



Technical Assistance Report

Project Number: 42190
Regional—Capacity Development Technical Assistance (R-CDTA)
April 2009

Regional Public Goods for Health: Combating Dengue in ASEAN

(Financed by the Regional Cooperation and Integration Fund under
the Regional Cooperation and Integration Financing Partnership
Facility)

ABBREVIATIONS

ADB	–	Asian Development Bank
DHF	–	dengue hemorrhagic fever
IVM	–	integrated vector management
Lao PDR	–	Lao People's Democratic Republic
TA	–	technical assistance
WHO	–	World Health Organization
WPRO	–	Western Pacific Regional Office

TECHNICAL ASSISTANCE CLASSIFICATION

Type	–	Regional capacity development technical assistance (R-CDTA)
Targeting Classification	–	Targeted intervention (non-income MDGs [TI-M])
Sector	–	Health and social protection
Sub sector	–	Health programs
Theme	–	Regional cooperation
Sub theme	–	Other regional public goods

NOTE

In this report, "\$ refers to US dollars.

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I. INTRODUCTION

1. Dengue has emerged as major public health problem in Southeast Asia, with the region accounting for 52% of the global risk. The transmission of dengue is facilitated by uncontrolled urbanization, environmental degradation, the lack of a reliable water supply, and improper management and disposal of solid waste. To strengthen the regional response and the capacity to combat dengue, the Western Pacific Regional Office (WPRO) and the South-East Asian Regional Office of the World Health Organization (WHO) prepared a regional dengue strategy for Asia and the Pacific,¹ in consultation with developing member countries and development partners, including the Asian Development Bank (ADB).

2. Communicable disease prevention and control is (i) identified by ADB's long-term strategic framework 2008–2020 (Strategy 2020)² as a regional public good and (ii) included as one of the pillars of the Regional Cooperation Strategy and Program for the Greater Mekong Subregion. Dengue is an increasing public health threat in Cambodia, Lao People's Democratic Republic (Lao PDR), and Philippines. The expansion of trade and tourism increases the potential risk that vectors may be introduced from endemic to non-endemic countries. Control of dengue transmission focuses primarily on vector control through integrated vector management (IVM),³ which utilizes environmental management, biological control and residual spraying. To support the implementation of IVM, the ministries of health requested that ADB and WHO help identify and pilot community-based approaches to IVM.⁴ The regional technical assistance (TA) will identify and pilot strategies for larval source reduction and control in Cambodia, Lao PDR, and Philippines, and will additionally support regional dialogue that contributes to broader interaction regarding dengue control. The concept paper was approved on 6 September 2008.

II. ISSUES

3. Dengue is caused by four closely related dengue viruses that are transmitted principally by the *Aedes aegypti* mosquito. The major contributing factors supporting transmission of the dengue virus are increased global movement of people and cargo via airplanes and ships, the presence of four dengue serotypes with little cross immunity, insufficient piped water supplies, poor basic environmental sanitation, and inadequate community participation in vector source reduction activities. The increasing number of severe, potentially fatal cases of dengue and the absence of an effective vaccine⁵ highlight the need to better understand dengue epidemiology and implement sustainable IVM-based interventions.

4. Historically, dengue fever and dengue hemorrhagic fever (DHF) have been reported predominantly among urban and peri-urban populations, where the density of dwellings increases the likelihood of transmission, but this epidemiology is changing rapidly. Evidence from recent outbreaks (such as the outbreak in Cambodia in 2007, which resulted in almost 40,000 hospitalizations and 400 fatalities), suggests that outbreaks are now spreading to rural areas. The timing of dengue and DHF outbreaks has become increasingly irregular, and they

¹ The strategy was endorsed by WHO ministers in September 2008.

² ADB 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank 2008–2020*, Manila.

³ IVM includes (i) advocacy, social mobilization and legislation; (ii) public policies that promote basic sanitation, hygiene, and a safe environment for the household and community; (iii) collaboration within the health sector, and between it and other sectors; (iv) an integrated approach; and (v) evidence-based decision making and capacity building.

⁴ The TA first appeared in the business opportunities section of ADB's website on 22 September 2008.

⁵ The development of a dengue vaccine is complicated by the need to incorporate four virus serotypes in a single preparation.

are no longer confined to the rainy season. The *Aedes aegypti* mosquito is highly domesticated, lives and breeds in and around houses, and feeds almost exclusively on humans. Consequently, people who spend more time at home during the day, (e.g., mothers and children) are more likely to be infected.

