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Regional Framework for an Integrated Vector Management Strategy for the South-East Asia Region

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ABBREVIATIONS

DALY	disability-adjusted life years
DDT	dichlorodiphenyltrichloroethane
DHF	Dengue haemorrhagic fever
FAO	Food and Agriculture Organization
FFS	Farmer field school
IPM	Integrated pest management
IRS	Indoor residual spraying
IVM	Integrated vector management
IVC	Integrated vector control
ITN	Insecticide-treated nets
ITM	Insecticide-treated materials
M&E	Monitoring and evaluation
LLINs	Long lasting insecticidal nets
POPs	Persistent organic pollutants
SEAR	South-East Asia Region of WHO
UNEP	United Nations Environment Programme
VCNA	Vector control needs assessment
WHO	World Health Organization

CONTENTS

1. PREFACE

In the South East Asia Region, malaria, dengue, filariasis, Japanese encephalitis and leishmaniasis are the main vector-borne diseases. Control of the vectors of these diseases has mainly relied on the use of chemical insecticides which has not been very successful due to human, technical, operational, ecological, and economic factors. Problems of insecticide resistance, including the costs and environmental concerns resulted in reduced reliance on insecticides, with the emphasis on the need for other vector control measures involving environment management, biological control and personal protection. In addition, the Stockholm Convention on Persistent Organic Pollutants (POPs) adopted in 2001 requires a reduced reliance on, with a goal to eliminate, the use of DDT and other intentionally produced POPs and the promotion of research and development of safe alternative products, methods and strategies. Ecological changes that are mainly caused by developmental activities and expansion of agriculture alter environmental receptivity and community vulnerability and increase the transmission of vector-borne diseases. There is a lack of a socio-developmental perspective in disease control. The current approaches against different vector-borne diseases operate in near isolation of each other. In certain situations, optimum control of vectors of two or more diseases can be targeted simultaneously and effectively managed by available technologies and resources when used judiciously.

An evidence-based, multi-disease control approach may be considered that rationalizes judicious use of effective insecticides, use of alternative approaches ranging from provision or promoting the use of insecticide-treated bed nets, environment management and biological control and actions aimed at personal protection. This entails the use of financial and human resources and organization structures within the existing heath systems in a cost-effective manner by engaging the local communities to ensure sustainability. Integrated Vector Management (IVM) is a strategy to reduce or interrupt transmission of disease. IVM provides a viable strategy for eliminating the use of POPs and reducing reliance on pesticides in general for the control of vector-borne diseases.

IVM is analogous to Integrated Pest Management (IPM) in agriculture that helps preserve ecosystem integrity, encourages propagation of natural enemies of pests, and makes better usage of environmental, biological and other measures to prolong the useful life of potential insecticides. Whereas, IPM is fully operational in agriculture, much is required to be done to make IVM operational.

IVM includes the use of methods based on knowledge of factors influencing local vector biology, disease transmission and morbidity; utilization of a range of evidence-based interventions, often in combination and synergistically; collaboration within the health sector and with other public and private sectors that impact on vectors; engagement with local communities and stakeholders; and a public regulatory and legislative framework, for example, to incorporate health safeguards in development activities.

After a number of consultations over the past decade, a global framework for IVM has emerged and has been used as a starting point to develop a regional framework. The Member States should consider adopting a healthy public policy, developing their national IVM strategic plans using the regional IVM framework and implement it through a decentralized integrated health system.

2. VECTOR-BORNE DISEASES IN THE SEA REGION

Major vector-borne diseases

- Malaria
- Filariasis
- Arboviral diseases- Dengue/DHF, Japanese encephalitis
- Visceral leishmaniasis (kala-azar)

Other diseases with a minor role of vectors

- Diseases transmitted to some extent by houseflies, cockroaches, mites, midges:- Diarrhoea, trachoma, asthma

- Nepa virus, West Nile Virus and Chikungunya
- Rodent-borne: Plague, leptospirosis and salmonellosis

Vector-related public health concerns

- Nuisance of mosquitoes, bed bugs, head/body lice

The distribution of major vector-borne diseases in the Region is shown in the following table.

