Recommendations for successful exploitation of IPM networks to scale IPM adoption

Deliverable D1.5

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An EU-wide farm network demonstrating and promoting cost-effective IPM strategies.

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Deliverable D1.5

Recommendations for successful exploitation of IPM networks to scale IPM adoption

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Abstract

IPMWORKS aims to advance Integrated Pest Management (IPM) practices across Europe through a network of hubs engaging farmers and advisors, and collaborative frameworks. This report examines IPMWORKS' methodologies, challenges, and successes in scaling IPM. It draws on IPMWORKS network questionnaires, self-assessment analyses, and validation workshops at both national and EU levels, building on prior deliverables that outline good practices, hub self-assessments, and shared methods among IPM networks. Its goal is to consolidate key insights from IPMWORKS' collective experiences across 16 European countries, highlighting what enables farmer demonstration hubs to most effectively promote broader IPM adoption and the associated reduction of pesticide use.

As part of the Agricultural Knowledge and Innovation Systems (AKIS) node, IPMWORKS emphasizes a multi-actor approach to strengthen the adoption of IPM practices by leveraging farmer communities. The evaluation conducted revealed barriers such as structural issues within hubs and wider socio-economic and cultural factors that influence IPM adoption.

Practical recommendations are provided to address these challenges, including strategies for hub creation and coaching, enhancing stakeholder connectivity, and organizing effective demonstration events. The need to address political, economic, and cultural factors from a multi-level perspective is stressed, and the importance of training and education is highlighted. Recommendations focus on bridging the education gap, improving understanding of the holistic IPM approach, and integrating suitable technology and innovation.

The document concludes with insights from various network actors, summarizing collective recommendations and outlining future directions for strengthening IPM implementation and network effectiveness. This report serves as a resource for stakeholders in IPM, contributing to a roadmap for enhancing the adoption and impact of sustainable pest management practices across Europe.

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Glossary of acronyms

AKIS	Agricultural Knowledge Innovation Systems
CAP	Common Agricultural Policy
DSS	Decision Support Services
EIP-AGRI	European Innovation partnership for agricultural productivity and sustainability
EU	European Union
FDN	Farm Demonstration Networks
IPM	Integrated Pest Management
MAA	Multi-Actor Approach
NFP	National Focal Point
NGO	Non-Governmental Organization

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1. Introduction

The IPMWORKS project is dedicated to promoting crop protection with minimal pesticide use through the adoption of Integrated Pest Management (IPM) strategies. IPM focuses on prevention and non-chemical control methods to reduce reliance on pesticides. While this approach has been adopted by a small group of pioneering farmers across Europe, the majority of European farmers continue to rely heavily on chemical solutions, leading to significant environmental and societal impacts. IPMWORKS aims to change this by creating an EU-wide network of farmers who demonstrate the benefits of holistic IPM practices. These farmers showcase reduced pesticide use, improved pest control, lower costs, and enhanced profitability, offering valuable examples to encourage others to adopt similar practices. The project also focuses on organizing training sessions and developing educational materials to further promote IPM. With 31 partners spanning most EU regions and impacting farmers in 13 Member States and 3 associated countries, IPMWORKS strives to establish a comprehensive, multi-actor network. This network includes both existing national IPM Farm Demo networks and new hubs of volunteer farmers committed to advancing IPM practices. By integrating these efforts, IPMWORKS seeks to significantly advance sustainable pest management across Europe.

