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Introduction

To reduce reliance on chemicals and slow down build up of vector resistance, repeated efforts have been made in the WHO South-East Asia Region (SEAR), to introduce less harmful or non-chemical vector control methods such as environmental control, eg.removal of breeding sites, use of impregnated mosquito nets and biological control interventions with larvivorous fish and bacillus thurengensis. The success of these alternative initiatives has been partially limited because most vector control programmes have been implemented in a more top-down manner, restricting effective and sustained community participation.

This state of affairs has been widely recognized, and led WHO to develop in 2004, a new Integrated Vector Management (IVM) strategy as a multisectoral participatory approach.

The need to further develop IVM was also highlighted at previous SEARO workshops organized by WHO Regional Office for South-East Asia (SEARO), such as the one in Chiang Mai, Thailand in November 2003 to finalize the WHO Guidelines on the Management of Public Health Pesticides, and the joint WHO/UNEP workshop on the Stockholm Convention and Related Activities" held in April 2004 in Bangkok, Thailand.

Following the issuance of WHO's new IVM strategy to manage all disease vectors, SEARO prepared a first version of the "*Regional Framework for an Integrated Vector Management Strategy for SEAR*". The "*Revised Malaria Control Strategy in SEAR 2006-2010*" to which IVM is a key element," was endorsed at the Health Ministers Meeting in Dhaka, Bangladesh, in August 2006.

Stronger and more active community participation is called for to ensure increased success in preventing and controlling vector-borne diseases. The IVM approach aims at integrating the domains of environmental management and adult education. Community members could learn to improve their knowledge and their intuitive abilities to make joint, sound decisions on vector management. Successful regional experiences in Integrated Pest Management (IPM) schemes can be a source of inspiration for IVM implementation.

Such an initiative (IPVM pilot project) in Sri Lanka has been implemented since 2003, using the synergies between IPM and IVM. The experience of farming communities in irrigation systems of the Mahaweli Authority that are affected by mosquito-transmitted diseases associated with wetland rice and irrigation canals should be shared at the regional level.

With this background in mind, a regional workshop was organized by the Vector Control Research Centre VCRC, Puducherry Tamil Nadu, India, to obtain consensus from SEAR countries to implement a regional strategy for community-based, integrated vector management (IVM) using participatory approaches.

The present report gives an overview of the results obtained, mainly in the form of conclusions and recommendations. The report also includes a follow-up plan of action and important annexes concerning policy, capacity building and selection of IVM pilot projects in the Region.

A. Message from Dr Samlee Plianbangchang, Regional Director, WHO South-East Asia Region

Malaria is a major public heath problem in the South-East Asia Region. Out of 11 countries of the Region, 10 are malaria-endemic. The Region accounts for 6% of the global morbidity and around 5% of the global mortality due to malaria. Dengue and dengue hemorrhagic fever are re-emerging in countries of the South East Asia Region. Case fatality is high if treatment is delayed.

To control the disease vectors, countries rely on the use of large amounts of insecticides, mainly synthetic pyrethroids and DDT. The chemicals are applied in or around people's homes to kill adult mosquitoes or in the aquatic breeding habitats to eliminate its eggs and larvae. The extensive use of insecticides has helped reduce the disease burden significantly.

As is well known, countries in the SouthEast Asia Region are engaged in intensive, especially irrigation-based, agriculture. There is a high use of pesticides in this sector, sometimes leading to overuse. For this reason, pesticide use has become a cause of major concern in many SEAR countries as it interferes with human health and the environment. The risk posed by multi-purpose use of insecticides, such as pyrethroids and the development of resistance by disease vectors, is well established.

Recent studies indicate that there are over 500 species of insects and mites resistant to pesticides. Over 270 weed species, over 150 plant pathogens, and about a half dozen species of rats are also resistant to pesticides that were once able to control them. Multiple resistanceresistance to more than one pesticide and to pesticides in more than one chemical classis increasing rapidly and at least 17 species of insects are now known to be resistant to all major classes of insecticides.

Frequent use of pesticides not only increases the potential for insecticide resistance, but also reduces the positive effects of natural enemies of crop pests and disease vectors. Hence, it presents an overall risk to biodiversity and the overall ecological integrity, with the potential to increase our vulnerability to pest and disease outbreaks.

Concerted efforts have been made in the Region to reduce reliance on chemicals and to slow down vector resistance. These include introducing less harmful or non-chemical vector control methods like removal of breeding sites, use of impregnated mosquito nets and bio-control interventions with larvivorous fish.

One reason for the limited success of these initiatives is the fact that as vector control programmes were conducted and monitored from a central level, most of the pilot projects were implemented in a top-down manner, allowing limited participation by the local communities. Other contributing factors that have limited the success of environmental management of disease control measures are poorly designed irrigation and water systems, inadequate housing, poor waste disposal and water storage, deforestation and loss of biodiversity.

Recognizing these shortcomings, WHO issued the new Integrated Vector Management or IVM Strategy in 2004. The strategy is based on the premise that effective control is not the sole preserve of the health sector but requires the

collaboration of various public and private agencies and community participation. The active engagement of communities is a key factor in assuring sustainability. IVM entails the use of a range of biological, chemical and physical interventions of proven efficacy, separately or in combination, in order to implement more cost-effective control and reduce reliance on any single intervention.

This strategy also serves to extend the useful life of insecticides and drugs by reducing the selection pressure for resistance development. IVM includes organization at the local level and the establishment of effective and broadly-based local partnerships. At the other end of the scale, countries and donors should be encouraged to develop partnerships and operate within adaptive management systems. IVM now needs to be implemented in the SouthEast Asia Region.

Rather than relying on a single method of vector control, IVM stresses the importance of first understanding the local vector ecology and local patterns of disease transmission, and then choosing the appropriate vector control tools, from the range of options available.

These include environmental management strategies that can reduce or eliminate vector breeding grounds. This can be achieved through improved design or operation of water resources development projects as well as use of biological controls (e.g. bacterial larvicides and larvivorous fish) that target and kill vector larvae without generating the ecological impacts of chemical use.

The South-East Asia Region has long-standing experience in the use of insecticide-treated nets (ITNs), biological control (e.g. larvivorous fish) and environmental management in the control of malaria vectors. Compared to other regions of the world, there is a relatively high indigenous use of untreated nets in the Region as well as a number of local manufacturers, distributors and retailers of nets. Under the Roll Back Malaria, partnership countries are being supported to accelerate the coverage of ITNs and other interventions within the context of integrated vector management. There are a number of success stories/lessons available in the Region. Indonesia has been able to control large malaria epidemic outbreaks in the Menoreh hills by the use of rapid diagnosis tests, combination of treatments and vector control measures.

At the same time, the agricultural sector in many South East Asian countries has also been very successful in mobilizing rural communities for the wide implementation of integrated pest management (IPM). IPM involves minimising the use of pesticides, as well as a wide range of other practices aimed at growing a healthy crop. Key success factors for the adoption of IPM approach have been the direct relevance to the farmers and evident economic benefits linked to reducing reliance on pesticides.

Four countries in the project region are being supported by FAO under the Community Integrated Pest Management Programme aimed at promoting an ecological approach to plant protection. It involves approaches to minimize the use of pesticides and many other practices to ensure a healthy crop. The IPM programme employs a training approach called the Farmers Field School (FFS) aimed at helping rural people learn about IPM.

Globally, over 2 million farmers have graduated from the FFS since 1990. Indonesia, Thailand, Sri Lanka and Philippines are members of the IPM programme and have well established and successful national programmes. IPM is now being integrated into the curricula of rural schools as part of formal primary education, under a concept called Students Field Schools (SFS). Thailand has had a successful SFS programme called Ecological Agriculture for students and Teachers (EAST) since 1995. A pilot FFS project, which started in Sri Lanka in 2002 has led to a significant reduction in the use of insecticides among the FSS/IPM-farmers compared to the non-IPM farmers. The results demonstrate that such reductions are possible while, at the same time, producing higher rice yields.

An inter-sectoral approach is essential for sustainable pesticide management. One such example is the IPVM pilot being implemented in Sri Lanka since 2003, monitored by the Anti-Malaria Campaign/ Ministry of Health, the Directorate for Plant Protection/Ministry of Agriculture and the Mahaweli Authority with support from FAO, UNEP and WHO. The IPVM pilot is designed to reduce the disease burden and increase crop yields, in the most cost-effective manner, while minimizing the negative impact on ecosystems (e.g. depletion of biodiversity) and adverse side-effects on public health from excessive use of chemicals in vector control. You will hear more about this valuable experience during the workshop.

