



Deliverable 4.2

Framework for Member States to support the generation of Farm-Specific Guidelines For Targeted Stakeholders

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2. Purpose of this framework

2.1. Context of outputs from Agrowise project

The Agrowise project is a part of the EU "LIFE Program" and aims at developing recommendations for Integrated Pest Management (IPM) guidelines while ensuring sustainable agricultural systems that are both economically and environmentally viable. Developed by a consortium of 10 research organisations from eight EU countries, this project will contribute to achieve the EU Farm to Fork strategy objectives of a 50% reduction in chemical pesticide use by 2030.

This public policy project contains two strategic pillars related to enhanced IPM implementation: information on plant protection practices and information on policy instruments and their efficiency.

Work Package (WP4) is tasked with defining criteria to support the delivery of tangible recommendations for EU Member State seeking to develop IPM policy / action plans. In essence, the guidelines developed here aim to assist Member States/policy makers to implement the IPM requirements in a more focused way taking particular sectoral and market dynamics into account.

This was achieved by first compiling and characterising the policy instruments related to pest management and pesticide reduction from the eight EU partners countries (Task 4.1 and MS3), then analysing the strengths and weaknesses associated with each type of instrument (Task 2, D4.1).

The review of existing IPM related policies and national measures (cf. MS3 - the IPM policy instrument database and D4.1 – IPM policy instruments strengths and weaknesses analysis) led to several findings:

- External factors such as behavioural factors, farm and market contexts or the level of knowledge on IPM have an influence on the effectiveness of IPM policy instruments, as demonstrated in the literature and confirmed during the stakeholder interviews held as part of Agrowise WP4.
- There is no lack of IPM policy instruments across the 8 member states surveyed. Yet over 80% of the 300 IPM policy instruments compiled in the Agrowise database target farmers, with a much smaller proportion targeting other influential stakeholders
- Most IPM policy instruments neglect to target a specific IPM Principle. It appears that 53% of the policy instruments fail to target one or several Principles but are related to "general IPM". Approximately 25% of instruments target Principle 6 ("reduced pesticide use") while the less targeted is Principle 8 ("evaluation"), with only 2% of the listed instruments.
- Of the policy instruments identified a similar distribution between the types of instruments (regulatory, informative and economic instruments) exists across the member states (see Annex 1). A mix of policy instrument types allows policies to address the different drivers that farmers and other stakeholders will answer to.

Drawing on this information, a framework of recommendations for Member States defining IPM policy-related guidelines has now been developed in this report (Task 3, D4.2) here.

2.2. Aim of the framework of recommendations

This report contains a framework of recommendations to support an improved implementation of IPM on farms, primarily destined for national/regional policymakers. This framework of

recommendations has been developed around a series of four actions identified through the Agrowise project and several supporting steps, which should assist in the contextualisation of IPM to specific national/regional challenges. A generic example is presented in this report, but it is necessary for national and/or local authorities to tailor their policy instruments, based on their regional agricultural context and organisation.

2.3. Legal framework (SUD directive, Vision for agriculture)

Article 14.5 of Directive 2009/128 (EC)¹ states that “*Member States shall establish appropriate incentives to encourage professional users to implement crop or sector-specific guidelines for integrated pest management on a voluntary basis. Public authorities and/or organisations representing particular professional users may draw up such guidelines. Member States shall refer to those guidelines that they consider relevant and appropriate in their National Action Plans.*”

The incentives and other policy instruments developed by each Member State based on the framework presented in this report could be used by Member States in their National Action Plans. They should also be consistent with the European Commission’s Vision for Agriculture and Food², and especially with:

- The simplification effort and the reduction of red tape to foster a competitive agri-food sector.
- the necessity for stakeholders along the food chain to “*contribute jointly to delivering these results* (i.e. preserving healthy soils, clean water and air and protecting and restoring Europe’s biodiversity) *and share transition risks*”.

3. Framework to support the generation of Farm-Specific Guidelines for Targeted Stakeholders

Considering the background to this report (MS3 and D4.1 especially), four ‘actions’ have been identified, which represent the primary framework to guide the development of national/regional and sector specific policies and measures based on the principles of IPM and supported through the regulatory requirements of Directive 128 (2009). They include the necessity to:

- (i) **Adapt** IPM policy instruments to ensure they reflect the national farm context
- (ii) **Include** all relevant stakeholders, including farmers, advisory networks, stakeholders interacting with the agricultural production process and others
- (iii) **Target** all IPM Principles relative to the agronomic challenges faced
- (iv) **Deploy** a mix of policy instrument types to support stakeholder awareness and implementation

Seven steps have been formulated to support Member States to successfully apply the four actions to enhance IPM policy instrument design and implementation. Ultimately, these steps are intended to help Member States to drive resulting impact at the farm level via effective policy choices, which if to be successful must include all stakeholders in the value chain.

