse. Large piles of accumulated refuse were dumped in areas deemed to be no-man's land, but which in fact lay very close to dwellings. The river was also used as a handy disposal area, and rubbish was carried in and out by the tide. This untreated waste consisted of food debris and empty containers, such as tins and plastic food wrappings, old mats, coconut shells—all objects that provided ideal breeding grounds for mosquitoes. To compound the problem, the communities did not have a piped water supply and relied on rainwater and nonpotable well water. Water needed to be stored in containers of varying sizes, from large tanks to jars and buckets, which provided further breeding grounds. Broken and inadequate toilet facilities, partial electricity services, lack of tar roads, overgrown vegetation, and surrounding

Table 1. Entomological Study: House Index

Name of <i>Kampung</i>	No. of Houses Surveyed	No. of Houses <i>Aedes</i> Positive	<i>Aedes</i> House Index
Beradek	53	43	81.1%
Semilang	112	101	90.2%
Sg. Aur (control)	24	21	87.5%

Note: A house is *Aedes* positive if there are *Aedes*-bearing insect larvae in the immediate vicinity.

swampland added to a difficult and unhealthy environment. Although privations seemed abundant to some outsiders, the communities were not poverty-stricken in relative terms. The control, Sg. Aur, had some problems of inadequate utilities but enjoyed a generally more hygienic environment. Table 1 highlights the high *Aedes* index found in the three communities under study, indicating a significant risk of an epidemic in the immediate and surrounding areas.

Globally, if conventional means of dengue prevention have proved to be largely disappointing, the rise in community participatory approaches promises an alternative means of combating the disease. Carl Kendall, for example, discusses a successful outcome using a brief and “practical epistemology” working with communities in Honduras where mosquito densities were “literally ‘talked down’” and used no chemical or biological interventions (Kendall 1998:219). Kendall adopted a medical anthropological approach that utilizes local beliefs and practices to formulate an intervention to engage communities in improving health practices. This stands in contrast to reliance on directive or technologically based intervention methods. Participatory methods, such as Kendall’s, use rapport and negotiation to combat dengue risks, hence “talked down.”

Yasumaro et al. (1998) describe a community development approach complemented by health education strategies. In Sarawak the community approach included active participation by the inhabitants of Semilang and Beradek, as well as a knowledge, attitude, and perception (KAP) study and focus group discussions to explore belief systems concerning health risks. Furthermore, a community participatory approach did not exclude health education and biological interventions.

The PAR Approach in Sarawak

Following WHO’s declaration of Alma-Ata in 1978, the commitment to “health for all by the year 2000” was universally endorsed by member states, including Malaysia, and now serves as a basis for health policy and development (WHO 1991). A fundamental component of this worldwide

strategy is the extensive involvement and participation of communities in supporting and operating health services and in developing activities and programs to improve their own health. To achieve this, community involvement in health development (CIH) has been seen, at least theoretically, as a fundamental component in increasing health coverage of communities. WHO (1991:14) has defined CIH as:

A process whereby people, both individually and in groups, exercise their right to play an active and direct role in the development of appropriate health services, in ensuring the conditions for sustained better health, and in supporting the empowerment of communities for health development.

Participatory Action Research (PAR) is designed to enable the local community to plan, act, monitor, and evaluate programs that will best address existing problems. PAR, therefore, can be seen as “a process of systematic inquiry” that invites those experiencing problems to engage and collaborate with trained researchers in ways that challenge the dichotomy between researcher and subjects of research (Deshler and Ewert 1998). The PAR methodology is distinguishable from other forms of research largely by its research and action component, which is carried out by the community rather than outsiders (Smith 1997). Although relatively simple, the PAR approach necessarily involves complex social and technical interaction (Schwab and Syme 1997). According