5. The mosquito breeds successfully in water that accumulates in discarded trash such as bottles, used tires, and plastic packaging, as well as in domestic water storage containers, which are used where people do not have easy access to a regular supply of piped water. A range of interventions have been tested; chemical control using larvicides such as Abate, which target insects during the larval life stage, is the main strategy used during the dengue transmission season. While effective, this intervention should be viewed as an interim measure due to its high cost, dependency on external funding, low level of community mobilization, and the prospect the mosquito may develop resistance to the insecticide. Cost-effective community-based interventions have been tested in some countries and include the mechanical removal of breeding sites, the provision of covers for water storage containers and the use of larvivorous fish.

6. It is estimated that about 80% of mosquito breeding grounds are in water jars and water tanks in urban and rural households in Cambodia, Lao PDR, and Philippines. Therefore, in an attempt to reduce the risk of dengue outbreaks, water jars and drums in these countries have become a target for dengue vector control activities. Jar covers of various types are used by households; many of them are neither efficient nor durable.

7. Larvivorous fish such as guppy fish are being used as biological control agents in water jars and other large containers. In Cambodia, the introduction of guppy fish resulted in a sharp decline in the entomological indicators (House, Breteau, and Container indices).⁶ Within 8 months of the introduction of guppy fish, 79% of water containers were free of mosquito larvae.⁷ In the absence of mosquito larvae, fish can survive through the consumption of algae and organic substances present in water jars.

8. Unlike malaria prevention and control programs, which rely on substantial external funds through the Global Fund to Fight AIDS, Malaria and Tuberculosis, there is limited external financial support for dengue control and prevention in member countries of the Association of Southeast Asian Nations. National dengue program budgets are largely earmarked for outbreak control—with an emphasis on chemically based interventions and to a lesser extent on capacity building at the community level—and not towards vector control based on entomological and epidemiological data. The budget for dengue control is allocated largely to the procurement of insecticides for chemical control. Essential preventive interventions—including those targeting community-based vector control through source reduction—are thus left unfunded, particularly between outbreaks. Dengue interventions that focus on outbreak response concentrate almost exclusively on chemical control rather than on more sustainable vector control methods, which should be in place during outbreaks.

9. Public education and community mobilization are essential to ensure vector control programs are sustainable. While public awareness of dengue control is increasing in most countries, actions are implemented only during dengue outbreaks. Innovative approaches that

⁶ To Seta et al. 2007. *A Community-Based Dengue Vector Control in Rural Villages of Cambodia*. Cambodia: National Center for Parasitology, Entomology and Malaria Control and the World Health Organization.

⁷ Chang Moh Seng et. al. 2008. *Community-Based Use of Larvivorous Fish *Poecilia Reticulata* to Control the Dengue Vector *Aedes Aegypti* in Domestic Water Storage Containers in Rural Cambodia*. Cambodia: World Health Organization.

combine nonchemical control and community mobilization for source reduction need to be identified and piloted to ensure the sustainability of vector control and the potential to expand interventions beyond the pilot areas. Findings and lessons from the pilot will be essential in strengthening national dengue prevention and control programs and encouraging future funding for dengue.

10. ADB supports Cambodia and the Lao PDR through the Greater Mekong Subregion Communicable Disease Control Project, which aims to strengthen dengue outbreak control, surveillance and clinical case management.⁸ A regional TA on surveillance, prevention, and control of severe acute respiratory syndrome, avian influenza, and other emerging diseases assists the Philippines in clinical case management of dengue and training of community health workers on dengue prevention and control.⁹ These programs for the prevention and control of communicable disease are regional public goods. Regional cooperation will yield greater benefits than will independent country-level interventions. Dengue is transmitted via vectors and environments that bridge country borders. Dengue's transboundary nature, combined with increasing travel that has the potential to transfer the dengue virus from endemic to non-endemic countries, makes regional cooperation for dengue prevention and control essential.¹⁰ The TA is intended to assist the three countries identify and pilot community-based vector control interventions. In this context, the involvement of communities and the coordination of stakeholders in and outside the health sector will be essential to optimize the impact of the TA, in cooperation with WHO and other development partners.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

11. The expected impact of the regional TA is a reduction in the number of dengue fever and DHF cases in the project areas. The outcome is reduced vector density of mosquito larvae in household water containers.

