

Stockholm Convention on Persistent Organic Pollutants (POPs)
Scientific and Technical Document Series: POPs pesticides

**Guidance to promote effective stakeholder
engagements for the introduction of safer
and sustainable solutions towards reducing
reliance on POPs pesticides**



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1. INTRODUCTION

The Stockholm Convention is an international treaty to protect human health and the environment from POPs. It was adopted in 2001 and entered into force in 2004, initially covering 12 chemicals. In 2017, an 16 additional POPs were added to the Stockholm Convention. The initial twelve POPs that were recognized for causing adverse effects on humans and ecosystemsⁱ were placed in 3 categories:

- **Pesticides:** aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene;
- **Industrial chemicals:** hexachlorobenzene, polychlorinated biphenyls (PCBs);
- **By-products:** hexachlorobenzene; polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), and PCBs.

The additional 16 POPs listed in 2017ⁱⁱ included 5 pesticides; lindane, chlordane, pentachlorobenzene, pentachlorophenol, and endosulfan. Two common POP by-products resulting from lindane manufacture were also included.

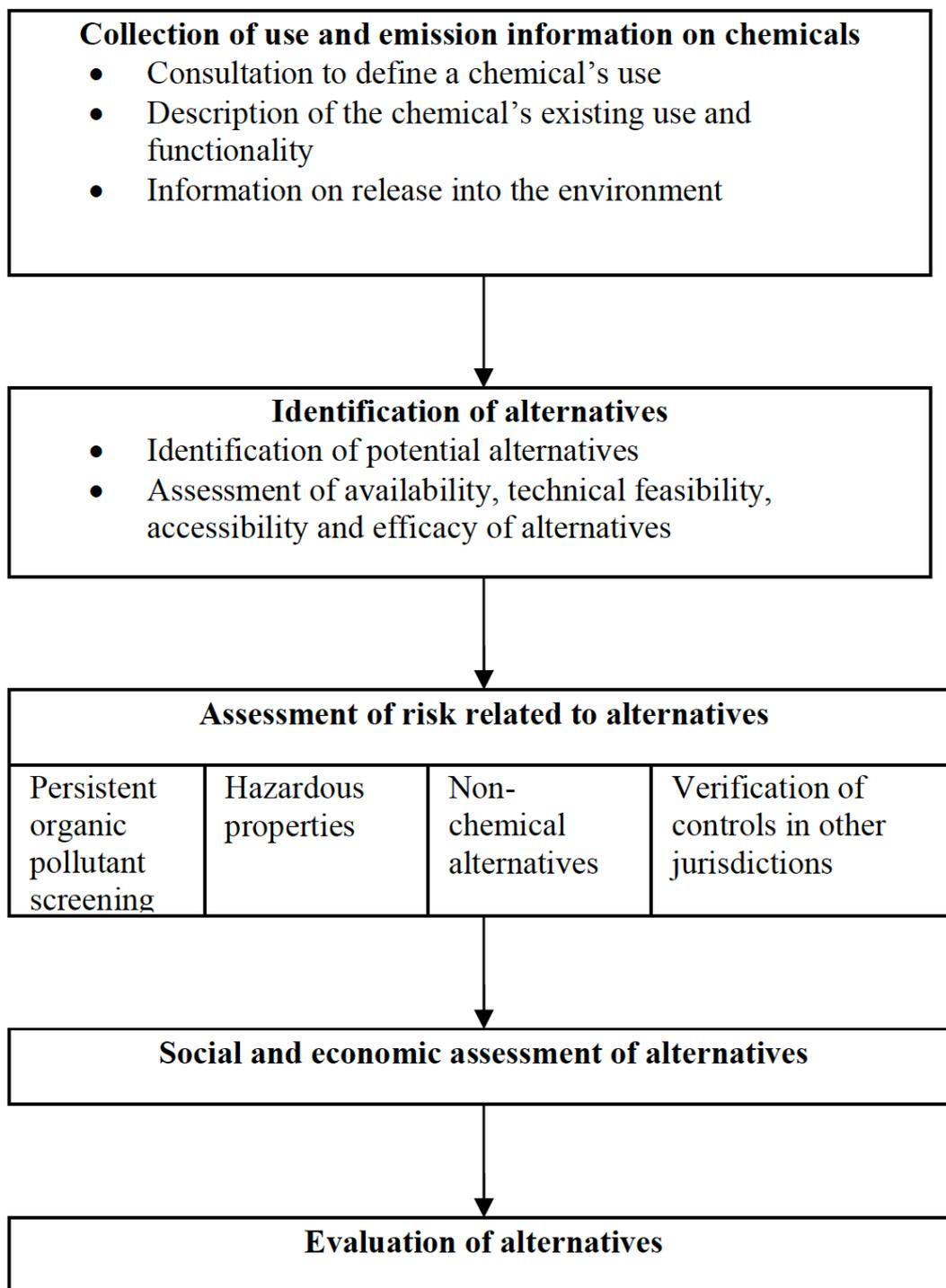
Where POP pesticides are listed under the Stockholm Convention, it is necessary to identify viable and sustainable alternative products or methods to the use of the POP pesticides that are to be removed. The alternative chemicals or methods should be assessed to ensure that there are actual cost-effective benefits and that risks are decreased overall. Guidance on such assessments is given elsewhere but will be summarized here and examples given. Once alternatives have been identified, local stakeholders must be engaged in the promotion of these more sustainable approaches