Although there have been some notable achievements through inter-sectoral collaboration, policy and operational frameworks continue to be weak and effective institutional arrangements need to be actively promoted. Therefore, the pilot sites you will visit during this workshop, which seek to integrate vector management with pest management (IPVM), will consolidate ongoing efforts and provide a very good opportunity to strengthen inter-sectoral approaches to pesticide management in the Region.

The implementation of IVM in combination with IPM and using the Farmer Field School approach was encouraged by the participants at the WHO/UNEP Sub-regional Workshop on the Reduction/Elimination and Management of Pesticides in the Context of the Stockholm Convention and Related Activities of WHO in May 2004 in Bangkok. As an outcome, we will start, from 2007, implementing a major IPVM programme benefiting a majority of countries in the South-East Asia Region.

The WHO 2006-2010 project, "*Reduction in use of DDT by Enhancing the Capabilities through the implementation of Integrated Vector Management* " funded by the Global Environment Facility (GEF) will also be shared with you during this workshop.

This programme really offers the potential of synergies between IPM and integrated vector management on several fronts. The participation of delegates from the health, agriculture and environment sectors, technicians, programme managers and policy makers, reflects their high level of commitment. The various experts from key related agencies and institutions as well as the technical support of WHO makes me confident that most of the current bottlenecks can be overcome and sustainable strategies for the sound management of disease vectors and crop pests, developed.

This workshop, I feel, is a milestone in that direction.

B. Objectives, Agenda, Participants and Programme

General Objective

To obtain consensus from SEAR countries to implement a regional strategy for community-based integrated vector management (IVM) using participatory approaches.

Specific objectives

1. To capitalize on lessons learnt from country IVM experiences and success stories, and
2. To discuss and finalize a draft framework for joint implementation of IVM in SEAR.

Agenda

1. Introduction of topic and of participants
2. Country presentations on lessons learnt from integrated, multi sectoral approaches to manage disease vectors.
3. Introduction and discussion on IVM strategy and synergies with integrated pest management (IPM)
4. Preparation of a draft action plan for implementation of IVM in SEAR (working groups)
5. Evaluation of the workshop.

Participants (For the detailed List of Participants see **Annex 9**)

The workshop mobilized close to 100 persons, with over 50 participants attending the workshop during the four days. Amongst them were 28 official country representatives; 5 environmental, 15 agricultural and 24 health professionals; 2 representatives of FAO and 6 representatives of WHO.

A total of 48 farmers (15 women and 30 men), helped organize the field exercise and carry out the agroecosystem analysis. Their contribution was key to the success of this workshop.

Programme overview (For the detailed Programme see **Annex1**)

Day	Topic	Location
18.12 am	Country presentations	VCRC Puduchery
18.12 pm	Working groups on country situations	
19.12 am	Presentation of group work	
19.12 pm	Presentation of group work and travel to Tiruchirapalli	
20.12 am	Field exercise in agroecosystem analysis	Tiruchirapalli
20.12 pm	Working groups	
21.12 am	Presentation of group work	
21.12 pm	Conclusions and recommendations	

C. Conclusions and recommendations

We, the participants of the "Regional workshop to implement the integrated management of disease vectors (IVM)", organized at the Vector Control Research Centre, Puduchery, and in collaboration with the Central Integrated Pest management Centre in Tiruchirapalli, Tamil Nadu, India, during 18-21 December 2006, representing the Governments of Bangladesh, Bhutan, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor Leste,

- **Recognizing** that achieving the Millennium Development Goals (MDGs) will require halving, between 1990 and 2015, the proportion of people whose income is less than one dollar a day (*MDG 1: Eradicate extreme poverty and hunger; Target 1);* Increasing the proportion of the population in malaria-risk areas using effective malaria prevention, to halt by 2015 and begun to reverse the incidence of malaria and other major diseases (*MDG 6: Combat HIV/AIDS, malaria and other diseases; Target 8*); Integrating the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources by maintaining biological diversity (*MDG 7: Ensure environmental sustainability; Target 9*); and implementing a multi-sectoral approach;

- **Taking into account** that WHO s' new Global Strategic Framework on Integrated Vector Management (IVM) sets out new and broad principles and approaches to vector control that are applicable to all vector borne diseases, seeking to improve the efficacy, cost-effectiveness, ecological soundness and sustainability of disease vector control. That IVM is based on the premise that effective control is not the sole preserve of the health sector but requires the collaboration of various public and private agencies and community participation. And that the Global Strategic Framework on IVM considers the engagement of communities as a key factor in assuring sustainability. (*Global Strategic Framework on Integrated Vector Management (IVM), WHO, 2004*);

- **Aware of** the World Health Assembly Resolution WHA50.13, which urges Member States to take steps to "reduce reliance on insecticides for control of vectors of human diseases through promotion of integrated pest-management approaches in accordance with WHO guidelines, and through support for the development and adaptation of viable alternative methods of vector control; to ensure that the use of DDT is authorized by governments for public health purposes only, and that, there is no diversion of DDT to entities in the private sector" (*WHO, May 1997*);

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[1] ***Integrated Vector Management or IVM****: Through evidence-based decision-making, IVM rationalizes the use of human and financial resources and organizational structures for the control of vector-borne disease and emphasizes the engagement of communities to ensure sustainability. It encourages a mult- disease control approach, integration with other disease control measures and the considered and systematic application of a range of interventions, often in combination and synergistically.*

Implementation of this strategy will require effective public health regulation and legislation, allied to a strong commitment and concerted action by the World Health Organization, working in coordination with the Food and Agriculture Organization of the United Nations, the United Nations Environment Programme, other United Nations agencies and donors, and Member States (WHO, 2004).

- **Fulfilling the commitments** of the Stockholm Convention on Persistent Organic Pollutants (POPs) to which eight of the 11 SEAR Member States are Parties to, notably to the development and implementation, especially for women, children and the least educated, of educational and public awareness programmes on POPs, as well as on their health and environmental effects and on their alternatives. *(Stockholm Convention on Persistent Organic Pollutants, Article 10*);

- **Committed to achieve the** aim of the World Summit on Sustainable Development (WSSD), by 2020, that the use and production of chemicals are done in ways that lead to the minimization of significant adverse effects on human health and the environment, and by implementing the Strategic Approach to International Chemicals Management (SAICM);

- **In harmony with** the mission statement of Decision VI/26 of the Conference of the Parties to the Convention on Biological Diversity to which nine of the SEAR Member States are Parties - which aims at achieving by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national levels as a contribution to poverty alleviation and to the benefit of all life on Earth;

- **Aware of** the need to prepare local communities to the potential increase in the transmission from climate sensitive vector-borne diseases such as malaria and dengue resulting of climate variability and climate change, as reported by the Intergovernmental Panel on Climate Change (IPCC), emphasizing the need for local adaptation to cope with this change;

- **Noting** the success and cost-effectiveness of the Farmer Field School approach promoted by FAO and other agencies, aiming at implementing Integrated Pest Management or IPM in agricultural systems by strengthening farmers' skills in analysis and adaptive management of crop health with the aim to increase productivity, while helping preserve ecosystem integrity and encouraging the propagation of natural enemies of pest species;

- **Aware** that the probable malaria cases in SEAR total 20 million and that the current national vector control programmes only reach a minority of the population who are at risk;

- **Conscious** of the call in the Revised Malaria Control Strategy for SEAR (2005), endorsed by all SEAR Member States in 2005, for reaching and

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[2] *The **Farmer Field School** approach is a form of adult education, which evolved from the concept that farmers learn optimally from field observation and experimentation. It was developed to help farmers tailor their Integrated Pest Management (IPM) practices to diverse and dynamic ecological conditions. In regular sessions from planting till harvest, groups of neighbouring farmers observe and discuss dynamics of the crop's ecosystem. Simple experimentation helps farmers further improve their understanding of functional relationships (e.g. pests-natural enemy population dynamics and crop damage-yield relationships). In this cyclical learning process, farmers develop the expertise that enables them to make their own crop management decisions. Special group activities encourage learning from peers,*
and strengthen communicative skills and group building.