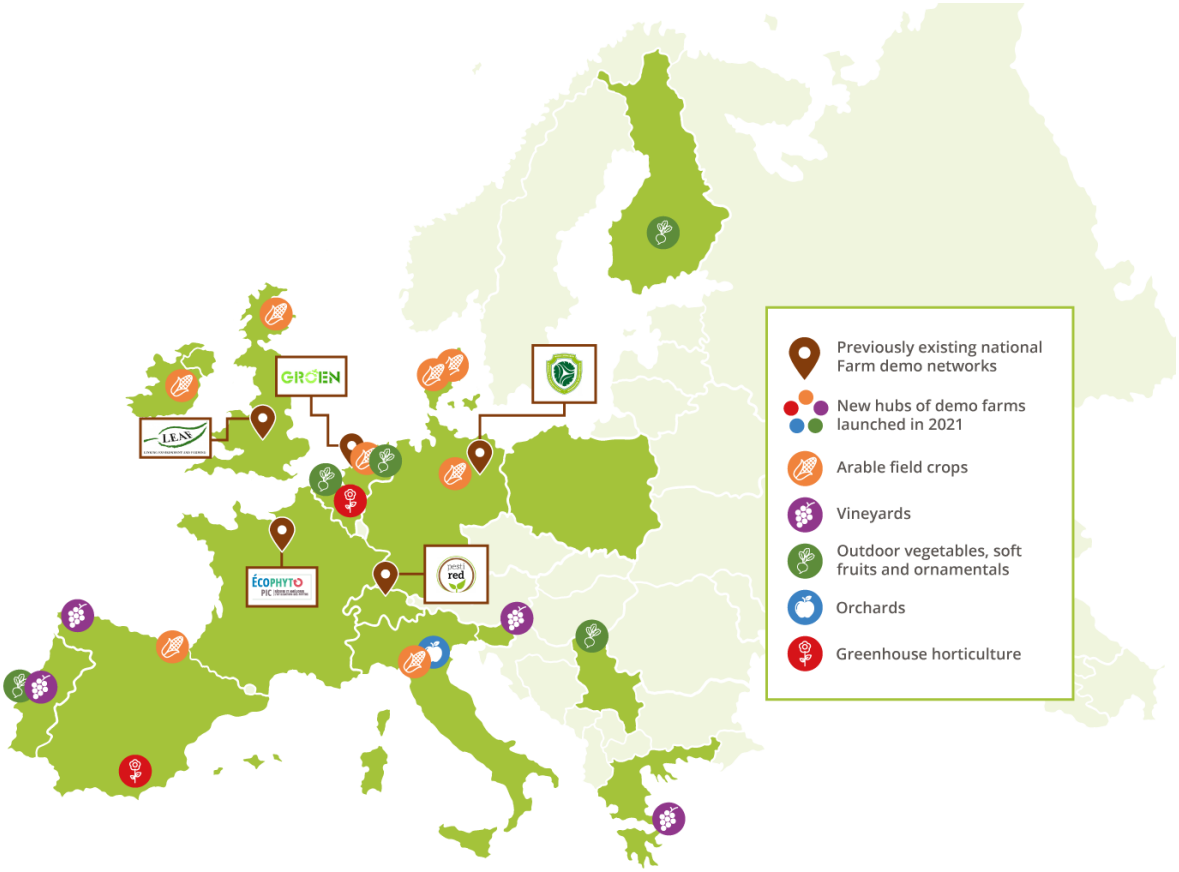

Figure 1. New HUBS created and national networks integrated into the IPMWORKS project.

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For a comprehensive overview of the IPMWORKS project and the demo HUB approach, readers can refer to Section 3.

Throughout the IPMWORKS project, valuable insights were gathered from numerous face-to-face events and interactions with various HUB members, project partners, and stakeholders across 16 European countries. These experiences have shaped several key recommendations aimed at enhancing the effectiveness of IPM-related HUBs to promote the scalability of Integrated Pest Management (IPM) measures. A central aspect of these recommendations is leveraging the diverse network of farmers, advisors, researchers, technical trainers, and industry players, which is crucial for fostering the adoption of IPM practices across the varied agricultural landscapes within the European Union. The relationships cultivated within these networks play a critical role in improving the understanding and application of IPM measures, building trust and collaboration among stakeholders.

In addition to strengthening these connections, IPM-related HUBs provide a supportive platform for knowledge sharing, enabling stakeholders to access valuable insights and collaboratively address uncertainties surrounding IPM practices. This collaborative environment fosters continuous learning and innovation, further aiding the scalability of effective IPM measures. Finally, aligning the efforts of these HUBs with European Union agricultural policies is essential in supporting the transition from traditional pest management approaches to more sustainable IPM strategies. These recommendations aim to guide IPM-related HUBs in expanding the reach of successful practices and contributing to the broader agricultural goals set forth within Europe.

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2. Methodology

This section is structured around several key elements, each contributing to the comprehensive methodology of the IPMWORKS project. These elements include:

- **Pre-existing Networks (section 2.1):** Examining the involvement and contributions of pre-existing IPM networks within the project.
- **Self-assessment Analyses (section 2.2):** A detailed exploration of self-assessments conducted by IPMWORKS demo HUBs.
- **National and EU-Level Workshops (section 2.3):** Insights gathered from national and EU-level workshops, which validated intermediate results and enhanced the recommendations.
    - **National Workshop (section 2.3.1)**
    - **EU Level Workshop (section 2.3.2)**
- **Previous Deliverables (section 2.4):** Synthesizing key findings and guidance from prior IPMWORKS deliverables.

Together, these sources provide complementary perspectives, ensuring a robust analysis of the practices and lessons learned throughout the project.

2.1. IPMWORKS pre-existing networks interviews

Five pre-existing networks participated in the IPMWORKS project alongside the newly established HUBs. These networks were interviewed through a detailed questionnaire focused on IPM practices, facilitation methods, and engagement strategies. The survey aimed to identify potential barriers, challenges, and gather general opinions across the different HUBs and agricultural sector groups managed by these networks (Annex I).