Table: *Distribution and estimated burden of major vector-borne diseases in the South-East Asia Region (2002)*

Major vector-borne diseases	Reported Incidence[a]	Reported Mortality	DALY's lost[b]	Principal vectors	Distribution in SEA
Malaria	2496332	4450	3 680 000	Anopheles spp.	All countries
Lymphatic filariasis	60 million[c]	0	2 802 000	Culex quinquefasciatus	All countries except DPR Korea and Bhutan
Dengue/ DHF	185443	1013	360 000	Aedes aegypti (new name: Stegomyia aegypti)	All countries except DPR Korea
Japanese encephalitis	842[d]	168[d]	347 000	Culex quinquefasciatus, Culex tritaeniorhynchus	Most countries, especially India, Nepal, Sri Lanka and Thailand
Leishmaniasis	22325	216	1 586 000	Phlebotomus spp.	Bangladesh, India and Nepal

[a]Year 2002
[b]World Health Report 2002
[c]Prevalence
[d]Information relates to Nepal only

3. THE EVOLUTION OF THE INTEGRATED VECTOR MANAGEMENT (IVM) APPROACH

Vector control has been a part of malaria control activities since the early 20th century. During the pre-DDT era, reduction of vector mosquitoes largely relied on larviciding and environmental management of breeding habitats. Beginning in the 1950s, DDT and other insecticides were extensively used to interrupt transmission of malaria by reducing densities, human-vector contact and, in particular, the longevity of vector mosquitoes. This intervention had collateral benefits against co-prevalent diseases such as kala-azar. Around the mid-1970s, the resurgence of malaria, together with development of insecticide resistance in vectors, poor human acceptance of indoor house spraying and environmental concerns against the use of insecticides, such as DDT, led to a rethinking in vector control strategies. In the early 1980s, WHO proposed an Integrated Vector Control (IVC) strategy based on the principles of Integrated Pest Management in agriculture. IVC was defined as utilization of all appropriate technological and management techniques to bring about an effective degree of vector suppression in a cost-effective manner.

In 1992, a Global Malaria Control Strategy was formulated, which provided for planning and implementing selective and sustainable preventive measures, including vector control. By the mid-1990s, the IVC further evolved into a Selective Vector Control approach, which can be considered as the targeted use of different vector control methods alone or in combination to prevent or reduce human-vector contact cost-effectively, while addressing sustainability issues.

In 1997, the World Health Assembly (WHA 50.13) recommended reducing the reliance on use of insecticides for control of vector-borne diseases through promotion of integrated pest management approaches in accordance with WHO guidelines, and through the development and adaptation of viable alternative methods of disease vector control. The Stockholm Convention on POPs (2001) recommended phasing out DDT and 11 other POPs and reducing reliance on pesticides for vector control in general. Vector control has been a strong component in the strategy to roll back malaria in the SEA Region. The existing vector control strategy in the Region evolved through a number of intercountry consultations in recent years (Bangalore, 1995; Bangkok, 1998; Yogjakarta 2001; Haryana, 2003 and

2004). A "UNEP/WHO sub-regional workshop on the reduction/elimination and management of pesticides in the context of the Stockholm Convention and related activities" was held in Bangkok in May 2004. All these activities have contributed in the emergence of an IVM strategy.

4. WHAT IS IVM?

Integrated Vector Management (IVM) is a process for managing vector populations to reduce or interrupt transmission of disease. Characteristic features of IVM include:

- selection of methods based on knowledge of factors influencing local vector biology, disease transmission and morbidity;
- use of a range of evidence-based interventions, often in combination and synergistically;
- collaboration within the health sector, outside the health sector and with other public/private sectors that impact on vectors;
- engagement with local communities and stakeholders;
- a public health regulatory and legislative framework, including incorporating health safeguards in development.

5. HEALTHY PUBLIC POLICY AND IVM

In recent years, healthy public policy has emerged as the main requirement in promoting equity-focussed social responsibility for health and safeguarding people from negative health impacts of development policies, programmes and projects. Healthy public policies are intended to create supportive environments, develop individual skills, strengthen community action, and reorient health services. The Jakarta Declaration on Health Promotion in the 21st Century (1997), and the Adelaide Recommendations on Healthy Public Policy (1998), place high priority on health and equal access to health services to all sections of the society, particularly the disadvantaged.

The IVM strategy is not seen to work in isolation; rather, it is intended to be a process to promote healthy public policy. Member Countries in the

Region are being urged to build healthy public policy through legislation, to assist in creating an enabling environment to implement IVM.