[1] ***Integrated Pest Management or IPM** is a knowledge-intensive and farmer-based management approach that is based on four objectives: (1) grow healthy crop, (2) regular field observation, (3) conservation of natural enemies, and (4) farmers become experts in their own field.*

- Pest and Vector Management or IPVM , since 2003 (*Evaluation Report of the Integrated Pest and Vector Management Project in Sri Lanka, WHO/SEARO, 2006*);

- **Based on** the need to act upon WHO's statement confirming that: "An estimated 42% of the global malaria burden could be prevented by environmental management' (*"Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease", WHO, 2006*);

- **Taking into account** the accelerating decentralization processes in the health sector as well as in other sectors in some SEAR countries and the need to ensure active community participation in developing capacity to find local solutions;

- **Aware** of the GEF funded national and regional projects aimed at the "Reduction in the use of DDT and other pesticides by Enhancing Capabilities for the implementation of Integrated Vector Management";

- **Having experienced,** during this workshop, the validity and cost effectiveness of the Farmer Field School approach, evidenced by the capacity of farmers to self-manage and protect their agroecosystem, as a result of the IPM programme carried out by the Ministry of Agriculture, India,

We conclude that:

1. The inter-relationship between the environment, agriculture and health is key to the identification and implementation of sustainable strategies for effectively protecting agriculture from pests, communities from some vector-borne diseases and protecting ecosystems from hazardous chemicals;

2. Community empowerment programmes (knowledge and skill development through capacity development programmes) through FFS have an immense opportunity for sparking off rural development;

3. IPM, IVM and IPVM are key strategies for achieving the 2015 MDGs, the 2020 goal of the WWSD/SAICM, and the implementation of the Stockholm Convention, for preserving biodiversity in a sustained manner and for preparing communities to respond to the potential increase of disease burden triggered by climate change;

4. There is an urgent need to reduce reliance on use of pesticides in agriculture and public health to protect human health and the environment;

5. IPM, IVM and IPVM are cost-effective approaches that ensure minimal exposure to pesticides and to sustained increase in local income;

6. IPM and IVM can be implemented separately or in an integrated manner as IPVM, depending on the local ecological conditions and other criteria. Therefore evidence-based decision-making needs to be conducted locally, involving the agricultural and health sectors and local communities;

[4] ***Integrated Pest and Vector Management or IPVM:*** *Is a combination of IPM and IVM, whereby the community-based, FFS-like approach is used to prevent and control crop pest and human disease outbreaks.*

7. The Farmer Field School (FFS) approach has a proven record in many countries. FFS programmes are seen to foster group dynamics and enhance community networking thus aiding in strengthening community inter-personal relationships. Such social dynamics are observed to be indispensable for the success of a programme. Thus, FFS should be used to implement IVM and IPVM schemes to reduce both, the burden of vector-borne human diseases and crop pests;

8. In areas where agroecosystems are not the major contributing factor for production of disease vectors and in areas where other types of water habitats are the perennial source for vector breeding, community-based interventions need to be encouraged and sustained by linking the programme with potential income generating schemes;

9. Capacity building programmes for the prevention and control of disease vectors should aim at increasing community empowerment;

10. More attention should be given to learn from experiences of NGOs/farmers' organizations, engaged in promoting community-based development, to implement IVM;

11. IVM and IPVM Pilots linked with operational research allow learning by doing. This way of gaining experience should be promoted;

12. Sharing information on IVM, as effectively facilitated during this workshop, is a key factor that needs to be strengthened by broadening existing IPM networks;

Therefore, we, the participants of the Workshop,

RECOMMEND to SEAR Member States:

1. To allow the programmes of different ministries/ authorities in charge of vector and pest management to follow a holistic approach rather than a sectoral approach in implementing their programmes;

2. To officially declare Integrated Pest Management, Integrated Vector Management and Integrated Pest and Vector Management as the preferred national strategies to reduce the health consequences and economic burden on account of vectors of human diseases and crop pests, and to commit national funds for their implementation;

3. To aim at rural development through community empowerment by building capacities (knowledge and skill development to enhance the power of decision making);

4. To ensure that community empowering approaches such as Farmer Field School be adopted to implement Integrated Pest and Vector Management programmes, with the aim to achieve sustainable agricultural production and further reduction of the disease burden from vectors;

5. To support and implement FFS-like approaches and to use them in other health promotion and rural development programmes;

6. To implement IVM/IPM as a means to reduce and phase out the use of POPs and other pesticides in agriculture and public health in the curricula aimed at training the professionals;

7. To advocate IPM and IVM for protecting, conserving and promoting human and environmental health through promoting IPM and IVM in school education curricula/eco-clubs.;

8. To increase the role and accountability of local communities in the management of environmental health by means of participatory learning approaches such as the FFS;

9. To promote an ecosystem approach to ensure achieving the Millennium Development Goals;

10. To propose adoption of IVM, in combination with IPM wherever feasible, as a preferred option to ensure the effective management of disease vectors, at the WHO Regional Committee meeting in August 2007;

11. To fully support the implementation of GEF-funded national and regional projects aimed at the "Reduction in the use of DDT and other pesticides by Enhancing Capabilities for the implementation of Integrated Vector Management", and initiate action by conducting national Vector Management Needs Assessments.

II. RECOMMEND to the World Health Organization

I. To play a catalytic role in encouraging Member States to accord high priority and political will to address environmental health as a human development objective in the SEA Region;

II. To strengthen its existing linkages and co-ordination with FAO, UNEP, UNDP and other agencies, many of which already support programmes based on Integrated Vector Management, to create a strong and effective advocacy for IVM;

III. To convene inter-ministerial meetings with regional agencies at local and regional levels, towards implementing of IVM, IPM and IPVM in the SEA Region;

IV. To support, mainly through the existing WHO Collaborating Centres and other national institutions, research and documentation of success stories to increase the knowledge base and further advocate for resource mobilization for implementation of IVM, IPM and IPVM schemes;

[5] ***Vector Management Needs Assessment***: *Carried out by a National Steering committee which will also include representatives and consider inputs of local communities.Steps: 1. Stratify areas according to the national malaria situation; 2. Determine needs for vector management in each eco-epidemiological stratum and in current local circumstances; 3. If there is a need for vector management, identify the specific vector(s) in each stratum; 4. Determine which integrated management methods (within the IVM and/or IPVM strategies) are best suited for the prevention and control of each concerned vector; 6. Develop local, district, sub-regional and national plans for monitoring and evaluation of the intervention's impact on the disease burden.*

V. To continue liaising with UNEP and GEF for the implementation of national and regional projects aimed at the "Reduction in the use of DDT and other pesticides by Enhancing Capabilities for the implementation of Integrated Vector Management"; and

VI. To promote IVM and IPVM as strategies in adapting to altered conditions of vector-borne disease as a consequence of climate change.

D. Products for the Workshop

The participants from 10 SEAR countries obtained consensus on the need to implement community-based, integrated vector management (IVM) through participatory approaches such as FFS. Based on an intensive exchange on lessons learnt from IPM and IPVM experiences, they agreed on a framework for joint implementation of IVM in SEAR.

The 22 country presentations (see List in **Annex1**) allowed all participants to share and exchange the strengths and challenges of national vector control programmes and on ways forward for implementing IVM. An overview of the findings is presented in **Annex 3**.

A specific working group had the mandate to elaborate on the contents of a curriculum for capacity building in Integrated Pest and Vector Management. This group also used existing guidance derived from the Sri Lanka experience (see **Annex 7**). The proposed way forward is presented in **Annex 4**.

The participants contributed to the revision of the draft "Integrated Vector Management Strategy for the South East Asia" by proposing elements for consideration. This product is presented in **Annex 5**.

For guidance on next steps, a working group produced **"**Perspectives for Implementing IVM and IVPM Pilot Projects". This product is available in **Annex 6.**

Finally, based on the country experiences shared, workshop products, background documents and especially the individual and group practical IPM field experience, the participants prepared a strong and comprehensive list of conclusions and recommendations.

E. Outlook and Action Plan

The vector control programme managers, vector control researchers and, agricultural scientists and extension workers, as well as environmental professionals and a group of IPM practising farmers, who all participated in this workshop, agreed that IVM needs to be promoted and implemented as a preferred strategy in countries of the South-East Asia Region.

The participants also agreed to encourage an integrated approach, wherever needed and possible, combining IVM and IPM, as IPVM. The best practice would be to implement these strategies through community empowering approaches such as the Farmer Field School.

The workshop used the experiences gained in IPM in rice, allowing a good comprehension of the FFS potential. IVM and IPM can go together to gain added advantages, mainly rationalizing the resources. Yet, IPM should not be over-emphasized, although the integration with IPM is one of the approaches envisaged in IVM.