These networks are:

- **DEPHY (France):** Réseau DEPHY (Démonstration, Expérimentation et Production de références sur les systèmes économes en phytosanitaires)
- **PESTIRED (Switzerland):** Pesticide Reduction Network Switzerland
- **LEAF (United Kingdom):** Linking Environment and Farming
- **DIPS (Germany):** Deutsche Initiative für Pflanzenschutzstrategien (German Initiative for Plant Protection Strategies)
- **GROEN (The Netherlands):** Growing Resilient and Organic Environmental Network

2.2. Self-assessment analysis by the IPMWORKS demo HUBs

Through a comprehensive self-assessment conducted by T1.2 *"Stimulate learning through the self-assessments of the IPM demo hubs"* and facilitated by HUB coaches within the project framework, a firsthand understanding of the multifaceted realities encountered by both the HUB coach and its

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members (farmers) has been acquired. This comprehensive examination explores their diverse perspectives, opinions, and the challenges encountered in relation to implementing IPM measures through IPM demonstration networks. Moreover, valuable insights into the intricate dynamics of interaction and collaboration among the various stakeholder groups operating within the HUB have been afforded through this self-assessment process, which appears to differ significantly between countries.

2.3. Validation workshops

2.3.1. National workshop

A validation workshop was conducted by 15 National Focal Points of the project in their respective countries to validate the intermediate results of this deliverable. The workshop began with an introduction to the project's scope, HUB concepts, the importance of HUB coaches, and the role of demonstration events. It then proceeded to present and validate recommendations for establishing HUBs, conducting successful demonstrations, boosting IPM adoption through knowledge exchange, and identifying barriers. Group activities followed, including a word cloud discussion to gather insights on driving IPM adoption, scaling methodologies, and customizing HUBs for local contexts. Additionally, there was an AKIS definition segment and a questionnaire on IPM practices and AKIS interaction. The session concluded with documenting the main points and significant takeaways.

To maximize productivity, the workshop involved diverse stakeholders from various sectors within the AKIS. This included representatives from universities and research institutions, professional agricultural associations and cooperatives, private companies, European project institutions, advisory services, agricultural innovation HUBs, and Non-Governmental Organizations (NGOs). This diverse representation ensured comprehensive participation and enriched the workshop's conclusions.

A workshop guideline had been devised to validate and reinforce the recommendations collected throughout the project. Each National Focal Point (NFP) (Annex II), representing one of the 16 countries involved, conducted this workshop to present the recommendations to their agricultural network and relevant national stakeholders involved in agriculture, pest management, pesticides, and potential alternative crop control measures.

To ensure consistency and comparability across regions and crop types, the NFPs had been provided with workshop materials and reporting templates. These resources standardized responses and outcomes from all NFPs, facilitating the detection of differences between regions or crop types.

2.3.2. EU Level Workshop

Another valuable source of information that has reinforced and validated the project's recommendations is the EU Level workshop held during the IPM conference in Brussels in May 2024. This workshop engaged participants from various countries and sectors involved in IPM, as detailed in Annex III.

The workshop was structured into two sessions of 45 minutes each, leveraging the diverse perspectives present at the event. It primarily focused on presenting key recommendations organized by thematic areas. Firstly, it provided contextual background crucial for understanding the workshop's content, highlighting the challenges and opportunities associated with IPM measures. It underscored the diversity

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within the European context, emphasizing the complexities across different European regions, and emphasized the importance of various stakeholders in addressing IPM issues.

Secondly, the workshop explored strategies for empowerment and recommendations gathered from multiple sources used in the study. These strategies aimed to overcome barriers and identify pivotal stakeholders to enhance the scalability of IPM measures. The workshop also analyzed education as a critical aspect for raising awareness about IPM.

Towards the conclusion of the workshop, a case study on the DEPHY network (from France) was presented as a model for effective HUB management in disseminating IPM measures. This case study prompted discussions within the group about essential measures for effectively disseminating knowledge on IPM, adaptable characteristics for other European regions, and potential additional measures to enhance scalability.

Overall, the workshop served as a significant platform for refining project recommendations through collaboration and diverse perspectives within the IPM community.

Figure 22. EU Level workshop during the IPM Conference in Brussels 14.05.24

2.4. Previous deliverables

2.4.1. D1.1: Good practices for learning and adoption of IPM practices in IPM pre-existing HUBs and networks.

This first IPMWORKS deliverable provides guidance and practical examples for effectively creating and managing HUBs and networks to promote IPM practices. Drawing from interviews with European demo network facilitators and relevant literature, the document addresses several key areas: holistic IPM strategies, challenges in adoption, building effective networks, engaging farmers, and methods to facilitate learning. It offers practical tips and key insights, including a useful table linking IPM principles with specific learning activities. Additionally, there is a dedicated chapter on the role of facilitators, known

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as HUB coaches, which outlines their importance in network success. These findings form the basis for D1.5 key recommendations, focusing on how to establish successful IPM demonstration networks.

