WORLD HEALTH ORGANIZATION
EUROPE

An Operational Framework on Integrated Vector Management

Developed within the framework of the GEF-UNEP Project "Demonstrating and scaling up sustainable alternatives to DDT for the control of vector-borne diseases in Southern Caucasus and Central Asia of the WHO European Region"

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LIST OF CONTENTS

EXECUTIVE SUMMARY

While the number of vector-borne diseases (VBDs) and their incidence in countries of the WHO European Region is much less than that of the tropical, developing countries, there are, nevertheless, a substantial number of such infections in Europe.

For some VBDs, vector control continues to be the only feasible public health intervention and for some others it remains a critical component of disease control programme. Vector control has a proven track record of successfully reducing or even interrupting transmission of various VBDs.

Vector control is well suited for integrated approaches because some vectors are responsible for multiple diseases, and some interventions are effective against several vectors. The concept of Integrated Vector Management (IVM) was developed as a result of lessons learnt from integrated pest management, which is used in agricultural sector. IVM aims to optimize and rationalize the use of resources and tools for vector control.

IVM is a rational decision-making process for the optimal use of resources for vector control. It is based on evidence and integrated management, promoting the use of a range of interventions – alone or in combination – selected on the basis of local knowledge about the vectors, diseases and diseases determinants. The IVM approach addresses several diseases concurrently, because some vectors can transmit several diseases and some interventions are effective against several vectors. IVM will reduce the pressure imposed by insecticides to select for insecticide resistance.

In the face of current regional challenges in connection with the magnitude of vector-borne diseases, the IVM approach is vital in controlling VBDs to achieve the regional and national targets.

WHO recommends IVM as the preferred approach to prevent and control VBDs. The five elements of an IVM strategy identified in the Global Strategic Framework for IVM include (1) advocacy, social mobilization and legislation; (2) collaboration within the health sector and with other sectors; (3) integrated approach; (4) evidence-based decision-making, and (5) capacity-building

The aim of IVM is, thus, to solve problems in vector control by improving efficacy, cost-effectiveness, ecological soundness and sustainability with sound policies, monitoring and evaluation. This is achieved by evidence-based decision-making, addressing several diseases at the same time, combining vector control with judicious use of insecticides and involving other sectors and communities.

INTRODUCTION

While the number of VBDs and their incidence in countries of the WHO European Region is much less than that of the tropical, developing countries, there are, nevertheless, a substantial number of such infections in Europe. Furthermore, the incidence of some of them has been on the rise, and their distribution (malaria; visceral and cutaneous leishmaniasis;West Nile Fever; dengue and chikungunya fever;Crimean-Congo hemorrhagic fever; tick-borne encephalitis, Lyme disease etc.)is spreading in many countries of the Region. VBDs could result in ill health, death, and economic hardship for the affected communities, and are a serious impediment to economic development.Some other VBDs have a less spread withinthe Region, or more limited importance, or much neglected where updated information is missing Sandfly fever (Pappataci fever), Tick-borne ricketsiosis of North Asia (Siberian tick typhus), Tick-borne relapsing fever, Mediterranean spotted fever (Marseilles fever), Q fever and others.

The perception that the WHO European Region is free from malaria has changed rapidly over the past decades. Since the early 1980s, the number of countries affected by malaria has increased from 3 to 10. At the beginning of the 1990s, the residual reservoir of malaria infection, aggravated by political and socio-economic situations, mass population migration and almost discontinued activities on malaria prevention constituted conditions favourable for malaria transmission. As a result, large-scale epidemics broke out in Central Asia and the Trans-Caucasian countries, and a total of 90 712 malaria cases were officially reported in the WHO European Region in 1995.

Owing to intensive anti-malaria interventions, where vector control operations played a leading role, there has been a substantial reduction in the number of autochthonous cases of malaria over the past years. The goal of the new regional strategy is to halt local transmission area- or country-wide, clear up malaria foci, and reduce the number of locally acquired cases to zero by 2015. To achieve interruption of malaria transmission, priority in terms of vector control is given to indoor residual spraying (IRS) and other vector control measures.

The other VBDs occurring in the Region have benefited from the previous structured anti-malaria campaigns. There have never been similar campaigns aimed at any of the other VBDs, and the present quite often neglected burden and potential threat of leishmaniasis, Crimean-Congo hemorrhagic fever; tick-borne encephalitis, Lyme disease and other VBDs must not be underestimated.

Although vector control has proven to be highly effective in preventing transmission of various VBDs, national capacities of entomological services are often not strong enough, and they are now faced with shortages of technical support and financial resources for vector control. National vector control programmes often lack trained personnel and, as a result, routine entomological activities are not conducted in a proper manner. Like elsewhere, the WHO European Region has been faced with problems related to the use of residual insecticides, development of vectors resistance and their unsafe storage with threats to humans and the environment. The indiscriminate use of pesticides in

agricultural sector has often accelerated resistance induction in vector populations.

Possible climate changes could change the temporal and spatial distribution of vector species and result in an increase in the prevalence and incidence of VBDs. Increased population mobility and uncontrolled migration due to political or economic instability may facilitate the introduction of new VBDs into areas where they have not been reported before.

For some VBDs, vector control continues to be the only feasible public health intervention and for some others it remains a critical component of disease control programme. Vector control has a proven track record of successfully reducing or even interrupting transmission of various VBDs when its application is guided by consideration of technical feasibility, operational applicability, effectiveness and sustainability. It is also logical to assume that a combination of different vector control options may compensate for deficiencies of each individual method, and the integrated vector control approach can provide the most effective means of tackling the problems with VBDs.

There is a desperate need for strengthening vector control programmes, and it is imperative that entomological staff participate in decision-making on the part of VBDs. Recognizing the need to increase support for vector control, national capacities to implement effective vector control programmes should be improved.

Vector control is well suited for integrated approaches because some vectors are responsible for multiple diseases, and some interventions are effective against several vectors. The concept of IVM was developed as a result of lessons learnt from integrated pest management, which is used in agricultural sector. IVM aims to optimize and rationalize the use of resources and tools for vector control.

Integrated vector management is a rational decision-making process for the optimal use of resources for vector control. It is based on evidence and integrated management, promoting the use of a range of interventions – alone or in combination – selected on the basis of local knowledge about the vectors, diseases and diseases determinants. The IVM approach addresses several diseases concurrently, because some vectors can transmit several diseases and some interventions are effective against several vectors. IVM will reduce the pressure imposed by insecticides to select for insecticide resistance.

In the face of current regional challenges in connection with the magnitude of vector-borne diseases, the IVM approach is vital in controlling VBDs to achieve the regional and national targets.

DRIVING FORCES FOR POLICY FORMULATION ON IVM

Several factors drive formulation of evidence-based policy on IVM. The resistance to insecticides is an increasing problem in vector control because of the reliance on chemical control and expanding operations, particularly for malaria and other vector-borne diseases. Furthermore, the chemical insecticides used can have adverse effects on health and the environment.

Vector control is often not sufficiently adapted to local or changing circumstances because many countries lack capacity in decision-making for vector control. Such decisions should be based on evidence about the characteristics of local vectors and human behaviour and on effectiveness of vector control methods. Furthermore, aspects of climate change, environmental degradation, water scarcity and urbanization, are affecting the distribution of vector-borne diseases. Vector control must be adapted locally to these diverse and changing conditions and also to community preferences and responding to local needs.

Most vector-borne disease control programmes focus on a single disease; however, there are opportunities for controlling several diseases that occur in the same area, thus resulting in greater efficiency and cost savings for vector control.