Indeed, the bulk of malaria emanates from the different ecosystems in SEAR countries. Still, here also, appropriate FFSlike community-based IVM strategies/measures need to be adequately addressed.

Besides aiming to reduce the burden from disease vectors, the participants saw the implementation of IVM and/or IPVM as an effective way to reduce insecticide use. The reduction of insecticides use will counter resistance build-up in vectors and in crop pests. It will also minimize farmers' exposure to pesticides and reduce the presence of toxic residues in food. The implementation of IVM and/or IPVM would protect biodiversity, contribute to the appropriate planning of irrigation schemes, and help better understand the role of domestic animals/livestock who are intermediate hosts for diseases. Successful IVM and/or IPVM schemes would result in substantial savings for the farmer households and improve their well-being.

Convinced of the need to promote and implement IVM and/or IPVM strategies in SEAR, the participants agreed on the following Action Plan for implementation of IVM in the Region.

Action plan for the implementation of IVM in SEAR in 2007

	What?	When?	How ?	Who?
1.	Present workshop report and a concept note to the WHO regional meeting of malaria programme managers, Thailand	February March, 2007	WHO/SEARO and Temporary Advisers to the IVM workshop 12/2006	WHO/SEARO
2.	Ensure financial support to the IPVM Pilot projects in Sri Lanka, beyond July 2007	January March, 2007	Consultation with WHO and FAO Sri Lanka, Rome and Geneva	WHO/SEARO
3.	Develop a full-fledged IVM training curriculum (including a Monitoring and Evaluation system)	January June, 2007	Consultation with WHO, FAO and related experts Use outputs of meeting of malaria programme managers, Thailand	Funded by WHO, by VCRC and Mahidol University
4.	Carry out the first 5 IVM courses in SEAR	November, 2007	22 participants	Funded by WHO and by VCRC
5.	Ensure start of the bi-regional GEF project before end of 2007	January - June, 2007	Follow-up with GEF office in Nairobi to accelerate the start of the PDF B phase	WHO/SEARO
6.	Prepare presentation for the high-level Environment and Health Ministerial Meeting , Bangkok	May-June, 2007	Consideration of IVM and IPVM in policy changes	WHO/FAO/UNEP/TWG
7.	Formation of national operational IVM committees	June December, 2007	Sensitization within and between ministries at national level and with NGOs;	Agriculture, Health, Environment, Education, Universities, Research Institutes. and WHO/FAO
8.	Formulate IVM and IPVM projects in all SEAR countries	June December, 2007	Consultation with WHO, FAO and related experts Use existing WHO document	All workshop participants, support from WHO/SEARO National IVM stakeholders
9.	Donor sensitization at international level	All of 2007		Country offices, FAO, WHO/TDR
10.	Develop a Monitoring and Evaluation system	January-March 2007		WHO/SEARO and Temporary Advisers to the workshop

List of Annexes

1. Detailed workshop programme and overview of country presentations
2. Photo report
3. Strengths, challenges of national vector control programmes, needs and ways forward for implementing IVM
4. Elements of a curriculum for capacity building in Integrated Pest and Vector Management
5. Revision of the draft "Integrated Vector Management Strategy for the South-East Asia Region": elements for consideration
6. Perspectives for implementing IVM and IPVM Pilot Projects
7. Summary of the IPVM pilot projects in Sri Lanka
8. List of background information distributed at the workshop
9. Contact details of the participants and organizers

Annex 1: Programme and overview of country presentations

Monday, 18th December 2006		
Time	**Topic**	**Speaker / Facilitator**
8.30 - 10.30	Registration, Inauguration, Presentation of Participants, Objectives and programme	Mr A. von Hildebrand, WHO/SEARO
10.30 - 11.00	The new Global Strategic Framework for Integrated Vector Management and its implications of the Region	Dr Chusak P WHO/SEARO
11.00 11.30	Le ssons Learnt from implementing Integrated Pest Management (IPM) by empowering communities	Dr Ricardo Labrada IPM Global Facility, FAO
11.30 12.00	Synergies and challenges for the implementation of Integrated Pest and Vector Management or IPVM	Dr H van den Berg, Wageninigen University, Netherlands
12.00 15.30	Country presentations	Participants, WHO and VCRC facilitators
16.00 17.00	Group work session 1 (GWS1): Synthesis of strengths and challenges of the vector control programmes in SEAR countries	
17.00 18.00	Plenary: GWS1 Group reports, discussion and synthesis	
Tuesday, 19th December 2006		
8.00 8.30	Capacity building for IVM: Developing a Curriculum at VCRC	Dr P.K. Das, VCRC, India
8.30 - 8.50	Focus on health end environmental dimensions in the curricula, Faculty of Tropical Medicine Management	Dr Piyarat Butraporn, Mahidol University, Thailand
8.50 - 9.10	The need for research in IVM: global and local perspectives	Dr Hanns Overgaard, Bioforsk, Norway
9.10 - 9.30	Environmental impact quotient(EIQ)	Dr Ole Martin Eklo, Bioforsk, Norway
9.30 10.00	Community empowerment for IPVM: experiences from a pilot project in Sri Lanka	Mr K. Piyasena, Directory of Plant Protection, Sri Lanka
10.00 - 12.30	Group work session 2 (GWS2): Prioritization of issues: IVM research, IVM / capacity building/ IVM demonstration projects (3 subgroups)	
13.00 14.00	Plenary: GWS 2 Group reports, discussion and synthesis	
14.00 - 15.30	Presentation and discussion on existing WHO IVM guidance documents	Mr A. von Hildebrand, WHO/SEARO
17.00	Departure for Tiruchirapalli	
Wednesday, 20th December 2006		
07 00 - 14.00	Abhishekapuram, Lalgudi village: visit to IPM farmer field school and carry out field exercises	Dr Ragunathan IPM team, Tiruchirapalli
15.00 16.30	Group work session 3 (GSW3) : Opportunities and challenges for joint action in agriculture & health in SEAR countries (3 subgroups)	
16.30 17.00	Plenary: presentation of GWS3 Group reports, discussion and synthesis	
Thursday, 21st December 2006		
8.30 12.00	Group work session 4 (GWS4): Elements for a Plan of action to implement IVM strategy/ IVM research & curricula/ Starting off the GEF Pilot projects	
12.00 13.00	Plenary GWS4 Group reports, discussion and synthesis	
14.30 15.30	Presentation and approval of elements of an action plan for implementation of IVM in SEAR and of workshop recommendations	
16.00 17.00	Participatory evaluation and closure	

Overview of country presentations

Country	Country presentations	No.
Bangladesh	MD. R.Hoque, MoA: Integrated Pest Management in Bangladesh	1.
Bangladesh	Dr Selina Khatun, IEDCR, MoHFW : Vector control programme in Bangladesh	2.
Bhutan	Dr Wangchuk, VDCP, MoH: Malaria Situation & Control strategies	3.
Bhutan	Dr Doe Doe, MoA: Integr ated pest management in Bhutan : An overview	4.
India	Dr Chanda Chowdhury, MOEF: Chemical Crisis Management System in India	5.
India	Dr N Dhingra, MoHFW: National Vector Borne Disease control Programme	6.
India	Dr R.Yadav, MOHFW : Experiences in IVM in Northern Gujarat, India	7.
India	Dr.V.Ragunathan, MoA: Lessons Learnt from promoting and Implementing Integrated Pest management India	8.
Indonesia	Dr Budisusanti, INO: Management of pesticides In Indonesia: perspectives from the national environmental authority	9.
Indonesia	Drs Winarno, INO: Challenges posed by effective decentralization to national vector control programmes: the case of Indonesia	10.
Maldives	Ms Saniha, MAV: Increasing agricultural production and pesticide use in the Maldives: perspectives	11.
Maldives	Mr A.Shareef. MAV: Vector control programme in the Maldives: issues and challenges	12.
Myanmar	Dr. Win Naing, DHF, MoH: Environmental Management & Vector Control: experiences from Myanmar	13.
Myanmar	Ms Mar Mar Win, VBDC, MoH:Vector contr ol programme in Myanmar	14.
Myanmar	Ms Daw Naing Naing Win,DOH, MoH:The role of water sanitation in vector control: perspectives for Myanmar	15.
Nepal	Dr Shambhu Kafle, VBDRTC, MoH: Strengths and Challenges of the national disease vector control programme	16.
Nepal	Mr Lila Ram Paudel , MoA:Disease vectors, Their occurrence and Management in Nepal	17.
Sri Lanka	Dr R.R. Abeysinghe,AMC, MoH: Integrated management of disease vectors in the malaria control programme of Sri Lanka	18.
Sri Lanka	MrSujeewa Fernando, MoEF: Integrated Management of Disease Vectors	19.
Thailand	Mrs Areepan Upanisakorn, MinAG:: Experience on Biological Control of Agricultural Insect Pest	20.
Thailand	Dr Wichai Satimai, MoPH, THA, Lessons learnt from integrated, multisectoral approaches to manage disease vectors	21.
Timor Leste	Mrs Rita Maria Soares, TLS: Overview of the Environmental health issues in Timor Leste	22.
Timor Leste	Mr Americo Alves Brito, TLS: Challenges for the sound management of pesticides in Timor Leste	23.
Timor Leste	Mr Antonio da Costa, TLS: The national vector control programme in Timor Leste: strengths and challenges	24.