This guidance is intended for officials in countries, especially LMICs, who are seeking to identify alternatives for POP pesticides and to make effective engagements with local stakeholders to achieve substitution with these lower risk and sustainable solutions.

2. SELECTING POP PESTICIDE ALTERNATIVES

One of the essential aims of the Stockholm Convention is to support the transition to safer alternatives. Some of the POPs targeted by the convention are already obsolete. Their toxic effects became obvious early on and they have been banned or severely restricted in many countries for years. The search for replacement chemicals and techniques is in progress, as is the search to find leftover stocks in order to prevent them from being used. Some developing countries may need financial support to dispose of these stocks and replace them with chemicals or methods whose benefits outweigh their risksⁱⁱⁱ. Guidance is given on POPs alternatives and substitutes by UNEP^{iv}. This guidance is shown in Figure 1 that outlines the steps in identifying alternatives to POPs.

Figure 1. The steps in identifying alternatives to POPs.



Such an examination would usually be done by an expert committee brought together by government and including private sector organizations, authorities, academics, and other stakeholders, including trade unions, environmental non-governmental organizations and mass media. All the factors identified as important for the evaluation of case studies were classified into five main analytical categories by Lhose et al (2003)^v as shown modified in Figure 2.

Figure 2. Analytical categories for evaluation of POPs case studies.

Main Category	Subcategories
Economy	<ul style="list-style-type: none"> • Costs • Liability • Resources • Competition
Technical feasibility	<ul style="list-style-type: none"> • Performance • Process integration • Product quality
Social factors	<ul style="list-style-type: none"> • Public awareness • Business to business communication
Risk information	<ul style="list-style-type: none"> • Risk information for POPs product • Risk information for alternative • Change of risk profile
Regulatory framework	<ul style="list-style-type: none"> • Legislation • Standardization

A series of possible alternative chemicals and methods can be considered in this way to determine whether they can cost-effectively replace the POP pesticide and whether they show an improved risk profile. If the substitute does not do the job cost-effectively then there will be little demand for it and if there isn't a significant improvement in the risk profile, then there is no advantage and the change is not sustainable. The approach used by the European Chemicals Agency for the evaluation of potential POPs alternatives is shown in Annex 1.

In Bangladesh in 2012, investigations were made into DDT substitutes in crops and in public health.^{vi} Some of the insecticide substitutes had greater acute human hazard than DDT and are categorized as highly hazardous pesticides (HHPs) under the definition in the International Code of Conduct for Pest Management 2016 guidance,^{vii} this demonstrates the need for a wider search of viable alternatives. Accordingly, a roadmap for the development of alternatives to DDT was published in 2015^{viii} which addressed other chemicals and formulations to be used for residual mosquito treatment, other chemical interventions including larvicides, systemic animal treatments, bed-nets and traps, and non-chemical alternatives such as pathogenic fungi and endosymbionts, as well as housing modifications. The results of this are summarized in Figure 3.

