

WHO-EM/MAL/386/E

Integrated vector management

Strategic framework for the Eastern Mediterranean Region 2016–2020



**World Health
Organization**

Regional Office for the Eastern Mediterranean

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WHO Library Cataloguing in Publication Data

World Health Organization. Regional Office for the Eastern Mediterranean
Integrated vector management strategic framework for the Eastern Mediterranean Region 2016-2020 / World Health Organization. Regional Office for the Eastern Mediterranean

p.

WHO-EM/MAL/386/E

1. Disease Vectors 2. Insect Vectors 3. Mosquito Control - methods 4. Communicable Disease Control
5. Regional Health Planning - Eastern Mediterranean Region I. Title II. Regional Office for the Eastern Mediterranean

(NLM Classification: WA 110)

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1. Introduction

1.1 Regional burden of vector-borne diseases

The WHO Eastern Mediterranean Region comprises three zoogeographical zones: Afrotropical, Oriental and Palaearctic, each with a specific cluster of dominant vector species.

WHO's most recent estimates of the burden of disease (1) assign 2.6% of the global burden of major vector-borne diseases to the Eastern Mediterranean Region in 2015 (Table 1). Malaria contributes the highest reported burden among vector-borne diseases in the Region, followed by leishmaniasis and schistosomiasis. Diseases such as onchocerciasis and lymphatic filariasis are disproportionately distributed and limited to only a few countries. The true burden of vector-borne diseases in the Region, however, is most likely underreported due to limited surveillance and poor reporting systems in some countries.

Table 1. Estimates of the burden of major vector-borne diseases, 2015 (1)

Disease	Burden in DALYs ¹ (000s)		Endemic countries
	Global	Regional (%)	
Malaria	38 520	574 (1.5)	Afghanistan, Djibouti, Islamic Republic of Iran, Pakistan, Saudi Arabia, Somalia, Sudan, Yemen
Schistosomiasis	3 514	233 (6.6)	Egypt, ² Somalia, Sudan, Yemen
Leishmaniasis	1 357	285 (21.0)	Afghanistan, Egypt, Islamic Republic of Iran, Iraq, Jordan, Lebanon, Morocco, Oman, Pakistan, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, Yemen
Lymphatic filariasis	2 071	32 (1.6)	Egypt, Sudan, Yemen ³
Onchocerciasis	1 136	0 (0.0)	Sudan, Yemen
Dengue	2 613	26 (1.0)	Djibouti, Egypt, Pakistan, Saudi Arabia, Somalia, Sudan and Yemen
Trachoma	279	31 (11.3)	Afghanistan, Djibouti, Egypt, Islamic Republic of Iran, Iraq, Libya, Morocco, Oman, Pakistan, Somalia, Sudan, United Arab Emirates, Yemen
Yellow Fever	556	128 (15.0)	
Total	50 345	1 309 (2.6)	

¹ DALYs = disability-adjusted life years. One DALY is one lost year of "healthy" life.

² Egypt has reached a low-endemic status for both *Schistosoma haematobium* and *S. mansoni*; additional countries in the Region claim having interrupted transmission of either or both species.

³ Egypt and Yemen are in post-treatment surveillance.

The Eastern Mediterranean Region has also experienced outbreaks of emerging and re-emerging vector-borne diseases in recent years including dengue, chikungunya and leishmaniasis (Box 1). During 2015 and 2016, Zika virus outbreaks and associated microcephaly and neurological disorders caused alarm in 61 countries in the Americas, the Pacific Islands, South-East Asia and Africa.

Box 1. Burden of selected endemic and emerging vector-borne diseases in the Eastern Mediterranean Region

Malaria

About 283 million people in eight countries were at some risk of malaria in 2015, with 111 million at high risk. Six countries have areas of high malaria transmission (Afghanistan, Djibouti, Pakistan, Somalia, Sudan and Yemen); transmission is focal in the Islamic Republic of Iran and Saudi Arabia. In 2015, the WHO-estimated number of malaria cases was 3.9 million and estimated number of malaria deaths was 6800 (2).

Schistosomiasis

Both urogenital schistosomiasis due to *Schistosoma haematobium* and intestinal schistosomiasis due to *S. mansoni* are transmitted in the Region. In 2015, about 12.6 million children and adults in Egypt, Somalia, Sudan and Yemen were estimated to require an annual dose of praziquantel to treat schistosomiasis. Eleven additional countries were previously endemic and have now achieved very low levels of transmission or its interruption, thus not requiring mass treatment interventions.