B. Methodology and Key Activities

12. The TA will focus on active involvement in communities and primary schools and in source reduction and biological control of domestic water sources. The TA will have two outputs: (i) piloted community-based strategies for vector source reduction, and (ii) strengthened communication for source reduction.

1. Output 1: Piloted Community-Based Strategies for Vector Source Reduction

13. The aim is to (i) build capacity for source reduction (physical removal of breeding sites through, for example, waste management in domestic environments); and (ii) introduce biological control in household water containers through the introduction of guppy fish,

⁸ ADB. 2005. *Report and Recommendation of the President to the Board of Directors on a Proposed Grant to the Kingdom of Cambodia, the Lao People's Democratic Republic, and the Socialist Republic of Viet Nam for the Greater Mekong Subregion Regional Communicable Disease Control*. Manila.

⁹ ADB. 2003. *Technical Assistance for Emergency Regional Support to Address the Outbreak of Severe Acute Respiratory Syndrome*. Manila

¹⁰ The dengue virus was imported from Southeast Asian countries to the People's Republic of China through travelers infected with the dengue virus. Further, dengue was imported from Japan to the southern parts of the United States in the 1980s via tire shipments. Larvae eggs can survive for 3 months.

complementing the physical removal of other breeding sites. Although guppies have been introduced in the Philippines (for malaria prevention) and in Cambodia (for dengue control), it would be necessary to determine whether containers (including water drums, tanks and jars) would be appropriate fish habitats. Activities undertaken between dengue outbreak seasons will focus on non-chemical interventions, such as covering household water jars with nylon net prototypes¹¹ and other suitable covers, to reduce potential mosquito breeding sites and required clean-up activities.

14. The TA will finance (i) the design, pre-testing, production, and distribution of water jar or drum covers; and (ii) assess (a) procurement and operations costs, and (b) costs associated with raising, distributing and monitoring the acceptance by the community of guppy fish. A baseline entomological study of vector density will be conducted in the project areas during the first 3 months, with the design, pre-testing and production of the covers undertaken over the next 6 months. Frequent entomological assessments will evaluate the efficacy of the covers and their use by households.

2. Output 2: Strengthened Communication for Source Reduction

15. The aim is to reduce vector breeding sites by modifying behavior through health education and community mobilization. Information and communication strategies will be prepared for health and non-health staff, including teachers, school children, parents, women's organizations, religious groups and communities, to ensure the new water jar covers and guppy fish are utilized effectively. This will include training of teachers on the identification of breeding sites and on non-chemical source reduction measures, including the use of guppy fish and water jar covers. Educational messages will be prepared encouraging behaviors that reduce potential breeding sites in and around houses and schools, and additional information, education, and communication materials on dengue prevention and control will be provided.

C. Cost and Financing

16. The total cost of the TA is estimated at \$1.25 million equivalent. ADB will finance \$1 million on a grant basis through ADB's Regional Cooperation and Integration Fund under the Regional Cooperation and Integration Financing Partnership Facility; this includes \$150,000 that will be provided to WHO for technical oversight of the pilot interventions in the three countries. WHO will provide \$200,000 in-kind in the areas of integrated vector management and capacity building. The balance of \$50,000 equivalent will be provided in-kind by participating countries.¹² The cost and financing plan are in Appendix 2.

D. Implementation Arrangements

17. ADB's Southeast Asia Department will be the Executing Agency for the TA. A memorandum of understanding will be developed between ADB and WHO outlining a cooperation framework for TA implementation. Local WHO offices will collaborate and provide technical support in the pilot areas, while overall technical guidance will be provided through the WHO WPRO. Each participating country will designate a focal point for interactions between the country's ministry of health, other government agencies, and the consultants engaged under the TA. Counterpart personnel at the national and local levels will provide direction and technical

¹¹ In Savannaketh, up to 77% of water jars have been found to contain larvae. Weekly emptying and cleaning of large water jars is not acceptable to communities because of the large size of the water jars. A pilot program to introduce nylon nets to cover water jars in four villages in Savannaketh and Champassak provinces was conducted in 2007.

