

Guidelines on Public Health Pesticide Management Policy



**World Health
Organization**

Regional Office for South-East Asia

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WHO Pesticide Evaluation Scheme (WHOPES)
Department of Control of Neglected Tropical Diseases
World Health Organization, Geneva

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Abbreviations

FAO	Food and Agriculture Organization of the United Nations
IRS	indoor residual spraying
ITN	insecticide-treated net
IVM	Integrated Vector Management
LN	long-lasting insecticidal mosquito net
NOAEL	no observed adverse effect level
PCO	pest control operator
PHP	public health pesticide
POP	persistent organic pollutant
SAICM	Strategic Approach to International Chemicals Management
SEARO	WHO Regional Office for South-East Asia
WHO	World Health Organization

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1. Introduction

Vector-borne diseases are among the major causes of illness and death in the WHO South-East Asia Region. Vector control plays a key role in prevention and control of major vector-borne diseases such as malaria, dengue, leishmaniasis and chikungunya, and often constitutes the first line of activity in case of epidemics. Chemical control (use of pesticides) is still the most important element in the integrated approach to vector control.

More than 3200 metric tons of active ingredient of DDT (about 80% of the global use of this pesticide), 225 tonnes of active ingredient of organophosphates and about 30 tonnes of active ingredient of pyrethroids have been used annually for vector-borne disease control in the South-East Asia Region during 2006-2007 [1]. The use of DDT has been for malaria and leishmaniasis vector control in India, while organophosphates and pyrethroids were applied against vectors of malaria, leishmaniasis, dengue and filariasis in the Region.

The public health burden caused by nuisance pests (mostly insects and rodents) is also significant in the Region, leading to the use of considerable volumes of pesticides and rodenticides for personal protection. However, comprehensive statistics are not available for South-East Asia.

Because of the importance of public health pesticides (PHPs) for the prevention and control of human diseases, it is essential that they are efficacious, cost-effective and operationally acceptable. However, the long-term sustainability of vector-borne disease control in the Region is threatened due to growing insecticide resistance and the depleted arsenal of less hazardous and cost-effective insecticides.

Furthermore, pesticides are toxic compounds and their improper use may pose a risk to human health and the environment. This includes those used in and around homes for personal protection or vector control.

Based on such concerns, and with the aim to ensure sustainable and cost-effective vector control, WHO published the *Global strategic*

framework for integrated vector management (IVM) [2], and subsequently adopted IVM as its central approach to disease vector management [3]. The IVM approach integrates all available and effective vector control measures, whether chemical, biological or environmental. In 2005, the Regional framework for an integrated vector management strategy for the South-East Asia Region was adopted [4], and this was subsequently translated into a concrete framework for implementation of IVM at the district level [5].

The judicious use and management of pesticides is a crucial element of IVM and of nuisance pest control. But sound public health pesticide management covers a broad range of aspects, including (but not limited to) evidence-based decision-making on the need for and type of control, careful selection of the most suitable pesticide, targeting pesticide use effectively in time and space, applying resistance control strategies, and safe disposal of pesticide waste and containers. It also involves many stakeholders, calls for long-term vision and requires high-level political support.

It was therefore considered opportune to elaborate these guidelines in support of national formulation or strengthening of specific policy for the sound management of public health pesticides.

The *International code of conduct on the distribution and use of pesticides* [6] is the worldwide guidance document on pesticide management for all public and private entities engaged in, or associated with, the distribution and use of pesticides, including public health pesticides. The Code is designed to provide standards of conduct and to serve as a point of reference in relation to sound pesticide management practices, in particular for government authorities and the pesticide industry. The principles of the Code have been used in elaborating these policy guidelines. Furthermore, the development of public health pesticide management policy contributes to national implementation of the Code of Conduct.

The guidelines are also intended to be used in support of national implementation of SEARO regional vector control strategies, in particular the *Revised malaria control strategy* [7], the *Regional strategic framework for elimination of kala-azar* [8], the *Asia-Pacific dengue strategic plan* [9], the *Regional strategic plan for elimination of lymphatic filariasis* [10] and the *Regional framework for an integrated vector management strategy for the South-East Asia Region* [4].

2. Scope of the guidelines

These guidelines provide national policy-makers in the WHO South-East Asia Region with critical elements to develop and strengthen national policy for the management of public health pesticides, such as vector control pesticides, household pesticides, and pesticides used by pest control operators. Issues and driving forces that may instigate national policy development are discussed and guidance is provided on the process of policy formulation, implementation and evaluation.

The guidelines focus on public policy development, formulated by a government and implemented under the overall responsibility of a government.

The guidelines do not provide specific advice on technical aspects relating to use and management of public health pesticides, for which separate guidance documents exist. References to such technical guidelines are provided.

While it is recognized that the large majority of products used for public health purposes are insecticides, other types of pesticides are being used as well (e.g. repellents, rodenticides, molluscicides). Therefore, the more generic term “public health pesticide” is used throughout this guideline, rather than “public health insecticide”.

3. Definitions

Counterfeit pesticide – A pesticide made by someone other than the approved or registered manufacturer, by copying or imitating an original product without authority or right, with a view to deceive or defraud, and then marketing the copied or forged product as the original.

Decentralized health system – A health system in which responsibility for policy implementation and service provision has been transferred from the central level to local structures. [11]

Household pesticide – A pesticide that is used in or around the house and is generally available over the counter. They may include mosquito coils, aerosols spray cans, insect repellents for personal use,

rodent poisons, cockroach sprays and baits, flea and tick control products and pet collars.

Illegal pesticide – A pesticide that is not registered or otherwise authorized for a particular distribution and use, or a pesticide for which no import authorization has been given (if applicable).

Integrated vector management (IVM) – A rational decision-making process for the optimal use of resources for vector control. An IVM approach takes into account the available health infrastructure and resources and integrates all available and effective measures, whether chemical, biological, or environmental. [5]

Life-cycle management – see *Pesticide management*

Pest control operator – A professional, often private, operator who carries out control of nuisance pests and other pests of public health importance, at the request of a client, e.g. in and around houses, offices and hospitals.

Pesticide – Any substance, or mixture of substances, or microorganisms including viruses, intended for repelling, destroying or controlling any pest, including vectors of human or animal disease, nuisance pests, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport, or marketing of food, agricultural commodities, wood and wood products or animal feeding stuffs, or which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies. The term includes substances intended for use as insect or plant growth regulators; defoliants; desiccants; agents for setting, thinning or preventing the premature fall of fruit; and substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport. The term also includes pesticide synergists and safeners, where they are integral to the satisfactory performance of the pesticide. [12]

Pesticide management – The regulatory control, proper handling, import, supply, transport, storage, application, and disposal of pesticides to minimize adverse environmental effects and human exposure. [11] This is sometimes also referred to as *life-cycle management*.

Pesticide registration – The process whereby the responsible national government or regional authority approves the sale and use of a pesticide following the evaluation of comprehensive scientific data demonstrating that the product is effective for its intended purposes and does not pose an unacceptable risk to human or animal health or the environment. [6]

Policy – A set of principles that guide decision-making. [13]

Policy instrument – A method, mechanism or measure that can be used by a government to achieve (part of) the objective of a policy.

Public health pesticide (PHP) – Pesticide that is used in the control of pests of public health significance. They include vector control pesticides, household pesticides, and professional pest management pesticides (i.e. pesticides used by pest control operators). For the purpose of this guideline, public health pesticides do not include disinfectants. [11]

Resistance – The selection of a heritable characteristic in a pest population that results in the repeated failure of a pesticide product to provide the intended level of control when used as recommended. [14]

Substandard pesticide – A pesticide product that does not comply with national (or international, where relevant) quality standards.

Vector – An insect or any living carrier that transports an infectious agent from an infected individual or its wastes to a susceptible individual or its food or immediate surroundings. The organism may or may not pass through a development cycle within the vector. [11]

4. Objectives of the guidelines

The objectives of these guidelines are to:

- Present issues in life-cycle management of public health pesticides in the South-East Asia Region that may require formulation or strengthening of national policy.
- Provide guidance on the process of national policy formulation, implementation and evaluation.