Leishmaniasis

A total of 123 906 new cases of cutaneous leishmaniasis were reported from the Region in 2015. The highest number of reported cases was in the Syrian Arab Republic, with 50 972 cases.

A total of 4289 cases of visceral leishmaniasis were reported from the Region in 2015. Sudan and Somalia had the highest number of reported cases, with 2622 and 1031 cases, respectively.

Dengue

Dengue cases were reported from Djibouti, Egypt, Pakistan, Saudi Arabia, Somalia, Sudan and Yemen between 2010 and 2015.

Chikungunya

Chikungunya cases were reported in Yemen in 2010 and 2012.

Crimean–Congo haemorrhagic fever

There was an increase in Crimean-Congo haemorrhagic fever cases reported from the Islamic Republic of Iran, Iraq and Pakistan between 2010 and 2015.

Yellow fever

Yellow fever cases were reported in Sudan in 2005, 2012 and 2013.

Such changes and/or increases in vector-borne disease transmission have been attributed to natural events (such as climate change, droughts and floods) and man-made factors (such as uncontrolled urbanization), as well as to the lack of appropriate vector control policies, strategies and capacity to plan, implement and monitor interventions. In recent years, the Region has also witnessed war and political conflict in several countries resulting in diminishing health services' response and major population movement, which may lead to an increased risk of vector-borne disease outbreaks and setbacks to the regional targets for their control or elimination.

Sustaining the achievements made and attaining further control of vector-borne diseases in the Region, including an efficient response to emerging and re-emerging diseases, will require additional investment in prevention and control interventions.

1.2 Role of vector control

Although vector control has a proven record of saving lives by preventing, reducing or eliminating transmission, its benefits are far from being fully realized.

Well-planned vector control can contribute significantly to sustained reduction of the burden of vector-borne diseases. For malaria, vector control is one of the main pillars of disease control strategy and is indicated for control of endemic malaria as well as for containing local outbreaks and protecting areas that are known to be receptive to the resumption of transmission or are exposed to frequent importation of malaria parasites. For dengue and chikungunya, for which there are no vaccines, vector control is the only means of protecting populations from infection. For diseases such as leishmaniasis, where current methods of chemotherapy are far from perfect, vector control offers the greatest potential for large-scale reduction in the burden of disease. For those vector-borne diseases where preventive chemotherapy is the principal control strategy, such as lymphatic filariasis and schistosomiasis, control of vectors or their intermediate hosts can accelerate reduction in disease transmission, thereby increasing the likelihood that regional goals will be met (3).

While resources for some vector-borne diseases, notably malaria, have significantly increased over the past decade, control of other diseases (such as leishmaniasis) is hampered by human resource deficiencies and limited resources (see section 1.4), highlighting the importance of an integrated approach to vector control for more efficient and rational use of resources. Adoption of integrated vector management (IVM), as recommended in resolution EM/RC52/R.6 issued by the WHO Regional Committee for the

Eastern Mediterranean, requires Member States to rationalize the use of human and financial resources and organizational structures for the vector control component of vector-borne disease management (4).

1.3 Integrated vector management

IVM is a rational decision-making process to optimize the use of resources for vector control. The purpose of IVM is to reorient, or transform, the way vector control programmes are structured, planned, implemented and evaluated in order to improve their efficacy, cost-effectiveness, ecological soundness and sustainability.

Planning and implementing IVM involves assessing the epidemiological and vector situation at country level, analysing the local determinants of disease, identifying and selecting vector control methods, assessing requirements and resources, and designing locally appropriate implementation strategies. Solid evidence on the cost-effectiveness of interventions and their underlying parameters and a comprehensive vector surveillance system are essential for locally appropriate decision-making.

By adopting IVM, vector control programmes will be better able to meet challenges in the control of vector-borne diseases in the Region, especially in the face of dwindling public sector human and financial resources as well as the reduced armamentarium for vector control.

1.4 Motives and driving forces for employing integrated vector management

In addition to addressing the heavy toll on health and related mortality from vector-borne diseases (see section 1.1), the following motives and driving forces call for urgent adoption and implementation of IVM by Member States (5,6).