Annex 2: Photo Report

Exchange and interaction in the meeting rooms at VCRC, Puducherry, Tamil Nadu, India

Exchange and interaction with the farmers of Abhishekapuram, Lalgudi village, Tamil Nadu

Farmer and Scientist taking part in the agroecosystem analysis exercise in Abhishekapuram.

IPM Farmers and participants of the workshop share and discuss insect samples and results of the rice agroecosystem analysis, under the shade

IPM farmers present a drama used in FFS to visualise the crop, its main pests and the role of pests enemies

Annex 3: Group work session 1: Strengths, challenges of national vector control programmes and ways forward for implementing IVM

Policy issues			
Issues	**Strengths**	**Challenges**	**Needs and Ways forward**
National vector control policy	Exists in all SEAR Countries	National policies support disease-specific Programmes	Advocacy for a National IVM Policy built on the principle of an eco-epidemiological approach to address multiple vector-borne diseases and that aim at empowering local communities to achieve successful vector management
		National policies on pesticide management do not consider all the implications of IPM and IVM	IVM Policy needs to consider revision of national pesticide legislation and experiences /outcomes of IPM in the country and beyond
		National policies do not take into account the role of local communities	National IVM Policy to consider approaches such as Farmer Field School
		Inter-sectoral collaboration is poor and mainly on an ad-hoc basis, dependant on individuals not institutions.	Bring together the different sectors on a common platform, main stakeholders: health, agriculture, environment, concerned communities
		Lack of awareness among policy makers	Advocacy at policy level can be facilitated by: Case Studies documentation; Pilot Project implementation with a joint inter-sectoral task force; Sensitization meetings at central, provincial, district and local levels; and with support from international partners

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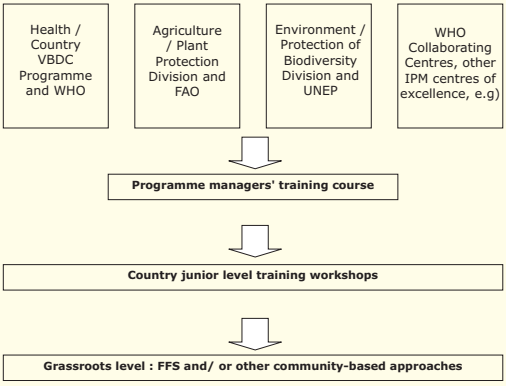
		Lack of awareness among policy makers	Advocacy at policy level can be facilitated by: Case Studies documentation; Pilot Project implementation with a joint inter-sectoral task force; Sensitization meetings at central, provincial, district and local levels; and with support from international partners

Social/environmental related issues			
Issues	**Strengths**	**Challenges**	**Needs and Ways forward**
Community participation	Communities participate in many vector control schemes by collaborating during IRS operations' conducting periodic clean villages campaigns and by using bed nets	Community Participation not aimed at community empowerment Vector control programmes are de-linked for the farmers economy Integration of IPM & IVM to generate income not always feasible	Organize national workshop, with health and agriculture to learn from IPM and Farmer Field School experiences Base IVM programmes on an eco-epidemiological approach, whereby the identification of problems is carried out at the local level. Promote community ownership of IVM initiatives by addressing agricultural production and economic issues and integration of IPM & IVM. This can be expanded to community empowerment for Health & Environment
Toxic residues in food	Some standards established in most countries	No standards established in some countries Poor monitoring of food quality: no evident link between agricultural practices and presence of toxic residues in food items Lack of effective/efficient system of enforcement	Food safety programmes to be strengthened and coordinated with agriculture and health for the promotion IPM and IVM as a way to reduce chemical contaminants in food.

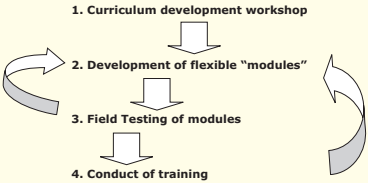
Technical issues			
Issues	**Strengths**	**Challenges**	**Needs and Ways forward**
Indoor Residual Spray with insecticides (IRS)	Regular programme in most countries, run by health sector	- Reaching less than 300 000 people at risk in SEAR - Quality control of pesticides not ensured - Resistance build-up and resurgence problems - Cost issue - Poor participation of agricultural sector	IRS to be scaled up through rigorous, close and regular monitoring of stocks management, application modes, etc. - Joint evaluation and action regarding resistance build up to insecticides and resurgence phenomena, with agricultural sector
Bed Nets		Currently used by 11 500 000 people at risk in SEAR Scarce tools for monitoring indicators	Scaling up by involving local communities through knowledge transferring approaches
Environmental management		Currently implemented to protect some 3 715 000 people at risk in SEAR	Scaling up of water, aquatic weeds and waste management through community participation within IVM schemes
Bio-control		Currently implemented to protect some 9 300 000 people at risk in SEAR Indigenous knowledge largely not considered	Capitalize on existing knowledge in academia and locally through R&D support and collaboration with community-based NGOs

Annex 4: Elements of a Curriculum for capacity building in Integrated Pest and Vector Management

Work should be based on the Training of Trainers Concept (TOT concept)



Process for the development of the curricula



Course contents of the curriculum

The group participants took into consideration the contents of the "Curriculum on IPM versus IPVM" annexed to the WHO publication "Evaluation Report of the Integrated Pest and Vector Management Project in Sri Lanka", WHO/SEARO, 2006.

Below are the additional elements to be included in the course

Target participants

- Senior level: ministries, departments, etc.
- Middle level: Facilitators, trainers (Health & Agriculture)
- Grassroots level: FFS, villagers

Curriculum/subjects

1. Fundamentals of IPM, IVM, IPVM
2. Eco-environmental systems
   - Principles of ecology
   - Fundamentals of environmental health
   - Environmental Impact assessment (EIA)
   - Water management
3. Medical & agricultural practices
   - Water, fertilizers, pesticides effects on insects
   - Appropriate methods in vector management
   - Modes of dentification of the major disease vectors and crop pests
4. Management aspects
   - Facilitation skills
   - Methods to assess the farmer's knowledge and skills
   - Planning, stratification for IPVM
5. Epidemiology
   - Tropical vector borne diseases
   - Socio-behavioural aspects
   - Statistical/analytical methods
6. Monitoring and evaluation
   - Identification of indicators (see Tables 2 and 3)
7. Information, education and communication
   - Questionnaire design for KAP assessment
   - Communication strategies such as Communication for Behavioural Impact (COMBI) /Behavioural Change and Communication (BCC)

Curriculum on IPM versus IPVM

Comparison of the curriculum of Farmer Field School on IPM versus IPVM, and suggested additions or modifications to improve the IPVM curriculum. The time-specific FFS activities can be related to crop stage and agricultural operations by referring to the corresponding time scale in Annex 4. * DAS = days after sowing; ** FFS = number of weekly FFS session

DAS *	FFS **	Description of IPM FFS activities	FFS **	Description of IPVM FFS activities	Suggested modifications
-35					Develop M&E implementation plan; Selection of villages; Engage local agric. & health authorities & schoolteachers; Participatory baseline survey
-28				Pre-FFS meeting: Selecting of FFS group and participants, explaining FFS programme, identifying local needs, baseline survey	No baseline survey
-21			1	Determining curriculum, identifying experimental plots, incorporating rice straw and/or other organic matter	Add: consolidating curriculum with FFS participants according to local needs
-14			2	Exercises: Identification of mosquito larvae (*Anopheles*, *Culex*); begin larval sampling	No modification
-7		Pre-FFS meeting: Selecting of FFS group and participants, explaining FFS programme, identifying local needs, identifying experimental plots, incorporation of rice straw and other organic matter	3	Laying out field plots for studies; mosquito larval dipper sampling in ploughed fields; determining curriculum; determining seed rates and basal fertilizer for field plots	No modification