2.4.2. D1.2 Learning and meaning-making in IPMWORKS HUBs

This deliverable examines farm demonstration networks (FDNs) as platforms for farmer learning in IPM and their impact on IPM adoption. The results were obtained through an analysis of a series of observations conducted over two years in Belgian and Dutch HUBs, as part of a human science PhD thesis focused on the topic (Simon Lox, ILVO, Belgium). The deliverable argues that IPM's challenging and transformative nature requires continuous learning facilitated by FDNs. The research aims to understand how farmers learn from each other in FDNs to enhance their understanding and adaptation of IPM strategies.

2.4.3. D1.3: Analysis report of the IPMWORKS HUB self-assessments

This report summarizes insights from the self-assessments conducted by IPMWORKS demonstration HUBs from 2022 to 2024, highlighting conditions and factors that enable demo HUBs to contribute effectively to wider application of (holistic) IPM and thus to reduced pesticide use. Recommendations include organizing practical demonstrations, fostering peer-to-peer learning, addressing communication barriers, providing continuous training for HUB coaches, facilitating connections with external initiatives, adopting holistic IPM approaches, organizing cross-visits among farmers, tailoring strategies to local conditions, leveraging digital tools for engagement, and understanding cultural and economic factors influencing IPM adoption. The self-assessment served as the foundation for the recommendations developed in deliverable D1.5.

2.4.4. D2.2: Compilation of agreed common methods among existing IPM networks.

This deliverable synthesizes best practices from five European demo-farm networks promoting IPM. Recommendations include involving farmers, advisors, and researchers; motivating farmers with values; defining clear roles and activities; implementing IPM on entire farms gradually; fostering peer-to-peer learning through farmer groups; prioritizing field visits and face-to-face communication; publishing results to enhance IPM advice; emphasizing preventive measures and alternative controls like mechanical and biological methods; and conducting regular planning and evaluation at farm and network levels.

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3. The IPMWORKS Context and the demo HUB approach

3.1. The IPMWORKS context

The IPM approach has long been recognized as a promising solution for sustainable agriculture, aimed at reducing the reliance on chemical pesticides while ensuring effective pest control. Introduced decades ago, IPM was envisioned to strike a balance between environmental protection and agricultural productivity. However, despite its introduction and the regulatory frameworks that followed, including Directive 2009/128/EC and Regulation (EC) No 1107/2009, IPM has not fully delivered on its promise in Europe. These regulations were designed to promote the sustainable use of pesticides and set stringent criteria for pesticide authorization, with each EU member state required to develop national action plans to reduce pesticide use and implement IPM strategies. The Directive 2009/128/EC mandates that since 2014, all EU farmers apply IPM principles to reduce pesticide use and promote sustainability. These principles focus on preventing pests through practices like crop rotation and resistant varieties, regularly monitoring pest levels, and acting only when necessary, based on economic thresholds. Farmers are encouraged to prioritize non-chemical methods, apply targeted treatments to minimize environmental impact, and use pesticides sparingly. Additionally, strategies to prevent pest resistance, such as rotating treatments, are required, and the effectiveness of pest control measures should be regularly evaluated and adjusted as needed. However, the practical implementation of these measures has faced several challenges, including limited farmer adoption, fragmented initiatives, and difficulties in scaling IPM practices across diverse agricultural landscapes.

In this context, the concept of demo HUBs presents a new and promising approach to reinvigorating the adoption and implementation of IPM strategies across Europe. Demo HUBs—networks that bring together farmers, advisors, researchers, and other stakeholders to share knowledge and demonstrate innovative practices—have been increasingly recognized for their potential to drive change at the grassroots level. Notably, initiatives such as NEFERTITI (GA No. 772705), a European Union-funded project aimed at promoting agricultural innovation through networks of demonstration farms and living labs, have already explored and refined the demo HUB approach, demonstrating its effectiveness in fostering collaboration and scaling innovations in agriculture. These HUBs serve as practical platforms where IPM practices can be tested, adapted, and showcased in real-world settings, thereby enhancing their credibility and uptake among farmers.

By leveraging the demo HUB model, there is a renewed opportunity to bridge the gap between IPM theory and practice. This approach not only enhances the dissemination of best practices but also aligns with the European Union's and member state governments' growing commitment to reducing pesticide use and advancing sustainable agriculture. As part of the EU's broader goals, including those outlined in the Farm to Fork Strategy and the European Green Deal, demo HUBs are envisioned as pivotal components in advancing agricultural sustainability. These HUBS, exemplified by projects like IPMWORKS and NEFERTITI, are designed to enhance the adoption of IPM practices by providing practical, hands-on demonstrations

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and fostering collaborative learning among farmers, researchers, and other stakeholders. By facilitating the exchange of innovative techniques and best practices, demo HUBs can significantly contribute to the EU's objectives of reducing pesticide use, minimizing environmental impact, and promoting a more sustainable agricultural future across Europe.