- Present options for policy instruments that may be incorporated into national policy for public health pesticides management.

5. Purpose of policy formulation

Policy is a set of principles that guide decision-making. Public policy refers to policy formulated and implemented by a government, and it is the basis for translating the government's political vision into programmes and actions. Policy defines desired changes, and may be developed in response to recognized problems or constraints, or to prevent problems arising in the future.

Ideally, a policy contains a definition of the problem being addressed, a statement of goals and objectives (the desired state of affairs; targets), and at least the broad outline of the instruments (approaches and measures) by which the objectives are to be achieved. [13]

Policy formulation, if carried out well, can serve a range of purposes, among them:

- to identify issues and problems in public health pesticide management;
- to define structural solutions to problems or options for dealing with identified issues;
- to project outcomes of policy options and evaluate their impact;
- to create a political basis for future plans and actions and ensure commitment from decision-makers;
- to provide a process through which stakeholders can build consensus around preferred policy options;
- to ensure transparency about objectives, targets and means to achieve these targets;
- to provide a framework for national resource allocation and international assistance;
- to provides a framework against which programmes or actions can be tested and progress measured.

The ultimate goal of the formulation of a national public health pesticide management policy is to achieve effective, safe and sustainable vector-borne disease and public health nuisance pest management. Key elements of this overall goal are:

- to achieve public health objectives, in particular with respect to lowering the burden of vector-borne diseases;
- to optimize and rationalize the use of resources and tools for nuisance pest and vector control, and where possible reduce reliance on chemical control;
- to ensure regulatory control over the import, distribution, use and disposal of public health pesticides with the aim to minimize risks to human health and the environment;
- to create an enabling environment for sound public health pesticide management by, among other things, awareness-building and resource mobilization.

6. Motives and driving forces for policy formulation

There may be many motives or driving forces that justify policy development for public health pesticide management in a given country. Some may be locally identified problems with pesticide use that should be solved; others are issues that could become constraints for effective pesticide management in the future, and hence require early intervention measures.

In this chapter, issues and problems associated with public health pesticide use and management are discussed that may be a motive or a driving force for a national government to develop a specific policy. These issues are presented in no specific order, and not all of them may be relevant to each country in the South-East Asia Region.

Role of public health pesticides in vector-borne disease control

Vector control plays a key role in prevention and control of major vector-borne diseases. For some diseases, such as dengue, no drug or vaccine

exists and vector control is the sole control option. For others, such as malaria and kala-azar, vector control is an essential component of the overall disease control strategies in the Region.

Insecticides remain the most important element of integrated approaches to vector management, and their effective long-term use therefore contributes greatly to reducing the burden of vector-borne diseases. In addition, antimalarial multidrug resistance in *P. falciparum* in the South-East Asia Region is among the highest in the world, limiting the efficacy of drug treatments and increasing the relative importance of malaria vector control.

Depleted arsenal of less hazardous and cost-effective pesticides

The number of less hazardous and cost-effective public health pesticides is limited, and indeed decreasing with time. This is due to a large extent to the development of resistance of the major vectors (e.g. widespread resistance of malaria and dengue vectors to common insecticides in the South-East Asia Region) and pests of public health importance (e.g. flies, rodents) to these pesticides. The number of new pesticide active ingredients for public health use in the pipeline is very few, which requires careful management and judicious use of the existing compounds to extend their useful life.

Human health and environmental risks posed by public health pesticides

While public health pesticides are generally chosen to have a low hazard with respect to human health and the environment, all pesticides pose an inherent risk that should be reduced as much as possible (“healthy public policy” also applies to public health pest management).

Pesticide applicators, both in government and the private sector, are often not adequately trained in the judicious use of public health pesticides, their supervision may be insufficient, and spraying equipment is frequently not well calibrated. This can lead to high occupational risks to workers, but may also result in unacceptable risks for inhabitants of treated buildings or neighbourhoods.

Household pesticides are mainly used in or around habitations, generally by untrained persons who may not be well informed about the risks of pesticides. Because these products are applied in such close proximity to humans, relatively high exposure may occur. However, in many countries pesticides for domestic use are not well regulated, and labelling is often inadequate to inform users about risks.

Furthermore, storage of public health pesticides in retail establishments and in houses, as well as by pest control operators and government vector control services, is often very inadequate, leading to risks to human health and the environment.

A specific issue is the possible “leakage” of DDT into agriculture, in countries like India where this insecticide is still used for vector control. While this is illegal in most South-East Asian countries, shortfalls in management or control may still result in DDT entering the environment and the food chain. In addition to the environmental and consumer risks that such inappropriate use poses, DDT residues in agricultural commodities may seriously threaten exports.

Inadequate regulation of public health pesticides

While most countries in the South-East Asia Region regulate agricultural pesticides to a greater or lesser extent, important gaps still exist in legislation, registration and enforcement for public health pesticides. Sometimes, legislation for some groups of public health pesticides is entirely lacking. In other cases, legislation and/or registration of public health pesticides is not well coordinated with other groups of pesticides, increasing the possibility of legal loopholes. Furthermore, the regulation of pest control operators is often inadequate, which may lead to inappropriate pesticides or treatments being used in or close to homes and other buildings.

Registration procedures for public health pesticides tend to be underdeveloped when compared to agricultural pesticides, and in particular pesticide dossier evaluation may require strengthening to ensure that products being authorized are effective and do not pose unacceptable risks to human health and the environment.

Even where legislation is adequate, compliance monitoring and enforcement is often insufficient. Inspectors responsible for compliance

monitoring and enforcement of pesticide-related legislation may be dispersed over the inspectorates of various ministries, which can result in lack of efficiency and suboptimal use of resources. Also, inspectors may have been designated for pesticide inspections but require specialized training to be able to do so effectively. Furthermore, quality control of public health pesticides and application equipment is often inadequate.

Decentralized health systems and challenges associated with management of pesticides

Over the last decades, many countries have gone through health sector reforms that have posed new challenges in the management of public health pesticides at decentralized levels—for example in the selection, purchase, procurement, use and disposal of these chemicals—and in monitoring of their application. These reforms, however, have not adequately included capacity building to address this highly specialized area of work.

Inadequate national capacity for the judicious use of public health pesticides

The technical capacity to ensure effective and judicious use of public health pesticides is still limited at various levels of government, but also in the private sector, in South-East Asia.

In a WHO survey in 2003/2004, only one out of the eight participating countries in the South-East Asia Region reported that all those in charge of vector control had been trained in vector control; in six countries only some, and in one country only a few vector control staff had received such training [15]. Even though capacity building has been carried out over the last few years, the availability of trained and experienced managers remains critical for proper planning and effective implementation of vector control programmes. This includes, among others, pesticide needs assessments, planning for procurement, pesticide storage and distribution, and disposal.

The lack in technical know-how of vector control personnel and other public health staff involved in nuisance pest control at the field level has become a serious concern. As has been mentioned above, regular training

has become ever more challenging due to decentralization and other health-care reforms.

In addition, there is limited capacity for monitoring and evaluation of vector control interventions, and for operational research to support evidence-based decision-making for judicious use of pesticides in public health. This results in suboptimal use of pesticides in vector control and nuisance pest control, lower efficacy, increasing risk for resistance development and adverse effects on health and the environment. It also slows down the development of truly integrated vector control approaches.

Slow progress in implementation of integrated vector management

IVM uses sound principles of management and allows full consideration of the determinants of disease transmission and control. WHO describes IVM as “a rational decision-making process for the optimal use of resources for vector control” [5]. IVM has been chosen as the recommended approach to vector control in the South-East Asia Region. [4]

IVM is a decision-making process for the management of vector populations, so as to reduce or interrupt transmission of vector-borne diseases. Its characteristic features include:

- selection of methods based on knowledge of local vector biology, disease transmission and morbidity;
- utilization of a range of interventions, often in combination and synergistically;
- collaboration within the health sector, among researchers and with other public and private sectors that impact on vector breeding;
- engagement with local communities and other stakeholders;
- a public health regulatory and legislative framework;
- rational use of insecticides;
- good management practices.