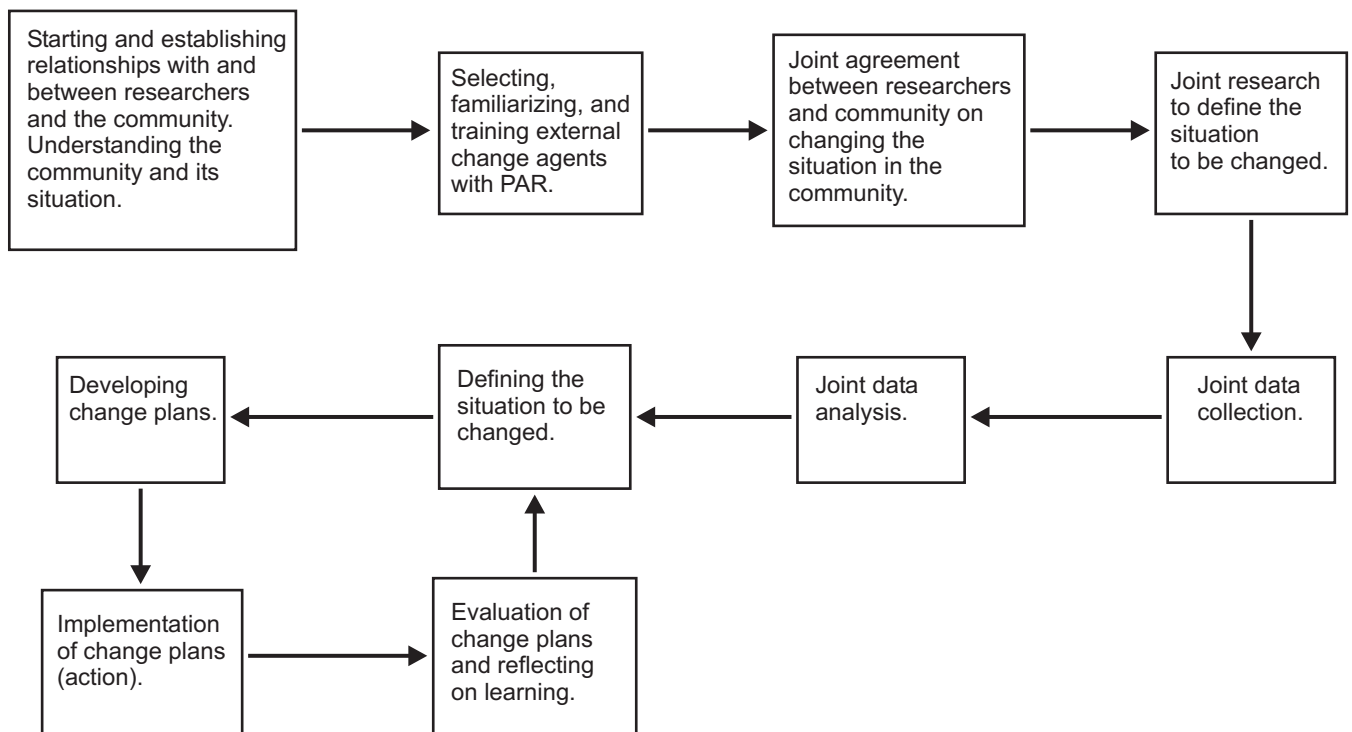
to Estrella and Gaventa (1998), such projects should include: 1) those directly and indirectly affected by the program; 2) beneficiaries of the program; and 3) marginalized groups, such as women, the very poor, children, and people with disabilities. The objective then is to equip the community with confidence and motivation, knowledge and skills, so that it can initiate a process of empowerment and instill a sense of “ownership” of the program (Wong and Andrew 1997:5).

In this research project, PAR was divided into five phases:

1. Organization of the project and gathering knowledge of the communities under study.
2. Definition of problems, data gathering, and analysis, which included workshops undertaken with the communities.
3. The group (community and professional researchers) identifies and plans appropriate action to address problems.
4. Implementation of plans.
5. Evaluation by the group.

These steps revolve around a continuous cycle (see Figure 1). PAR is never static because it is an “encounter with reality and with possibility” (Smith 1997:42).

Figure 1. Model of Participatory Action Research (PAR) Approach in the Dengue Prevention at Semilang and Beradek



The research team implemented phase 1 through a KAP and community study, which helped create a clearer understanding of people's attitudes and beliefs about what might constitute a health risk in the kampungs as well to identify other related issues and problems. We also carried out focus group discussions with four distinct groups: women, youths, male family heads (Malay social organizations are predominantly patriarchal), and heads of the elected village security and development committee (Jawatankuasa Kemajuan Kampung [JKKK]). Focus group discussions revealed a general ignorance of vector-borne illnesses, including dengue. Since there was little perception that mosquitoes represented a health hazard, few families used either spray repellents or mosquito nets in an appropriate way. Dengue was not seen as a genuine threat since it had not yet affected the lives of the community and was only remotely heard of. Attempting to emphasize the health hazard posed by dengue was difficult because the communities were preoccupied with other more immediate concerns:

The challenge in working with communities to respond early to emerging diseases is that diseases are unlikely to be local priorities. This creates a dilemma: how to be responsive to local priorities and at the same time generate interest in an emerging problem whose relevance may not yet be immediately apparent (Yasumaro et al. 1998:8).