3.2. IPMWORKS is promoting a holistic vision of IPM

IPMWORKS has been developed under the banner of the Farm-to-Fork strategy, that set two non-legally binding pesticide reduction targets, namely a 50% reduction in the use and risk of chemical pesticides and a 50% reduction in the use of more hazardous pesticides. IPM has the potential to contribute to a significant decrease in the reliance of agricultural systems on pesticides, provided that it is implemented at the farm level with a holistic approach considering all the relevant aspects of pest, weed and disease management. The IPMWORKS consortium has discussed about the concept of holistic IPM, and agreed about both the objectives and the practical implementation of holistic IPM in view of reducing pesticide inputs and impacts.

- The objectives of holistic IPM are to get healthy crops with a limited use of chemical solutions, particularly of pesticides with some possible impacts on the environment and human health, to provide a safer environment with enhanced biodiversity, and to avoid the selection of resistant biotypes in pest populations. Holistic IPM aims at providing a better control of the pest, and should contribute to the economic profitability of European farming;
- The practical implementation at the field level, in the view of reducing the reliance on pesticide, should consider each of the **five pillars of holistic IPM**, whenever relevant, as they all have the potential to contribute to the various objectives. As defined by the IPMWORKS community, the five pillars are:
    - The arrangement and management of **agricultural landscapes**, with diverse semi-natural habitats, hedgerows, isolated trees, flowers strips, beetle banks, to attract beneficial organisms that have the potential to regulate crop pests and decrease pest pressure.
    - The **design of cropping systems** by combining preventing measures able to decrease the local pressure of invertebrate pests, weeds and pathogens, through crop rotations including functional diversity, cultivars resistant to pests and diseases, adapted sowing dates and densities, adapted fertilization and soil tillage whenever relevant, adapted pruning, etc.
    - The preferential use of **non-chemical control options**, when they are available and applicable, such as biocontrol solutions, mechanical weeding or robotics, protective nets.
    - The **optimization of decision making** to avoid unnecessary treatments, by making use of Decision Support Systems, and precise monitoring of local pest pressure. On this topic, IPMWORKS is promoting the IPM-Decisions platform, that provides easy access to a range of Decision Support Systems with this specific purpose.
    - The **maximization of the efficiency of treatments**, when they are deemed necessary, by using proper technologies of precision agriculture, such as patch spraying, or the adaptation of the doses to the specificities of the crop and of the pest, without any impact on the efficacy of the treatments to avoid the development of resistances.

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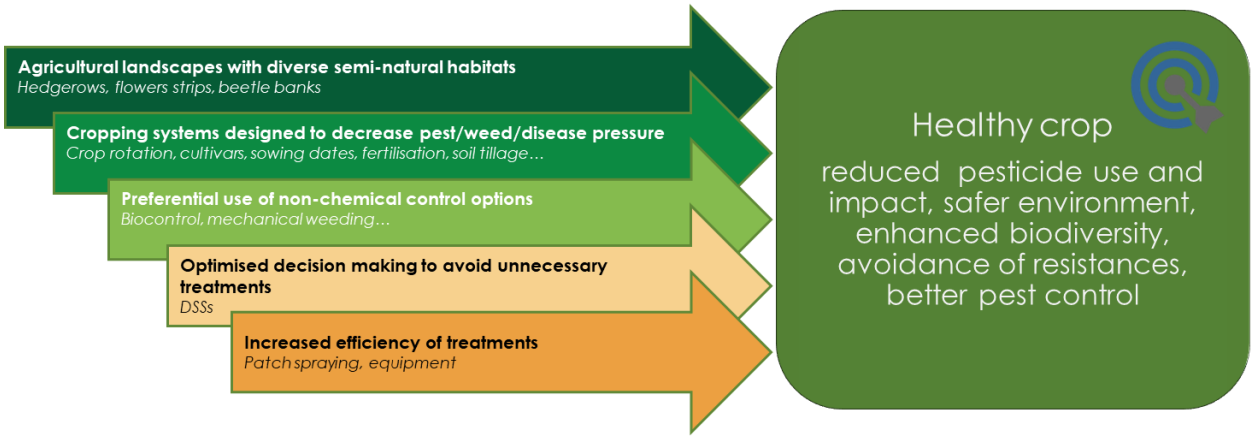

Figure 3. The five pillars of holistic IPM.