Figure 3. Potential alternative chemicals and substitute methods for the replacement of DDT for the control of vector-borne diseases.

Category	Method	Leishmaniasis	Malaria
Environmental	Source reduction		√
	Habitat manipulation		√
	Irrigation management		√
	Proximity of livestock		√
	Waste management	√	
Mechanical	House improvement	√	√
	Mosquito Trapping	√	
Biological	Natural enemy conservation		√
	Biological larvicides (<i>Bacillus thuringiensis israelensis</i> strain AM65-52)		√
	Fungi (<i>Beauveria basiana</i>)		Development
	Endosymbionts (<i>Wolbachia</i>)		Development
	Botanical insecticides		√
	Gene-based sterility		Research
Chemical	Treated bed-nets	√	√
	Indoor residual treatment	√	√
	Treated habitat		√
	Domestic animal treatment		Development
	Biorational methods		√
	Chemical repellents	√	√

The process for selecting appropriate alternatives can be an extensive process and requires input from a range of local stakeholders in order to identify materials or methods that are cost-effective substitutes and also offer improvements in the net risk to people and the environment. Once these alternatives have been identified, it is then necessary to build an understanding and a pull for these new solutions in local markets.

3. IMPLEMENTING THE SUBSTITUTION OF POPS PESTICIDE ALTERNATIVES IN LOCAL MARKETS.

In order to make progress with the implementation of substitute chemicals or methods on the ground, it is essential that all the relevant stakeholders are engaged and support the action required. Though the benefits of the elimination of POP pesticides under the Stockholm Convention may seem clear at a global level to global stakeholders, this clarity may not be so great at a local level and other priorities may slow or stop the desired progress being made. This problem is common to the implementation of many policies and there are some systematic ways of approaching this in order to make progress more likely.

The initial difficulties often come with establishing the **root cause** of the resistance to change. There are two ways of doing this that have been used in international development work. Having refined the definition of the problem of resistance to the change to its root cause, or series of root causes, the appropriate **stakeholders** who have both the interest in the problem and the influence to make changes must be identified and characterized in terms of their support or opposition to the substitution process. In order to influence these stakeholders, suitable **allies** must be identified, and individual messages crafted for each stakeholder outlining the **benefits** to them of supporting the intended change. If there are no benefits, change will most likely be resisted. In order to understand the overall success of the intended substitution, **metrics** must be established before the program has started and these must be **assessed**. It is often helpful to have the assessment done by an **independent body** so that an objective view of the success or areas for improvement can be obtained.

3.1. Defining the problem, the root cause

It often happens in a wide range of problems that attention is drawn to the symptoms rather than the underlying root cause or causes. Unless the problem is refined to the root-cause, any actions taken will tend to be ineffective. Here are two methods that can be used to refine the problem of resistance to the required substitution. Depending on the nature of the issue, one may be more effective than the other at determining the root cause of the problem of adopting the change. Though developed for engineering process, they are generally applicable to other systems