[6] **Source:** "*Evaluation Report of the Integrated Pest and Vector Management Project in Sri Lanka*", WHO/SEARO, 2006

DAS *	FFS **	Description of IPM FFS activities	FFS **	Description of IPVM FFS activities	Suggested modifications
0	1	Laying out field plots, determining curriculum, determining seed rates & basal fertilizer for field plots.	4	Larval sampling in paddy fields; identification of mosquito genera facilitated by AMC Officers	Add: special topic on vector-borne disease cycle including transmission Add: assignment to study the life cycle of mosquitoes at home
7	2	Introduce agro-ecosystem analysis (AESA); collection and identification of natural enemies and plant feeding insects; group dynamic exercise; special topic on growth stages of rice plant and nutrition	5	Introduce agro-ecosystem analysis (AESA); collection and identification of natural enemies and plant feeding insects; larval mosquito sampling; group dynamic exercise; special topic on mosquito types and identification of larvae and adults	Add: presentation of results of life cycle study
14	3	AESA activities (field observations, drawing, analysis, group presentation, discussion); introduction of mechanical weed control; group dynamics exercise; special topic on weed control and fertilizer requirement for first top dressing	6	AESA activities (field observations, drawing, analysis, group presentation and discussion); larval mosquito sampling; mechanical weed control; group dynamics exercise; exercise on larval predation by aquatic natural enemies; special topic on weed control & fertilizer requirement for first top dressing	Add: village walk to identify mosquito breeding places in the surrounding environment; management practices to eliminate vector breeding
21	4	AESA activities; initiate field studies on defoliation & detillering; group dynamics exercise; special topic on leaf eating caterpillars	7	AESA activities; larval sampling; initiate defoliation & detillering studies; group dynamics exercise; special topic on growth stages of rice plant and early pests and their management; assignment to study	Add: introduction of cup studies on predation of mosquitoes and assignment of cup studies at home Remove: assignment on life cycle study

DAS *	FFS **	Description of IPM FFS activities	FFS **	Description of IPVM FFS activities	Suggested modifications
28	5	AESA activities; maintenance of field studies; group dynamics exercise; special topic on internal feeders	8	AESA activities; maintenance of field studies; larval mosquito sampling; group dynamics exercise; presentation of life cycle study results; special topic on rice internal feeders and their management; introduce cup studies on predation	Add: presentation of results on cup studies on predation Remove: presentation on life cycle study
35	6	AESA activities; maintenance of field studies & cup studies; group dynamics exercise; fertilizer requirement for second top dressing; special topic on brown plant hopper management and its natural enemies	9	AESA activities; maintenance of field studies; group dynamics exercise; fertilizer requirement for second top dressing; special topic on vector-borne diseases and transmission	Add: Special topic on self-assessment of signs and symptoms of acute poisoning Remove: special topic on vector-borne diseases
42	7	AESA activities; maintenance of field studies; group dynamics exercise; inspect plants for panicle initiation; special topic on booting stage and water requirement	10	AESA activities; maintenance of field studies; larval mosquito sampling; group dynamics exercise; inspect plants for panicle initiation; special topic on booting stage and water requirement	No modification
49	8	AESA activities; maintenance of field studies and cup studies; group dynamics exercise; inspect plants for panicle initiation; special topic on paddy bug management and its natural enemies	11	AESA activities; maintenance of field studies; larval mosquito sampling; group dynamics exercise; inspect plants for panicle initiation; special topic on paddy bug management and its natural enemies	Add: village walk to observe other crops and home gardening by participants to discuss pest management issues

DAS *	FFS **	Description of IPM FFS activities	FFS **	Description of IPVM FFS activities	Suggested modifications
56	9	AESA activities; maintenance of field studies and cup studies; group dynamics exercise; special topic on flowering, pollination and fertilization	12	AESA activities; maintenance of field studies & cup studies; larval mosquito sampling; group dynamics exercise; special topic on flowering, pollination and fertilization; village walk to identify mosquito breeding places in the surrounding environment	No modification
63	10	AESA activities; maintenance of field studies & cup studies; group dynamics exercise; special topic on ripening phase	13	AESA activities; maintenance of field studies and cup studies; larval mosquito sampling; group dynamics exercise; special topic on ripening phase; assignment to examine vector breeding places in their own gardens and homes and list them	No modification
70	11	AESA activities; maintenance of field studies and cup studies; group dynamics exercise; special topic on the importance and rate of the third top dressing	14	AESA activities; maintenance of field studies and cup studies; larval mosquito sampling; group dynamics exercise; special topic on the importance and rate of third top dressing; reporting of results on mosquito breeding places; management practices to eliminate breeding	No modification
77	12	AESA activities; maintenance of field studies and cup studies; group dynamics exercise; special topic on maintaining purity	15	AESA activities; maintenance of field studies & cup studies; larval mosquito sampling; group dynamics exercise; special topic on maintaining purity of	Add: village walk to observe other crops and home gardening by participants to discuss pest management issues

DAS *	FFS **	Description of IPM FFS activities	FFS **	Description of IPVM FFS activities	Suggested modifications
84	13	Maintenance of field studies & cup studies; group dynamics exercise; special topic on varieties of rice	16	Maintenance of field studies & cup studies; larval mosquito sampling; group dynamics exercise; special topic on varieties of rice	Add: special topic on household storage and disposal of pesticides Remove: special topic on varieties of rice
91	14	Maintenance of field studies & cup studies; group dynamics exercise; special topic on producing good seed paddy	17	Maintenance of field studies & cup studies; larval mosquito sampling; group dynamics exercise; special topic on producing good seed paddy	No modification
98	15	Analysing data on productive and non - productive tillers, pest & natural enemy counts, population fluctuations, etc.	18	Analysing data on productive and non - productive tillers, pest & natural enemy counts, population fluctuations, etc. Examine mosquito breeding places in irrigation canals	Add: special topic on income generating activity, e.g. composting, poultry, beekeeping, bio-agent production, paddy straw mushroom production, food processing
105	16	After harvesting of study plots: analysing of data on crop yields, natural enemies, pests, etc.	19	After harvesting of study plots: analysing of data on crop yields, natural enemies, pests, etc.	Add: marketing and/or value addition of produce
112			20	Post-FFS meeting to discuss / obtain feedback from farmers and reinforce IPVM practices	No modification

Category	Aspect	Indicators and measurements
General	Pre-FFS meeting	Did it take place? number of participants; number of women
	When was first FFS session?	Indicate number of weeks before the time of planting
	Meeting place, distance to filed plot	Type (under the shade of a tree, shelter, house, school)
	FFS field plots	Presence; area (m ⎾)
	IPVM plot	Transplanted/ seeded; rice straw incorporation (Yes/No); type of weeding practiced
	Farmer practice plot	Genuine farmer practice or follows IPVM treatment?
People	FFS participants present	Number of persons attending FFS session
	Women participation	Number; involvement in aspects on agriculture/health
	Public health inspector presence	Yes/No
	District or divisional staff present	Indicate
	Potential farmer trainers	Number of participants with qualities of FFS facilitator if given the opportunity of additional training
Materials	Refreshments	Available/provided; adequacy
	Stationary	Available/provided; adequacy (writing pads, pens, newsprint paper, colour markers; measuring ruler)
	Mosquito-related materials	Available/provided; adequacy (soup spoons as dippers, plastic cups, plastic containers, sweep nets)
Activities	Field observations	Number of sub-groups; number of participants enter the paddy field for observations
	AESA drawing	Indicate aspects in drawing viz., plant, water level, natural enemies, pests, mosquitoes, weeds, weather condition, management decisions
	AESA presentation	Do participants take turns in presenting AESA data? Do women present? Is IPVM compared with the farmer practice? Is there a discussion after each presentation?
	Special topic	Takes place (Yes/No); type; relevance to crop stage; quality of process (e.g. lecture or discovery learning exercise?)
	Group dynamics exercise	Takes place (Yes/No); name of exercise; is explanation / interpretation of the exercise conducted?
	Defoliation & detillering trial	Practiced; quality (number of rice hills, treatments)
	Cup studies	Are cups or containers used by participants for home assignments on lifecycles or predation studies?
	Miscellaneous activities	Give descriptions
Other	Facilitator	Does the facilitator enter the paddy field? Does facilitator provide ready answers/ instructions/lectures? Are participants encouraged to find out the answers by themselves?
	General atmosphere	Describe (e.g. formal, cheerful, indifferent, motivated)
	Duration of FFS session (hours)	Hours