The five pillars of holistic IPM should be considered for the management of all potential invertebrate pests, weeds, and plant pathogens likely to provoke yield losses. The systemic approach required for the design of site-specific strategies based on holistic IPM implies to consider a systemic vision in the evaluation of the cost-efficiency of the whole strategy, since the cost of one specific component of the strategy (e.g., cost of biocontrol solutions) can be offset by the cost saving of other components (e.g., saving of pesticides and of fertilizers). IPMWORKS demo events might be focused on a specific component of the whole holistic strategies (e.g., a specific innovative equipment for mechanical weeding), but this component is always presented as part of a full strategy, with all the consequences on the farm economics.

3.3. The demo HUB approach

The recommendations presented in this deliverable are derived from the lessons learned during the project and target all key stakeholders involved in the sustainable development of IPM networks. It highlights the role each stakeholder can play in implementing these recommendations. The main instrument for the project's interaction with various actors has been the HUB, which serves as a central node for coordinating activities and advancing the project's objectives. The report also analyses the functioning of the HUBs as tools for spreading IPM practices, building capacity, encouraging peer-to-peer learning, and facilitating multi-stakeholder actions to enhance the adoption and scalability of these measures.

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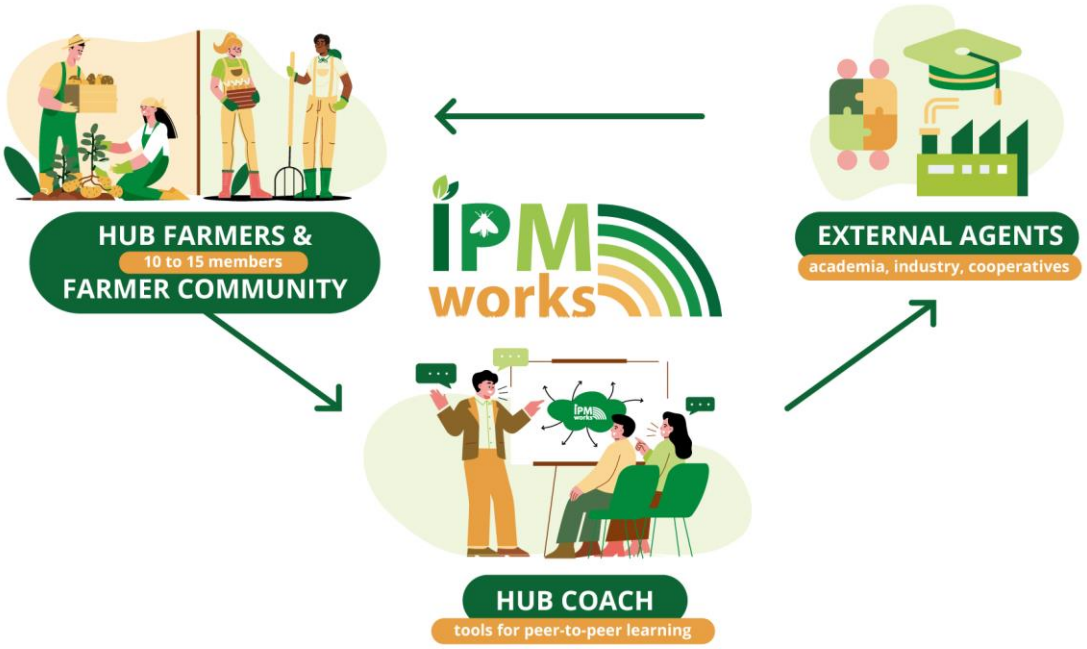

Figure 44. HUB interconnections.

Particular emphasis is placed on the role of the HUB coach among the stakeholders in the IPM environment. The HUB coach is critical for the successful operation of the HUB, responsible for identifying key actors, analysing the group's needs, facilitating actions within the HUB, and ensuring its engagement and sustainability. There is no specific sector or professional background required for a HUB coach; they can come from various profiles within the agricultural sector, particularly those related to IPM. In the IPMWORKS project, HUB coaches often have backgrounds as advisors, representatives of associations and cooperatives, or from agricultural innovation HUBs. Farmers engaged in the HUBs might also be involved in other similar groups led by researchers or policymakers, often under regional administration.

Despite their varied backgrounds, a HUB coach must possess key skills, particularly soft skills, communication abilities, and group management capabilities. Due to their significance in the IPM framework, this report provides specific recommendations with a special focus on HUB coaches.

3.4. HUBs within the AKIS

The future of agriculture will hinge on modernization driven by sustainability and innovation. Central to this transition is the Multiactor Approach (MAA) within the AKIS. The MAA fosters collaboration among a diverse range of stakeholders - including members of the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) and national Common Agricultural Policy (CAP) managers, researchers, academic members, university professors of agricultural subjects, environmental associations and NGOs- enabling a comprehensive understanding and effective implementation of IPM. By integrating various perspectives and expertise, this approach enhances the adoption of modern techniques and promotes sustainability.