¹ [Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides. Text with EEA relevance](#)

² [Vision for Agriculture and Food - European Commission](#)

The section below explains the four actions and seven steps in more detail with illustration in Figure 1 to show inter-relationships. From this analysis, policy makers and responsible authorities should consider these actions to develop national/regional IPM policy instruments to support an improved implementation of IPM on farms

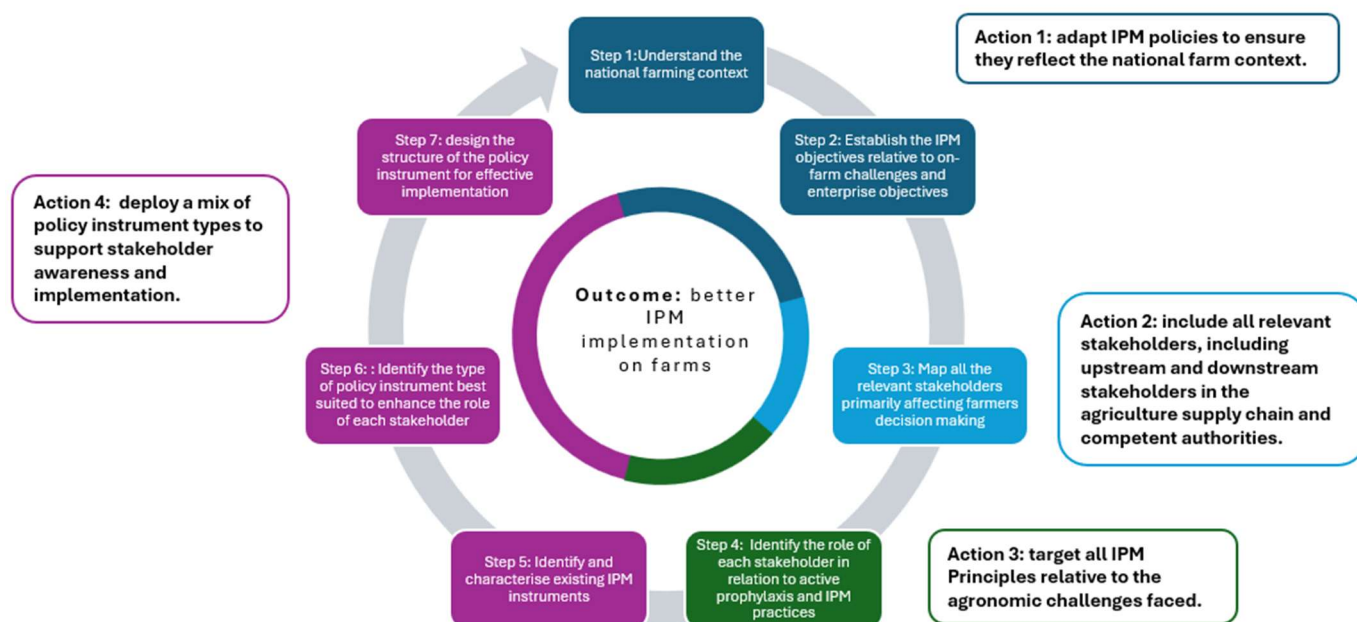


Figure 1: Illustration of the recommendations to develop a coherent set of national IPM policy instruments

3.1.1. Action 1: adapt IPM policies to ensure they reflect the national farm context

External factors such as behavioural factors, farm and market contexts or the level of knowledge on IPM have an influence on the effectiveness of IPM policy instruments, as demonstrated in the literature³ and confirmed during the stakeholder interviews held as part of this project (see D 4.1).

Considering the national and local farming landscape, considering the cropping systems, farm size, economic situation, the farmers' demographic, etc. when designing IPM policy instruments has been proven to contribute to effective policy outcomes³. Furthermore, the results of Deliverable 3.2 clearly outline the framework necessary to carry out a cost benefit analysis of specific IPM practises, considering input and output variables, farm specific variables, and time considerations.

Therefore, tailoring policies to the national farming context, and ensuring that all stakeholders are supported, equipped and encouraged to understand their own farm current situation and take it into account when setting their IPM objectives and planning is a key action.

Several factors inherent to the national farming sector such as the average size of the farm, the type of cultivated crops, the farmer tenure, age, work pattern, as well as the level of knowledge of farmers regarding IPM practices and policy instruments are proven to influence the effectiveness of IPM policy instruments³. Specific on-farm challenges regarding

³ Helepiciuc F-E, Todor A (2021) Evaluating the effectiveness of the EU's approach to the sustainable use of pesticides. PLoS ONE 16(9): e0256719. <https://doi.org/10.1371/journal.pone.0256719>

disease/pest control and availability of viable, effective non-chemical control agents are also factors to consider. It is hence essential that policy makers take these into account when designing policy instruments to ensure required uptake and impact.

Policy makers should ensure that IPM objectives are clearly defined, both at national level to drive the design of IPM policy instruments but more importantly at local level. Moreover, policy makers must ensure that stakeholders and farmers are supported to understand their own farm context and are able to develop a realistic and tangible IPM plan considering their situation, resources and objectives. Such a plan must underpin both the economic and environmental sustainability of the farming enterprise, ensuring that IPM measures are tangible and realistic relative to the challenges faced on farm.

3.1.2. Action 2: include all relevant stakeholders, including farmers, advisory networks, stakeholders interacting with the agricultural production process and others

The characterisation of more than 300 IPM policy instruments from 8 countries in the database has shown that >80% of the IPM policy instruments are solely focussed on farmers, with the vast majority of IPM instruments (83%) implemented by national authorities. While the legal obligation is on the end user (e.g. a professional user such as farmer), the incorporation of multiple actors across the agriculture value chain, as well as range of relevant competent authorities (such as agriculture ministries and water regulators) alongside with the farmers, is identified as a success factor to drive the uptake of IPM practices.