¹² The in-kind support will include remuneration and per diem of counterpart staff.

inputs. Provincial departments of health will be responsible for implementation of all community-based activities, including monitoring and surveillance, in cooperation with community leaders and women's groups. The provincial departments of health will coordinate the village-level pilot interventions. For example, community health workers will be responsible for raising and distributing the guppy fish and disseminating water jar covers. Social mobilization with regard to larvae detection will be provided jointly by community health workers and women's groups, and focused at households. Departments of education will be responsible for (i) information dissemination for school children, teachers and members of the parent-teacher associations; (ii) teacher training; and (iii) monitoring of school-based activities.

18. A consulting firm will be engaged by ADB. TA implementation in the three countries will require approximately 16 person-months of international consultant services for TA coordination and social mobilization, and 6 person-months of national consultant services for financing and health economics. The WHO WPRO will provide technical support for the duration of the TA from its own malaria and other vector born and parasitic diseases (MVP) unit staff and from MVP staff of the WHO country offices in the three participating countries for 6 person-months each, on a part-time basis. The consultants will be engaged in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time) and other arrangements satisfactory to ADB for the engagement of national consultants. The disbursements under the TA will be done in accordance with ADB's *Technical Assistance Disbursement Handbook*.¹³ The Project will begin in May 2009 and be implemented over 24 months, ending in April 2011. An inception report will be submitted within 6 weeks of TA commencement, outlining detailed activities for each country and a time-bound implementation plan. Within 12 months, a regional consultation meeting will be held to share initial results of the pilot interventions, and a midterm report will be presented. A final report will be completed within 2 months of project completion.

IV. THE PRESIDENT'S DECISION

19. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$1,000,000 on a grant basis for the Regional Public Goods for Health: Combating Dengue in ASEAN, and hereby reports this action to the Board.

¹³ ADB. 2008. *Technical Assistance Disbursement Handbook*. Manila.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and/or Indicators	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
<p>Impact Reduced number of dengue fever and dengue hemorrhagic fever cases in the project areas</p>	<p>Number of locally reported dengue fever and dengue hemorrhagic fever cases reduced by 20% from the baseline^a (based on the mean annual number of cases during 2006–2008) by 2015</p>	<p>Country surveillance system</p>	<p>Assumption Functional surveillance system in place</p>
<p>Outcome Reduced density of mosquito larvae in household water containers</p>	<p>Number of breeding sites reduced by 80% from baseline by 2011</p> <p>House and Breteau indices reduced by at least 80% from baseline by 2011^b</p>	<p>Project reports</p> <p>Baseline and completion surveys</p> <p>Report of periodic entomological assessments</p>	<p>Assumption Community supports interventions</p>
<p>Outputs 1. Piloted community-based strategies for vector source reduction</p>	<p>At least 80% of households conducting monthly larvae source reduction in water containers by 2011</p> <p>At least 80% of households utilizing an appropriate water jar and/or water drum cover by 2011</p> <p>At least 80% of households utilizing guppy fish in water containers by 2011</p> <p>Recommendations for program expansion and regional collaboration prepared by 2010</p>	<p>Project progress reports</p> <p>Baseline and completion surveys</p> <p>Report of periodic entomological assessments</p>	<p>Assumption Local authorities are able to mobilize communities for preventive interventions.</p> <p>Risk Local authorities too resistant to promotion of nonchemical vector control</p>