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AKIS serves as the central HUB within this framework, linking stakeholders and enabling effective knowledge exchange. It supports shared goals and collaborative efforts, which are crucial for advancing agricultural practices. Through AKIS, the synergy between different actors enriches pest management strategies, drives the integration of cutting-edge technologies, and supports sustainable development.

Together, the MAA withing the AKIS node enhances the effectiveness and resilience of agricultural practices, leading to a more innovative and environmentally friendly agricultural sector. This collaborative model ensures that advancements in pest management and other agricultural practices are widely adopted and effectively implemented, paving the way for a sustainable future in agriculture.

Here can be seen the description of different AKIS actors around the role of the HUB.

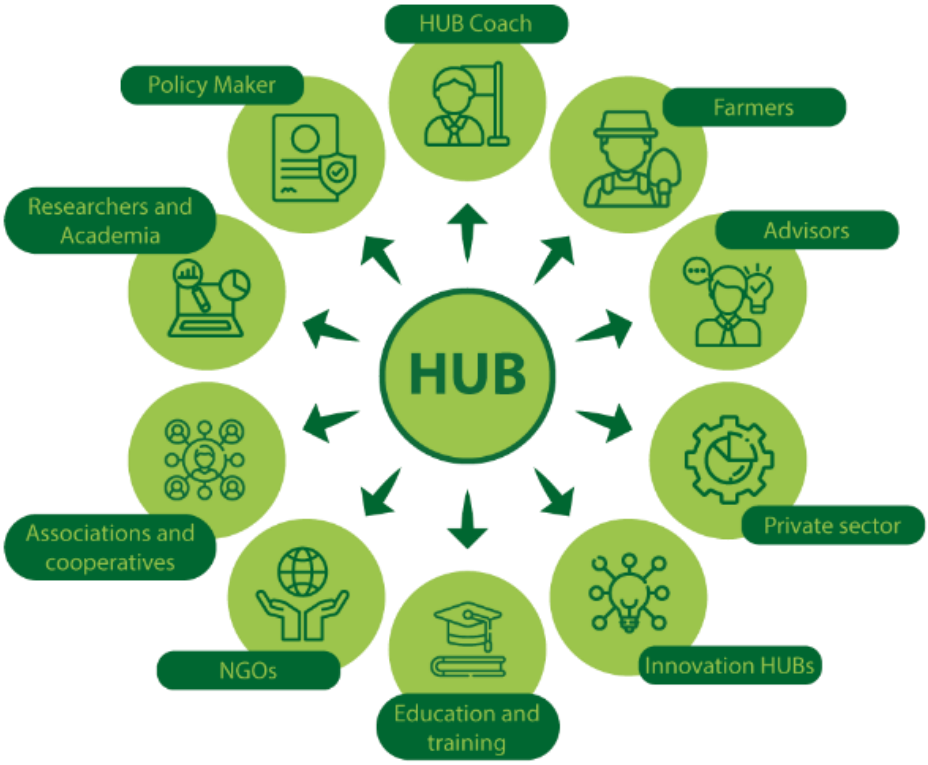

Figure 55. AKIS structure around the HUB Coach.

- **HUB** functions as the central point for coordination and collaboration within the IPM networks. It acts as the main facilitator for bringing together diverse stakeholders such as farmers but also advisors, industry representatives, researchers, and policymakers. The HUB ensures that information flow, resource allocation, and strategic planning are effectively managed to support the implementation of IPM measures across the agricultural landscape. By fostering a community-driven approach, the HUB facilitates the sharing of best practices, the development of innovative solutions, and the promotion of sustainable agriculture. This initiative not only encourages farmers within the HUB to advance their adoption of Integrated Pest Management (IPM) practices but also extends its reach to the broader regional farming community, ensuring a collective effort toward sustainable farming practices.
- **HUB coach** plays a crucial role in facilitating knowledge exchange in IPM networks and disseminating information to farmers and other stakeholders. The recommendations encompass

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various aspects of their professional expertise such as HUB creation, group facilitation, event management, and efficient information transfer. These recommendations are designed to enhance their effectiveness and maximize their impact.