Indeed, as stated in Deliverable 5.1 of the Agrowise project, *“there is a large literature showing that the present crop protection approach, mainly based upon pesticides, is a typical locked-in situation, as it is initially described by Geels (2002) (Bakker et al, 20214; Trèves et al, 2025). It has been demonstrated that, in such locked-in situations, it is not possible for one stakeholder to change his/her behaviour and practices, if the other stakeholders are not changing accordingly. The other stakeholders in the crop protection locked-in situation are i) the upstream and downstream sectors of the agrifood system, down to processing industries and retailers, ii) the society (NGOs) and consumers, and iii) policy makers”*.

While farmers are the ones who implement the IPM practices, they do not act in isolation. Several primary stakeholders revolve around farmers as the end-users of IPM practices, with links of influence and type of interaction (buy-sell, advice, training, collaboration, regulatory constraints, etc.) varying between countries.

As effective policy instruments should include all stakeholders in the value chain, i.e. from upstream companies, farmers, downstream industries to consumers⁵, targeting stakeholders other than farmers with policy instruments would be a beneficial action to increase the uptake of IPM practices. This is especially relevant regarding IPM as many drivers of farmers’

⁴ Bakker L., et al, 2021. Kicking the Habit: What Makes and Breaks Farmers' Intentions to Reduce Pesticide Use? Ecological Economics 180, 106868. DOI 10.1016/j.ecolecon.2020.106868

⁵ Robert Finger, Jaap Sok, Emmanuel Ahovi, Sharmin Akter, Johan Bremmer, Silke Dachbrodt-Saaydeh, Carolien de Lauwere, Cordelia Kreft, Per Kudsk, Fatima Lambarraa-Lehnhardt, Chloe McCallum, Alfons Oude Lansink, Erwin Wauters, Niklas Möhring, 2024. Towards sustainable crop protection in agriculture: A framework for research and policy, Agricultural Systems, Volume 219,104037, ISSN 0308-521X, 4037 <https://doi.org/10.1016/j.agsy.2024.104037>

decisions are influenced by other stakeholders including farm advisors and the value chain organisations that they have relationships with.

In this regard, four Tiers of stakeholders (see Table 1) have been identified: farmers (Tier 1), advisory networks (Tier 2), stakeholders interacting with the agricultural production process (Tier 3) and stakeholders influencing the quality and quantity of what is produced (Tier 4).

Tier	Tier 1: Farmers	Tier 2: Advisory network	Tier 3: Stakeholders interacting with the agricultural production process	Tier 4: Other relevant stakeholders
Stakeholders	Farmers	2.A: Farmer's advisors	3.A: Farmer's suppliers	4.A: Policy Makers
		- Advisors affiliated to the PPP industry - Advisors affiliated to the State authorities - Independent advisors - Farmer groups	- Plant protection industry (registration holders and/or manufacturers) - Seed industry - Machinery industry - Precision farming industry (decision making tools, weather apps, modelling tools, etc.) - Other (e.g. fertiliser suppliers) - Retailers (PPP, seeds and/pr machinery) - Banking, credit and insurance service providers	- Local authorities - National authorities - EU institutions
			3.B: Farmer's customers	4.B: Advocacy groups
			- Supermarkets - Export companies - Downstream industry (processors, wholesalers)	- Corporate associations (upstream and downstream actors) - NGOs and consumers associations - Consumers
				4.C: Policy evaluation/implementation
				- Water agencies - Certification bodies - Scientific evaluation agencies

				4.D: Wider finance and insurance sector
				4.E: Research organisations
				- Public funded institutes - Private funded institutes/groups

Table 1: Group of stakeholders per Tier. The stakeholders listed in this table are generic and should be adapted to the context of a respective region/country. Stakeholder list while not exhaustive was generated from Agrowise stakeholder workshop, Brussels, September 2024.

Prior to designing IPM-related measures/policies, policy makers should identify the full suite of stakeholders engaging with farmers relevant for their country/entity and identify for each. the nature of the interactions. For example, a schematic illustration of the stakeholder-to-stakeholder connectivity and influence in relation to IPM implementation by the farmer is a useful tool to map these interactions (see Figure 2). Once all the stakeholders have been mapped, policy makers can compile the existing IPM instruments and attribute them by main targeted actor. This exercise provides an in-depth overview of the current situation and provide insights on stakeholders not targeted previously by policy instruments, but which can play a key role in supporting IPM implementation.