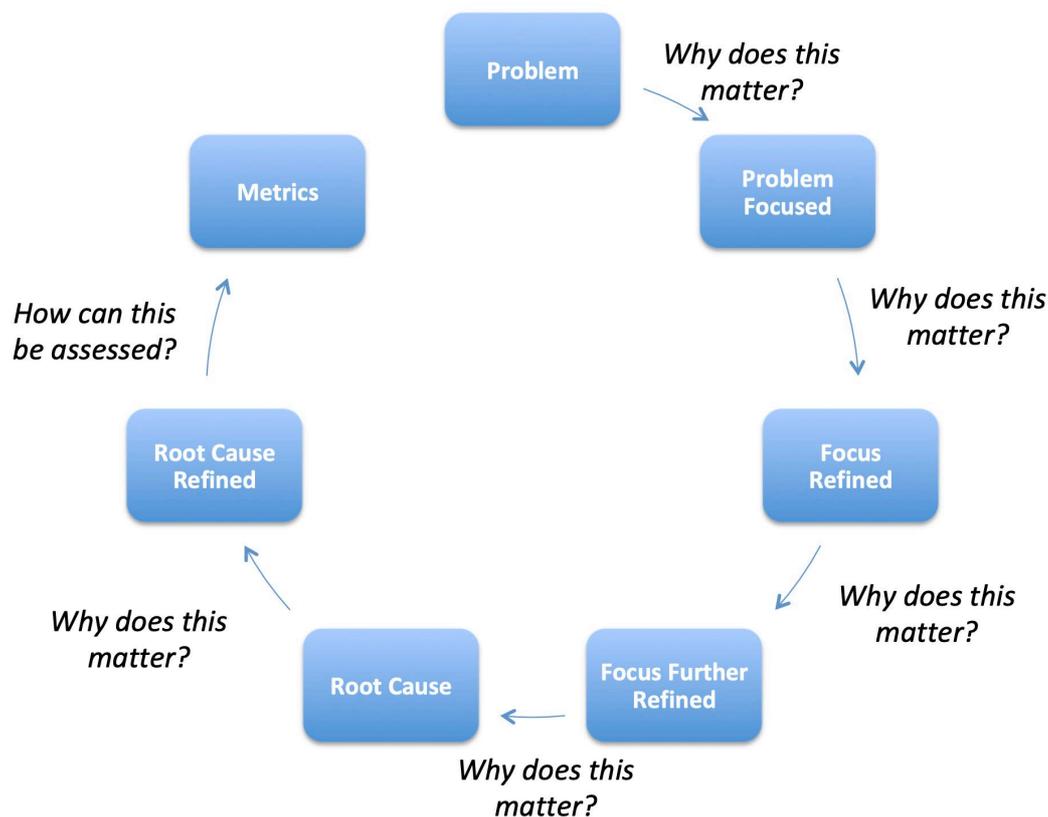
3.1.1 The Five Whys

The technique was originally developed by Sakichi Toyoda and was used by the Toyota Motor Corporation during the evolution of its manufacturing methodologies. This method is to repeatedly pose the question “why does this matter” until the underlying nature of the problem becomes clear. This tool is widely used in lean manufacturing processes such as Kaizen and Six Sigma to focus attention on the real definition of the problem. When the problem has been clearly understood, it is then possible to determine what metrics could be used

to assess the ultimate success of the whole change program. Figure 4 shows the Five Whys approach go determining the root cause of a resistance to the change.

First, it needs to be determined why there is resistance to the change. The actual problem needs to be defined with a statement such as, “No desire to adopt the new, unfamiliar solution to mosquito control”. *Why does this matter?* Because of DDT withdrawal there will be no mosquito control. *Why does this matter?* Because then malaria will increase locally, and the health and productivity of the community will decrease. *Why does this matter?* Because malaria can be controlled with the new solution. *Why does this matter?* Because the income from DDT can be replaced with investment in the new solution. *Why does this matter?* Because it gives a sustainable future both for business and for community health and productivity. *How can we measure the adoption of the new solution?*

Figure 4. The Five Whys applied to a problem



While conducting this analysis, it may become apparent that there may be more than one root cause of the problem. If this is the case, the analysis should be conducted to refine each root cause.

3.1.2 Fishbone diagrams

This approach to analysis of problems in an industrial setting was designed by Kaoru Ishikawa, Professor of Engineering at Tokyo University. It became widely known in the 1980s and had arisen from his work in the quality improvement of engineering processes. It can also be applied to brainstorming of the problems of a larger business system. The problem is put at the head of the 'fish' and then the general causes and their details can be filled in as the bones.