Other sectors and communities can contribute to the increase or reduction of the burden of vector-borne diseases but are often unaware of this. The agricultural and construction sectors could create conditions favourable for proliferation of mosquito populations by irrigation. Moreover, communities are often not aware that the risk for vector-borne diseases is partly or largely determined in their domestic sphere of influence and that they could contribute to reduce this risk by means of preventive measures including personal protection.

Countries attempting to maintain malaria elimination status and prevent the re-establishment of its transmission need a more integrated approach to vector control in order to sustain their achievements. The Stockholm Convention on Persistent Organic Pollutants and World Health Assembly resolution WHA50.13 both called on member states to develop sustainable strategies for vector control that would reduce their reliance on insecticides. Donor funding for operations, research and training for vector control of malaria and other vector-borne diseases has increased substantially in the past few decades including support for selected countries in the WHO European Region.

DEFINITION OF IVM

IVM is defined as a rational decision-making process to optimize the use of resources for vector control. It is based on evidence and an integrated management, promoting the use of a range of interventions – alone or in combination, selected on the basis of local knowledge about the vectors, diseases and disease determinates. The IVM approach addresses several diseases

concurrently, because some vectors can transmit several diseases and some interventions are effective against several vectors. IVM will reduce the pressure imposed by insecticides to select for insecticide resistance.

WHO recommends IVM as the preferred strategy for vector control in preventing and controlling VBDs. The five elements of an IVM strategy identified in the Global Strategic Framework for IVM are listed below.

Advocacy, social mobilization and legislation
Promotion and integration of the principles of IVM into the development policies of all relevant agencies, organizations and civil society; establishment or strengthening of regulatory and legislative controls for public health; empowerment of communities

Collaboration within the health sector and with other sectors
Consideration of all options for collaboration within and between public and private sectors; application of principles of subsidiarity in planning and decision-making; strengthening channels of communication among policy-makers, managers of vector-borne disease programmes and other IVM partners

Integrated approach
Ensuring rational use of available resources by controlling several diases concurrently; combination of non-chemical and chemical methods for vector control; integration with other disease control initiatives

Evidence-based decision-making
Adaptation of strategies and interventions to local ecology, epidemiology and resources, guided by operational research and subject to routine monitoring and evaluation

Capacity-building
Provision of the essential material infrastructure, financial resources and human resources at national and local levels to manage IVM strategies on the basis of a situational analysis

The aim of IVM is thus to solve problems in vector control by improving efficacy, cost-effectiveness, ecological soundness and sustainability with sound policies, monitoring and evaluation. This is achieved by evidence-based decision-making, addressing several diseases at the same time, combining vector control with judicious use of insecticides and involving other sectors and communities.

Hence, IVM is a managerial approach for gradually transforming the system of vector control to an approach with other sectors to reduce the risks for disease transmission. Capacity-building, advocacy and legislation are required to achieve these outcomes.

POLICY AND INSTITUTIONAL FRAMEWORK

An analysis of the problems experienced in national systems for vector control and their causes is followed by analysis of policy environments, institutional arrangements and stakeholders.

SITUATION ANALYSIS

To adopt a country's vector control system to IVM, any existing obstacles and their causes should be identified. A situation analysis could be used to identify, for example, factors that reduce the efficiency of vector control operations of the effectiveness of interventions and any adverse side-effects. Situation analysis is a component of the "vector control need assessment".

The main component of the analysis is the burden of vector born diseases. Inadequate capacity for evidence-based decision making, disintegrated and static disease control programmes, lack of involvement of other sectors and communities, and issues connected with resistance to insecticides are usually problems which need to be addressed. These problems cover a range of interrelated topics and require on interdisciplinary approach.

POLICY ANALYSIS AND INSTRUMENTS

The challenges in vector control cover a wide range of issues, including capacity-building, vector surveillance and management, applied research, intersectoral coordination and collaboration, decentralization and community empowerment. To enable the government or its relevant agencies to take decisions on these issues, policy support is required at different levels.

A government's policy as its position on different issues may be mandatory or advisory, and compliance with mandatory policies has to be enforced. The policy analysis is an interdisciplinary approach to identifythe strengths and weaknesses of the policy environment for preparing an IVM strategy. Evaluation of any gaps and inconsistencies in the policy environment will help to improve the policy itself and make surrounding legal framework effective and supportive for IVM.

Existing policies related to IVM within the health sector may include the national health policy, national strategies on VBDsincluding vector control, current guidelines for vector controland national legislation and regulation documents on the use of pesticides. These policies might have to be amended or rephrased in order to increase support for IVM. There may be health public policies or policies in other government sectors that affect vector-borne diseases, either negatively or positively.

In policy analysis, the favourable and unfavourable aspects of existing policies are explored, and gaps are identified in order to propose options for policy change. The following should be taken into account in order to develop new or revise existing IVM policies:

- Technical and programme management capacities in IVM;
- Management of public health pesticides;
- Integrated pest management in agriculture;
- National norms and standards to control and prevent VBDs;
- Health system's capacity on and support for IVM at state, provincial and district level;
- Decision-making and financial support for IVM at health/non-health/private sectors at all levels;
- Existing/planned development projects related to control/prevention of VBDs;
- Public awareness and existing communities' practices to disease prevention.

The existing policies and programmes may have adverse, neutral or beneficial effects on VBDs, which should be specified. The outcome of the analysis is identification of gaps, shortcomings and inconsistencies in the existing public policy framework, which provide the basis for solutions to revise existing or create new policies in support of IVM.

Policies do not automatically result in outcomes. The procedures through which governments implement public policy are called "policy instruments". These tools can be used by a government to establish and implement a national IVM strategy. The policy instruments for IVM could be used to establish a national strategy and new government bodies, to adjust institutional arrangements or to establish collaboration between sectors. They could also be used to advise on training and research directions, to regulate the use of public health pesticides and to guide budget allocation.Examples of policy instruments to be used by governments to address the principles of the IVM approach are listed below.

Table: Policy instruments that governments could use to implement public policy according to the basic concepts of IVM

Basic IVM concept	Policy instrument
Evidence-based decision-making	Allocation for capacity-building and career paths. Facilitate decentralized decision-making. Allocation for surveillance systems. Allocation and strategic direction for research.
Combing vector control interventions	Legislation and regulation on pesticide management. Legislation and regulation on environmental management. Subsidies, tariffs or taxes on vector control products. Allocation and strategic direction for research.
Adopting a multi-disease approach	Instruction on collaboration between health divisions. Allocation for monitoring and evaluation.
Collaboration within the health sector	Government position statement on IVM. Instruction on collaboration between health divisions. Facilitate a "vector control needs assessment". Review job descriptions.

Collaboration with other sectors	Government position statement on IVM. Establish intersectoral IVM committee. Interministerial meetings. Instruction in each sector on health impact assessments.
Community empowerment	Support for community-based services. Community awareness and education programmes. Support for decentralized decision-making. Incentives programmes.

INSTITUTIONAL ARRANGEMENTS

An IVM strategy involves various public and private sectors and civil society organizations and their active collaboration. The success of policy instruments depends on the suitability of such "institutional arrangements", which can be defined as a set of rules about who does what, when and how.

Reinforcing institutional links

In the public domain, tasks have traditionally been divided among clearly defined government sectors, such as health, agriculture, environment and construction. Each sector usually has its own sphere of influence with accountability. As a result, sectors generally work more or less separately, with little interaction or collaboration.