Design Summary	Performance Targets and/or Indicators	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
2. Strengthened communication for source reduction	<p>Communication materials revised and developed for primary school teachers and community organizations by 2009</p> <p>At least 80% of all district health staff and primary school teachers trained in information, education, and communication by 2011</p>	<p>Project progress report</p> <p>Completion survey</p> <p>Completion survey</p>	<p>Assumption Teachers and community organizations utilize communication materials</p> <p>Risk Knowledge is not applied at the household level.</p>
Activities with Milestones			Inputs
<p>Output 1: Piloted Community-Based Strategies for Vector Source Reduction</p> <p>1.1 Recruit consultants and community focal points (July 2009)</p> <p>1.2 Prepare detailed time-bound action plan (August 2009)</p> <p>1.3 Conduct technical workshops for baseline entomological survey and pilot intervention (June/July 2009)</p> <p>1.4 Design, pre-test, and produce water jar and/or drum covers (June 2009)</p> <p>1.5 Establish cultivation and distribution of guppy fish (commencing July 2009 and continuing throughout)</p> <p>1.6 Assess operational costs for water jar cover and guppy fish (October 2010)</p> <p>1.7 Conduct baseline/completion surveys and follow-up assessments including knowledge, attitude and practice (July 2009–February 2011)</p> <p>1.8 Conduct periodical entomological assessments (December 2009–January 2011)</p> <p>1.7 Conduct 6 national workshops and 2 regional meetings; prepare recommendations for expanding interventions and regional collaboration (2009–2011)</p>			<p>Asian Development Bank - \$1million</p> <p>Governments - \$50,000</p> <p>World Health Organization - \$200,000 (in-kind)</p> <p>Consultants - \$535,000</p> <p>Workshops - \$60,000</p> <p>Surveys - \$90,000</p>
<p>Output 2: Strengthened Communication for Source Reduction</p> <p>2.1 Recruit consultant (August 2009)</p> <p>2.2 Review social mobilization/ communication strategies and materials for behavioral change health and education (September/October 2009)</p> <p>2.3 Prepare communication strategies, including on activities to reduce breeding sites, for health staff, teachers, women organizations and</p>			

<p>Activities with Milestones</p> <p>religious groups (commencing October 2009)</p> <p>2.4 Prepare and test information, education, and communication materials (November/December 2009)</p> <p>2.5 Train health and education staff (commencing August 2009)</p> <p>2.6. Implement community-based social mobilization and communication interventions for behavior change</p>	
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^a The baseline entomological survey will be conducted during technical assistance inception.

^b The House index is used to monitor the percentage of houses infested with larvae and/or pupae of *Aedes Aegypti* or related species; the Breteau index is used to monitor the number of infested with larvae and/or pupae per 100 houses inspected.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Total Cost
A. Asian Development Bank Financing^a	
1. International Consultants	
a. Remuneration and Per Diem	415.00
b. International and Local Travel	50.00
c. Reports and Communications	20.00
2. National Consultants	
a. Remuneration and Per Diem	60.00
3. Workshops ^b	60.00
4. Surveys	90.00
5. Miscellaneous Administration and Support Costs	55.00
6. Support for World Health Organization	
a. Technical Meetings	25.00
b. Workshops (planning and evaluation)	15.00
c. Monitoring and Evaluation	35.00
d. Studies and Research	35.00
e. Local Travel	25.00
f. Reports and Communications	15.00
7. Contingencies	100.00
Subtotal (A)	1,000.00
B. World Health Organization Financing (in-kind)	
1. World Health Organization Staff	
a. Remuneration and Per Diem	
i. Regional Office and Country Staff	112.00
b. International and Local Travel	20.00
c. Reports and Communications	8.00
2. Office Facilities and Services	60.00
Subtotal (B)	200.00
C Government Financing	
1. Remuneration and Per Diem of Counterpart Staff	34.70
2. Office Facilities, Services, and Transport	13.00
3. Others	2.30
Subtotal (C)	50.00
Total	1,250.00

^a Financed by the Regional Cooperation and Integration Fund under the Regional Cooperation and Integration Financing Partnership Facility.

^b National and subregional workshops.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Scope of Work

1. A consulting firm will be engaged by the Asian Development Bank (ADB) to provide approximately 16 person-months of international consultant services for technical assistance (TA) coordination and social mobilization, and 6 person-months of national consultant services for financing and health economics. The firm will designate a TA coordinator to coordinate with the respective implementing agencies and other government agencies, the World Health Organization (WHO) Western Pacific Regional Office, and local WHO offices in each country. Activities costing less than \$100,000 will be contracted or procured through the consulting firm. The Project will commence in May 2009 and be implemented over 24 months (ending in April 2011).

B. Consulting Services (ADB Supported)

2. **TA Coordinator—Public Health Expert and Medical Entomologist** (international, 12 person-months, intermittent). The TA coordinator will have a strong background in medical entomology and substantial experience in managing public health programs in Southeast Asia with a focus on dengue prevention and control. The TA coordinator will be responsible for overall planning, including consultation with relevant stakeholders in the three countries, and preparing the progress reports. The expert will have strong leadership and organizational capabilities.