Depleting arsenal of less hazardous and cost-effective pesticides

National programmes in the Region rely heavily on the use of pesticides for prevention and control of endemic and emerging vector-borne diseases. They are, however, facing a depleting arsenal of less hazardous and cost-effective pesticide products, which is largely due to the development of resistance in major vectors and pests of public health importance. The reliance of public health on pyrethroid insecticides and the emergence and spread of resistance to these chemicals, especially among malaria vectors, is of great concern and puts current regional efforts at risk. Careful management and judicious use of the existing compounds, in both agriculture and public health, to extend their

useful life and provide the intended level of vector-borne disease control, is therefore necessary, noting the very few new pesticide compounds for public health use in the pipeline (7).

Multisectoral and multistakeholder nature of vector-borne disease control

IVM is based on the premise that effective vector control is not the sole preserve of the health sector. Other sectors such as agriculture and construction, as well as communities, are often insufficiently aware of the consequences of their actions on the incidence of vector-borne disease. Collaboration between various public and private agencies at both national and local level and the engagement of communities are, therefore, crucial to effective vector control and its sustainability.

Suboptimal use of resources and tools for vector control

The capacity needed for evidence-based decision-making in the planning, design, implementation and evaluation of vector control programmes and activities remains inadequate in most affected countries, often resulting in suboptimal choice or timing of interventions, lack of monitoring and waste of valuable resources. In addition, many vector control programmes focus on a single disease, are highly centralized, and do not maximize opportunities for synergies nor rationalize the use of human/financial resources and organizational structures for the control of vector-borne diseases, raising concerns about their sustainability and optimal use of resources.

Pesticide risks to human and animal health and the environment

While public health pesticides are generally chosen to have a low hazard with respect to human and animal health and the environment, all pesticide use poses an inherent risk that should be reduced as much as possible. “Healthy public policy”,¹ recommended by WHO (8), also applies to public health pest management. This is of particular importance in the Region noting the general inadequate capacity for regulation and management of pesticides throughout their life-cycle, including their disposal (9,10,11).

Implementation of global and regional policy instruments and commitments

The following global and regional policy instruments call upon governments to develop and promote IVM:

¹ Healthy public policy is characterized by an explicit concern for health and equity in all areas of policy and by an accountability for health impact.

- Resolution EM/RC52/R.6 of the WHO Regional Committee for the Eastern Mediterranean on integrated vector management (IVM), urging Member States to develop national integrated vector management strategies and plans for all vector-borne diseases;
- Resolution EM/RC58/R.10 on Managing the use of public health pesticides in the face of the increasing burden of vector-borne diseases (12);
- World Health Assembly resolution WHA63.26 on Improvement of health through sound management of obsolete pesticides and other obsolete chemicals, urging Member States to establish or strengthen their capacity to regulate pesticides throughout their life-cycle (13);
- International Code of Conduct on Pesticide Management, urging governments to develop and promote IVM as a strategy for judicious use of pesticides (14);
- Stockholm Convention on Persistent Organic Pollutants, emphasizing the need for sustainable strategies for vector control that will reduce the reliance on insecticides.

The IVM approach is also essential for vector-borne disease control and implementation of the following resolutions of the Regional Committee.

- EM/RC54/R.3 on Neglected tropical diseases: an emerging public health problem in the Eastern Mediterranean Region (16)
- EM/RC55/R.9 on Malaria elimination in the Eastern Mediterranean Region: vision, requirements and strategic outline (17)
- EM/RC58/R.4 on Dengue: call for urgent interventions for a rapidly expanding emerging disease (18)

1.5 Guiding principles for implementation of integrated vector management

Adaptive management

Systematic iterative process for decision-making using available evidence on methods/strategies and adapting to prevailing conditions (e.g. ecological, insecticide susceptibility, epidemiological, socioeconomic), supported by feedback through surveillance and routine monitoring and evaluation; and efficient use of available resources (e.g. human, financial).

Decentralized approach

Planning, implementation and evaluation of vector control at the most local level, ensuring more responsive, flexible, precise and accountable operations.

Inclusiveness

Collaboration within and between public and private sectors, and with communities; and strengthening channels of communication among policy-makers, vector-borne disease programme managers and other IVM partners.

Integrated approach

Rational use of available resources by addressing several diseases through integration with other disease control methods, and integrating non-chemical and chemical vector control methods.

Protection of human health and the environment

Consideration of environmental soundness through promotion of environmental management techniques (such as source reduction methods) for sustainable vector control solutions; and ensuring human safety of selected methods and judicious use of pesticides.