The possible inconsistencies within sectors and with research can be resolved by identifying constrains and opportunities and taking action in the form of policy reform, capacity-building and increased collaboration. Sectors could formulate common goals by acknowledging the interaction between economic progress and health status. Sectors should make use of synergic effects that benefit agricultural production and also suppress vector proliferation in crops. Sectors might have to adopt new policies to prevent vector breeding or to reduce the risk for diseases transmission in their sector-specific programmes. This could require a specific budgetary allocation for vector control in each sector.

Intersectoral steering committee

An intersectoral steering committee on IVM with ministerial support is vital to establishing intersectoral collaboration. The steering committee as an inter-ministerial governing body should be established to facilitate harmonization of policies and institutional arrangements, and to provide strategic direction and to coordinate research in relation to IVM. A memorandum of understanding could facilitate such collaboration. Under this governing body, technical working groups could be set up with specific terms of reference to discuss capacity-building, evidence-based decision-making or monitoring/evaluation approaches. The steering committee would guide the activities of the working groups and monitor/evaluate progress made on a regular basis.

The members of the intersectoral steering committee should be senior staff such as directors of divisions or institutions. They should represent ministries dealing with health, agriculture, the environment, commerce and local government, and

appropriate agencies. Countries could explore the possibility of using existing intersectoral steering committees for IVM.

Focal person for IVM
In a multi-partner IVM strategy, there should be a single focal person who acts as an IVM coordinator, and typically the person who is responsible for vector control within the Ministry of Health. He or she should have an overview of all IVM-related activities and should have access to each member of the intersectoral steering committee including partners involves. The main tasks of the focal person would be to manage networking among national partners and to coordinate implementation of the recommendations made by the committee. It would also be beneficial to have focal points for IVM at district and even village level.

Stakeholders
The primary stakeholders in IVM are the communities that will benefit from improved vector-borne disease control. Other entities with a direct stake in IVM are sectors such as health, agriculture, environment, commerce and local government, which often shared responsibility for planning, implementation and evaluation. Another important stakeholder in field implementation is the private sector, particularly in areas related to tourism or agriculture or development. Civil society organizations could be involved in advocacy and implementation of IVM at national and local levels. Educational institutions are essential for capacity-building and research to strengthen the evidence base for decision-making and in evaluating impact. The media are essential in advocacy and communication.

DECENTRALIZATION

Health reforms
In most countries endemic for vector-born diseases, health reforms have resulted in decentralization of decision-making and recourse allocation. In decentralization, decision-making is brought to the most appropriate lower level of administration, transferring the responsibility for planning, budgeting and implementing certain functions from the central government to district or local units. A prerequisite for decentralization is that the skills and capacity for analysis and decision-making be firmly established at district level.

Subsidiary
Decentralization has been guided by the principle of "subsidiarity" in which the central authority performs only those tasks that cannot be performed effectively at a more immediate or local level. The IVM approach abides by the subsidiarity principle which promotes the planning, implementation and evaluation of vector control interventions at the grassroots level. Decisions made locally are potentially more responsive, precise and accountable, and locally elected representatives are better informed about the needs of their local communities. Decentralized health systems could provide an adequate framework for IVM.

Integration into health system
Coordination the activities of existing vector-borne diseases control programmes can result in more efficient use of resources and sustained support by local authorities and communities. Established capacity and strategies for IVM in districts is also likely to affect other services and functions of local health units, extending the reach of services are targeted at the same areas, as discussed in *section…* IVM could become a platform for the delivery of other strategies and interventions at community level.

Integration with other partners
The IVM approach requires establishment of a partnership among sectors and with civil society to undertake a joint systems analysis and joint decisions on the course of action to be taken.

ORGANIZATION AND MANAGEMENT

The IVM is not another programme; it is a management strategy in which existing systems are reoriented to make them more efficient, cost-effective, ecologically sound and sustainable. As described above, a new set of approaches is used: evidence-based decision-making, integrated vector control methods, addressing several diseases concomitantly, involving existing systems and ensuring the active participation of many partners. This strategy calls for a shift from centrally managed, sector-specific operations to integrated and multi-partner programmes to be implemented at local level. New roles, responsibilities and organizational links are therefore required for IVM.

WITHIN HEALTH SECTOR

At the central level
At central level, it is usually the health sector and its vector control department that take the lead in an IVM strategy However, internal relations determine how vector control is organized, where operational decisions are made and whether vector control is incorporated into single-disease programmes or not. In the field IVM adheres to the subsidiarity principle, which is consistent with health sector reform involving decentralization of health services.

In a decentralized system, the central ministry maintain an important role in IVM in terms of preparing policy and guidance, reviewing job descriptions and terms of reference, facilitating planning and implementation IVM activities, preventing and responding to epidemics and providing supplies and technical support. However, decisions on implementation and associated management aspects of IVM are transferred to health systems at district or village level.

At the local level
IVM involves integration of disease-specific vector control programmes and surveillance services within a decentralized health system. The embedding of IVM in local health systems requires new skills and capacities for analysis and decision-making. Public health staff in districts and villages could be trained in the

technical, operational and managerial aspects of IVM giving rise to local leadership of IVM. IVM could thus contribute to making health offices more capable and less dependent on centralized expertise, because it adds analytical and decision-making skills and contributes to partnerships with other sectors and communities.

When IVM is incorporated into decentralized health services, vector control becomes more sustainable, as it becomes less dependent on external technical programme assistance, is recognized by local decision-makers and receives regular allocations from local budgets.

INTERSECTORAL COLLABORATION

An IVM strategy calls for collaboration between the health and other sectors and civil society. This implies new links, roles and responsibilities, which may require changes in job descriptions or terms of reference. Sectors such as agriculture, local government, environment, construction and tourism, and communities may contribute to vector proliferation and put people at risk for infection. All sectors should be strongly encouraged to conduct a health impact assessment of their activities to identify any risks for vector-borne disease, in order to reduce the risks in each sphere.

Establishing collaboration

Established formal collaboration between the health and other public sectors is an important step in increasing the participation of those sectors in vector control. Collaboration at national level could take the form of an intersectoral steering committee on IVM endorsed by a memorandum of understanding. At district and villages levels such collaboration should be set up and promotedamong all partners involved. Intersectoral partnerships and collaboration should be backed by policy support.

Partnerships at community level should include representatives from both public sectors and civil society, and usually consist of civil society organizations, community representatives and village leaders, but quite often with insufficient representation from the public sector. In order to achieve the targets set in each sector, village-level partnerships should establish strong links with public sector and district authorities.

The partnership with the public health sector, as the leading entity, must ensure that vector control activities are planned, implemented and evaluated in a coordinated way to ensure that the joint efforts are consistent and complementary for achieving common targets. To reinforce the partnership, measures should be instituted to ensure that all partners adhere to the agreed standards and activities. Formal village-level partnerships should be recognized officially by district authorities and their actions recognized in the context of the national IVM strategy.

Roles and responsibilities

The vector control unit or a similar capable entity should have overall responsibility for the coordination and facilitation of partnership and collaborative actions. It is essential that health staff acquire the skills to facilitate

the partnership and guide its activities. Facilitation skills are not part of conventional training in the health sector and should be developed.

Other public sectors, civil society organizations and communities would also play roles in implementing and monitoring/evaluation of IVM activities. Individual entities could assume responsibility for implementation of particular interventions or actions.

Monitoring of activities by all partners involved and evaluation of outcomes are critical for assessing overall progress and moving the partnership in the right direction. Technical support can be sought on issues such as disease epidemiology and medical entomology.

Management of pesticides
The management of public health pesticides requires intersectoral collaboration. The issues involved in sound management of pesticides include legislative control, procurement, storage, transport, distribution, application, management of resistance, quality control and disposal.