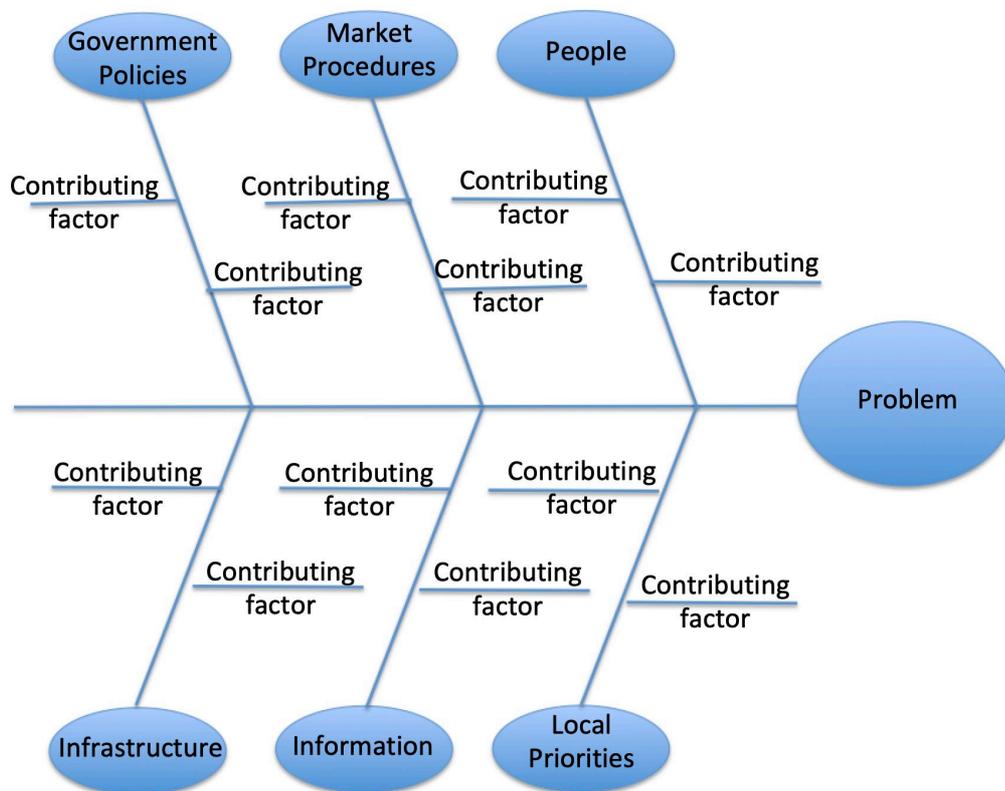
In an engineering context, the fishbone diagram will often address the 4P's (Policies, Procedures, People and Plant). In a wider sector analysis other things might need to be addressed, for example, government policies, market procedures, people, infrastructure, availability of information and local priorities. It is important that for this analysis and the Five Whys that the whole system is looked at, including those areas, such as local industry, with which the convention implementation team may not be that familiar. It is important that the brainstorming team contains people with knowledge of how the sector being analyzed actually works in the local environment of interest.

In this case the problem of building support for the adoption of the new substitute method or chemical is considered in terms the impact on local people, market procedures, government policies, infrastructure, information and local priorities. Each one of these will have a number of contributing factors that may prevent or make the desired substitution difficult. By reviewing these factors comprehensively and systematically with input from the appropriate stakeholders, it will be possible identify the key points that need to be addressed to achieve the successful implementation of the substitute to the POPs pesticide. This approach is shown in Figure 5.

3.2 Stakeholder mapping

With the problems associated with the introduction of a new chemical or method as a POPs pesticide substitute clearly defined and the root causes established, it is then necessary to look at the stakeholders who can impact those root causes. Stakeholders can be characterized by their level of interest in the issue and by their influence in the local environment, as shown in Figure 6. The conventions are attended by many people who have an interest in the issues, but they do not always have the level of influence to make things happen, especially locally in some LMICS. It is important that those stakeholders that have the ability to influence the market on the ground are identified and local knowledge is vital in order to get this analysis correct. The understanding of local markets and businesses needs to be comprehensive and so the makeup of the brainstorming team needs to represent all the areas that contribute to the overall picture. Groups with a high level of interest will be keen to be involved but it is vital to make sure that those that really have the ability to influence are identified,