1.6 Challenges and opportunities for implementation of integrated vector management in Member States

Major steps have been taken and significant achievements been made by Member States, WHO and international partners (notably the Global Environment Facility) in strengthening capacity for implementation of IVM in the Region since adoption of resolution EM/RC52/R.6 (4) and development of the IVM strategic framework for the Eastern Mediterranean Region 2004–2010 (19). Nevertheless, many countries have yet to develop and implement a well-articulated and updated national policy and implementation strategy for IVM. Many countries have also failed to develop national policy for public health pesticide management and review pesticide legislation and regulations to address sound management of these chemicals throughout their life-cycle. Political support and resources for insecticide resistance prevention and management have been insufficient and the majority of countries have yet to develop a national plan for this purpose, under the umbrella of IVM. Collaboration, coordination and communication within and between sectors on IVM and pesticide management have been limited in many countries in the Region.

There is a general lack of policy for an integrated approach to vector-borne disease control and several countries have yet to establish a central vector control unit to guide, support, oversee and monitor vector control operations for all endemic and emerging vector-borne diseases. There is also a lack of timely and adequate evidence to support decision-making for vector control.

There is generally no certification requirement on IVM and pesticide management for vector control managers among Member States, and there are no such certified training courses in the Region. Lack of well-documented regional success stories on implementation of IVM and lack of regional and national advocacy strategies and plans are noticeable.

Most countries have critical human resource deficiencies for vector control, including professional, technical and support staff. Managerial training lags behind academic training, and there are few trained economists, environmental engineers, social scientists, statisticians and surveillance experts working in IVM programme activities. Facilities for technical and vocational training are lacking. Few managerial staff have their skills in working in an intersectoral context developed. This fundamental weakness can only be overcome if governments integrate vector control in their overall strategies for strengthening human resources for health.

Assessment of strengths, weaknesses and available opportunities is crucial to planning for the full employment of IVM in the Region (see Annex 1). Further political support and resources for IVM are required to sustain achievements and address regional elimination targets, as well as to address the growing challenge of emerging vector-borne diseases.

A long history of malaria vector control in the majority of countries and the existence of a strong pool of scientists and research institutions in the Region – as well as existing regional disease elimination initiatives, and the integrated multisectoral approach promoted by WHO and other key stakeholders for malaria control – provide excellent opportunities to be explored, and on which to capitalize, for further and full employment of IVM by Member States.

2. Aim and objectives of the strategic framework

The aim of the IVM strategic framework for the Eastern Mediterranean Region 2016–2020 is to contribute to achievement of the regional targets set for vector-borne disease control, by making vector control more efficient, cost-effective, ecologically sound and sustainable. It builds on achievements made and lessons learnt from implementation of the IVM regional strategic framework for 2004–2010 (19).

The objectives of the strategic framework are to further raise the profile of vector control at policy level, streamline IVM into national health policies and relevant programmes, and strengthen capacities of Member States for IVM implementation. The specific objectives of the framework are to:

- ensure that vector control interventions are evidence-based and guided by operational research, are based on knowledge of factors influencing local vector biology, disease transmission and morbidity, and human behaviour, and are subject to routine monitoring and evaluation;
- minimize pesticide selection pressure and preserve vector susceptibility – ensuring the continued utility of the current limited tools for disease control and contributing to sound management of public health pesticides through rational and judicious use of pesticides;
- strengthen collaboration within the health sector and with other sectors, communities and stakeholders for sustainable and environmentally sound vector control interventions, including source reduction;
- strengthen the capacity of Member States in planning, implementation and evaluation of IVM, supported by mobilization of resources.

3. Priority actions

The priority actions below are deemed essential for implementation of IVM in the Eastern Mediterranean Region. A plan of action, including milestones and targets, needs to be developed by each Member State and WHO to address the activities. Continuous monitoring and systematic evaluation of implementation of the strategic framework by Member States and WHO is essential, and will ensure that problems detected, actual results and impact reported are used to improve implementation.

As IVM is a management strategy designed to improve on existing systems of vector control and disease prevention in Member States, its monitoring and evaluation involve examining whether existing vector control systems are being transformed as originally intended. This applies to all the components of IVM and should identify progress made in: 1) the policy and institutional framework; 2) organization and management; 3) planning and implementation; 4) advocacy and communication; and 5) capacity-building. The WHO guidance document on monitoring and evaluation of IVM implementation (20) should be consulted for selection of relevant processes, outcomes and impact indicators for such a purpose.