We found cholera to be foremost in the minds of participants because they had suffered from it in the past. In group discussions, the causation and symptoms of dengue were often seen as similar to those of cholera. Interactive educational sessions to raise awareness of the actual causes and symptoms of dengue were required. Group discussions did reveal a perception that unsanitary conditions were liable to lead to illnesses, an important point since some families were using the nearby river to dump untreated sewage. This was the same river that adults and children fished, waded, and played in. Adequate water storage was also considered very important, as were working toilet facilities. The very young and the elderly were deemed most at risk for disease by the Kampung participants, although there was a general lack of awareness of effective preventive strategies. Within these communities, as in Sarawak, malnutrition represents a significant problem, especially for children, due to ignorance of what constitutes a balanced diet.

After exploring topics related to dengue, most groups agreed that action was needed to correct prevailing unsanitary conditions. The communities felt health authorities should take the initiative in commencing a clean-up operation for health reasons. However, kampung dwellers clearly believed the best way to tackle the environmental problems was through *gotong royong*, or grassroots community action.

In the final stage of phase 1, facilitators from among the research team were trained by the authors. Good communication skills, personal motivation, and a close rapport with participants are essential in encouraging and assisting communities in their initiatives. Fifteen health-care personnel,

including health inspectors, public health and primary health workers, were chosen to participate in the community workshops.

Engaging the Community in Dengue Prevention: Conducting the Workshops

Phase 2 commenced after facilitators were trained. The study communities selected participants to take part in the project. In March 1998 workshops were held at the two kampungs, with approximately 24 participants in each group. Workshops were designed to train the groups to conduct a needs assessment for a dengue prevention program in their own communities. By the end of an intensive three-and-a-half day workshop, the participants were familiar with issues surrounding dengue and the *Aedes* mosquito transmission routes, breeding places, and the cause and effect of the presence of the *Aedes* mosquito in the local environment.

In phase 3, kampung participants carried out a house-to-house survey and analyzed the results with help from the facilitators, identifying problem areas within the community. A brainstorming activity engaged the participants in finding feasible, readily available solutions to these identified problems. After prioritizing the problems, participants proceeded to plan an appropriate program with an emphasis on reducing potential breeding places of the *Aedes* mosquito. The groups then presented these results to the JKKK for consultation and approval.

Definition of Action

Dialogue took place between the workshop participants and the JKKK, elected zone leaders (of small demarcated areas within each community), and various newly organized subcommittees. In Beradek, plans were made to hold *gotong royong* community action sessions, where houses would be inspected for potential breeding sites and the tops of septic tanks would be covered with cement. A campaign for school children on dengue prevention and environmental hygiene was also planned and spearheaded by the parent-teacher association. Other strategies included holding a competition for the house with the cleanest environment, burning rubbish, clearing paths, and setting out rubbish bins.

In Semilang, plans were made to hold an exhibition and health talk on dengue and competitions for the cleanest house and area. Facilitators encouraged each zone to create its own banner and signboard, with prizes for the most creative ones.

Implementation

Phase 4 began with an announcement of the launching of the plan of action. Households attended to their compounds, public paths were cleared, and general rubbish dumps were removed. The health department placed an incinerator in each community to facilitate this operation, and homemade rubbish bins were placed at strategic points. Signboards reminded

everyone to maintain dengue awareness, and one zone greeted passersby with an alarmingly magnified model of the *Aedes* mosquito suspended on a post. Apart from cementing the septic tanks, plans formulated during the workshop were carried out as agreed.