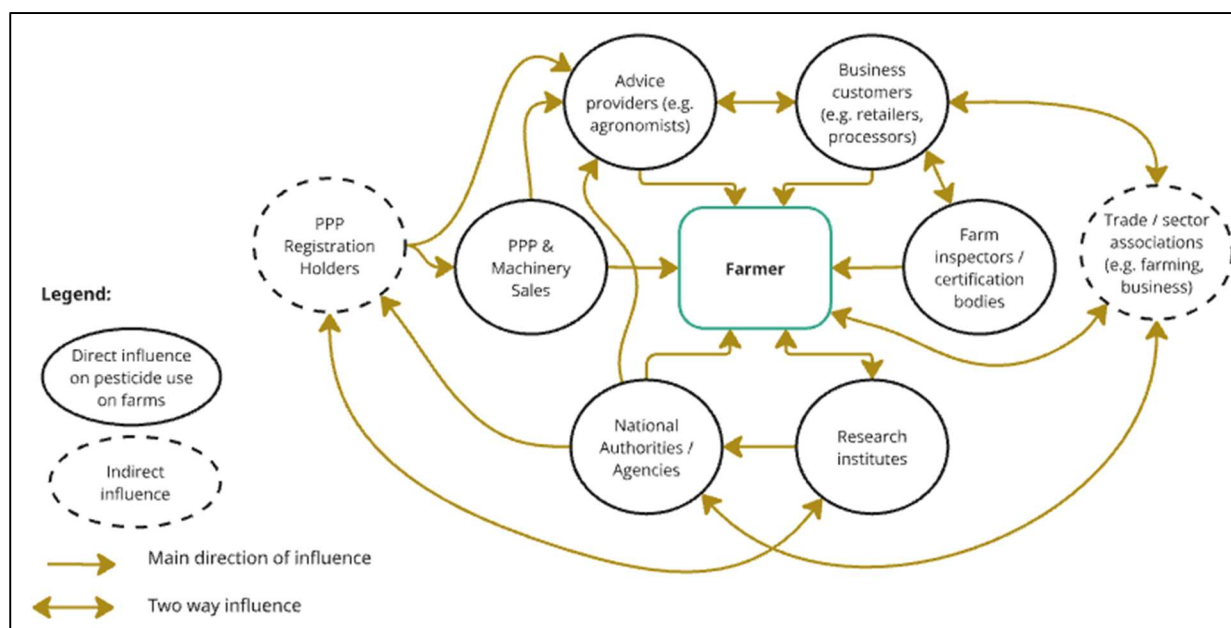


Figure 2: Hypothetical schematic illustrating the potential stakeholder-to-stakeholder connectivity and influence in relation to IPM implementation by the farmer. The links represented on this illustration are illustrative and not exhaustive. Relationships and influences will differ depending on the countries' national farming organisation system.

3.1.3. Action 3: target all IPM Principles relative to the agronomic challenges faced

Agrowise has concluded that most IPM policy instruments are generic and fail to target IPM Principles specifically, with 53% of the policy instruments related to “general IPM”. The IPM Principle most often targeted by policy instruments is Principle 6 (“reduced pesticide use”) with 25% of the instruments, and the least targeted is Principle 8 (“evaluation”) with 2% of instruments only. This apparent paradox highlights an emphasis on pesticide user reduction

without a complementary mechanism to evaluate the success/impact of that pesticide use and impact reduction.

Designing policies that encompass the uptake of the whole range of IPM practices will support better on farm planning and decision making.

Designing policy instruments to target specific IPM practices will improve the implementation of such practices, especially practices related to Principle 1 (Prevention and Suppression) which is most relevant to **Active Prophylaxis**. Active prophylaxis is a concept formalised in Deliverable 5.1, and is defined as a series of actions, agronomic practices, and cultural combinations intentionally implemented to reduce weed, pest, and disease pressure below a harmfulness threshold. Increased adoption of Active Prophylaxis can lead to a significant reduction in pesticide dependency and should be a key target for public policy instruments. More detailed information on active prophylaxis is available in Deliverable 5.1⁶

When implementing active prophylaxis, farmers:

- consider an intention in classic growing actions (e.g. choosing a crop rotation to reduce weed burden in current and future crops) as well as the action.
- purposely establish IPM objectives relative to farm system profitability and the specific challenges and opportunities on farm, for example prevent disease outbreaks for a key farm crop or over all crops, minimize chemical pesticide use, ensure economic viability. Short and long-term objectives should be considered – for example reduce short-term input costs and increase longer term exposure to disease risk;
- have a clear understanding of their farm ecosystem. The farm ecosystem consists of the farm current situation, practices and context to form the foundation of IPM planning and decision-making on farm. This could include considering factors such as crop profile, pest and disease inventory, beneficial organisms inventory, soil condition, climate and weather patterns, etc).

In support of this action, policy makers should consider using the harmonised IPM taxonomy⁷ developed by the Swedish University of Agricultural Sciences (SLU) under WP2 of the Agrowise project. This harmonised taxonomy details a comprehensive set of farm practices aligned to the 8 IPM principles and organised in hierarchical layers. It is a helpful check-list for Member States to ensure coverage of all IPM principles within their policies. This supporting tool is available [here](#)⁸.

3.1.4. Action 4: deploy a mix of policy instrument types to support stakeholder awareness and implementation

An important finding from the analysis of the policy instrument database is that the eight countries evaluated present a well-balanced mix of categories of instruments - economic, regulatory, informative and research. See **Erreur ! Source du renvoi introuvable.** for further detail of the different types of public policy instruments which Member States could deploy within their national approach to IPM.

For national IPM policies to be efficient, it is essential that policy makers consider a range of different types of policy instruments – including economic, regulatory, informative and research

⁶ [Add title & correct link for the deliverable when published]

⁷ <https://eng-agrowise.hub.inrae.fr/content/download/231/2230?version=2>

⁸ <https://eng-agrowise.hub.inrae.fr/ipm-taxonomy-explorer>

instruments. The importance of targeting a large variety of stakeholders has already been highlighted, as well as the necessity to adapt policies to the farm context. Using instruments of different nature provides adequate flexibility to afford policies the opportunity to address the different drivers that farmers and other stakeholders will answer to.