Figure 5. Ishikawa or Fishbone Diagram

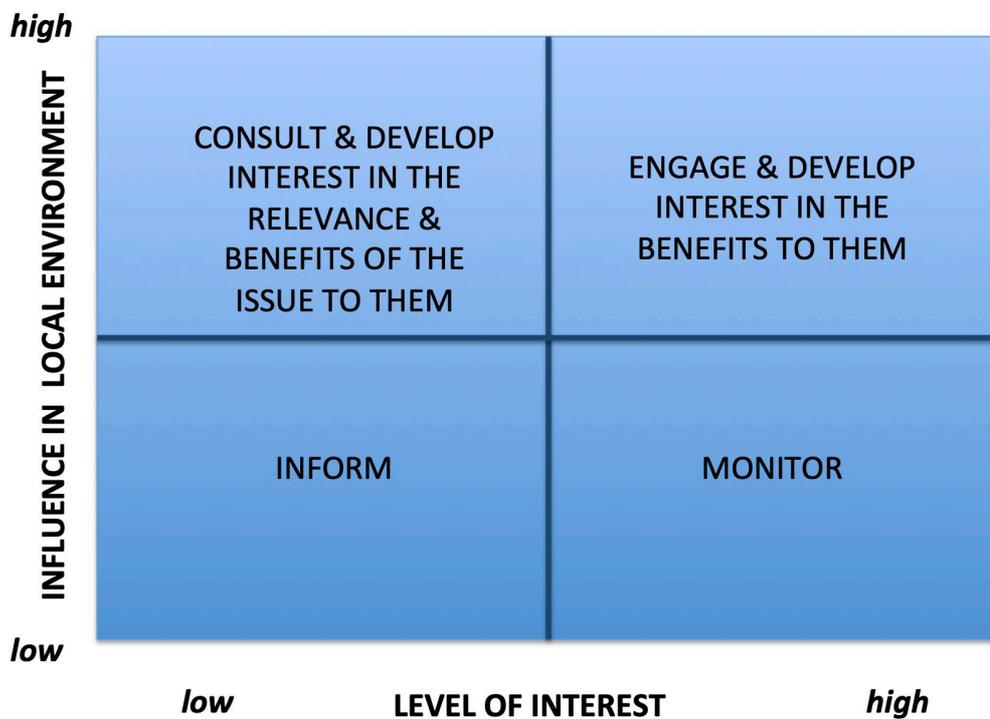


whether they are positively or negatively disposed towards the overall project and it is necessary for this positive or negative view to be identified, recorded and managed.

Those stakeholders with both high interest and influence, be it positive or negative toward the project's goals, must be identified and engaged with as the top priority. The next priority is, those with influence but at present with less interest in the issue. If they are potential allies in the implementation, then they need to understand what the benefits to them are for greater engagement. Stakeholders who have a high level of interest, but no particular level of influence should be monitored but without influence there will be a low return in terms of project implementation from time invested with them. The stakeholders with a low level of interest and influence should be informed of any progress but significant resource should not be spent with them.

A comprehensive stakeholder map that also identifies the groups in each quadrant with positive or negative attitudes towards the implementation should be the basis of the stakeholder engagement plan.