The use of pesticides in agriculture has important implications for public health, not only in terms of pesticide poisoning but also for vector control, particularly for malaria mosquito control. The uncontrolled use of pesticides in agricultural sector is obviously directed at selection of resistance to insecticides. Of particular concern is the use of pyrethroids in agriculture, which has been associated with the development of resistance in malaria vectors. Pyrethroids are the only pesticide group available for impregnation of insecticide-treated nets. Therefore, to ensure the continued effectiveness of vector control methods, coordination with the agricultural sector is crucial.

OTHER LINKS

Research institutions and international collaboration
IVM must be guided by research in order to strengthen the evidence base for decision-making. Opportunities should be taken to build a capability for operational research within disease control programmes to be addressed issues of a direct relevance to IVM. As there may be a lack of such capacities/capabilities within programmes, links should be established with national and international research institutions.IVM implementation is expanding rapidly. International or regional cooperation is useful for sharing expertise and accessing research findings.

Private sector
Other stakeholders include the private sector, medical associations and the media. Each stakeholder plays a role in implementation, evaluation or communication related to IVM.

MOBILIZING RESOURSES

The available resources should be used for transforming a conventional system of vector control to an IVM strategy. The new capacities, structures and activities of the IVM approach might require start-up funds for their establishment and recurrent funds for maintenance. Some funds might be available from the health sector, and extra funds could be provided by other public sectors and/or the private sector and/or by external donors. Governments should be encouraged to contribute to IVM rather than relying on short-term donor assistance, in order to ensure national stewardship and the sustainability of the approach.

Resources from the health sector

In most countries endemic for vector-borne diseases, the health sector is underfunded and funds to support IVM will not be readily available. IVM should be seen as a strategy for strengthening health systems, not as separate programme with a separate budget line. Therefore, funds earmarked to support local health systems could become available for IVM as part of a strategy to increase the efficiency of overall disease control.

Resources from other public and private sectors

Other public sectors, often with larger budgets than the health sector, can sometimes mobilize resources for the establishment and maintenance of an IVM strategy. The ministries that might be involved in generating funds in their own sectors are those of finance, agriculture, environment, local government, commerce, development, infrastructure and tourism.

Private sector funds have been used to support vector control in special situations such as tourist areas, plantations and mining zones, where vector control helps to avert lost work days and medical costs due to VBDs, and increase profits. Involving private sector entities in a health impact assessment, particularly with regard to VBDs, could assist in fund generation from the private sector. Civil society organizations, including local clubs and associations, could also mobilize resources for IVM when the benefits on the approach are made clear to them.

External donor funding

Although funds may be made available for IVM from various sectors, external funding from donor agencies may be required in some countries endemic for VBDs, especially at the beginning. Initial funds will be needed to conduct a situation analysis and needs assessment, to train staff in IVM and to acquire technical resources for IVM. A start-up investment will facilitate transition from the conventional system of vector control based onthe IVM principles.

INFORMATION MANAGEMENT

IVM is an approach involving evidence-based decision-making and problem-solving methods at all levels. In an IVM strategy, various types of information are generated by different partners through mapping, situation analysis, planning, monitoring of implementation, vector surveillance, evaluation of outcomes and progress made towards IVM.Local partners should have ownership of the data they collect.

PLANNING AND IMPLEMENTATION

To improve the efficacy, cost effectiveness, ecological soundness and sustainability of vector control, a better decision-making about the course of action is required. Decision-making is therefore central to IVM, particularly in relation to advocacy, capacity-building, planning and implementation. Decisions to be made in IVM planning are related tothe type of interventions, targets and timing of interventions, management of resources and stakeholder participation. Planning involves continuous adaptation of management choices to a heterogeneous and changing environment. Making decisions on any of these issues requires valid, accurate, locally specific information that is accessible to all parties involved.

DISEASE SITUATION

Analysis of vector-borne disease situation includes epidemiological assessment to determine the incidence and prevalence of all vector-borne diseases, entomological assessment to determine the main vector species and their characteristics, and stratification to classify geographical areas according to the burden of vector-borne disease, in order to guide the allocation of resources to the appropriate areas.

Epidemiological and entomological assessment

The first step in decision-making is to determine the burden of vector-borne diseases. This is fundamental for designing and evaluation strategies for vector control and providing the basis for policy formulation at national level.

Measuring the burden of disease requires reliable, current data on disease incidence, prevalence and mortality, and information on seasonal variations of diseases, populations at risk and other data. Information is needed for each vector-borne disease, with overlay mapping to identify areas in which two or more diseases coexist.

An epidemiological assessment contributes to policy formulation and prioritization for individual vector-borne diseases. It is important, however, that disease of lower priority not be dropped from decision-making at this stage, because it may be seen in subsequent steps that the vector of diseases of lower priority could be targeted at the same time as those of the diseases of higher priority, making more efficient use of resources.

Understanding the biology, ecology and behaviour of potential vectors is essential to planning vector control strategies and choosing the most effective methods. This requires the expertise of professional entomologists and other trained personnel, who convey their findings to decision-makers at national, district and village level. The assessment of vectors of diseases comprises five aspects: their ecosystem, their role in disease transmission, their habitat and seasonality, their behaviour and their susceptibility to insecticides.

Stratification

In the context of disease control, the term “stratification” means the sub-division of endemic areas into various strata with different epidemiological and ecological

characteristics. Stratification is conducted to identify areas in which different approaches to disease control are indicated.

LOCAL DETERMINATION OF DISEASE

A number of risks factors, or "determinant of disease", determine the spread of vector-borne disease. It is important that all of the determinants of disease be understood in order to ensure appropriate action to disease control and prevention.

Identifying the determinants

The determinants are related to the parasite, the vector, human population and the environment. Vector-born disease control programmes usually focus on the parasite and the vector; however, if human and environmental determinants are ignored, people will continue to be at risk for infection and the vectors will continue to proliferate in environment.

Mapping the determinants

Participatory mapping of the determinants is valuable for determining those locations in which there are risks for VBDs and those in which they are greatest. The variables that might be considered in overlay mapping are where people live, the patterns of their movements, infrastructure, vector breeding sites, locations of service providers (e.g. health facilities, district and municipal offices, community clinic), land use, vegetation, water bodies etc.

Tackling the determinants

A local analysis of determinants of VBDs helps to understand in detail where and when the risks for VBDs occur. This would provide a basis for identifying the practical options for reducing these risks.

Determinants can be influenced by human intervention, for example, through vector control, personal protection, environment management or a change in behaviour or living conditions. Risk factors such as rainfall patterns obviously cannot be controlled.Many determinants of disease are outside the scope of conventional programmes for vector-born disease control, such as irrigation systems, urban development, sanitation, and housing. These call for the involvement of other health divisions, other sectors and local communities.

SELECTION OF VECTOR CONTROL METHODS

Available methods

Table below lists the vector control methods and their applicability to each VBD; however, the proposed methods have to be assessed locally.

Table: Methods to control vector-borne diseases

Category	Questions	Dengue	Leishmaniasis	Malaria
Environmental	Source reduction	+		+
	Habitat manipulation		+	+
	Irrigation management and design			+
	Proximity of livestock			+
Mechanical	House improvement		+	+
	Removal trapping	+	+	
Biological	Natural enemy conservation	+		+
	Biological larvicides	+		+
	Larvivorous fish	+		+
Chemical	Insecticide-treated bednets		+	+
	Indoor residual spraying		+	+
	Insecticide treatment of habitat			+
	Chemical repellents	+	+	+

The main categories of vector control include biological, chemical, environmental and mechanical. Most methods can be used to control several different diseases, so that their application is useful when several diseases coexist in the same environment. Some non-chemical methods require the participation of communities and other sectors. *Bacillus thuringiensisisraelensis,*and larvivorous fishesare increasingly used for larval control of mosquitoes instead of chemical insecticides, because they are safe for humans and the environment.