The week before the launching, health education videos on dengue prevention were lent to the kampungs for general viewing, sandwiched between film shows to attract the public, and the local primary school hosted a storytelling competition on the subject. Launch day was held amidst fanfare and was organized jointly by the two communities, including school teachers, and officiated by the local state assembly candidate, the director of the Sarawak Health Department, and various other dignitaries. Journalists from local newspapers and radio stations recorded the occasion. Activities included health screening and an exhibition on dengue prevention; lunch was provided courtesy of the communities. It was a memorable day, the culmination of hard work on all sides. Once the first enthusiasm died down, however, the question remained: would these changes in attitude, so evident in the improved appearance of the community, be sustained?

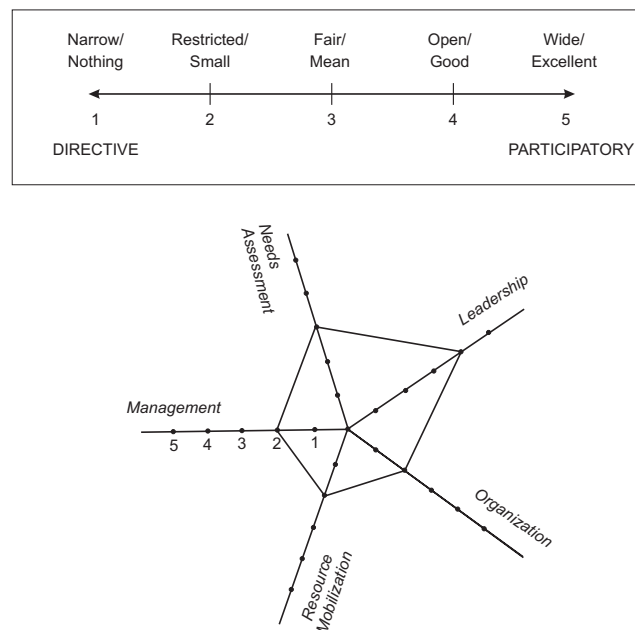
Measuring Participation

Evaluations of the study have taken place on several levels within different time frames using quantitative and qualitative methods. The first evaluation consisted of a baseline survey, followed by a postintervention survey at the completion of the PAR program. Finally, a follow-up survey took place seven months after the research team had withdrawn from the communities.

The first evaluation took place immediately after the community workshops and incorporated feedback from 10 discrete groups, including the overall research team, research facilitators, and kampung participants. Evaluation solicited from workshop participants proved to be positive overall; but some problems were identified. Workshops were scheduled during harvest season and were held in a large, rudimentary, and uncomfortably hot community hall. In turn, research facilitators felt insufficient time was allowed between workshops, which compounded the problems of very basic accommodation and utilities. Eight months later, in November 1998, another evaluation took place. Focus-group discussions with the women's group, youths, and the JKKK were held in both communities to explore their reflections on the project.

The framework used to measure participation was taken from Rifkin (1988). The factors that comprise a needs assessment include leadership, organization, resource mobilization, and management. Figure 2 shows an example of the "spider web" method used to measure participation among the 10 groups, which included the health department as the main research body, researchers from University Malaysia Sarawak, external change agents from the health department, medical assistants and nurses carrying out the

Figure 2. Measuring Participation



workshops, the JKKK from Beradek and Semilang, and the local participants.

The figures showed community movement from narrow and directive participation to a wider participation from the base period in March 1998 to November 1998. It should be noted, however, that although a range of indicators was used to show changing participation, these indicators do not imply judgment in terms of good or bad. Nor do they try to correlate wider participation with successful implementation of this dengue control program. Instead, the aims are to understand the changes within the processes of community participation in the project. The study is premised on the belief that community involvement in health projects such as this is the first step in the general improvement of health conditions through broad participation built on a variety of activities and involvement by different groups within the community.

Reduction in *Aedes* Index

Prior to the study, the amount of refuse scattered indiscriminately around human habitations was seen by kampung inhabitants as an inevitable aspect of life. There was little awareness that this refuse constituted a health risk. Intervention raised awareness and there was a noticeable improvement in how refuse was identified and disposed of. Other hygienic practices were implemented, such as regular cleaning of water containers and removal of stagnant water. Unfortunately, this practice decreased slightly after the intervention phase. Table 2 shows the *Aedes* indices taken after three separate surveys spread out over the course of several months.