Figure 6. Stakeholder mapping



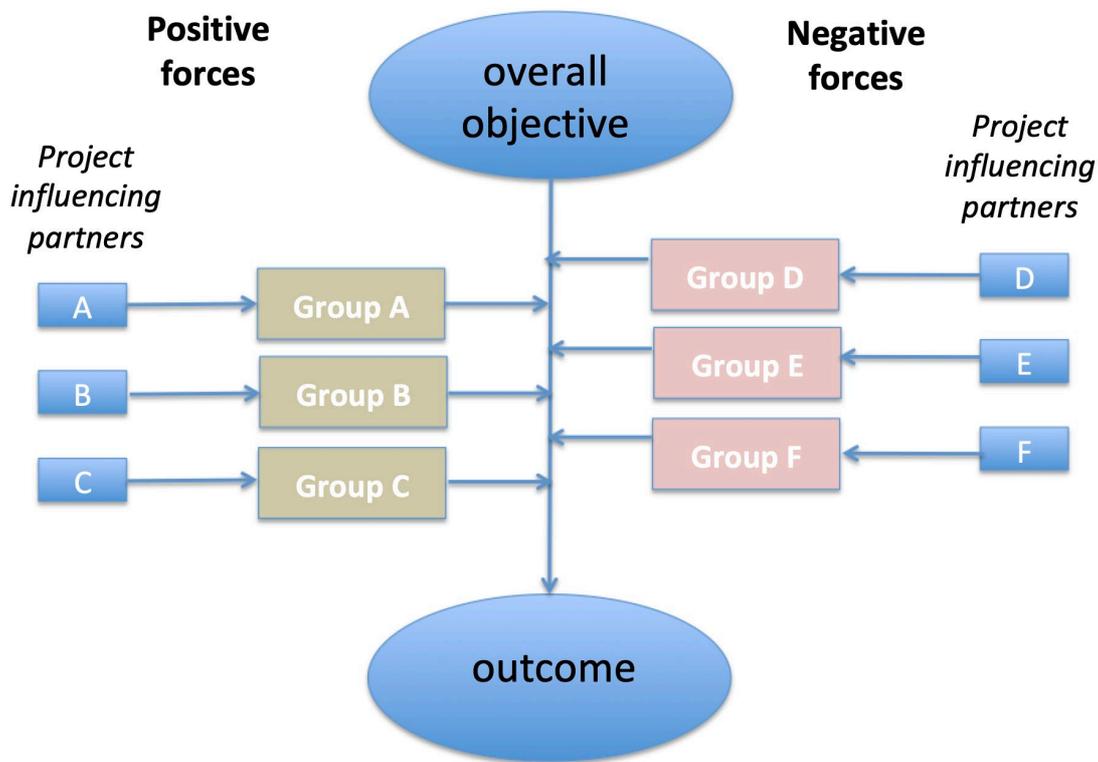
3.3. Stakeholder engagement plan

Those stakeholders that have high interest and influence should be divided into those groups that have a positive and a negative approach towards the implementation plan. In addition, those with influence but not necessarily a high interest at present should be identified if they are potential supporters of implementing the plan. These are the key stakeholders that need to be approached.

The next thing is to identify any potential allies that would be willing and able to work with the team as influencing partners to help persuade key stakeholders of the benefits of the implementation of the desired changes. These partners may be important in a local administrative, academic or cultural context and will have credibility with the stakeholders that need to be influenced.

Having assigned stakeholders to positive and negative groups and identified any additional influencing partners that are needed, it is necessary to establish the overall objective of the influencing program and from that the key outcome that is trying to be achieved. This is based on the work done in section 3.2. Without a clear and measured overall objective, it is difficult to actually reach the desired conclusion. Such an objective could be to “Have agreement to the full and measured implementation of the new solution as the substitute for the POP pesticide in these sectors by (date) and these by (later date).” The stakeholder engagement plan is shown in Figure 7.

Figure 7. Stakeholder engagement plan.



3.4. Stakeholder messaging

Messaging is the heart of what has to be done in order to successfully influence the stakeholders to support the changes that are desired. Each stakeholder group needs a specific message tailored for them that is consistent with the overall message for the project.

Work needs to be done to establish what the benefits are to each stakeholder for engaging positively with the substitution program. It is important to understand the needs and motivations of local people and their priorities. Some effort will probably be needed to understand this. Assumptions from a global perspective about what is important often come from a different viewpoint to that of the local people. It is important to invest resource into understanding the local priorities.

Likewise, local businesses may not be aligned with the goals of the substitution project if it means a change from patterns of working that they know. People who are invested into local markets are necessarily risk averse. An understanding of what their principal concerns are is essential and also the provision of information to help them to see the new opportunities that the substitutions could bring about.

Some local merchants may be familiar with products or practices that are trying to be removed or changed. It is important to work with these people and institutions to establish how they can profit from new opportunities and to avoid future threats by supporting the changes.

From this deeper understanding of the needs, concerns and priorities of the stakeholders, tailored messages can be developed for each group, that are consistent with the overall message. There should be assigned to individual people to deliver these messages to each different group. As is appropriate, this can be members of the team or allies who have aligned interests and possibly have greater local credibility. A summary of the parts of the stakeholder messaging plan is shown in Figure 8.