The main methods used for reducing vector transmission in malaria mosquito control are insecticide-treated nets and indoor residual spraying, which reduce vector density and longevity. Insecticides also have repellent and irritant effects, however, which limit their killing effect. Space spraying is not usually included in the list options because it is recommended only in emergency situations to prevent or suppress outbreaks of dengue and other diseases.

Selection criteria

Each vector control method has its advantages and disadvantages, and their appraisal guides the selection of the most appropriate one(s) for the local setting. The appraisal covers the aspects of their effectiveness and practical applicability, human and environment safety, risk for development of resistance, affordability, community participation and policy and logistic support.

Some methods, such as source reduction to prevent vector breeding, may be moderately effective but affordable with the active participation of communities. Other methods, such as indoor residual spraying, may be effective against malaria if have strong technical and logisticsupport at national level but may carry risks, such as the development of resistance. Evidence on local vectors (i.e. species, ability to transmit disease, breeding habitat, behaviour and susceptibility to insecticides) should be used to select the most effective interventions.

The use of insecticides in public health and agriculture contributes to the development of resistance in disease vectors, which is a particular problem in view of the limited choice of public health pesticides. Moreover, chemical pesticides pose risks to human health and the environment.

Community participation is a key aspect of the effectiveness of most, if not all, vector control methods. Participation ranges from adherence to interventions to active involvement in environmental management. Community participation is critical for achieving coverage and sustainability of preventive activities.

Affordability is also important in selecting vector control methods, and it refers not only to government budget allocated to health, but also to contributions available from other sectors and the willingness of communities to invest times and resources.Finally, the level of logistic and policy support must be taken into account in the selection and planning of IVM intervention at community level.

Multiple diseases

When several vector-borne diseases occur together in the same area, decision-making should include an additional step. Decisions must be made not only on the vector control methods to be used for each disease but also on the relative importance of each disease. Where there are several diseases in the same area, opportunities to use synergistic effects must be identified. Thus, vector control should target more than one disease, including low-priority diseases, which, on their own, would not justify the control effort.

REQUIREMENTS AND RESOURCES

When the locally appropriate vector control methods have been selected, an inventory should be made of the financial, human and technical resources available for vector-born disease control at local level. The organizational structures in which the resources could be used should also be assessed.

The inventory of resources and organizational structures requires the participation of local stakeholders. Possible links and collaboration with other local programmes or government services should be discussed, so that activities are coordinated in order to ensure consistency and avoid duplication. The potential resources include those received from national programmes, district health offices, local government and other public sectors, the private sector, civil society organizations and the community.The amount and type of resources depend on the diseases and vectors targeted. The methods selected for vector control also have implications for all types of resources needed.

Local requirements for capacity-strengthening should also be identified. The role of community members, community health workers and agricultural extension workers could be enhanced relatively quickly by practical short courses on vector biology, ecology and control.

IMPLEMENTATION STRATEGY

Any vector control strategy should be responsive to changes in local ecological and epidemiological conditions.

Setting targets, timelines and milestones is essential for planning and implementing a vector control strategy. The targets should be specific and indicate what has to be achieved by a certain time, and can include changes in human behaviours or attitudes, vector density, infection rate, parasite prevalence and

incidence rates, morbidity and mortality data etc. Monitoring and evaluation are necessary to establish and confirm whether the targets are being met. Intermediate targets can provide direction during implementation of a strategy. It is important that the targets be consistent with national goals and objectives for control of VBDs.

Principal and secondary vectorsand VBDs to be targeted, the timing and areas of implementation, the partners involved in implementation, monitoring/evaluation activities and measuring the impact of IVM interventions are the main issues to be taken into account in the planning stage.Some interventions can be used only against specific vectors, whereas others might be effective against several species. This is particularly relevant when several vector-born diseases coexist.The timing depends not only on the type of method but also on local conditions.

In which locations of areas should interventions be targeted so that the available resources can have a maximum effect? Priority could be given to vulnerable groups, to geographically isolated groups with poor access to health services, or to groups living on marginal lands or near vector breeding habitats. Sustaining high coverage with interventions can be costly and could increase the risk for resistance to insecticides. Once transmission reaches low levels, however, the main interventions might be scaled down, and the remaining interventions targeting only those locations of high risk for transmission could be combined with disease management activities.

The use of insecticide-treated nets, indoor residual spraying and personal protective measures should be promoted through awareness-raising sessions, community involvement and social marketing. Partners, such as communities, the private and public sectors such as health, agriculture, construction and local governments have important roles in planning and implementing a wide range of vector control options adapted to local situations and conditions.The health sector has conventionally been responsible for vector control and interventions that require strong logistic support, such as indoor residual spraying, usually require the specialist skills and capacity of the health sector.

The involvement of multiple stakeholders in vector control requires a functional organizational structure for effective coordination of activities to ensure that the joint efforts are consistent and have common goals.

Local partners should monitor and evaluate the implementation and maintenance of their activities to identify shortcomings and suggest remedial action. Monitoring and evaluation conducted by an external agency (governmental or nongovernmental) is likely to increase accountability for vector control and help to ensure unbiased results.

GENERATING AND EVIDENCE BASE

The continued strengthening of the evidence base for vector control is essential to improve a decision-making in the IVM context. The evidence base is the synthesized knowledge about the effectiveness of interventions in a particular setting and its purpose is to inform on decisions related to vector control and

resources allocation. A systematic approach to generating evidence is required. In some cases, knowledge on the characteristics of disease vectors remains fragmental.

ENTOMOLOGICAL SURVEILANCE

Vector surveillance is systematic monitoring of the seasonality and abundance of vector populations. The functions are twofold, and include response and evaluation. Vector surveillance is used to ensure appropriate, timely responses with vector control interventions, and it is also used for evaluating the effect of vector control.

A vector surveillance system should cover the vectors of all diseases prevalent in the targeted areas, in line with the multi diseases approach to IVM. This improves the use of resources.

ADVOCACY AND COMMUNICATION

IVM should be communicated effectively at all levels to ensure its understanding and acceptance, to foster collaboration and networking among partners and to empower communities (***see Annex on Advocacy & Communication enclosed***).

CAPACITY BUILDING

Capacity-building is a significant challenge in implementing an IVM strategy. The IVM strategy depends heavily on the knowledge and skills of people involved in implementation of IVM at national level.

LEARNING ENVIRONMENT

The development of human resources requires a supportive environment, with political and financial commitment for training, recruitment and career development. Substantial investment in training will be required to update the knowledge and enhance the skills of people involved in planning, implementation and evaluation of IVM interventions.

The IVM approach itself provides a supportive environment for learning, as IVM is a problem-solving approach. Direct observation, analysis and decision-making are the ingredients of a learning cycle, which stimulates continued learning by interacting participants. This results in an environment that is conductive to learning and development. Once an IVM strategy is operational, it could serve as a self-enforcing mechanism of generating knowledge and skills.

CORE FUNCTIONS AND REQUIRED COMPETENCE

The planning and implementation of IVM require appropriate knowledge and skills for management, analysis, problem-solving, communication and facilitation. Human resource development begins with an assessment of the current competence of all relevant personnel in order to identify the requirements for others. This is a part of a “vector control needs assessment”.