An IVM approach takes into account the available health infrastructure and resources and integrates all available and effective measures, whether chemical, biological or environmental [5]. Judicious use of public health pesticides is thus an essential element of IVM.

However, constraints may exist in a country for sound pesticide management, which can jeopardize the implementation of successful vector control programmes based on an IVM approach. Examples are: illegal import and distribution of cheap pesticides, which may reduce investments in the development of alternative pest and vector control methods; impediments to the registration of low-risk (bio-)pesticides, which are needed in an IVM programme; lack of funding for research into effective environmental management options for vector control; lack of evidence-based decision-making for proper pesticide procurement and use; and lack of coordination between the agricultural and health sectors with respect to insecticide use, resulting in resistance problems.

Problems related to pesticide management may therefore cause the implementation of IVM to be impeded, while slow progress in development of IVM may lead to less attention being given to judicious pesticide management.

Substandard, illegal and counterfeit pesticides in the market

The use of substandard pesticide products can result in ineffective pest or vector control operations, leading to increasing application rates and costs. It may also lead to the development of pest resistance to pesticides or aggravate existing problems. In addition, substandard pesticide products may seriously increase the risk to users and the environment as these products may contain impurities/chemicals that can increase the toxicity of the product to humans and other non-target organisms.

In 2001, WHO and the Food and Agriculture Organization of the United Nations (FAO) estimated that around 30% of pesticides marketed in developing countries (with an estimated value of US\$ 900 million annually) did not meet internationally accepted quality standards. [16] When the quality of labelling and packaging is also taken into account, the proportion of poor-quality pesticide products in developing countries is likely to be even higher.

The trade in illegal and counterfeit public health pesticides is also a major concern in the Region, which requires adequate legislation and capacity for enforcement.

Poorly coordinated local responses to management of pesticides

Local responses to the management of pesticides in public health, agriculture and environment sectors are often poor. In many South-East Asian countries coordination and collaboration may not be sufficiently effective between the principal pesticide regulatory authority (generally the Ministry of Agriculture) and the Ministry of Health, on the evaluation, authorization, monitoring and control of public health pesticides. As a result, not all elements of the pesticide life cycle may be properly regulated and managed.

Similarly, a lack of coordination tends to be observed between government and other stakeholders, such as the private sector (e.g. manufacturers, importers, retailers, pest control operators), civil society, academia and research institutes. Consequently, problems in pesticide management that could have been recognized and dealt with at an early stage are either overlooked or only materialize in the legislation or enforcement phase.

A particular example is the development of insecticide resistance in public health applications which is caused or exacerbated by use of insecticides with the same mode of action in agriculture. The prevention and management of such resistance selection requires routine monitoring of insecticide resistance as well as joint development of a strategy for resistance management between the ministries of health and agriculture.

Disposal of pesticide-related waste

The use of public health pesticides generates various types of waste: leftover pesticides that have become obsolete or otherwise unusable, empty pesticide containers and sachets, and used-up or torn long-lasting insecticidal mosquito nets (LNs). The disposal of pesticide waste is generally not well regulated or organized in many countries in the Region, and public health pesticide waste is no exception in that respect. Such waste is often

being deposited in general purpose dumps or littering the environment, which may result in environmental pollution or pose risks to human health.

The prevention of pesticide-waste generation, local recycling of empty pesticide containers, and the environmentally sound disposal of leftover waste all pose great challenges to national governments and require urgent attention.

Obligations under international instruments

There are several international instruments that invite Member States or Parties to implement sound management of pesticides. The main instruments with respect to public health pesticides are listed below:

The *Stockholm Convention on Persistent Organic Pollutants (POPs)*¹ requires Parties to take measures to eliminate or reduce the release of POPs into the environment. With respect to public health, two pesticides are particularly concerned: DDT and lindane. The Convention limits the use of DDT to disease vector control. Parties to the convention using DDT are required to put in place regulatory and other mechanisms to ensure that DDT use is effectively restricted to disease vector control. Furthermore, with the aim of reducing and ultimately eliminating the use of DDT, Parties are required to develop and implement suitable alternative products, methods and strategies, including resistance management strategies to ensure the continuing effectiveness of these alternatives. The Stockholm Convention also provides mechanisms to assist countries in finding alternatives for DDT in vector control. Furthermore, Parties to the Convention should eliminate the production of lindane, and allow its use only as a human health pharmaceutical for the control of head lice and scabies.

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade² aims to contribute to the environmentally sound use of certain hazardous pesticides, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties. Pesticides used for

¹ Stockholm Convention web site: <http://www.pops.int>

² Rotterdam Convention web site: <http://www.pic.int>

public health purposes that fall under the provisions of the Rotterdam Convention are DDT and lindane, as well as all other pesticides that have been banned or severely restricted by individual Parties.

The *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*³ is the global environmental agreement on hazardous and other wastes, including pesticide-related waste. The Convention primarily regulates the transboundary movements of wastes but it also obliges its Parties to ensure that pesticide wastes are managed and disposed of in an environmentally sound manner. To this end, Parties are expected to minimize the quantities that are moved across borders, to treat and dispose of wastes as close as possible to their place of generation and to prevent or minimize the generation of wastes at source. Strong controls have to be applied from the moment of generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal. This also applies to public health pesticide wastes.

International policy

The *International Code of Conduct on the Distribution and Use of Pesticides*⁴ is the worldwide guidance document and a framework for the management of pesticides, for public and private entities engaged in, or associated with, the distribution and use of pesticides, including public health pesticides. Even though the Code is not legally binding, it is designed to provide standards of conduct and to serve as a point of reference in relation to sound pesticide management practices, in particular for government authorities and the pesticide industry. The Code can be used as a means to verify the national status of sound public health pesticide management, and identify gaps and needs.

The Sixty-third World Health Assembly, held in May 2010, adopted resolution WHA63.26, which urges the Member States, *inter alia*, to establish or strengthen capacity for the regulation and sound management of pesticides and other chemicals throughout their life cycle, as a preventive measure to avoid accumulation of obsolete chemicals. The World Health

³ Basel Convention web site: <http://www.basel.int>

⁴ International Code of Conduct web site: <http://www.fao.org/agriculture/crops/core-themes/theme/pests/pm/code/en/>

Assembly also requested the WHO Director-General to support the ongoing joint efforts of FAO and WHO in capacity building of Member States in the sound management of pesticides.

Adopted by the 1st International Conference on Chemicals Management (ICCM) in 2006, the *Strategic Approach to International Chemicals Management (SAICM)*⁵ is a policy framework to foster the sound management of chemicals throughout their life cycle, by 2020. Pesticides, including those used in public health, are part of SAICM, and implementing the International Code of Conduct is seen as a major policy tool to achieve its objective. The promotion of integrated vector management is mentioned in the Global Plan of Action for SAICM as an important approach to reduce the risks of pesticide use.

Relevant SEARO policies

Various regional SEARO policies on vector control contain provisions to promote integrated vector management, improve effectiveness of control interventions, reduce the risk of insecticide resistance development, or strengthen pesticide management. They include:

- The *Regional strategic plan for elimination of lymphatic filariasis*, which identifies integrated vector management as one of the main strategies to progressively reduce and ultimately interrupt lymphatic filariasis transmission. [10]
- The *Regional framework for an integrated vector management strategy for the South-East Asia Region* [4], which adopts IVM as the recommended approach to vector management and requests Member States to promote the implementation of IVM principles as part of healthy public policy. The *Framework for implementing integrated vector management at district level in the South-East Asia Region* [5], provides approaches and options to strengthen IVM at the district level, and lists the promotion of sound pesticide management as one of the intervention tools.
- The *Regional strategic framework for elimination of kala-azar* [8] identifies integrated vector management, with a focus on indoor

⁵ SAICM web site: <http://www.saicm.org>

residual spraying (IRS) for sandfly control, as an essential element of the strategy.