Figure 8. Stakeholder messaging plan

Overall message for the project			
Group A	Tailored message for Group A addressing their benefits and concerns	Who delivers?	Success or not?
Group B	Tailored message for Group B addressing their benefits and concerns	Who delivers?	Success or not?
Group C	Tailored message for Group C addressing their benefits and concerns	Who delivers?	Success or not?
Group D	Tailored message for Group D addressing their benefits and concerns	Who delivers?	Success or not?
Group E	Tailored message for Group E addressing their benefits and concerns	Who delivers?	Success or not?
Group F	Tailored message for Group E addressing their benefits and concerns	Who delivers?	Success or not?
Overall success against metrics			

3.5. Assessment of success

It is important that there is an independent assessment of the overall success or failure of the plan. In the messaging plan (Figure 8.) it is acceptable for the individual communicators to report back how successful their message has been to individual stakeholders as it would be potentially disruptive for this to be assessed independently, however the overall success should be reviewed independently and the successes and failures discussed with the team and sponsors. In this way it can be clearly established if there are indeed changes in local practices and if not, the areas that need closer attention can be identified and addressed.

3.6 Challenges to policy implementation

In any implementation of change it will be necessary to deal with various organizational structures, both governmental and private. There will be many different organizations but one thing that is common to all is how simple or complex the policy structure is. Simple structures with centralized decision making, uncontested goals have predictable change pathways. Action can be achieved effectively in such an organization by getting agreement to the changes desired at the appropriate high level. As much as many managers and politicians would like such structures, in reality most structures in public and private organizations are a little more complex.

Complex structures policy structures have distributed decision making, with different players contributing different opinions at different stages. These different players may also have divergent goals at different levels in the hierarchy. This makes for unpredictable change pathways, which need to be understood if there is any chance of achieving change. In order to work with such systems, work needs to be done to establish common goals before progress can be made.

Figure 9. Policy implementation structures

Simple policy structure	Complex policy structure
<p>Centralized Decision will filter through to the lower levels without much distortion</p>	<p>Distributed Decisions are influenced by a number of different players with different opinions at different stages.</p>
<p>Uncontested goals Everyone in the hierarchy supports the same goals.</p>	<p>Divergent goals Different groups or individuals in the hierarchy have their own, differing goals.</p>
<p>Predictable change pathways Within the established policy-making cycle</p>	<p>Unpredictable change pathways Must understand how change happens in this organization and adapt accordingly.</p>
<p>Action Get agreement of benefits to stakeholders and place idea with key stakeholder.</p>	<p>Action Work to establish common goals & benefits to each group of the policy change</p>

4. CONCLUSIONS

Many policy implementations fail, at least partially, due to a lack of engagement at the local level, especially with local businesses and commercial organizations. This can be because those stakeholders that have the power to influence what happens locally were not engaged and supportive of the changes or that they could not understand the opportunities of the change or avoidance of threats that would occur. The needs and concerns of local communities must be investigated and recognized. Messages must be tailored to engage them in supporting the change. Information needs be made available to them so that that they can develop new opportunities to replace old products or practices. Changes can be adopted rapidly where the benefits to those involved are clear and organizational and societal blockages can be removed or ameliorated to allow for change. Basically, change is not imposed but it comes about if the people and organizations involved can see the benefits to them for the new position.

Annex 1. Example of evaluation of potential POPs alternatives based on the system of the European Chemicals Agency (2007).

Parameter	Questions to be answered	Alt. 1	Alt. 2	Alt. 3
Technical feasibility	<ul style="list-style-type: none"> • Is the alternative effective? • Will it require changes to processes? 			
Availability	<ul style="list-style-type: none"> • Is it available in the required quantity now and in the future? • How fast could change be made? 			
Risk assessment	<ul style="list-style-type: none"> • Human health hazards – are there concerns or restrictions • Human health risks – are there concerns or restrictions • Environmental hazards – are there concerns or restrictions • Environmental risks – are there concerns or restrictions • Assessment of net risk – Would the alternative result in sufficient decrease in net risk compared to the POP being replaced. Are there new risks? 			
Economic feasibility	<ul style="list-style-type: none"> • Net cost of compliance (taking account of increases and decreases associated with the replacement) throughout the supply chain • Financial viability of alternative • Ability of different actors in the supply chain to handle costs • Trade and wider economic effects 			
Uncertainty	<ul style="list-style-type: none"> • In feasibility • In risks • Economic viability 			

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