National and sub-national level
At national level, an IVM strategy requires a high-level intersectoral steering committee, as mentioned previously. Technical working groups could work under the guidance of the steering committee, and include people with competence and skills in epidemiology, entomology, vector-borne disease control and programme management. This competence is often available in existing systems but might require its reorientation or strengthening to address IVM challenges.

An important function at national level, apart from providing direction and advice, is facilitating activities at lower levels of administration, requiring facilitation skills. Advocacy is a growing responsibility of health professionals and programme managers, and the skills and experience for such active communication strategies should be strengthened.

District and village level
Reorientation to IVM often requires training or retraining of public health staff to increase their knowledge and give them the required skills for their roles in IVM partnership. Staff in other sectors and representatives of civil society organizations may also need additional training. At district or village level, intersectoral partnerships should be established, and the health sector should have working relations with other public sectors and communities. Decision-making skills should be developed and maintained by community leaders and local IVM partners should be able to ensure appropriate planning and implementation of local IVM strategies.

CURRICULUM PREPARATION

The global action plan for IVM includes a proposal for a comprehensive modular training package on IVM. In response, WHO designed a *Core structure for training curricula on integrated vector management,* consistingof six modules, to provide guidance to WHO regions in preparing their own regional and national curricula on IVM. The structure was adapted to the requirements and conditions of each region and country. It focuses on the management aspects of IVM and is not a replacement for courses on medical entomology or vector control methods. Most of the modules are consistent with the sections of this handbook.

In preparing a curriculum for use at national level, the modules should be adapted to local conditions and situations situation, and translated into local languages. Surveys to determine social and cultural perceptions of vectors, VBDs and vector control in communities and among partners in the public and private sectors can help to identify training requirements. Field-testing of the modules before finalizing the curriculum gives input for improvement before they are used in actual training. Representatives of all target groups should be involved in preparing the curriculum to ensure its relevance and suitability.

TRAINING AND EDUCATION

The success of IVM strategy depends largely on the human resources available at decentralized levels. Consequently, the emphasis in training should be on short courses for as many people as practicable in districts and villages. After a national

curriculum has been prepared, a cadre of national or provincial trainers can be formed to give the necessary in-service training to public health staff in the health sector, staff in other relevant public sectors, local authorities and civil society organizations. Ideally, epidemiological and entomological experts should be recruited to give technical support in training courses.

Parts of the modules should be adapted for use in health projects in primary and secondary schools to educate schoolchildren in vector biology and basic epidemiology. This can motivate them to participate in vector surveillance or vector control and preventive activities, such as environmental management. IVM should also be added to the curricula of science, medical and engineering faculties of higher education institutions to foster wider recognition of the importance of vector control in health and other disciplines. Undergraduates should be encouraged to conduct fieldwork on topics related to IVM.

Career development in vector control is essential in disease-endemic countries. Therefore, a career structure should be designed for entomologists and public health staff, to encourage trained, skilled staff to remain in vector control, with adequate legal protection of their positions.

INFRASTRUCTURE

Another area for capacity-building in IVM is infrastructure. The required infrastructure includes entomology laboratories, insectaries, supplies, equipment, transport and communication technology. Some of these facilities and resources may already exist in public health and other sectors, institutions and programmes, and might be used for IVM.

MONITORING AND EVALUATION

Monitoring and evaluation are essential tools to guide the planning of interventions, to measure the effectiveness of the activities, to identify critical areas, to monitor the resources used and to measure the impact. “Monitoring” refers to examining a programme’s process or performance, which, in the context of an IVM strategy, consist of the activities or interventions. “Evaluation” refers to assessment of the outcomes and impacts that can be attributed to a programme’s activities. Hence, monitoring involves examining the cause, which is the intervention, and evaluation involves analysing the effect, which is the outcome or impact.

FRAMEWORK

Monitoring and evaluating an IVM strategy, involve examining whether the existing system of vector control being transformed as originally intended. This applies to all the components of IVM. Monitoring and evaluation should identify progress made in the following areas:

- The policy and institutional framework,
- Organization and management,
- Planning and implementation,

- Capacity-building, and
- Advocacy and communication.

Different types of indicators are used to determine process, outcomes and impact. Process indicators reflect the performance of a programme (i.e. whether the planned activities were adequately conducted in a timely manner). Outcome indicators show the desirable outcomes of the activities conducted, and impact indicators reflect the impact that can be attributed to the programme's outcomes.

METHODS

Monitoring and evaluation of disease control are generally conducted longitudinally, to record changes over time. Therefore, baseline data along with information collected during interventions are required. Changes in progress, outcomes and impact indicators observed to be compared with baseline data.

One limitation of this approach is that other changes occurring during the same period can influence the indicators, so that the changes observed might not be attributable solely to the IVM interventions. To address this problem, cross-sectional comparisons should be made with a control group, i.e. a setting without IVM.

For demonstration purposes, three types of data are specified for the indicators: descriptive, numerical and logical (yes/no). A number of indicators cannot be measured numerically or logically and require descriptive data and qualitative assessment. Qualitative data can be obtained by interviews with stakeholders, review of documents, field visits and community or household surveys. Questions for interviews and formats for measuring knowledge and skills should be designed by evaluators, and survey tools or monitoring forms should be field-tested before use. Interviews and surveys are time-consuming and require careful planning.There are several methods for collecting health data through routine health surveillance, epidemiological assessments and special surveys. Sampling schemes should be designed on the basis of the requirements of each indicator.

Vector populations should be monitored at sentinel sites, and the entomological data can be used to evaluate the impact of vector control activities. Evaluating the impact on disease transmission requires special studies adapted to the requirements for each disease. The impact on parasite prevalence, disease incidenceand morbidity and mortality rates are not always easy to assess in connection with IVM interventions.

The results of monitoring and evaluation should be used to decide what strategic or operational adjustments are needed. Those who are responsible for monitoring and evaluation should document and disseminate the results to target groups. The obtained results could be used to inform national decision-makers about related costs and impacts to help them understand and interpret the results and guide them in deciding whether to support or modify the strategy. Monitoring and evaluation could also serve advocacy purposes by indicating policy change.

Monitoring is usually done internally by stakeholders, whereas evaluation is done both internally and externally. The advantages of internal evaluation are low cost and knowledge about the context and operations. Internal evaluators may, however, be biased and might hide certain shortcoming because of a conflict of interest. The important advantages of external evaluation and their presumed objectivity, as this evaluation is independent and can raise sensitive issues.

In IVM partnerships at decentralized levels, a cross-wide evaluation would be an ideal alternative. In this type of evaluation, one partner monitors the activities of another and vice versa. The cross-wise evaluation stimulates the accountability of both partners for their activities, strengthens partnership and helps avoid biased results; however, it requires training and supervision. Monitoring and evaluation become integral to the IVM strategy, leading to improvement and adaptation according to changing circumstances.

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ANNEXES

Advocacy & Communication Strategy: Planning Guide

INTRODUCTION

Integrated Vector Management (IVM) has to be effectively communicated at all levels to ensure its full understanding and acceptance by all parties concerned, to foster collaboration and networking among partners and to empower communities.

Several milestones in IVM advocacy have been achieved to date at global level (***see Box 1***). Global plans have been prepared and used in several WHO regions. Many countries have already initiated policy change in support of IVM or are already implementing an IVM strategy. In other countries, however, advocacy on IVM has not begun yet.