- The *Revised malaria control strategy* [7] lists integrated vector management, scaling up of the use of insecticide-treated nets (ITNs) and selective IRS as key instruments for disease prevention. The strategy further stipulates that effective IRS programmes require good planning and management, selection of effective safe insecticides, use of appropriate equipment, adequate coverage and close supervision. Specific attention should also be given to the safety of spray team members.
- The *Asia-Pacific dengue strategic plan* [9] also mentions integrated vector management as one of the key components of the disease prevention and control approach. Its implementation plan lists the development of national regulatory mechanisms for pesticide management, rational use of insecticides for vector control, and adoption of IVM principles, as important activities.

The implementation of these regional policies, to which SEARO Member States adhere, requires, and therefore drives, the formulation of specific national policies for public health pesticide management.

Relevant national policies and legislation

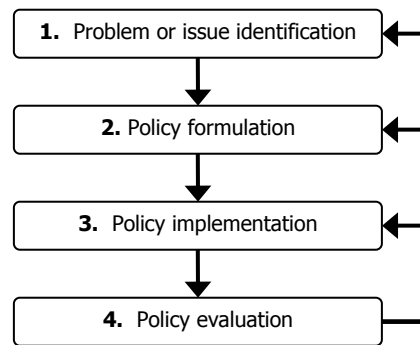
Similarly to the role of regional policies, SEARO Member States will often have national policies or legislation that requires a policy for public health pesticides. Occupational health regulations, may require policy for vector control staff or PCOs; environmental policy or legislation, may affect public health pesticide use and management; and commerce and trade policy may affect the distribution and sales of public health pesticides.

7. The policy cycle

Policy-making is a continuous process with a cyclical nature. Public health pesticide policy is developed with the ultimate aim to solve recognized problems or weaknesses in pesticide use or management, or avoid potential problems. Therefore, as policy is being implemented, the situation will change (and ideally, improve), and the set goals will become less relevant.

Also, other problems may arise that did not exist earlier, or were not recognized as such. Both policy and the situation it was intended to influence need to be evaluated on a regular basis.

The basic policy cycle consists of four steps, as outlined schematically below. [13]



First, problems or issues that require the development of a policy need to be identified. The second step is to strengthen existing policy or formulate new ones to tackle the identified issue, taking into account the results of existing or past policy. Third, the formulated policy will be implemented. Finally, at some stage the policy being implemented will need to be evaluated to verify whether the intended results were achieved and if new problems or issues were identified. Applying this four-step project cycle facilitates organized thinking about policy, but it should be recognized that the actual process may be less orderly, with repeated iterations between steps, before policy can be effectively implemented.

Experience has shown that effective policies can be recognized by a number of general “features”. Adhering to most or all of these features when formulating, implementing and evaluating policy tends to increase the chances of success (see Box 1).

In the following chapters the four-step policy cycle and the general features of successful policy will be applied to public health pesticide management.

Box 1 – Features of modern policy-making

Forward-looking

The policy-making process clearly defines outcomes that the policy is designed to achieve and, where appropriate, takes a long-term view of the likely effect and impact of the policy based on informed predictions of social, political, economic and cultural trends.

The following actions demonstrate a forward looking approach:

- Preparation, at an early stage, of a statement of intended outcomes
- Include contingency or scenario planning
- Take into account the government's long-term strategy

Outward-looking

The policy-making process takes account of influencing factors in the national, regional and international situation; draws on experience in other countries; and considers how policy will be communicated with the public.

The following actions demonstrate an outward-looking approach:

- Make use of United Nations, regional mechanisms, etc.
- Look at how other countries dealt with the issue
- Recognize regional variation within the country
- Prepare and implement a communications strategy

Innovative, flexible and creative

The policy-making process is flexible and innovative, questioning established ways of dealing with things, encouraging new and creative ideas, and where appropriate, making established ways work better. Wherever possible, the process is open to comments and suggestions of others. Risks are identified and actively managed, and policy feasibility is explicitly addressed.

The following actions demonstrate an innovative, flexible and creative approach:

- Use alternatives to the usual ways of working
- Consciously assess and manages risk
- Take steps to create management structures that promote new ideas and effective teamwork
- Bring in people from outside into the policy team

Evidence-based

Box 1 – Features of modern policy-making

The advice and decisions of policy-makers are based upon the best available evidence from a wide range of sources; all key stakeholders are involved throughout the policy's development. All relevant evidence, including that from specialists, is available in an accessible and meaningful form to policy-makers.

The following actions demonstrate an evidence-based approach:

- Review existing research
- Commission new research
- Consult relevant internal and external experts
- Consider a range of properly costed and appraised options

Inclusive

The policy-making process takes account of the impact on and/or meets the needs of all people directly or indirectly affected by the policy, and involves key stakeholders directly.

The following actions demonstrate an inclusive approach:

- Consult those responsible for implementation of the policy
- Consult those at the receiving end or otherwise affected by the policy
- Carry out an impact assessment before implementing the policy

Seek feedback on policy from recipients and front-line deliverers

Joined-up

The process takes a holistic view; looking beyond institutional boundaries to the government's strategic objectives and seeks to establish the ethical, moral and legal base for policy. There is consideration of the appropriate management and organizational structures needed to deliver cross-cutting objectives.

The following actions demonstrate a joined-up approach:

- Define cross-cutting objectives clearly at the outset
- Clearly define and understand joint working arrangements with other government entities
- Identify barriers to effective collaboration and a strategy to overcome them

Box 1 – Features of modern policy-making

Learning lessons

Established policy is constantly reviewed to ensure it is really dealing with problems. Learns from experience of what works and what does not.

The following actions demonstrate a learning approach:

- Put in place an ongoing review programme with a range of meaningful performance measures
- Disseminate information on lessons learned and good practice
- Make available an account of what was done by policy-makers as a result of lessons learned
- Amend or scrap redundant or failing policies

Source: adapted from [17]

8. Problem or issue identification

The first step in formulation of public health pesticide management policy is the clear definition of problems that need to be solved, or issues that require attention. While the main reason that a policy is being developed is often a recognized problem with pesticide management, policy should be forward-looking (see Box 1), and should also focus on the prevention of potential new problems. A good example is the elaboration of an insecticide resistance management strategy, which aims to prevent or slow down disease vectors becoming resistant to pesticides.

A thorough situation analysis may help to better understand the strengths and weaknesses of (or gaps in) public health pesticide management, opportunities and threats that may exist for its improvement, and identify key problems or issues that require policy formulation. As such, the situation analysis provides the evidence underpinning policy formulation.

The management of public health pesticides cuts across various sectors, requiring concerted action by the different ministries, notably those responsible for health, agriculture, environment, and commerce and trade. And in addition to government entities, the private sector and civil society

will be involved. Therefore, it is essential that all relevant stakeholders are involved in the analysis from the start, to get a broad and objective assessment of the situation.

A good national situation analysis will cover many elements, including but not limited to:

- Assessment of the importance and spread of disease vectors and nuisance pests, and the need for control.
- Present public health pest management practices in vector control, household use, and nuisance pest control: control options available; the extent to which non-chemical approaches are used optimally or could be developed more intensively; pesticide selection and procurement procedures; pesticide storage; etc.).
- Expected future trends in vector-borne diseases and nuisance pests.
- Adverse effects of public health pesticide use (pesticide resistance, human health effects, environmental impact, residues in agricultural commodities, etc.)
- Legal framework (including international obligations and policies) and its enforcement.
- Economic and fiscal practices, impacting on the availability and use of public health pesticides.
- Awareness, information and education with respect to pesticide use and management.
- Activities carried out by research institutions, private sector and civil society that are relevant to public health pesticide management (pesticide efficacy, biological control, environmental management, resistance development and management, etc.).
- Human and financial resources available and required for public health pesticide management.
- Donor policies and requirements with respect to disease vector control.