Table 2. Results of House Survey and Indices During Baseline, Postintervention, and Follow-up Surveys

Parameters	Kg. Beradek			Kg. Semilang			Kg. Sg. Aur (Control)		
	A	B	C	A	B	C	A	B	C
Houses surveyed	53	60	65	112	111	115	24	21	21
% positive for <i>Aegypti</i>	60.4	13.3	21.5	77.7	18.9	18.3	0.0	0.0	0.0
% positive for <i>Albopictus</i>	66.0	50.0	40.0	69.6	36.9	45.2	87.5	57.1	52.4

Note: A - Baseline survey; B - Postintervention survey; C- Follow-up survey.

In general the modified behavior of kampung dwellers succeeded in reducing the breeding of dengue-bearing mosquitoes in their immediate environment, with a greater reduction of *Aedes aegypti* than for *Aedes albopictus*. This has been largely attributed to the reduction of open water containers. A reduction of *Aedes albopictus* can also be seen in the control kampung, and this raises the question of whether seasonal fluctuations related to the breeding cycle of mosquitoes have played an important role in reducing the *Aedes* indices in the three communities. It would appear, however, that the program was successful in reducing the risk of dengue in the two intervention communities. Furthermore, it is worth noting that the best rates were achieved on the heels of intervention, while the indices climbed to some extent once the program was completed. This indicates that sustaining modified behavior may prove to be a problem over time, as the earlier community-based project into dengue prevention eventually showed. It is likely that the situation will need close monitoring and continued motivation to maintain improvements.

Community Benefits

At the beginning, the communities evidently did not see such a project as a priority. The communities generally lacked awareness of the risk of dengue, the hazardous nature of the disease, its impact on the wider community, and related social consequences. At the outset, the communities involved may not have been prepared for the project.

Shortly after introducing the PAR program, however, the priorities of both communities changed. Dengue is a disease shaped by human activities, and the risk of dengue transmission can be both escalated and reduced by human behavior. In Malaysia, control of risk-laden behavior has usually been in the shape of public education and punitive actions, such as inspection of homes and heavy fines. As Gordon (1998) notes, coercion is unlikely to accomplish compliance, and strategies to reward habits commensurate with lower health risks should be explored and followed.

While awaiting further evidence of a reduced *Aedes* index in the long-term, behavioral change can be observed in

the communities in the following aspects. First, the culturally appropriate strategy of gotong royong appeared to promote a sense of community cohesion and shared directions and objectives. The PAR approach seeks to facilitate empowerment within groups and communities. We believe that the participants' ownership of the program and autonomy in developing strategies to deal with identified problem areas conveyed that this was taking place. Second, eight months after the program began participants continued to comment on the greatly enhanced appearance of the kampungs, demonstrating a sense of civic pride and a commitment to ensuring that these improvements were maintained. Third, health and well-being were given more emphasis, exemplified by the enthusiasm shown for the health authority's plans to establish a community health clinic. Fourth, the program showed that communities could cooperate well with outside agencies and within their own community. This newfound ability strengthened networks and empowered the community to advocate on its own behalf with government departments. Fifth, the launching-day activities represented a high point in the program and were the focus of almost unprecedented media and public attention for these small, isolated rural communities. The effects of this focus acted as a powerful message of legitimization and validation for the kampungs and their impressive efforts and, finally, their vital importance to the well-being of the whole.

Conclusion

In conclusion, we believe the PAR approach used in this project successfully empowered the community to take charge of its own health development through involvement in a needs assessment and program planning and implementation. Even though most people did not see dengue as a threat to their community during the first phase of the project, the project created sufficient awareness to motivate people to modify their behavior. This raised awareness has in turn brought further benefits to the community beyond the initial objectives, and we hope this highly beneficial process will continue over time. This said, a degree of skepticism about the sustainability of the project should be maintained. Despite the traditional

use of gotong-royong activities, the tendency of the communities has usually been to rely heavily on government intervention to address environmental and infrastructure problems, a fairly common response in this region. A return to former attitudes and behavior may need to be anticipated. Finally, the heavily patriarchal system of the communities embodied by the JKKK meant that dynamics in the community power structures were also affected: workshop participants were for the most part young men and women, which generated a certain tension that militated against effective action.

The challenge now lies in the sustainability of this project. Future evaluation of the communities should offer insights into the PAR process. If successful, the approach could be extended to other projects and communities in Sarawak, generating opportunities for health work and other forms of community development.

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