3. As TA coordinator, the expert will have the following tasks:

- (i) Serve as liaison between ADB and the governments participating in the TA, including the respective ministries of health, other relevant government agencies, and WHO.
- (ii) Assist the country focal points in the planning, implementation and evaluation of pilot interventions, and take responsibility for preparation of a detailed time-bound action plan.
- (iii) Plan and coordinate a participatory planning process that includes stakeholder consultations and workshops to obtain necessary inputs for pilot interventions, and ensure government ownership of the pilot interventions.
- (iv) Ensure timely submission of formal written reports, including the inception report (submitted after 4 weeks), summary quarterly progress reports, the midterm report, the draft final report (submitted 2 weeks before completion), and the final report (submitted 2 weeks after completion).
- (v) Ensure that the TA is implemented in a timely manner and according to the terms of reference of the consultants and any subsequent instructions from ADB.

4. The technical tasks of the expert are as follows:

- (i) In cooperation with WHO, assist the focal points in the three countries in the planning, design, and implementation of the pilot interventions.
- (ii) Coordinate and compile results of the baseline, completion, and entomological surveys with the TA focal points and WHO's malaria and other vector borne and parasitic diseases' staff at the regional and country offices.

- (iii) Coordinate the design, production and procurement of water jar and water drum covers with the TA focal points and WHO country offices.
- (iv) Oversee implementation of the pilot interventions, including communication and social mobilization.
- (v) Organize and conduct regional workshops to share findings, discuss the potential for expansion of interventions, and identify mechanisms for regional collaboration and mutual support activities.
- (vi) Consolidate the results of the pilot activities in the three countries and prepare recommendations for expanded interventions, nationally and between countries.

5. **Social Mobilization and Community Development Specialist** (international, 4 person-months, intermittent). The social mobilization specialist will have substantial experience in community development, health communication, and behavior change communication in the area of communicable disease control in Southeast Asia. Under the leadership of the TA coordinator, the expert will assist the country focal points in overall TA planning with regard to communication and community development activities.

6. The technical tasks of the expert are as follows:

- (i) Evaluate the efficacy of current communication mechanisms on dengue prevention and control in the education and health sector and prepare communication and community mobilization strategies for each pilot intervention in the project areas.
- (ii) Identify the most appropriate avenue in each project site for health and non-health sector communication, including teachers, parents, and women's organizations.
- (iii) Identify most appropriate community mobilization strategies in each project site for the reduction of breeding sites, and the utilization of water jar or water drum covers and guppy fish.
- (iv) Prepare appropriate training materials for local health staff and teachers.
- (v) Work in close collaboration with the TA focal point and the health promotion teams (community health workers and schools).
- (vi) Train and supervise the community focal points in the project areas.

7. **Finance Specialists** (three national specialists for 2 person-months each). The three finance specialists will have experience in the analysis of health intervention and program costs. The specialists will be responsible for assessing the full costs of the pilot interventions, including operational costs, and making cost projections for the expanded interventions.

C. World Health Organization Staff Support

8. **Dengue Prevention and Control Expert** (international, 24 months, part-time). The WHO Western Pacific Regional Office staff expert will have a background in developing public health initiatives in a regional context, particularly in Southeast Asia, with a strong background in community-based vector control interventions. The expert will have the following responsibilities:

- (i) Liaise with the TA coordinator and provide overall technical guidance to participating governments and workshop participants.
- (ii) Provide technical back up to WHO country office staff.
- (iii) Assess the overall efficiency of pilot interventions and their potential for expansion.

- (iv) Provide recommendations on regional collaboration relating to dengue control and prevention.
- (v) Assist in conducting the regional workshops.

9. **Vector Specialists** (three part-time international specialists for 6 person-months each). The three WHO country office staff experts (from WHO country offices in Cambodia, Lao People's Democratic Republic, and Philippines) will have substantial experience in dengue prevention and control with regard to community-based vector control in Southeast Asia. The experts will have the following duties:

- (i) Provide in-country technical advice and facilitation for the design and implementation of the pilot interventions, with focal points in the ministries of health and education, and the TA coordinator.
- (ii) Assist the TA focal points in conducting regular entomological surveys, and monitoring and evaluating activities.
- (iii) Assist the local health staff in cultivating guppy fish and establishing a distribution system.
- (iv) Assist the TA coordinator in identifying the appropriate design for and producing or procuring water jar covers.
- (v) Support the TA focal points in organizing and conducting in-country workshops.
- (vi) Assist the TA focal points as necessary.