The situation analysis should also include the evaluation of any existing policy implemented to strengthen public health pesticide management, to assess whether previously proposed measures have been effective. An important aspect of a situation analysis is that it is not limited to a mere description of the situation, but provides a true analysis of strengths and weaknesses. The *WHO Guidelines on situation analysis for public health pesticide management* [18] provide further information on this topic. A situation analysis should ideally be carried out on a regular basis, and can also be part of the policy evaluation step (see Chapter 11).

The situation analysis will likely identify a large number of problems, weaknesses or issues that, according to one or more stakeholders, require attention. Some of these may be more important than others; some are based on better evidence than others; some are better tackled under existing, other national policies; some may be in conflict; and some are beyond the control of the policy-maker. Since it may not be feasible to address all problems within the proposed timeframe of the policy, key problems or issues that require most urgent attention may need to be identified at this stage.

It is also very important that the problem(s) or issue(s) for which policy needs to be developed are clearly defined. **The definition of the problem will be the foundation of any policy development.** Before immediately starting to address solutions to a problem, it is essential to step back and invest time and effort to improve our understanding of it. This will result in better-tailored solutions and a more solid justification of the policy that is being developed. Note that ill-defined problems lead to ill-defined solutions.⁶

9. Policy formulation

After the problems, or potential future problems, with public health pesticide management have been identified and clearly defined, policy can be formulated with the aim of solving or preventing them.

As mentioned earlier, ideally, a policy contains a definition of the problem being addressed, a statement of goals (the desired state of affairs)

⁶ Simple tools and strategies that may help to better define problems or issues can be found elsewhere [e.g. 19, 20, 21]

and at least the broad outline of the instruments (approaches and activities) by which the goals are to be achieved.

The following steps in policy formulation can be recognized:

- Set goals, objectives and time frame.
- Set criteria for success.
- Identify and select policy instruments.
- Draft alternative policies.
- Project outcomes of alternative policies and assess their impact.
- Compare alternative policies.
- Build consensus towards a “best” policy.
- Decide the best policy.
- Define policy review methods.
- Obtain formal endorsement of the policy.

In practice, some of these steps may be carried out repeatedly, or simultaneously, before a best policy can be decided upon. All through the policy formulation process, the features of modern policy-making (Box 1) should be checked and followed where feasible.

Set goals, objectives and time frame

A first step in policy formulation is the definition of the goals, objectives and time frame of the policy.

Goals are long-term aims that a government wishes to accomplish with respect to public health pest and pesticide management; they are general intentions that often cannot be directly validated. Objectives, on the other hand, describe the more detailed achievements that the policy is designed to attain under the umbrella of the overall goal. Objectives are frequently written to meet the so-called SMART rules: **S**pecific, **M**easurable, **A**ssignable, **R**ealistic and **T**ime-defined. It is important to set a time frame for the implementation of the policy.

Obviously, goals and objectives of the policy should aim to solve the problems and address the issues that were identified under the previous identification step in the policy cycle (Chapter 8). Care should also be taken that goals and objectives which are defined for a public health pesticide management policy are in concordance with, or at least don't contradict, other elements of national policy with respect to vector-borne disease control, or nuisance pest management, chemicals or pesticide management, public health, environment, etc.

Set criteria for success

Along with formulating the definition of policy goals and objectives, criteria should be identified that can be used to assess whether the policy eventually meets its stated objectives. Such criteria are preferably quantitative, e.g. a reduction in cases of pesticide poisoning; reduction in substandard, illegal and counterfeit products in the market; increased cost-effectiveness of vector-control interventions, etc.. But these may also be (semi-)qualitative, e.g. improved pesticide storage practices, strengthened legal basis for the management of public health pesticides, improved pest and vector control services and the like.

Criteria for success will not only be used to evaluate policy implementation but can already be applied in the policy formulation process when different policy alternatives are compared and their impact assessed (see below).

Identify and select policy instruments

A large number of instruments, tools and approaches exist that can be used to build a policy. These can be seen to fall into four broad categories [22, 23]:

- **Suasive approaches:** Policy tools that encourage changes in behaviour through the provision of information, such as via general education programmes, guidelines and codes of practice, training programmes, extension services and research and development.
- **Regulatory approaches:** Require changes in behaviour by introducing penalties for parties who don't comply with the

regulatory provisions. Types of regulatory instruments include standards (including planning instruments), licensing, mandatory management plans and covenants.

- **Market-based instruments:** Policy tools that encourage behavioural change through market signals rather than through explicit directives. There are a range of types of market-based instruments including trading schemes, subsidies and grants, accreditation systems, stewardship payments and taxes.
- **Public provision of services:** Often used where the management solution has the characteristics of a “public good” which make it difficult for the service to be provided by the private sector.

Box 2 provides some examples of policy instruments that can be used to promote sound public health pesticide management. References to relevant background information on such policy instruments available from other sources are also provided.

When identifying and selecting policy instruments that could be included in a public health pesticide management policy, it is important to assess whether the instrument can be realistically applied in the country. On the other hand, policy development can also be used to introduce innovative approaches, and doubts regarding current feasibility should not necessarily preclude the introduction of a new approach.

Generally, a public health pesticide management policy contains a mix of policy instruments. This is because many pesticide management problems are multifaceted (e.g. illegal pesticide sales may have its origins rooted in regulatory, economic or awareness aspects). Also, certain policy instruments can mutually strengthen each other (e.g. collection of sales statistics, information to retailers and enforcement may mutually strengthen good pesticide sales practices). Sometimes such mixes can also enhance enforcement possibilities or reduce administrative costs.

However, when applying several policy instruments in a mix, care has to be taken that one instrument will not unnecessarily hamper the flexibility to find low-cost solutions to a problem that another instrument could have offered if it had been used on its own. In other cases, some of the instruments in a mix are simply redundant, contributing only to increase total administrative costs.

Draft alternative policies

It is good practice to develop a number of alternative policy options to address the same problem or issue. There are generally many different ways of dealing with a pesticide management problem, and it tends to be very helpful to make different policy options explicit by writing them down. This will allow a more transparent and objective comparison between policy options, and choosing the most appropriate one for the country.

As a minimum, two policy alternatives should always be compared: the new policy and the “do nothing” option.

Project outcomes of alternative policies and assess their impact

An important step in policy evaluation is the projection of the outcomes of each of the alternative policies. These are as much as possible quantified predictions of the results that the policy is likely to have. As a minimum, it should be assessed to what extent the criteria for success that were identified in an earlier step in the policy formulation process have been satisfied by each of the alternative policies.

In addition, an impact assessment should be made, which outlines the expected impact each policy will have on the various stakeholders. These include the private sector, the general public and government institutions.

Prediction of policy outcomes and impact is unfortunately often not a very precise science, and generally a high level of uncertainty will be unavoidable. However, as this uncertainty will often apply to all policy alternatives in the same manner, comparisons between them can still provide very useful information.

Box 2: Selected policy instruments that can be incorporated into a national public health pesticide management policy

Examples of intended results from a public health pesticide (PHP) management policy (not exhaustive)	Examples of policy instruments, according to type of approach (not exhaustive)			
	Suasive approaches	Regulatory approaches	Market-based instruments	Public provision of services
	[policy tools that encourage changes in behaviour through the provision of information]	[require changes in behaviour by introducing penalties for parties who don't comply with the regulatory provisions]	[policy tools that encourage behavioural change through market signals rather than through explicit directives]	[often used where the management solution has the characteristics of a “public good” which make it difficult for the service to be provided by the private sector]
Strengthened legal basis for management of PHPs	Advocacy and awareness building for political commitment	Establish comprehensive pesticide legislation [24, 25]		
Reduced illegal imports of PHPs	Build awareness on risks of using illegal PHPs	Establish licensing scheme for PHP distribution and sales Increase fines for illegal imports		Build effective compliance, monitoring and enforcement [26]
Reduced presence of substandard PHPs	Build on risks of using substandard PHPs	Set quality standards for PHPs Use WHO pesticide quality specifications where available [12]		Establish an effective national pesticide quality control system [27]

Box 2: Selected policy instruments that can be incorporated into a national public health pesticide management policy