Actions for Member States

1. In collaboration with relevant stakeholders, establish a national IVM coordination committee with clear terms of reference and funding for advisory/coordination functions and pilot/proof-of-concept initiatives, and with the remit to establish specific task forces such as:
 - a. a task force to formulate non-chemical vector control measures (e.g. environmental management) that will provide support for other interventions in terms of sustainability and resilience, to be implemented in an intersectoral context;
 - b. a task force to develop, through national multisectoral collaboration and civil society participation, a comprehensive pesticide policy; and review and where necessary revise pesticide legislation in line with the recommendations of the International code of conduct on pesticide management, within an agreed timeframe;
 - c. a multisectoral pesticide resistance management task force to develop and implement a national plan for insecticide resistance management in vectors and pests of public health importance, with clear milestones and a target date for production.

2. Formulate and/or update national policy, strategic framework and implementation plan for IVM through a multi-stakeholder approach and based on a vector control needs assessment; evaluate and report progress, using WHO-recommended core indicators.
3. Raise public awareness and promote political support and stakeholder engagement, including community empowerment, for implementation of IVM; ensure optimum use of media and relevant groups for social mobilization; and allocate adequate resources for these activities.
4. Establish an integrated approach to vector-borne disease control; develop and implement a national plan for capacity strengthening for vector control at all levels of the health system, including the establishment/strengthening of central and peripheral vector control units and the certification of vector control managers on IVM and pesticide management.
5. Incorporate career pathways for vector control professionals, managers and technicians, including opportunities for skill improvement and lateral staff movement, to enhance expertise in all concerned government establishments.
6. Establish mechanisms and strengthen communication channels/collaboration with academia and other stakeholders to develop research priorities, and support their implementation.
7. Strengthen skills to engage in intersectoral collaborations, irrespective of sectoral affiliation, through joint IVM orientation training; and incorporate IVM principles in the curricula of public health education.

Actions for WHO

1. Develop a work plan for, and support implementation of, the IVM strategic framework by Member States through provision of technical support and other resources including guidelines for vector control in emergencies, guidance for risk assessment of emerging vector-borne diseases and core IVM indicators.
2. Support interregional WHO exchange of experience and promote international networking on IVM; and facilitate interagency collaboration.
3. Establish a mechanism and support information exchange on implementation of IVM and sound management of public health pesticides among Member States; support intercountry collaboration in these areas; and document case studies.
4. Assess progress in implementation by Member States of the IVM regional strategic framework and the regional framework for action on the sound management of public health pesticides, and publish lessons learnt; and report to the Regional Committee on implementation of resolutions EM/RC52/R.6 and EM/RC58/R.10.

4. Monitoring implementation of the regional integrated vector management strategy

Continuous monitoring and systematic evaluation of implementation of the IVM strategic plan are essential. Key monitoring indicators have been identified from WHO's 2012 guideline *Monitoring and evaluation – indicators for integrated vector management (20)* and adapted according to the context of Member States (Table 2). These indicators will be reported on annually by all countries and used for reporting the progress made in achieving the key priority actions. Member States will be provided with a supplementary guide detailing the definition and criteria for each indicator.

Table 2. Key monitoring indicators for implementation of integrated vector management

Indicators	2017	2018	2019	2020
1. Number of countries with national IVM coordination committee in place, which represents all senior-level stakeholders.				
2. Number of countries with national IVM policy in place, which has consulted all stakeholders.				
3. Number of countries with national strategic and implementation plans on IVM in place, regularly updated.				
4. Number of countries that have developed a community mobilization strategy.				
5. Number of countries that have developed a human resource development plan for vector control professionals, managers and technicians.				
6. Number of countries where 80% of requested resources for planned IVM activities have been allocated.				
7. Number of countries in which operational research priorities on vector control have been identified and conducted.				
8. Number of countries that have documented evidence of intersectoral collaboration in tackling vector-borne diseases				

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Annex 1. Strengths, weaknesses and opportunities for the implementation of integrated vector management in Member States