6. WHY AN IVM FRAMEWORK

IVM promotes healthy public policies and is based on the premise that effective control is not the sole responsibility of the health sector but requires the collaboration of various public and private agencies and communities. IVM also serves to extend the useful life of insecticides and drugs by reducing the selection pressure for resistance management. The IVM framework aims at addressing the deficiencies in vector control and improving the efficacy, cost-effectiveness, ecological soundness, sustainability and intersectoral linkages towards attaining the Millennium Development Goals. It will serve as an advocacy tool for public health managers, environmentalists, development planners, project proponents and policy makers.

7. KEY ELEMENTS OF AN IVM STRATEGY

7.1 Advocacy, social mobilization and legislation

The actions required include:

- Promotion and inclusion of IVM principles in healthy public policies;
- Empowerment of communities for community action for sustainability;
- Establishment or strengthening of regulatory and legislative control for public health, such as urban bye laws for mosquito abatement or legislation to safeguard against adverse health impacts of development activities in rural areas (e.g. water resources development projects, rainwater harvesting).

7.2 Collaboration within the health sector and with other sectors, such as those involved in:

- Agriculture and agriculture development projects;

- Urban sector;
- Industrial development;
- Infrastructure development projects;
- Water resources development projects;
- Housing projects;
- Other health sectors

7.3 Integrated approach

This involves selective application of the following methods to interrupt disease transmission:

- Indoor residual spraying in high risk areas and in epidemic situations based on vector behaviour and community acceptance and status of insecticide resistance in vectors;
- Use of insecticide-treated nets/long-lasting insecticidal nets (ITN/LLIN) and other personal protection methods;
- Environmental management including improved housing and sanitation, wherever feasible. The Region has vast experience in environmental management work but the experiences require to be analysed to create a scientific evidence base;
- Biological control such as use of larvivorous fish and biolarvicides. Fish have extensively been used in malaria control programmes, such as in India, or the use of locally available mesocyclops in dengue vector control in Myanmar;
- Larviciding in urban, peri-urban and project areas.

7.4 Evidence-based decision making

Implementation of an IVM strategy requires assessment of the vector control needs based on the local factors of epidemiology. It demands an efficient surveillance/information management system that highlights promptly targets for vector control interventions; this will include emerging and existing problem situations such as disease outbreaks (malaria, dengue, JE). For these

reasons, rapid assessment tools for vector control needs assessment (VCNA) will be required to be developed both for the programme personnel as well as for the local communities.

Possible decision making criteria for the programme personnel are suggested at Annex.

7.5 Operational and implementation research

Strong operational and implementation research support will be required for effective implementation of IVM-based interventions. This will necessitate investment in research and development of new and modified tools, as well as operational research.

7.6 Capacity building

In order for the countries to formulate country-specific IVM strategies and implement then to control vector-borne diseases, national, regional and local capacities need to be strengthened. This will require developing tools and guidelines in local languages and training of personnel responsible for vector control. Orientation of communities will be required enabling them to take action and seeking their participation in scaling up interventions.

Necessary entomological and vector control capacities within the decentralized integrated health system will have to be built up and strengthened. This should, in particular, address the managerial capacity requirements under the current de-centralized management of health services incorporating IVM (in which there is little experience so far) and related support services including entomology. The capacity building should also address the expertise needed at the central, as well as peripheral levels.

7.7 Monitoring and evaluation

This involves deciding monitoring and evaluation indicators as per the local requirements and targets set. Monitoring and evaluation is an aspect often neglected. When a variety of interventions with diverse characteristics are to be used in IVM, their relative contributions to the overall impact has to be

assessed for cost-effectiveness. The inputs, costs, and outcome/impact of different interventions, when used singly or in combination, and simultaneously or consecutively in a defined area, must be monitored.

8. FACTORS FAVOURING IMPLEMENTATION OF IVM IN THE SEA REGION

The following factors favour implementation of an IVM strategy in the Region:

- The Region has a reasonably good health system, but it needs to be oriented to accommodate the IVM principles and requirements with WHO Collaborating Centres to provide support in capacity building for vector control.
- The existing WHO Collaborating Centres and other national institutions provide support in capacity building for vector control in the Region;
- The Region has a sound IPM experience base in agriculture, which can be emulated where relevant. The concept of farmer field schools (FFS) is being successfully operated in 12 Asian countries supported by the FAO Programme for Community IPM in Asia. The IPM programme can benefit IVM in many ways, for example, in rice field mosquito management, water management in agriculture and judicious use of insecticides in agriculture;
- The Region has considerable experience in malaria control using indoor residual spraying (IRS) and has a wide knowledge base on the implications of relying excessively on insecticides;
- There is experience in tackling more than one vector borne disease together. For example, control of kala-azar as a collateral benefit of malaria control using IRS in India;
- Some countries in the Region have made substantial progress in the application of alternative methods of vector control. For example, industrial malaria control and malaria and dengue control in urban areas by bio-environmental methods including use of legislation, management of irrigation malaria in Indonesia, use of larvivorous

fish, community-wide use of bed nets and successful pilots in treatment of community-owned bed nets in some areas;