The importance of offering a mix of different type of policy instruments has also been underlined by several stakeholders during this project (see D4.1). Similarly, the importance of applying a mix of instruments for effective results was highlighted by Lee, R., et al., 2021 in their meta-analysis of policy instruments for pesticide use reduction in Europe⁹ with both high and low degrees of authoritative force in instrument application.

IPM implementation across the EU differs from one Member State to another, and even from one region to another within the same country^{Erreur ! Signet non défini.}. Mixing instruments from different categories offers flexibility and addresses the agricultural landscape specific to each country.

⁹ Lee, R., den Uyl, R., Runhaar, H., 2019. Assessment of policy instruments for pesticide use reduction in Europe; Learning from a systematic literature review. Crop Protection 126 (2019) 104929, Available from <https://research.vu.nl/en/publications/assessment-of-policy-instruments-for-pesticide-use-reduction-in-e>

Table 2: Categories of policy instruments and their main strengths and weaknesses (further detail in Deliverable 4.1)

Main category	Definition	Strengths	Weaknesses	Types	Details
Regulatory	Legal instrument restricting, allowing or making something mandatory	• <i>Enforceability of the measures.</i> • <i>Stakeholder consultation and wide acceptance is a key success factor.</i>	• <i>Administrative burden to enforce legislations and check compliance. Regulatory instruments can be associated with acceptance issues and lack of compliance.</i> • <i>Risk of abandonment of specific crops due to rapid withdrawal of pesticides.</i> • <i>Potential high cost for farmers.</i>	Financial penalty	Financial charge resulting from failure to comply with the law, rule, or initiative
				Prescription	Requirement to implement a specific practice, method or action
				Bans	Constraining use
				Zoning	Constraining or promoting use on a specific area
Economic	Instrument impacting the	• <i>Can encourage farmers take some risks and rely less on pesticides.</i>		Subsidies	Financial incentive or compensation
				Taxes	Financial charge, levy

Main category	Definition	Strengths	Weaknesses	Types	Details
	cost-benefit ratio of an option	<i>Risk-averse farmers are generally less inclined to adopt sustainable crop protection practices than their risk-neutral counterparts. Their preference for minimizing financial risk leads them to select less-risky alternatives that offer lower, yet more predictable, returns.</i> <i>Economic incentives can cover the cost of the alternative IPM practice if it is higher than the pesticide use and/or compensate for possible loss of yield and therefore revenue.</i> <i>Taxation schemes can also be efficient tools that are easy to administer compared to other type of levers.</i>	<i>Complexity of some economic instruments, lacking clarity on eligibility.</i> <i>Taxation schemes can be associated with acceptance issues and financial pressure for farmers</i>	Other economic instrument	Other type of financial incentive or disincentive
Informative	Instrument aiming at informing, communicating	<i>The lack of knowledge is cited in the literature as a main barrier to implement IPM practices.</i> <i>Individual or collected advice through demo-farms provide legitimacy to farmers to implement alternative practices.</i>	<i>Inadequate accessibility or quality of advisory services in some countries or at local level.</i>	Certification	Process to gain a certificate of compliance with requirements of a specification or standard
				Direct advisory services	Direct information and advice on practices, usually aimed at farmers
				Information campaign	Wider communication of information
				Guidelines	Best management practices
				Knowledge transfer	Sharing of knowledge and practices, including from scientific research into practical application.

Main category	Definition	Strengths	Weaknesses	Types	Details
				Other	Other type of information sharing
Research	Instrument aiming at promoting research or data collection	Investment in research can lead to new technologies, biological controls, and decision-support tools tailored to local contexts and addressing the rapid withdrawal of pesticide active substances in some specific crop sectors. Research provides data that can inform better regulations and agricultural practices	<i>Delayed impact: Research outcomes may take years to translate into practical solutions, which can be a barrier for urgent pest issues.</i>	Funding	Funds provided for a research purpose
				Monitoring	Activity of regular surveillance

3.2. Seven practical steps to guide policy makers to establish the recommendations

The four actions presented above constitute the basis for the establishment of national recommendations for an improved implementation of IPM on farms.

A seven steps process, presented in Figure 3, has been developed to practically support policy makers writing these recommendations.