Box 1: Global milestones in advocacy for IVM

2004: *Global strategic framework on IVM prepared*
2007: *WHO Position Statement on IVM issued*
2007: *Global Plan to Combat Neglected Tropical Diseases 2006-2015 includes promotion of IVM*
2007: *Global Strategic Plan on IVM prepared*
2007: *Regional resolutions on IVM approved in some WHO regions*
2008: *Global Action Plan on IVM prepared*
2008: *Conference of the Parties of the Stockholm Convention on Persistent Organic Pollutants encourages introduction of IVM in countries in which DDT is used*
2008: *Global Malaria Action Plan calls for greater emphasis on IVM in both the control and elimination stages of malaria programmes*
2010: *62% of countries report having a national IVM policy*

FRAMEWORK

One of the central requirements of a successful control and prevention of VBDs is the move from vertical centralized programmes to decentralized integrated strategies based on the creation an environment with a positive disposition to IVM.

A project framework for advocacy and communication is presented in ***Table 1***, indicating target groups, key messages, tools, channels/mechanisms and expected outcomes. In the introductory stage of setting up IVM mechanisms, advocacy is required to leverage high-level commitment in policy, funding and research agendas. During the consolidation phase of the project and its expansion as well, continued advocacy and feedback on the performance and impact of IVM are required to ensure sustained allocation of resources and to expand further IVM activities. Successes or shortcomings should be identified by means of project monitoring and evaluation. Case studies should be used to demonstrate the feasibility and benefits of IVM.

The public and private sectors and civil society organizations are expected to implement, sustain and promote IVM activities. This group as the main target audience is expected to advocate and communicate on IVM advantages at community level. The involvement of communities as well as their linkages with national and local authorities is central to the success of the project. It is important that communities themselves appreciate the benefits of IVM from the onset. This would require raising public awareness and specific community campaigns to adequately empower them for decision-making and to drive behavioural change regarding IVM. Such an approach should take into account local behaviours, social and economic conditions, which vary from one country to another.

Table 1: Framework for advocacy and communication, with target audience,key messages, tools, channels/mechanisms and expected outcomes

Project Phase	***Target audience***	***Key messages***	***Tools***	***Channels & mechanisms***	***Expected outcomes***
Introduction	*Politicians, Policy-and decision-makers, Donors, Research institutions*	*Project concept Expected outcomes*	*Messages on IVM Success stories*	*Websites, Newsletters, Bulletins, Brochures, Leaflets, Presentations Posters Press-conference Video-conferencing*	*Political commitment to support IVM, Financial support provided*
Consolidation	*Government officials, Decision-makers, Public health staff, Staff from non-health sectors, Private sector, Research institutions, NGOs, Municipalities, Local communities*	*Progress on implementation*	*Progress reports*	*Meetings, Project reports Websites Scientific publications Newsletters, Bulletins, Brochures, Leaflets, Presentations Posters Press-conference Video-conferencing*	*Effectiveness of IVM proven, Policy change in support of IVM initiated, National capacities on IVM strengthened, Operational research conducted, Research agenda revised*
Expansion	*Politicians, Government officials, Policy-and decision-makers, Donors Research institutions Public health staff, Staff from non-health sectors, Private sector, Research*	*Project outcomes Future plans*	*Final reports with results obtained*	*Websites, Newsletters, Bulletins, Brochures, Leaflets, Presentations Posters Press-conference Video-conferencing*	*National strategies and plan of actions for IVM developed, Donors committed extra support for IVM, Additional financial resources mobilized*

	institutions, NGOs, Municipalities, Local communities				

ADVOCACY

To bring IVM on the national health and development agenda, advocacy is needed to present it as a valuable option for vector control. Associating the IVM benefits with broader development issues, such as strengthening health systems and empowering communities, could increase support for IVM. Advocacy is also needed for adapting research agendas and career development with IVM. Researchers should advocate for IVM within their own spheres of influence. Basic and operational research should be directed to fill the existing gaps in the evidence base for decision-making on IVM, to identify the technically sound IVM approaches and strategies and barriers for IVM implementation, and finally to find new techniques for vector control.

In the phase of disease elimination or prevention of its reintroduction, policy-makers may reduce their support for IVM because the strategy has been successful and the attention to this health problem is not longer required. However, continued advocacy for IVM is particularly critical at this time, in order to avoid"fatigue" among donors and politicians. In these situations, when a disease may no longer represent a public health concern the surveillance and management of vector populations should be sustained. Continued investments in IVM during the phases of elimination and prevention of reintroduction are justified, so as preventive activities against vectors can reduce the risks associated with reintroduction of disease(s).

Advocacy must be based on strong evidence to convince policy- and decision-makers on the benefits of IVM and ensure their full support and high priority in allocation of resources. Policy-makers are bound to have reservations about changing the existing vector control systems, and they have to know how investment in IVM will pay off in terms of health, social and economic benefits and whether IVM can be sustained financially. Purposeful analysis of the available evidence and effective use of advocacy are essential. Advocacy could be done through person-to-person communications and forum meetings with visual presentations.

Three main tools which can be used for advocacy include messages, and success stories obtained from a target country and/or other countries. Messages are the most straightforward tool. Although IVM is clearly defined, it is still seen by some people as an intangible, somewhat philosophical concept. IVM is not, however, a new programme, not a new technique, but a management tool for improving existing systems of vector control. This lack of understanding of IVM indicates that advocacy to policy- and decision-makers is required, through proper messages to ensure that the concept and principles of IVM are unambiguously communicated.

Box 2 shows the example how the basic concepts of IVM can be presented. It is a strategy of evidence-based decision-making, with a multi-disease approach, integrating vector control interventions and involving other sectors and communities. A strategy can be called "IVM" if all these features are incorporated. Even if there is only one disease locally and one appropriate method of vector control, but all four features have been taken into account, the strategy abides by the principles of IVM.

Box 2: Key messages on "What is IVM"

Basic concept	***Description***
Evidence-based decision-making	*Decision making based on evidence of the local conditions of disease and its transmission*
Multi-disease approach	*Taking account of all prevalent vector-borne diseases within one strategy of vector control*
Integrated vector control approach	*Taking into account of all relevant vector control methods to make use of supplementary effects*
Involving other sectors and communities	*Other sectors and communities playing a major role in vector control*

The conventional system of vector control may face some constraints, and the following problems could be identified in the absence of IVM:

- Suboptimal choice or timing of interventions, lack of monitoring and waste of resources
- Vector control programme with a single-disease focus, not integrated into the existing health system
- Vector control programme not optimally adapted to ecological and environmental conditions
- Other sectors and communities insufficiently aware of the consequences of their activities on vector-borne disease
- Resistance to insecticides is a growing problem in vector control

Success stories on IVM from other countries or regionsare another advocacy tool. Cases showing the success of IVM or its components help illustrate the potential benefits of IVM for policy-makers and donors. The basic concept of IVM have been shown to have positive impacts on the transmission and incidence of vector-borne diseases in studies in different contexts, with different combinations of interventions, interventions against several diseases, environmental management, evidence-based decision-making, collaboration with other sectors and involvement of communities in prevention and personal protection. Although some of the results are generally applicable, most of the evidence is specific to the study area.

Successful results obtained locally could be used as another advocacy tool. The results of monitoring and evaluation, which are needed to improve IVM operations, also serve advocacy purpose and can be used to inform policy-makers and donors about successes. In-depth analysis of local susses stories could be presented as case examples.