- There is strong acceptance in the region, of the adverse health impact of development projects, especially related to vector-borne diseases. There are also positive experiences of preventing malaria by incorporating health safeguards in irrigation projects such as in the Himalayan Terai region;
- Environmental activists, stakeholders in development and institutions promoting ecologically sound approaches all favour the environment-friendly IVM approach which contributes to a healthy public policy.

9. ROLE OF WHO IN IVM IMPLEMENTATION

WHO has remained in the forefront in advocating equity-focussed healthy public policy and developing an IVM strategy for control of vector-borne diseases. In the SEA Region, its role in supporting the implementation of the IVM strategy can be:

- To develop and disseminate tools and regional guidelines adaptable to country IVM strategy needs, as well as conduct assessment of IVM needs;
- To assist in developing training materials according to country needs;
- To provide technical support in situation analysis, developing country-specific IVM plans, implementation of IVM strategy and monitoring and evaluation of the progress;
- To assist in capacity building for successful planning, implementation, and monitoring and evaluation of IVM in the Member Countries;
- Advocacy for resource mobilization for scaling up or switching over to IVM;
- To review the regional experience base on alternative methods of vector control. There is little experience in systematic IVM

implementation in vector-borne disease control in the Region. Relevant experiences need to be consolidated and documented, to facilitate their extrapolation and duplication in other situations;

- To promote the development of an IVM-specific database; and
- To promote research and development for new and improved tools, methods and strategies in support of IVM;

10. ROLE OF MEMBER COUNTRIES

Member Countries also have a role to play in IVM. For example, they can:

- Develop a healthy public policy incorporating IVM principles;
- Conduct a situation analysis to assess needs for implementation of IVM in the context of existing health systems, health policies and available resources;
- Review and strengthen/build national and sub-national capacities for planning, implementation, and monitoring and evaluation of IVM activities;
- Develop national tools and guidelines;
- Develop a national implementation plan for IVM;
- Promote research and development for new and improved tools, methods and strategies in support of IVM; and
- Implement the IVM strategy.

Annex

DECISION-MAKING CRITERIA FOR VECTOR CONTROL NEEDS ASSESSMENT BY PROGRAMME PERSONNEL

Step 1. Stratify areas according to disease burden and epidemiology of transmission

Step 2. Determine if there is need for vector control in each eco-epidemiological stratum and in current local circumstances

Step 3. If there is a need for vector control, identify vector(s) in each stratum. Also identify vectors that can be managed together by an IVM approach

Step 4. For each vector implicated, determine relevant issues, e.g.:

- Adult resting sites and behaviour relevant for application of IRS
- Biting habits relevant for use of ITNs/personal protection measures
- Ecology of breeding habitats relevant for larval control
- Insecticide susceptibility or resistance status to select insecticides

Step 5. Determine which method(s) of prevention/vector control is suitable:

- method to reduce abundance and longevity of vectors (IRS)
- method for quick reduction of vector population: space spraying (fogging) for epidemic control
- methods to reduce human vector contact: use of personal/community protection measures such as ITMs, house/window screening etc.
- environment management, biological control, use of larvicides: to reduce vector breeding
- application of legislation: to promote preventive measures or incorporate health safeguards in the development projects
- personal hygiene
- Key issues: feasibility, cost-effectiveness, community acceptance

Step 6. Where the use of insecticides is essential:

- check susceptibility of target vector(s) to insecticide to be used;
- select the type of insecticide, formulation and dosage, and method of application (how to apply?);
- decide the time of application/treatment and number of rounds (when to apply?);
- decide where to apply, such as human dwellings or cattle sheds or both;
- when in use, check bio-efficacy of the insecticide used.

Step 7. Monitoring and evaluation of impact on disease:

- decide indicators
- decide targets in space and time
- establish monitoring and evaluation mechanism