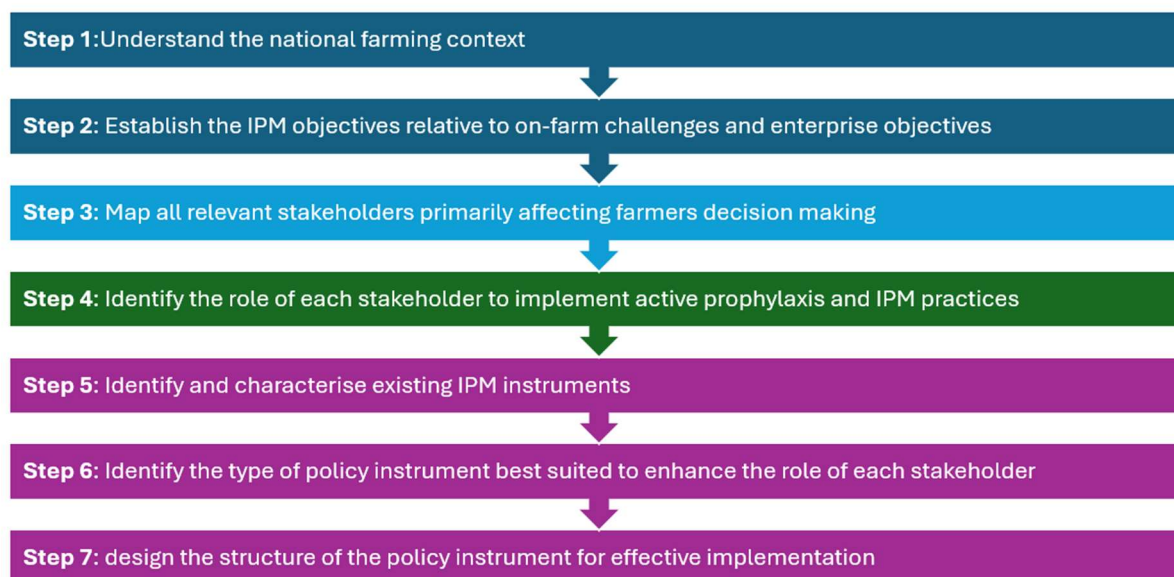


Figure 3: Seven steps process

The seven steps are described below.



Understand the national / sectoral farming context

Several factors inherent to the national farming sector such as the size distribution of farms, the types of cultivated crops and typical cultivation practices, the farmer tenure, age, work pattern, as well as the level of knowledge of farmers regarding IPM practices and policy instruments are proven to influence the effectiveness of IPM policy instruments. Equally important are the on-farm challenges regarding disease/pest control and availability of viable, effective non-chemical control agents. Policy makers should start with the identification of these factors, including seeking insight from relevant stakeholders, to take account of them in the design of the IPM recommendations.

Moreover, policy makers must ensure the diversity within the national farming sector is understood. A one-size-fits all approach is not fit-for-purpose. Policy needs to be adaptable to national diversity and support stakeholders and farmers to understand their own farm context as a critical step to develop a realistic IPM plan considering resources and objectives.

ASK: Do we know what are the main characteristics and challenges and how they vary across regions, crops, and relevant farming

Step
n°2

Establish the IPM objectives relative to on-farm challenges and enterprise objectives

Policy makers should ensure that IPM objectives are clearly defined, at national/ regional, local and sector or crop-specific levels. The clear definition of IPM goals will help identify the main drivers for pesticide reduction at a national level. In addition, farmers may have specific pest/disease pressures and so national/regional policy objectives should consider supporting farmers in responding to these. Policy makers should also consider the time frame (long-term or short-term objectives) and whether there is a need to focus on specific IPM practices in this regard.

***ASK:** Have we set clear short- and longer-term objectives which relate to the specific challenges and characteristics identified in Step 1?*

Step
n°3

Map all the relevant stakeholders primarily affecting farmers decision making

While farmers are the ones who implement the IPM practices, they do not act in isolation. Several primary stakeholders revolve around farmers as the end-users IPM practices, with different degree of influence. When it comes to crop protection, many drivers of farmers' decisions are influenced by other actors. Policy makers should identify all the stakeholders involved in the agriculture value chain alongside farmers who can play a role in the implementation of IPM practices, using the list of stakeholders identified in Table 1. Policy makers should map out stakeholder-to-stakeholder connectivity and better identify the nature of the interaction and the degree of connectivity (see Figure 2).

***ASK:** Have we identified all relevant stakeholders, their level of influence and how they relate to farmers and each other? Is there a risk of contrary influence?*

Step
n°4

Identify the role of each stakeholder in implementing active prophylaxis and IPM practices

Once the relevant stakeholders have been identified (Step 3), policy makers should identify the role they play or can play in relation to each IPM practice, to increase their uptake or their efficacy. To do so, policy makers can use the harmonised taxonomy of IPM practices accessible here, developed under WP2 of the Agrowise project¹⁰. For example, state authorities can deliver mandatory authorisation and training of farm PPP advisors, and alongside this can retailers support implementation of specific practices through their procurement policies? Policy makers should pay a particular attention to IPM practices relative to **Active**

¹⁰ <https://agrowise.hub.inrae.fr/ipm-taxonomy-explorer>

Prophylaxis, as they support form the foundation of IPM planning and decision-making on farm.

***ASK:** Do we know what role(s) each stakeholder could play, and how they could help drive uptake of IPM practices? Can data be collected from these stakeholders to monitor the deployment of IPM across the stakeholder network?*

**Step
n°5**

Identify and characterise existing IPM instruments

To complete this step, policy makers should:

- **Compile and characterise all the existing informative, regulatory, economic and research policy instruments** related to the practice(s) they are willing to implement (refer to table 2 for more information). These instruments could be implemented at European, national, local or sectoral level. They can be further characterised following the categories in **Erreur ! Source du renvoi introuvable.**, whether they are binding, and the time-scale for impact.
- **Identify the main targeted stakeholder(s)** for each existing policy instrument, the key features of the instrument and whether there is any information of its **effectiveness**.
- **Map out the stakeholders not targeted by any instruments** or targeted by instruments not sufficiently effective. They should be targeted in priority in future public policy developments.