Examples of intended results from a public health pesticide management policy (PHP) (not exhaustive)	Examples of policy instruments, according to type of approach (not exhaustive)			
	Suasive approaches [policy tools that encourage changes in behaviour through the provision of information]	Regulatory approaches [require changes in behaviour by introducing penalties for parties who don't comply with the regulatory provisions]	Market-based instruments [policy tools that encourage behavioural change through market signals rather than through explicit directives]	Public provision of services [often used where the management solution has the characteristics of a "public good" which make it difficult for the service to be provided by the private sector]
Increased cost-effectiveness of vector control	Promote IVM [5] Train vector control staff [28, 29]		Register more products for the same use (increased competition)	Establish IVM projects
Insecticide resistance development prevented or slowed down	Promote IVM [5] Train vector control staff [28, 29] Promote insecticide resistance monitoring and management	Restrict registration according to mode of action	Reduce registration fees for insecticides with new modes of action	Develop a resistance management strategy, in collaboration with Ministry of Agriculture and other stakeholders [14]

Box 2: Selected policy instruments that can be incorporated into a national public health pesticide management policy

Examples of intended results from a public health pesticide management policy (PHP) (not exhaustive)	Examples of policy instruments, according to type of approach (not exhaustive)			
	Suasive approaches [policy tools that encourage changes in behaviour through the provision of information]	Regulatory approaches [require changes in behaviour by introducing penalties for parties who don't comply with the regulatory provisions]	Market-based instruments [policy tools that encourage behavioural change through market signals rather than through explicit directives]	Public provision of services [often used where the management solution has the characteristics of a "public good" which make it difficult for the service to be provided by the private sector]
Reduced risks of vector control for human health and environment	Promote IVM [5] Build awareness on ITNs/ LLINs Establish pesticide risk reduction targets or schemes (voluntary)	Register low-risk insecticides [25] Restrict moderate/high-risk insecticides in vector control Establish pesticide risk reduction targets or schemes (legally binding)	Subsidize LNs	Establish IVM projects Fund public research in biological control and environmental management
Reduced incidence of pesticide poisoning	Build awareness on risks of household pesticides	Only register of low-risk household insecticides Prescribe comprehensible pesticide labelling	Reduce registration fees for low-risk pesticides as incentive to industry to bring low-risk products on the market	Strengthen compliance monitoring and enforcement in supermarkets and retail shops

Box 2: Selected policy instruments that can be incorporated into a national public health pesticide management policy

Examples of intended results from a public health pesticide management policy (PHP) (not exhaustive)	Examples of policy instruments, according to type of approach (not exhaustive)			
	Suasive approaches [policy tools that encourage changes in behaviour through the provision of information]	Regulatory approaches [require changes in behaviour by introducing penalties for parties who don't comply with the regulatory provisions]	Market-based instruments [policy tools that encourage behavioural change through market signals rather than through explicit directives]	Public provision of services [often used where the management solution has the characteristics of a “public good” which make it difficult for the service to be provided by the private sector]
Improved pest and vector control services	Train vector control staff [28, 29] Train private pest control operators [29]	Establish certification scheme for vector control staff Establish licensing scheme for private pest control operators	Establish association of private pest control operators	Elaborate technical guidelines
Sustainable funding for pesticide management available.	Advocacy and awareness building for political commitment	Include cost/recovery mechanisms in pesticide legislation	Introduce import/sales taxes on pesticides	Allocate adequate human and financial resources

Box 2: Selected policy instruments that can be incorporated into a national public health pesticide management policy

Examples of intended results from a public health pesticide (PHP) management policy (not exhaustive)	Examples of policy instruments, according to type of approach (not exhaustive)			
	Suasive approaches [policy tools that encourage changes in behaviour through the provision of information]	Regulatory approaches [require changes in behaviour by introducing penalties for parties who don't comply with the regulatory provisions]	Market-based instruments [policy tools that encourage behavioural change through market signals rather than through explicit directives]	Public provision of services [often used where the management solution has the characteristics of a “public good” which make it difficult for the service to be provided by the private sector]
Accumulation of obsolete pesticide stocks avoided	Train vector-control managers on PHP needs assessments and procurement	Centralize PHP procurement	Include provisions in tender documents for return of substandard PHPs by the supplier at their own cost [30, 31]	
Availability of good quality public health pesticide		Licensing policy allows wide access to reduced hazard PHPs		

Further information on policy instruments relevant to public health pesticide management is provided by, for instance, FAO [23], OECD [32] or MBI [22].

Compare alternative policies

When the outcomes and impact of the alternative policies have been assessed, it is possible to compare them in a relatively objective manner. Comparisons can be made between evaluation criteria based on outcomes, impact and degree of success.

A relatively simple way of summarizing different policies is through a comparative matrix, with the alternatives along one axis and the evaluation criteria on the other. This also allows quantitative and qualitative information to be combined.

Build consensus towards a “best” policy

Rarely will there be only one acceptable or appropriate alternative policy. In some cases, two alternatives may have roughly similar results. More often, different stakeholders will have preferences for different policy options based on their specific interests, e.g. while stricter enforcement of regulations may appeal to the Ministry of Health, awareness building and self regulation may be preferred by the pesticide industry. Furthermore, none of the alternatives is likely to be perfect inasmuch that the policy completely resolves all identified problems through them.

Therefore, consensus needs to be sought between stakeholders as to what is the most appropriate and most effective policy to be adopted to strengthen public health pesticide management. Consensus-building often takes the form of intersectoral meetings, one-on-one discussions, information and awareness activities, etc.

It may well be that to achieve consensus, a best policy is crafted based on elements from different alternatives. In such a case, it is wise to reassess impact and expected outcomes of the new consensus policy.

Decide the best policy

As public health pesticide management policy is in the ultimate analysis a public affair, the government will have to take a final decision on the best policy to be implemented. Whenever possible, such a decision should be made on the basis of consensus between the major stakeholders. However,

in many cases, complete consensus may not be reached, and the government has the last word. Decision-making will then often be guided by more overarching national policies with respect to public health, environment, agriculture or commerce/trade (e.g. the protection of human health may take precedence over economic costs; or reduction of vector-borne disease levels may take precedence over environmental protection).

Define monitoring and evaluation methods

Systematic monitoring and evaluation should be built into the policy to ensure that it is really dealing with the problems it was designed to solve, and to assess its effectiveness in doing so. Meaningful performance indicators should be defined at this stage. Both internal monitoring and evaluation methods (by the implementing entity) and external ones (either by independent evaluators or by those affected by the policy) should ideally be defined (see Chapter 11).

Obtain formal endorsement of the policy

For a public health pesticide management policy to be implemented effectively, it is essential that it is endorsed at a high level. Since pesticide management is multisectoral and multistakeholder, endorsement at the level of the Council of Ministers is recommended. In some countries, the policy may be published in the official government gazette.

In addition, formal endorsement by nongovernment stakeholders, in particular the pesticide industry, consumer groups and other civil society organizations, and pest control operators, greatly strengthens and facilitates implementation of the policy. Whenever possible, such endorsement should be sought.

To ensure sustainability of the policy, it may be important to incorporate its main goal and objectives in the general scheme of national development or health policies or strategies (sometimes referred to as “mainstreaming” of the policy). This also tends to facilitate mobilization of resources in the future.