[7] **Source:** "*Evaluation Report of the Integrated Pest and Vector Management Project in Sri Lanka*", WHO/SEARO, 2006

Impact level	Impact type	Indicators	Methods
Knowledge and skills	Knowledge about agro-ecology	Able to identify pests, natural enemies, plant nutritional requirements; understand biology, functional relationships, nutrient cycles	Semi-structured questionnaire
	Knowledge about vector ecology, disease cycles and transmission	Able to identify mosquito genera; understand vector biology, breeding, and transmission and reservoir of disease	Semi-structured questionnaire
	Knowledge about pesticide effects	Knows toxicity categories; aware of effects on health and environment; aware of alternatives to pesticides (plant-based or biological products)	Semi-structured questionnaire
	Crop management skills	Knows appropriate agronomic practices and pest management decision-making	Open questionnaire
	Vector management skills	Knows when, where and how to eliminate vector breeding	Open questionnaire
	Critical analytic skills	Knows how to analyse complex agro-ecosystem data resulting in evidence-based decision-making; knows how to experiment; understands farm-level economic analysis	Open questionnaire
	Social skills	Ability to express and communicate views; understands the importance of collective action	Open questionnaire
Change in practices	Improved crop management	Number of ploughings; rice straw incorporation in soil; balanced fertilizer application; planting method; weeding method; irrigation and drainage; farmers conduct economic analysis	Semi-structured questionnaire
	Pesticide use	Frequency, amount and type of pesticide; toxicity category of pesticides; mixing; targeting of pests; facility for household storage; disposal of pesticides	Semi-structured questionnaire; local pesticide outlet sales
	Vector management activities	Type of water storage structures/bodies drained or eliminated; frequency of actions; scale of operations; number of containers, coconut shells etc.	Open questionnaire
	Personal protection	Use of mosquito nets for beds by family members; use of repellents (plant-based; chemical)	Semi-structured questionnaire

[8] **Source:** "*Evaluation Report of the Integrated Pest and Vector Management Project in Sri Lanka*", WHO/SEARO, 2006

Impact level	Impact type	Indicators	Methods
	Innovations	New practices of crop management or vector management	Open questionnaire; interviews
	Change on social/political relations	Communicate IPVM with other stakeholders; engage in cooperative action on the management of vectors or crops	Open questionnaire; interviews
Field level effects	Agricultural production	Crop yield; quality of produce; pesticide residues in produce; marketability	Semi-structured questionnaire
	Vector larval and adult densities	Dipper samples of larval densities in various habitats; adult mosquito catches	AMC data; community driven surveys
	Ecosystem integrity	Density and diversity of aquatic fauna and fauna above the water surface; organic matter content in soil	AESA data; trainer studies
	Economic benefits	Input costs; labour cost; opportunity cost; sale of produce	Semi-structured questionnaire
Community level impacts	Collective action for pest or vector control	Number of people involved; frequency and type of actions	Open questionnaire; interviews
	Change in gender roles	Women's role in decision-making on vector control or personal protection; women's role in field activities and concerted activities	Stratification of all data for gender; interviews
	Incidence of vector-borne disease of public health importance	Number of locally reported cases	Local hospital registry and laboratory data; AMC data
	Incidence of pesticide poisoning	Incidence of signs and symptoms among farmers and spray operators; incidence of poisoning at the household level; re-use or disposal of empty containers; chemical residues on food	Local hospital registry and laboratory data; community-driven surveys
Change at the institutional level	Increased inter-sectoral collaboration and integration	Joint workshops; joint field visits; integration of field activities	Documentation; interviews
	Change in immediate objectives, implementation strategy, policies	New activities; new regulations; job descriptions; budget allocations; involvement of public health inspectors	Documentation; interviews
	Impact on research agenda	Trans-disciplinary research initiated; field visits by researchers; researcher-farmer interactions; farmer participation in research forums	Documentation; interviews

Annex 5: Revision of the draft "Integrated Vector Management Strategy for the South-East Asia Region": elements for consideration

1. The final document should be renamed: **REGIONAL FRAMEWORK FOR DEVELOPMENT OF GUIDELINES FOR IPVM"**

2. Broad components of the Guidelines:

A. Background

A.1 Need for IPM and IVM integration- advantages of integration

A.2 Development necessity

A.3 Part of national health/ agricultural/environment, etc policies

B. Broad Goals/Objectives/Targets and Outcomes

B.1 A clear-cut definition of IPVM operational definition

B.2 Needs to be updated and modified to focus on IVM-IPVM with a clear goal, objectives and strategies to be adapted by countries in line with MDGs and national development policies.

B.3 Needs to have multisectoral, intersectoral and decentralized approach.

B.4 Suggested Ministries of Health be the lead agency, describing roles of others ministries/agencies need to be precisely defined.

B.5 Time-frame for implementation

3. Components

Situational Analysis collection of baseline data by relevant agencies

1. Multi-sectoral approach: A Country Technical Advisory Group/Committee with expert members from relevant ministries, organizations, agencies will decide on policy issues and provide technical advice to the implementing agencies. Role of each ministry has to be clearly delineated at the national level.
2. Involvement of NGOs/local self government/ environmental protection agencies/farmers unions or representatives/ community groups/ industrial organizations needs to be considered. Role/responsibilities of each agency have to be clearly defined.
3. Decentralized approach convergence to begin from ground level in the form of pilot projects to show decision makers that strategies work.
4. Regional framework to be endorsed by country decision makers WHO/ international organizations to play the lead role.
5. Networking and coordination amongst SEAR countries WHO to provide forum for information exchange.

4. INPUTS

1. Resources: - Funds Budgetary and extra-budgetary
2. Infrastructural development: training institutions; laboratory strengthening; working groups.

5. PROCESS

1. Capacity Building Training and capacity building including infrastructural capacities, strengthening of existing public health laboratories and institutes, identification of schools for training of excellence, etc. WHO to provide appropriate funds and technical support.
2. Curriculum development, piloting and standardization of training material, development of TOTs, evaluation of training process.
3. Developing advocacy, sensitization and participatory materials for different levels of implementation.

6. PILOT STUDIES

Countries have to decide on criteria for selection of sites to conduct pilot projects for control of disease vectors identification, stratification and deciding the interventions for a particular eco-epidemiological approach - on a priority basis for adapting IVM, IPVM. Lessons learnt to help scale-up later to the other areas.

Community mobilization

- Advocacy
- Sensitization
- Learning-by-doing process FFS

Operational Research

- Strong operational research institutions/bodies
- What works and what does not work

Sustainability

- Political commitment
- Financial
- Motivation
- High visibility of results
- Long-term plans of collaborating institutions/agencies including WHO/international organizations.
- Add income-generating schemes
- Involvement of farmers/NGOs,others in disease control interventions concepts of social marketing in selected areas like ITNs, etc.

7. OUTCOMES

- Change in disease burden - measurement criteria
- Change in vector densities
- Change in use of pesticides baseline,
- Development of FFS
- Number of pilot projects
- Number of trained farmers
- Institutions involved and participating
- Labs strengthened
- Areas under IPVM

8. MONITORING AND EVALUATION

- Input indicators:
  - Budget allocated and disbursed
- Process indicators:
  - Development of FFS
  - Number of pilot projects
  - Number of trained
  - Institutions involved and participating
  - Labs strengthened
  - Areas under IPVM

- M&E to be carried out by agencies not involved in implementation by independent agencies WHO to play an important facilitating role.

9. Development of an international IPVM Network

10. Prepare the following Annexes:

1. BACKGROUND PAPERS & SUCCESS STORIES OF IPVM

Annex 6: Perspectives for implementing IVM and IVPM Pilot Projects

Existing projects

- IPVM project in Sri Lanka;
- IPM Projects: Bhutan, India, Thailand, Bangladesh, Indonesia, Nepal

Proposed projects

- Bi-regional WHO/Bioforsk GEF project: Objectives: Reduction of pesticide use and promote IVM in 10 countries: Sri Lanka, Myanmar, Thailand , Viet Nam, Indonesia, Papua New Guinea, Vanuatu, Republic of Korea, the Philippines, Solomon islands. To start before end-2007;
- India: WHO/GEF project: Objectives: Reduction of pesticide use and promote IVM in India. Still being negotiated;
- Potential IPVM projects in vegetables are required in Maldives, Timor-Leste, and Bhutan. To be prepared.