***ASK:** Do we have a comprehensive picture of all current policy instruments already implemented, any gaps in terms of the practices and stakeholders targeted or other challenges for their effectiveness (e.g. poor uptake and enforcement)?*

**Step
n°6**

Identify the type of policy instrument(s) best suited to enhance the role of each stakeholder

Some stakeholders with scope to influence an increase in the uptake of one or more IPM practices will be clearly identified (Step 4) but will not be targeted by effective IPM policy instruments yet (Step 5).

For these stakeholders, policy makers should decide what type of policy instruments would be the most appropriate to best address the stakeholders' drivers and maximise the adoption of the IPM practices.

To support their decision, policy makers can refer the analysis of IPM policy instruments strengths and weaknesses performed by the Agrowise consortium (Deliverable 4.1).

***ASK:** What further policy instruments or changes to existing instruments should we implement to address the gaps and challenges identified in Step 5, considering the influence of different stakeholders?*

**Step
n°7**

Design the structure of the policy instruments for effective implementation

Once the most suitable type of policy instruments has been agreed (Step 6), policy makers should:

- Decide whether each instrument should or could be **binding** (mandatory) **or optional** (voluntary). Whilst the first can lead to a faster and more uniform implementation across the territory, it can also be less cost-effective for authorities due to administrative burden associated, and lead to resistance from stakeholder due to potential higher costs generated.
- Decide whether the instrument aims at a **short term or a long-term impact**. Some policy instruments such as tax are usually designed with a short-term objective, whilst others, for example the development of advisory services, serve a long term and more holistic objective.
- Include all the stakeholders in the process of designing the policy instrument.
- Ensure that there is a strong enough **data and data collection system** in place to ensure the possibility to evaluate the efficiency of the instrument in delivering reductions in pesticide use and harms at a national level. This is particularly important to avoid the risk of continued investment in inefficient instruments due to lack of data collection on instrument efficacy.
- By applying the economic evaluation protocol outlined in Deliverable 3.2, within the context of IPM practices, serve as a benchmark to support policymakers, researchers, and practitioners to develop actionable insights that promote sustainable, resilient, and economically viable agricultural systems.

***ASK:** Have we designed our instruments for effective implementation of each IPM instrument, and are they efficient, as simple as possible and complementary to each other?*

3.3. *Example: designing policy instruments to increase the uptake to disease tolerant varieties of vine and reduce the dependency on pesticides.*

This section provides a practical example of the application of the seven steps to develop IPM policy instruments to increase the IPM practice consisting in the use of disease tolerant varieties of vine and reduce the dependency on pesticides. This example does not take place in any specific countries and is intended as a hypothetical, illustrative example to aid Member States in understanding application of the four actions by following the seven steps.

Step 1	Understanding the farming/sectoral context
	Policy makers assessed challenges for vineyards nationally: - The state of resistance / pest pressure (e.g. disease types, most affected varieties and locations, future prognosis): around half vineyards are at risk of losses from pesticide resistance pests. - The surface of vineyard to be renewed in the next 3 to 5 years: 10% - The economic situation of these vineyards: profitability is threatened due to high pesticide costs; vineyards are 40% of national agricultural economy. - The tolerant varieties available, current adoption levels and drivers of adoption (or barriers to adoption e.g. knowledge gaps or low cost of PPP): several varieties suitable for the climate regions, but not all are suited to current market preferences. - The timeframe: The vines are renewed on average every 25 years. This duration implies a very slow renewal of varieties and also indicates an opportunity for long-term planning. - Future varieties becoming available: limited spontaneous developments are planned. - Any other information relevant to the national vineyard context.
Step 2	Establish the IPM objectives relative to on-farm challenges and enterprise objectives
	Policymakers described and established clear, national objectives related to IPM. It can for example help in prioritising some policy instruments over others. In this case the objectives of - preventing vineyard loss from untreatable / treatment resistant diseases, - protecting the long-term economic viability of vineyards by reducing pesticide costs - reducing environmental harms from pesticides in waterways and habitats in vine growing regions, - improving the relationships between farmers and residents, etc.
Step 3	Map all the relevant stakeholders primarily affecting farmer decision making
	Policy makers mapped all the national and local stakeholders playing a role in the value chain. For example: - Farmers - Rootstock suppliers/ nurseries - Advisory services - Protected designation of origin corporations (PDOs) - Wine processors and wine sellers - Research organisations involved in variety development and testing - Etc.

Policy makers mapped the stakeholder-to-stakeholder connectivity and influence in relation to IPM implementation by the farmers and identified strong collaboration between growers, PDOCs, and wine processors, with the latter two being very influential over varieties planted.

Step 4 Identify the role of each stakeholder to implement active prophylaxis and IPM practices

Policy makers identified the roles of each stakeholder in relation to the IPM practice: “1.1.4 Seed/Planting Materials”.