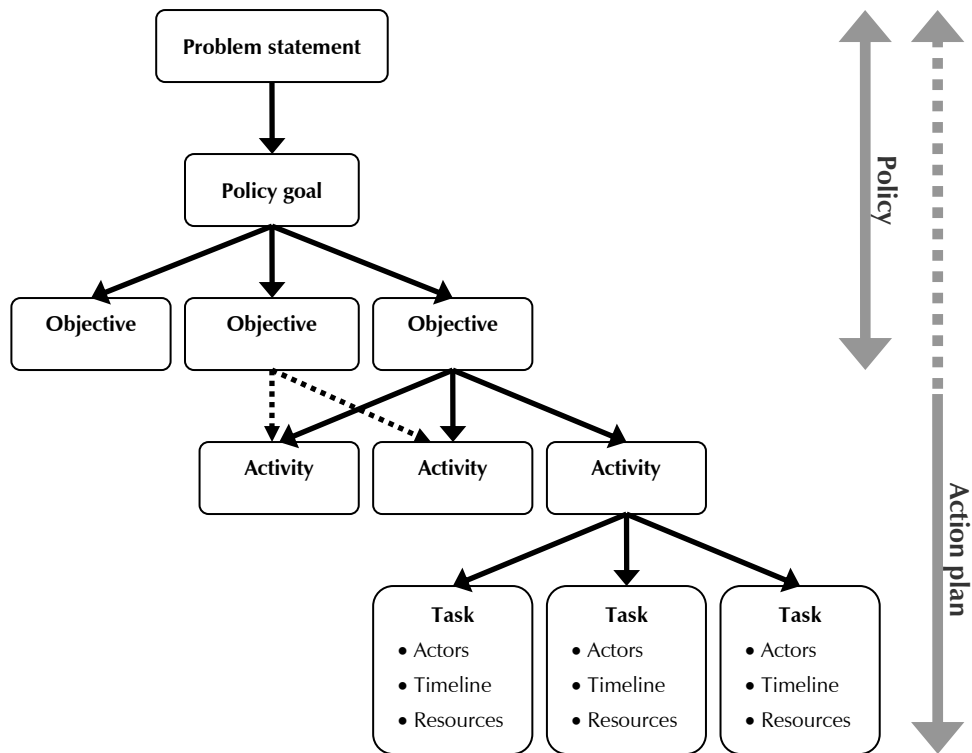
10. Policy implementation

10.1 Action plan

Elaborating one or more policy action (or implementation) plans is the next step in the policy cycle. An action plan is the detailed description of what exactly needs to be done to achieve one or more objectives, and lists who is going to carry out the activities, when do they need to be done, and what resources are required.

If the objectives of the Public Health Pesticide Management Policy cover a wide range of and very different topics, it may be practical to elaborate more than one action plan. This can sometimes facilitate the execution and allocation of resources. However, if more action plans are elaborated, care should be taken to ensure that they are complementary to each other and effectively coordinated.

Policy action plans come in many types and formats. Generally, the action plan summarizes the problem statement, lists policy goals and objectives as outlined in the policy, and then describes in detail the activities and tasks required to achieve those objectives. The hierarchical relationship between policy and action plan is schematically shown below.[33]



Define activities

Activities are the highest level of action in an action plan and can be defined as an element of work performed during the course of a project. An activity has an expected duration, cost and resource requirements. In some cases, activities will only address one objective, while in other cases they will help to deliver multiple objectives.

One approach to identifying and selecting activities for a project is to begin with a brainstorming session. Participants can identify any activities that they believe will help to reach the objective(s). These suggestions can be collected and compared, providing a comprehensive list which can then be assessed in order to develop an effective and logical set of activities.

Break down activities into tasks

Since the activities are typically large elements, they will need to be broken down into more manageable tasks. Activities should only be broken down to a level which enables effective estimation of time and resource requirements and provides enough information for those responsible for the particular activity or task. Breaking down activities into too much detail overemphasises the role of planning and makes it difficult to easily obtain an overview.

Consider order of activities and tasks

After a comprehensive list of activities and tasks has been established, it is important to assess how they relate to each other in order to determine the necessary sequence of implementation and identify any dependencies. In other words, which activities/tasks can begin immediately? Which activities/tasks need to be completed before others can begin? Do some activities/tasks need to start at the same time?

Estimate realistic activity time frames

Estimating how much time each activity/task will likely require to be completed is essential to developing an effective action plan. While the duration of each task, at this stage, can only be an estimate (be prepared to adjust the action plan during its implementation), the durations should be carefully estimated to ensure that the action plan is as accurate as possible.

If funds are in place for the implementation plan, it would already be possible to set the specific start and finish dates for each activity/task. Where this is not possible, a format independent of specific dates can be used, such as “month 1, month 2”, etc.

If human or financial resources are (likely to be) limited, it may be better to choose for a phased implementation of the action plan based on priorities and following a logical order of activities.

Develop project milestones

Project milestones are reference points that mark clearly distinguishable events in the plan that can be used to monitor the rate of progress during implementation. They are predetermined points to verify whether a project is on track as planned.

Define required resources

A range of resources are typically required to implement an action plan. These may include human resources, facilities, equipment, materials, travel, training, etc. It is important to be as accurate as possible when estimating resource requirements at this stage, since the more accurate the estimates are, the less likely that the plan will run into problems during implementation (and entail requests for additional funds).

Identify actors and allocating responsibilities

This step helps to determine, in a preliminary manner, which actors (e.g. specific ministries/departments, local governments, private sector associations, NGOs, civil society organizations, research institutions and the like) should be involved in carrying out each activity and task. It is useful to be as specific as possible about the identified actors (e.g. vector control programme of the Ministry of Health rather than the Ministry of Health in general). If more actors are involved in carrying out an activity or task, as will often be the case, one should be assigned as a “lead actor” and assume final responsibility for the activity/task.

Further detailed guidance on action plan development is provided elsewhere. [33]

10.2 Implementation process

Based on the action plan that has been elaborated, various elements should be taken into account with the aim to facilitate policy implementation.

Allocation of resources

Allocation of adequate human and financial resources is crucial to successful policy implementation.

The public health pesticide management policy in itself can be used to mobilize resources. In particular when the policy is subsequently mainstreamed into general government development, health or environment policies or strategies, both governments and donors may allocate resources more easily. Certain elements of a public health pesticide management action policy can, or should, also be funded by the private sector.

Country representations of relevant UN organizations, such as WHO, FAO and UNEP, can also be contacted to assist in resource mobilization, in particular across sectors.

Coordination

To ensure effective execution of the identified policy activities, it is generally recommended that one government entity (often the Ministry of Health) will oversee policy implementation. However, since the implementation of a public health pesticide management policy is by definition multisectoral, continuous and effective coordination both within the government and among stakeholders are very important. Coordination at the national level is important to exchange information, strengthen collaboration, ensure complementarity and avoid duplication, and step up advocacy to raise awareness and to enhance stakeholder involvement.

Examples of coordination mechanisms at the national level are:

- interministerial pesticide registration board;
- interministerial integrated vector management committee;
- interministerial working group on pesticide risk reduction;
- advisory groups on pesticide management, involving both relevant ministries and other nongovernment stakeholders;
- national workshops on public health pesticide management, implicating a broad audience.

International or regional coordination and information exchange may also be needed, in particular for activities that address transboundary problems, or when greater efficiency can be achieved by regional/international collaboration. Examples are pesticide registration, efficacy testing of vector control insecticides, pesticide risk assessment, development of integrated vector control programmes, and control of illegal pesticide trade or of counterfeit products.

Information and awareness of stakeholders

Raising awareness and information provision about the public health pesticide management policy, and the reasons why a government has adopted it, is crucial to obtain support for the policy's implementation from decentralized government entities, nongovernment stakeholders and the general public.

Also, during policy implementation, stakeholders should be kept informed about progress, achievements and possible constraints. Transparency and public access are important elements.

Phased implementation

In some cases, it may not be possible to implement the entire policy action plan at once, for instance when human or financial resources are limited. In such cases, phased implementation of the plan can be considered. Various options can be chosen for phased implementation, such as starting with activities that are considered to be high-priority or with activities which come early in the timeline of the action plan. Care should be taken, however, to ensure that if for any reason no further resources for implementation are available, the chosen activities lead to results that independently achieve a part of the policy objectives.

Another option for phased implementation is to initiate the action plan in a restricted geographical area, e.g. one or several provinces/districts. This may be particularly useful if innovative policy instruments or approaches have been chosen which require further validation and evaluation in the field. Based on lessons learned in a limited area, the policy can then be widened subsequently.