Available documentation

- WHO IVM Strategy
- WHO Mission report and FAO/WHO video on IPVM project in Sri Lanka
- IPVM published articles: Junko Yasuoka (PhD Thesis), van den Berg, others
- IPM lessons learnt: Bhutan (EU report), India (FAO reports).

Potential external support/funding

- Established IPM trained staff is available in most SEAR countries
- The IPVM curriculum from Sri Lanka can be used for inter-country training
- IPM projects can be funded by the FAO Global IPM facility, UNEP, IDRC/ Canada, AUSAID, Norway/NORAD, SIDA /Sweden, Government of Japan.

Criteria and tools for selection of project sites

- Mapping of crop areas to be overlapped with disease distribution to identify "Hotspots" with high pesticide use and high disease vector incidence
- IPM sites
  See UNEP for digitized maps.
- Tools for monitoring and evaluation of FFS practice (process evaluation, impact evaluation) available with FAO.
- EIQ, Knowledge, Attitude and Practice analysis
- Residue monitoring, sampling processing (research topic)
- Qualitative and quantitative methods to measure empowerment and knowledge increase.

Inter-sectoral collaboration

- Tap existing interministerial structures created for intersectoral initiatives (e.g. avian flu), involving Agriculture/Environment /Health
- Identify synergistic effects of IVM and IPVM.

Annex 7: Executive summary of the Mission Report of the Evaluation of the Integrated Pest and Vector Management (IPVM) project in Sri Lanka
By H. van den Berg, P.K. Das, A. von Hildebrand, V. Ragunathan, July 2006

Background

Integrated Pest and Vector Management (IPVM) builds upon the successful experience in Integrated Pest Management (IPM), which is based on the practical, field-based education of groups of rice farmers in weekly sessions of the Farmer Field School (FFS). Farmers learn the skills of observation-based crop management to grow better crops in healthier environments and be less dependent on the use of insecticides. The wetland rice environment, while providing food and fodder, also supports breeding of the vectors of human diseases. The IPVM project in Sri Lanka, which started in 2002 with support from FAO and UNEP, has been unique in connecting vector management with agricultural activities thereby actively involving farming communities in observation-based decision-making on vector management. An evaluation mission was organized by WHO's Regional Office for South-East Asia on the effectiveness, sustainability and replicability of the project to assist in the implementation of WHO's new strategy on Integrated Vector Management (IVM).

Rationale and mission objectives

Malaria and other vector-borne diseases like lymphatic filariasis, leishmaniasis, Japanese encephalitis and dengue are a major health problem in the South East Asia Region (WHO, 2004a). In the wake of increased drug resistance and insecticide resistance in the vectors, there is a need for establishing integrated vector management strategies which are less reliant on chemical methods of disease control but involve other sectors and local communities in ecosystem management to reduce health risks.

The Integrated Pest and Vector Management (IPVM) project in Sri Lanka has for the first time, integrated vector management with farmer education in agriculture, thus involving rural communities in reducing the health risks of vector-borne disease. The new approach could potentially benefit other areas in the Region, including those affected by the tsunami.
Hence, the main objectives of the mission were:

1. To determine the effectiveness, sustainability and replicability of the IPVM approach in Sri Lanka
2. To explore prospects for replication in the country itself and in India

General findings

The mission team observed that the project is basically on the right track. Visits to IPVM Farmer Field School activities and discussions with IPVM-FFS alumni demonstrated that farmers can identify and monitor larval and adult populations of the major mosquito genera, farmers are able to analyze their agricultural and peri-domestic environments and make sound decisions on the management of vectors in a sustained manner, pests and crops. IPVM-FFS alumni reported a sharp drop in insecticide use attributable to the training.

Vector management activities are being practiced after FFS training, including small-scale local rearing of fish, clearing of coconut shells and containers, covering water containers at regular intervals, use of mosquito bed nets, and group action on household and village sanitation. Initial research findings generated during the project suggest that the role of farmers in vector management is most crucial in the short, rainy season when clustered ecosystem

management was associated with lower anopheline mosquito densities, which can potentially break the transmission cycle. This effect was not observed in the long, rainy season. The role of agricultural use of insecticides on mosquito dynamics needs further study. IPVM leads to an increase of up to 60% in the use of bed nets. The team developed frameworks for monitoring project performance and evaluation of project impact. Recurrent costs of the IPVM-FFS are approximately $10 per graduated farmer.

Curriculum

The reduction of health risks in irrigated agriculture can be made more explicit in the FFS curriculum. Health risks are not limited to vector-borne disease but include harmful effects of pesticide use in agriculture, on occupational poisoning and food safety. The mission recommended inclusion of exercises on self-monitoring of signs and symptoms at acute pesticide poisoning into the IPVM-FFS curriculum. The mission also recommended broadening the FFS activities to include field walks in other crops grown by rice farmers.

Convergence

The mission found that convergence between activities by the health and agriculture sectors have come a long way, producing effective cross-sector learning and a joint process of curriculum development. However, there is a need to further enhance convergence. In particular, the roles and activities of the two sectors could become better integrated. This can be achieved by district-level workshops for all local stakeholders and by better synchronization of mosquito surveys by the Anti-Malaria Campaign (AMC) with weekly IPVM-FFS activities to allow for interaction with farmers resulting in mutual benefits.

Vector control

The main challenge for AMC is to internalize IPVM into its own vector-borne disease control strategy. In fact, AMC has started to adopt IPVM as a prevention strategy in low transmission areas, and there is a possibility of extending this strategy to intermediate transmission areas because of the demonstrated synergistic effect between IPVM and bed net use.

Moreover, the current surveillance system of the AMC, aiming to detect early warning signals of disease outbreaks to initiate action, is constrained by limited human and financial resources. Surveillance could benefit from involving communities and developing local capability on monitoring and evaluation as part of an IPVM strategy. This would provide better coverage and intervals of data collection, allowing the AMC to target their interventions (FFS or bed nets) more accurately and in a timely manner. Community-based surveillance would also enhance local project ownership and preventive actions taken by local people.

Next steps

There was a strong overall consensus among the directors of AMC and Environmental & Occupational Health (EOH), Ministry of Health of Sri Lanka, WHO and FAO about the value of IPVM to involve local people in reducing and evaluating health risks related to vector-borne diseases and chemical pesticides. The sensitization of policy makers, particularly in the health sector, is a priority. WHO-SEARO will support the production of a short video to publicize IPVM. The Director EOH, who joined the mission team's field visits, will introduce IPVM at a national session of the Health Development Committee meeting and hold a short seminar on IPVM.

Annex 8: List of background information distributed at the workshop

Burden from vector-borne diseases in South-East Asia Region

1. What is malaria?
2. Situation of malaria in the South-East Asia Region
3. Roll Back Malaria: Overview
4. Malaria situation in SEAR countries (Bangladesh; Bhutan; DPR Korea; India; Indonesia; Maldives; Myanmar; Nepal; Sri Lanka; Thailand, Timor-Leste)
5. Situation of Dengue/Dengue Haemorrhagic Fever in the South-East Asia Region.

Success stories

Success stories implementing integrated vector control in SEAR

1. Bangladesh
2. Indonesia
3. Nepal
4. Sri Lanka
5. Thailand

Background materials:

1. The Revised Malaria Control Strategy, SEARO: 2006 2010;
2. Report on the IPVM Pilot Project in Sri Lanka
3. Dengue Regional Guidelines on Dengue/DHF Prevention and Control;
4. *"IPM Farmer Field School: A synthesis of 25 Impact Evaluation"*, FAO, 2004;
5. *"Investing in Farmers: The Impacts of Farmer Field School in relation to "Integrated Pest Management"*, H. van den Berg and J. Jiggins;
6. *"Integrated Vector Management: a framework for decision-making to prevent disease"*, Henk van den Berg & Willem Takken
7. Case Study: *"Thai School Children's Studies on the Health Hazards of Pesticide Use";*
8. *"IPM in the school..."* Thai Education Foundation, Thailand

Reference documents:

1. Global Strategic Framework for an Integrated Vector Management, WHO, 2004
2. Regional Strategic Framework for Integrated Vector Management, WHO, 2006
3. Regional Strategic Framework for Scaling Up the Use of ITN, WHO, 2005
4. Summary of the WHO/GEF 2006 2010 Project document "Reduction in the of DDT by Enhancing the Capabilities through the implementation of Integrated Vector Management"
5. International Code of Conduct on the Distribution and Use of Pesticides, FAO, 2002

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