- **Farmers:** choose and plant vine varieties that are genetically resistant or tolerant to specific pests, diseases, or environmental stresses.
- **Rootstock suppliers/ nurseries:** (i) develop new varieties, (ii) develop and maintain a transparent list of varieties along with the services they provide for crop protection, (iii) establish correlations between the resistance ratings of varieties (recorded at the time of their registration in the EU Plant Variety Catalogue) and the actual reduction in pesticide dependence they deliver.
- **Advisory services:** provide independent recommendations on varieties and suitability for specific farmers and prioritise the disease tolerant traits in the varieties they recommend.
- **Protected designation of origin corporations:** include resistant and tolerant varieties in the list of approved varieties; provide training and information to advisory services and directly to farmers.
- **Wine processors and wine sellers:** include resistant and tolerant varieties in the list of preferred varieties for the procurement contracts or product specifications
- **Research organisations:** (i) develop new varieties, (ii) develop and maintain a transparent list of varieties along with the services they provide for crop protection, (iii) establish correlations between the resistance ratings of varieties (recorded at the time of their registration in the EU Plant Variety Catalogue) and the actual reduction in pesticide dependence they deliver.

Step 5 Identify and characterise existing IPM instruments

Policy makers found:

- There were few existing informative, regulatory, economic and research policy instruments related to the uptake of disease tolerant varieties of vine.
- A benchmark of policy instruments in countries with similar crop systems showed that other countries had more and different IPM policy instruments, for example incentives for uptake of resistant varieties and research funding targeted to their national needs.
- Existing policy instruments mainly targeted farmers and PPP advice providers (from the list developed in Step 4), the key features of the instrument and whether there is any information of its effectiveness.
- The actors (from Step 4) not already targeted by any instruments included wine processors and PDOCs and farmers were targeted by instruments not sufficiently effective – they are incentivised to reduce pesticide use annually, but no incentives

supported vine renewal capital investments or regulated planting of disease prone varieties. They should be targeted in priority with additional instruments.

Step 6 Identify the type of policy instrument best suited to enhance the role of each stakeholder e.g.

- **For farmers:** economic (e.g. incentives through funding via CAP or national instrument for planting renewal with disease resistant varieties); informative (credible, independent information on varieties and performance in relation to market requirements); regulatory (mandatory use of disease resistant varieties presenting included in an official list).
- **For rootstock suppliers:** regulatory (binding requirement), economic (either incentive to prioritise disease resistant traits in their programmes, or financial penalty for those who do not), saving certificates mechanisms such as the CEPP in France, etc.
- **For advisory services:** economic (funding for 1-to-1 or 1-to-many advice on vine varieties), regulatory (criteria for the registration of advisors), informative (guidelines, information documents on the correlation between varieties and the actual reduction in pesticide dependence they deliver), knowledge transfer facilities such as demo farms.
- **For protected designation of origin corporations:** research funding for partnering with research organisations, targeting variety research which meets commercial / product needs) informative (e.g. certification or labels, training for local farm advisors) and regulatory (requirement to amend specifications in line with the regulations applicable to vine growers)
- **For wine processors and wine sellers:** informative – training and awareness programmes to educate on disease risks and benefits of new varieties
- **For research organisations:** economic (e.g. funding for variety development and testing – specifically targeted to market requirements and local growing conditions)

Step 7 Design the structure of the policy instruments for effective implementation

Policy makers chose the most adequate policy instruments listed in Step 6, and determined key features to make them the most efficient, including the:

- **Binding** of regulations to prevent planting of the most severely at risk varieties, where viable resistant varieties are already available and **optional** education programmes for wine sellers
- **Prioritising research funding for partnerships** between PDOCs and research institutes, to increase acceptance by wine sellers, farmers and rootstock suppliers of new varieties.
- **Evaluating systems in place** including data collection, for example, tracking deployment through certified plant sales, collect information on the varieties maintained, renewed, or multiplied on-farm to capture the full picture of variety deployment. Additional data to allow evaluation against objectives (Step 2) e.g. economic data, environmental monitoring.

Figure 5 lists the potential IPM policy instruments that could be implemented, targeting the various stakeholders and designed to address their main drivers.

Figure 5: illustration of the possible set of IPM policy instruments per type of stakeholder

Regulatory Economic Informative Research					
Farmers / growers	Advisory services	Rootstock suppliers	Protected designation of origin corporations	Wine processors and wine sellers	Research institutes
Individual Certificate for Plant Protection Products Users; Retailers; Advisors					
Reg EC 396/2005 Max Residue Levels					
Binding requirement to use disease resistant varieties		Binding requirement to develop disease resistant varieties	Binding requirement to incorporate disease resistant varieties		Binding requirement to develop disease resistant varieties
Pesticide reduction certificate mechanism					
Financial penalties					
Incentives: tax credit, subsidies, ...					
CAP intervention targeted to disease resistant variety planted and related advice & support				Contract specifications	
Payments for environmental services (water)	Specific advice (1-to-1 or 1-to-many)	Training, awareness programmes, ...			
		Zero Pesticide Label and Zero Pesticide Residue Label			
Transparent list of varieties along with the services they provide for crop protection					
Cropping system guidelines					
IPM web Portal					
Demo farms					
		Research & Innovation programmes			
		Strategic plan for anticipating PPP withdrawal			

Annex 1 – Number of instruments collated per type and per country

Source: Agrowise policy instrument database. Note some instruments have been implemented across all 8 countries, such as those required by Directive 128/2009/CE for example.