11. Policy monitoring and evaluation

As outlined in Chapter 7, policy-making is a continuous process with a cyclical nature. Continuous monitoring of the policy and its implementation are important to ensure that it solves the problems it was designed to address. Systematic evaluation of the effectiveness of the policy assesses its actual results and impact. Lessons learned can then be used to improve implementation of the existing plan, identify other problems or constraints and formulate new (or updated) policy. [34, 35]

Monitoring can be defined as the ongoing process by which stakeholders obtain regular feedback on the progress being made towards achieving the goals and objectives of the policy. Monitoring is primarily being done by using process indicators. However, monitoring should ideally not be limited only to asking the question “are we taking the actions we said we would take?” (i.e. the process) but also “are we making progress on achieving the results that we said we wanted to achieve?” (i.e. the result). Monitoring of the performance of the public health pesticide management policy, and its action plan(s), should be carried out continuously during its implementation, at least by the implementing agency itself.

Evaluation is a rigorous and independent assessment of either a completed or ongoing policy to determine the extent to which it is achieving stated objectives. Generally, to be able to properly evaluate the success of a public health management policy, data need to be analysed on pesticide use, efficacy, costs, human and environment impact, etc. Such data may not be systematically available in a country in which collection of relevant data is an integral part of the policy implementation plan.

The key distinction between monitoring and evaluation is that the latter is done independently to provide managers and staff with an objective assessment of whether or not the performance is on track and expected outcomes could be achieved within the time frame set. Evaluation also tends to be more rigorous in its procedures, design and methodology, and generally involves more extensive analysis. Policy evaluation should at least be done at the end of the policy time frame, but on a more regular basis if appropriate. However, the aims of both monitoring and evaluation are very similar: to provide information that can help inform decisions, improve performance and achieve planned results.

Box 3 provides some selected indicators that may be used to assess the performance of implementation and evaluate the effectiveness of a public health pesticide management policy. It should be stressed that this list is not exhaustive, and appropriate indicators should be defined at the national level based on the exact contents of the policy and its implementation plan.

Box 3: Selected indicators to monitor and evaluate the performance and impact of a public health pesticide management policy						
Intended outcome of policy (not exhaustive)	Indicator (not exhaustive)	Type			Limitations of the indicator for monitoring and evaluation	Data needed to measure the indicator
		Process	Outcome	Impact		
Reduced risks of vector control for human health and environment	Registration procedure or criteria amended to limit the authorization of hazardous PHPs	x			Does not mean that the fraction of registered low-hazard PHPs has increased	
	Number of trained staff in sound PHP application and disposal	x			Does not necessarily indicate quality/technical capacity of staff	Training statistics
	Number of IVM projects	x			Does not necessarily result in effective implementation of IVM	Project data from different stakeholders
	Percentage of the number of low-hazard PHPs registered ⁷		x		Does not indicate trends in actual use	List of registered PHPs

⁷ Low-hazard pesticides may, for instance, be defined as those pesticide products that are “unlikely to present any acute hazard in normal use”, according to the *WHO Classification of pesticide by hazard*. [36]

Box 3: Selected indicators to monitor and evaluate the performance and impact of a public health pesticide management policy						
	Percentage of volume of PHPs used which are low-hazard		x		Indicates trends in use, but not necessarily in risk	PHP use statistics
	Quantity of toxic units ⁸ of PHPs used		x		Indicates trends in hazard, but not necessarily in risk	PHP use statistics Basic toxicity data (e.g. LD ₅₀ , NOAEL) for each PHP
	Coverage/use rate of LNs		x		Achieves risk reduction only if LN use replaces or reduces IRS applications and/or ITNs	LN distribution and use statistics
	Number of poisoning cases due to PHPs (per population)			x	Results may not be directly linked to regular practices of PHP use	Representative and sufficiently detailed poisoning statistics PHP use statistics
	Quantity of toxic units of PHPs used per prevented disease case			x	Indicates trends in hazard, but not necessarily in risk	PHP use statistics Basic toxicity data (e.g. LD ₅₀ , NOAEL) for each PHP Coverage of PHP applications Disease statistics (e.g. DALYs)

⁸ A “toxic unit” may, for instance, be defined as the total volume of PHPs used during a given time period and in a determined geographical area divided by a relevant toxicity endpoint (e.g. acute LD₅₀, chronic NOAEL). [37, 38]

Box 3: Selected indicators to monitor and evaluate the performance and impact of a public health pesticide management policy						
Improved pest and vector control services	Good practice guidelines published	x			Does not mean that good practices are followed	
	Number of staff trained in good PHP management and/or IVM	x			Does not necessarily indicate quality/technical capacity of staff	Training statistics
	Certification scheme and/or certified training for vector control staff established and operational	x			Does not necessarily indicate quality/technical capacity of staff	
	Licensing scheme for PCOs established and operational	x			Does not necessarily indicate quality/technical capacity of PCOs	
	Percentage of national vector control staff trained in good PHP management and/or IVM		x		Does not necessarily indicate quality/technical capacity of staff	Training statistics National staff statistics
	Percentage of vector control operators that has been certified or trained			x	Does not necessarily indicate quality/technical capacity of staff	Certification statistics Vector control staff statistics

Box 3: Selected indicators to monitor and evaluate the performance and impact of a public health pesticide management policy						
	<i>Increased cost-effectiveness of vector control</i>			x		<i>[see separate policy outcome for details]</i>
Reduced presence of substandard PHPs	National PHP quality standards established	x			Does not necessarily mean that standards are followed	
	Pesticide quality control system established and operational	x			Does not necessarily mean that quality is acceptable	
	Number of samples analysed	x			Does not necessarily mean that quality is acceptable	Analysis statistics from quality control laboratories
	Percentage of PHPs on the market which are substandard		x		Does not necessarily represent the volume of substandard PHPs on the market	Quality control data for a representative sample of products
	<i>Reduced risks of vector control for human health and environment</i>			x		<i>[see separate policy outcome for details]</i>
	<i>Increased cost-effectiveness of vector control</i>			x		<i>[see separate policy outcome for details]</i>

Box 3: Selected indicators to monitor and evaluate the performance and impact of a public health pesticide management policy						
Insecticide resistance development prevented or slowed down	National Resistance Management Strategy developed and adopted	x			Does not mean that the strategy is effective in reducing resistance development	Data on resistance development in the country
	Number of staff trained in resistance management	x			Does not necessarily indicate quality/technical capacity of staff	Training statistics
	Number of staff trained in resistance monitoring	x			Does not necessarily indicate quality/technical capacity of staff	Training statistics
	Number of foci where resistance is monitored	x			Does not mean that resistance management measures have been taken	Resistance monitoring statistics
	Percentage of national vector control staff trained in resistance monitoring or management		x		Does not necessarily indicate quality/technical capacity of staff	Training statistics National staff statistics
	Percentage of monitoring foci in which insecticide resistance is observed			x	May not indicate the actual importance of resistance	Resistance monitoring statistics

Box 3: Selected indicators to monitor and evaluate the performance and impact of a public health pesticide management policy						
Increased cost-effectiveness of vector control	Per capita cost of insecticide applied per year (including operational costs)	x			Does not include effectiveness	Insecticide and operational costs Intervention coverage rate
	Studies of insecticide efficacy completed according to WHO protocol	x			Does not include costs	Records of the National Malaria Control Programme or research institutes
	Cost of vector control per disease case averted per capita per year			x		Incidence/parasite rate Insecticide and operational costs Intervention coverage rate

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Vector control plays a key role in prevention and control of major vector-borne diseases such as malaria, dengue, leishmaniasis and chikungunya etc. The use of pesticides remains a key element in the integrated approach to vector control. However, the long-term sustainability of vector control is threatened due to growing insecticide resistance. Furthermore, pesticides are toxic compounds and their improper use may pose a risk to human health or the environment.

The development and implementation of effective guideline for the sound management of public health pesticides is a first step in assuring long-term sustainability of vector control.

The guidelines discuss issues and driving forces for national policy development. They also provide guidance on the process of policy formulation, implementation and evaluation.



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