To persuade government policy- and decision-makers to endorse IVM, a strategy for advocacy is needed, with a clear vision and feasible plan. The following steps are suggested to develop it:

- To establish a working group at national or inter-country levels
- To collect data on the burden of vector-borne diseases in a given country or project countries
- To analyse the situation and identify problems in the current system of vector control (e.g. lack of evidence-based decision-making; lack of institutional capacity, inadequate monitoring and feedback, poor integration with the health system, resistance to insecticides)
- To define a clear position and the expected outcomes of IVM
- To set timelines and milestones
- To identify the target audience
- To prepare messages and other advocacy tools
- To acquire the skills and practice needed for advocacy
- To prepare a plan of action and implement advocacy activities
- To monitor and evaluate advocacy activities

COMMUNICATION AND EMPOWERMENT

To create an enabling environment for IVM at community level, people implementing an IVM strategy should be aware of any socio-cultural barriers, so that all opportunities can be best used. Changing human behaviour to reduce vector biting and disease transmission, increasing compliance with interventions and motivation for vector control activities and removing misperceptions and misguided methods of vector control are the main challenges. It is important to provide access to information and services on vector-borne diseases and ensure mutual interaction and communication. The principal challenges are to improve access to information and services and to change behaviour.

Interventions designed to remove socio-cultural barriers generally focus on increasing the knowledge and enhancing skills of the general public by giving them better access to information and services. This should lead to a change in behaviour and in activities that will reduce the burden of vector-borne diseases.

Many risks factors for vector-borne diseases are within people's sphere of influence, which is the peri-domestic environment. Public services cannot easily reach this environment, and communities must take control and assume responsibility. People should be empowered, not just to be aware of the risks but to take appropriate action of personal protection and vector control when and where needed. Empowerment means that people take more control over their lives. People need empowerment in areas in which they themselves can contribute to improving their solutions, with less reliance on scare external services such as the health sector.

It has been suggested that empowerment occurs only when two basic conditions are met. First, the necessary means or enabling factors including challenges,

responsibilities, opportunities, resources and capabilities have to be used to achieve empowerment. Secondly, a process of analysis and decision-making for subsequent action must be accepted and followed. While the "means" refers to capacity-building and a group approach, the "process" refers to active involvement in the planning and implementation of IVM at local level. Numerous tools including the media; information, education and communication (IEC); and communication for behavioural impact have been used for improving access to information and changing the behaviour of communities to reduce vector-borne diseases. Use of these tools in an overall advocacy should be coordinated in order to obtain the desired result.

The mass media, such as radio and television broadcasts, and the print media, can be used to create awareness about IVM in the general public. Videos could be produced locally in support of an IVM strategy, drawing on local experience.

By using the IEC approach, planned interventions combine information, education and motivation as a component of a national disease control programme. The aim is to increase the role of people in protecting their own health by changing their attitudes and behaviour taking into account of their needs and perceptions. IEC draws on the fields of diffusion theory, social marketing and behaviour analysis. Information messages are prepared to help people to understand the causes and consequences of disease; education is given to change attitudes and behaviour and facilitate cooperation among participants; communication is required to form a community-based network. In this approach, the mass media are used in combination with group and interpersonal communication.

Communication for behavioural impact is an education- and information-based approach to communication and social mobilization. It is based on the principles of integrated marketing communication used in the private sector to influence consumer behaviour. It is a tool of proven efficacy for achieving desired behaviour in relation to vector-borne diseases.

The approach begins with an analysis of the situation to determine behavioural barriers and constraints in a certain group. The outcome of the analysis is a small number of precise behavioural objectives. Next, a strategy for achieving the objectives is designed, with an optimal mixture of activities, such as public relations, community mobilization, advertising and interpersonal communication – all aimed at achieving the desired behaviour. Then, the strategy with its well-planned social mobilization and communication activities is implemented, and progress towards achieving the desired behaviour is monitored.

This approach has been used in many countries in the control of dengue, lymphatic filariasis and malaria, and for several other diseases to increase the effectiveness of treatment and to diminish mosquito breeding sites. A significant purpose of communication for behavioural impact is to ensure that effective methods are effectively used at community level.

Each of these tools has its strengths and weaknesses, and the selection of a tool or their combination should be based on careful consideration of the local conditions in which they will be used and the expected outcomes. The IEC approach has had positive effects on knowledge and attitudes, but concern has been expressed about the slow pace of achievements and the lack of documented behavioural impact of this approach. People might understand the behaviour needed to reduce a health risk but fail to act accordingly. Communication for behavioural impact requires considerable effort for specific outputs, but the results suggest that it affects people's behaviour. Both, IEC and communication for behavioural impact are designed for situations in which the messages are generally applicable in targeted areas.

DEVELOPING A COMMUNICATION STRATEGY

The ability to communicate is essential to the success of any undertaking and an important factor in the achievement of its objectives. The pooling of skills and competencies is essential, and an expert in communication can make a valuable contribution. The strategy can be developed in several stages:

- A preliminary outline is prepared by the project team and close collaborators
- The outline is submitted to various partners for comments and revisions. The partners can be consulted individually or in groups as a brainstorming session that includes anyone who could make a contribution
- The project team meets to finalize the strategy. The input of a communication expert is highly desirable at this stage
- Once the strategy has been established, it mist be communicated to the partners and groups you want to reach. This will make it easier to integrate them into the process of developing the various tools intended for their use.

The following approach could be followed while preparing the communication strategy:

- What are goal and objectives of the strategy to be reached?
- What key target audiences would be interested in this knowledge?
- What are the needs of key target audiences and what knowledge are most interesting to them?
- What communication tools are to be used for these target groups?
- What financial and human resources are available to support this process?

The objectives of the communication strategy are to provide timely and evidence based information and guidance on IVM for key target audiences; to provide stakeholders and partners with accurate and timely information on progress made and results achieved; to support participating countries to develop a comprehensive communication strategies and plans of action on IVM; to raise levels of public knowledge on IVM, and to promote positive perceptions, grounds and attitudes towards IVM.

The sustainability of the strategy should be continually verified in the field, where the strategy and its tools have to be adapted to local conditions and respond to needs at the grassroots level.

The target audiences are the groups or individuals at the local, national, or international level with whom information has to be shared. Because each target group has specific characteristics and is faced with different problems or situations, a specific communication strategy may be needed for each group. The importance of defining your target groups cannot be overstated. Knowledge, beliefs and customs often vary widely from one group to another and the ways in which knowledge is acquired are not the same in each community. For decision-makers, the strategy is needed to ensure that participatory development is better understood and adopted to other project and situations. For community, stakeholders and funding agencies, the strategy is needed to gain visibility in the field and share the project results.

MONITORING AND EVALUATION

Progress in advocacy and communication has to be monitored and evaluated. Indicators that could be used are listed in ***Table 2***.

Table 2: Process and outcome indicators for monitoring and evaluating progress in advocacy and communication on IVM

Process indicator	***Outcome indicator***
Advocacy materials on IVM prepared	*Advocacy tools on IVM available*
Case studies on IVM conducted and documented	*Advocacy tools on IVM available*
Key target audiences identified	*Advocacy activities on IVM conducted*
Advocacy and communication strategy & plan on IVM designed and agreed by all parties concerned; resources allocated	*Advocacy and communication strategy & plan on IVM implemented and results evaluated*
IEC research on IVM designed and resources allocated	*IEC research on IVM conducted and reports published*
Social mobilization and communication for behavioural impact designed; resources allocated and staff trained	*Social mobilization and communication for behavioural impact conducted*
Awareness raising campaigns on IVM designed; resources allocated and staff trained	*Number of local people involved in such campaigns*
Media relations to inform the general public on IVM activities established	*Number of media activities carried out*