IVM components	Strengths	Weaknesses	Opportunities
Policy	<ul style="list-style-type: none"> • Availability of regional resolutions on IVM and pesticide management. • Availability of international policy instruments and agreements on IVM and pesticide management. • Experience, in many countries, in situation analysis and needs assessment for vector control and in malaria programme review. 	<ul style="list-style-type: none"> • Insufficient national political commitment, support and resources for vector-borne disease control. • Lack of well-articulated and updated national IVM policy, implementation strategy and resources in many countries. • General lack of national pesticide policy and updated and comprehensive pesticide legislation for sound management of pesticides throughout their life-cycle. • General lack of policy for an integrated approach to vector-borne disease control. • Insufficient political support and resources for prevention and management of insecticide resistance. • Lack of proper appreciation of the preventive power of vector control, and its application, for control of vector-borne diseases. 	<ul style="list-style-type: none"> • Strong commitment of the WHO Regional Committee for the Eastern Mediterranean on principles of IVM and sound management of pesticides. • Mobilization of further political support and resources for IVM to sustain achievements and address regional elimination targets, as well as to address increasing challenge of emerging vector-borne diseases. • Endorsement of a multisectoral approach to malaria control and elimination by the Roll Back Malaria Partnership.
Institutional framework	<ul style="list-style-type: none"> • Positive experience and/or existence of national IVM steering committee for promoting IVM. • Existence of integrated approach to vector-borne disease control in some countries. 	<ul style="list-style-type: none"> • Lack of a central vector control unit in some countries to guide, support, oversee and monitor vector control operations for all endemic and emerging vector-borne diseases. • Inadequate linkage between ministry of health, research institutions and academia; inefficient use of expertise in academia and lack of translation of information/knowledge for timely decision-making and action. • Limited collaboration, coordination and communication within and between sectors on IVM and on pesticide management. • Limited cross-border collaboration among some countries and general lack of information exchange. 	<ul style="list-style-type: none"> • Institutionalization of IVM steering committee at central and periphery levels. • Existence of subregional collaborative mechanisms and initiatives (e.g. Gulf Cooperation Council). • Integrated multisectoral approach to malaria control promoted by WHO and other key stakeholders. • Streamlining IVM activities through a bottom-up approach in a decentralized health system.

IVM components	Strengths	Weaknesses	Opportunities
Organization and management	<ul style="list-style-type: none"> Long experience of malaria vector control in majority of countries. 	<ul style="list-style-type: none"> Lack of timely and adequate evidence to support decision-making for vector control. Lack of national plan for prevention and management of insecticide resistance in major disease vectors. Absence of certification requirement on IVM and pesticide management for vector control managers. Lack of national human resource development plan and insufficient resources for vector control implementation in many countries. 	<ul style="list-style-type: none"> Establishment of a national advisory committee for setting research priorities and interpreting data for “real-time” decision-making, and to advise on vector control-related issues.
Planning and implementation	<ul style="list-style-type: none"> Availability of tools for vector control situation analysis and needs assessment and for vector control. Availability of resources from international donors and partners (e.g. the Global Fund, World Bank and Global Environmental Facility). 	<ul style="list-style-type: none"> General lack of updated and well-articulated national plans on IVM, guided by strong monitoring and evaluation. Lack of guidance for implementation of IVM at periphery level. Lack of updated knowledge on different ecological requirements for different vector species, hindering effective implementation. Lack of guidance to establish public–private partnerships. Lack of standard operating procedures for vector control operations. 	<ul style="list-style-type: none"> Strengthening capacity for planning, implementation, monitoring and evaluation of vector control activities at periphery level. Capitalizing on existing capacity for vector mapping and district health information system. Sharing successful IVM practices and lessons learnt. Incorporating IVM activities in development projects.
Advocacy and communication	<ul style="list-style-type: none"> Significant investment by WHO, advocating for and supporting national efforts for IVM implementation. 	<ul style="list-style-type: none"> Lack of well-documented regional success stories on implementation of IVM. Limited regional experience in achieving behaviour change for vector control. Limited awareness among key decision-makers on IVM. Lack of IVM regional and national advocacy strategies and plans. 	<ul style="list-style-type: none"> Strengthening channels of communication among policy-makers, vector-borne disease programme managers and other IVM partners. Using all existing advocacy opportunities (media, private sector and nongovernmental organizations). Capitalizing on existing disease elimination initiatives (lymphatic filariasis, schistosomiasis, malaria), development projects and global initiatives such as climate change.
Capacity-building	<ul style="list-style-type: none"> Existence of IVM handbook, core structure for curricula and other key guidance documents. Existence of a strong pool of scientists and research institutions in the Region. Existence of professionals trained on IVM for training of trainers. 	<ul style="list-style-type: none"> Absence of curricula and nationally certified training courses on IVM and pesticide management. Lack of IVM problem-based learning exercises in vector control and/or entomology courses in universities. Lack of exchange of expertise for capacity-building among Member States. 	<ul style="list-style-type: none"> Development of locally appropriate guidance documents. Establishment of a roster of experts to support national implementation of IVM. Vector control programmes providing opportunities for university student projects. Building on existing IVM training curriculum package to make it more context-specific and available in local language.



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