- **Farmers** are the primary recipients of information and the key implementers of IPM measures, making them the central focus of our recommendations. The recommendations of this report emphasize the importance of farmers exploring new alternatives for pest management and preparing themselves for the future of agriculture in this domain. It is vital that this group feels motivated and equipped to adopt improved practices in pest management, replacing outdated methods with ones that are better suited to a changing reality and aligned with upcoming European regulations. Furthermore, farmers play a crucial role in the co-production of knowledge through peer-to-peer exchanges and by testing IPM practices on their fields. Farmers are key for demonstration events that are likely to convince a wider audience that IPM is worth implementing, since skeptical farmers will always be more impressed by practical implementation of different approaches to pest management showcased by peer neighbor farmers than theoretical presentations of distant IPM trials. This collaborative approach not only enhances the practical application of IPM but also fosters a community of shared learning and innovation, ensuring that pest management strategies are both effective and adaptable to evolving agricultural challenges.
- **Advisors** serve as experts trusted by local stakeholders and have a reputation tied to the groups they work with, recommendations are offered to enhance their technical expertise in agricultural knowledge, specifically regarding IPM measures. These recommendations aim to bolster their practical skills and ensure they can effectively guide and support farmers in adopting sustainable practices.
- **Private sector/Industry** consolidates the efforts of the previous members of the chain in its implementation towards the commercial environment and foreign markets. It faces an increasingly demanding food sector with consumers who are more and more aware of sustainability, health, and quality issues. The industry, both agro-food, retailers and industrial providers, is becoming more demanding in terms of the origin and protection of its products. Additionally, industries that deliver machinery, crop protection products, and other agricultural inputs also play a crucial role. These sectors are vital in supporting and enhancing the networks that ensure efficiency, sustainability, and innovation in agricultural practices and food production.
- **Innovation HUBs** work as dynamic research stations within the IPM framework, equipped with dedicated fields for experimentation and applied research. These centres bring together scientists, entrepreneurs, and technology experts to create, test, and compare innovative pest management solutions in real-world conditions. By developing advanced technologies, such as sophisticated monitoring systems and biopesticides, these HUBs enable the practical application of Integrated Pest Management strategies. Through rigorous testing and evaluation, Innovation HUBs play a vital role in translating scientific discoveries into effective solutions that can be adopted by farmers and other stakeholders.
- **Education and training** institutions are pivotal in preparing the next and current generation of agricultural professionals. They offer programs and courses that focus on sustainable agriculture, pest management, and IPM principles. By providing both theoretical knowledge and hands-on experience, these institutions ensure that (new) agricultural professionals are well-equipped to implement and advocate for IPM practices. Continuous professional development opportunities for current practitioners also help to keep the agricultural community updated with the latest advancements and best practices in pest management.
- **NGOs** play a significant role in advocating sustainable agriculture and supporting the implementation of IPM measures. They often work closely with local communities to promote

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awareness, provide education, and facilitate access to resources necessary for effective pest management. NGOs also engage in policy advocacy, aiming to influence legislation and funding priorities to support sustainable agricultural practices and environmental protection.

- **Associations, producer organizations, and producer cooperatives** act as collective bodies that represent the interests of farmers and other professionals involved in agriculture. They provide a platform for knowledge exchange, collective bargaining, and resource sharing. By organizing training sessions, workshops, and field days, they may help disseminate IPM techniques and foster a community spirit that encourages mutual support and collaboration. These organizations can be essential in amplifying the voice of the agricultural community and driving the adoption of sustainable practices.
- **Researchers and academia.** As an important part of the stakeholder environment of IPM, researchers are working closely in sustainable pest control strategies. Through practical training and mentoring, educates future professionals in principles of control including the use of biological and chemical intervention. Together researchers and trainees conduct studies in the field, experiment, analyze data, and implement innovative techniques as pioneering testers.
- **Policy Makers** are instrumental in shaping the regulatory and legislative landscape that supports IPM measures. They develop and implement policies that promote sustainable agriculture, incentivize the adoption of IPM practices, and ensure compliance with environmental and safety standards. By providing funding for research and development, and creating frameworks for cooperation among stakeholders, policy makers play a crucial role in driving the widespread implementation of effective pest management strategies.

Sharing the project's best practices, lessons learned, and implementation challenges throughout its lifecycle serves as a valuable resource for others who wish to work with these insights in other IPM-related initiatives.

The recommendations contained in this report are addressed to all of the above-mentioned actors that are part of IPM networks or are directly linked to activities that could potentially integrate IPM. These recommendations aim to provide IPM networks with the necessary tools to develop, enhance and stimulate their connectivity by identifying concrete actions that will enable them to build stronger relationships, share information more effectively and learn about good practices in all aspects of IPM measures and their implementation. In this way, by applying the guidelines shared in these recommendations, greater scalability of IPM measures, thereby encouraging and facilitating their broader adoption.

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4. Barriers and challenges encountered

The recommendations outlined in this report are based on a thorough examination of network follow-up and an analysis of the efficacy of their processes and approaches as explained in the Methodology section. The aim is to fortify IPM networks, thereby enhancing their effective actions and fostering improved implementation and scalability of IPM measures, but also detecting the barriers and weak points that can hinder the successful development of IPM strategies.

Throughout the analysis of IPM-related networks and stakeholder groups, prevalent barriers and challenges for IPM adoption have been identified, transcending regional or crop-specific distinctions. These findings are based on the project's outcomes and reflect the core insights gained during its execution. Recognizing these barriers has been instrumental for the project, providing a strong argument for adopting the HUB approach and guiding efforts to overcome the detected obstacles.

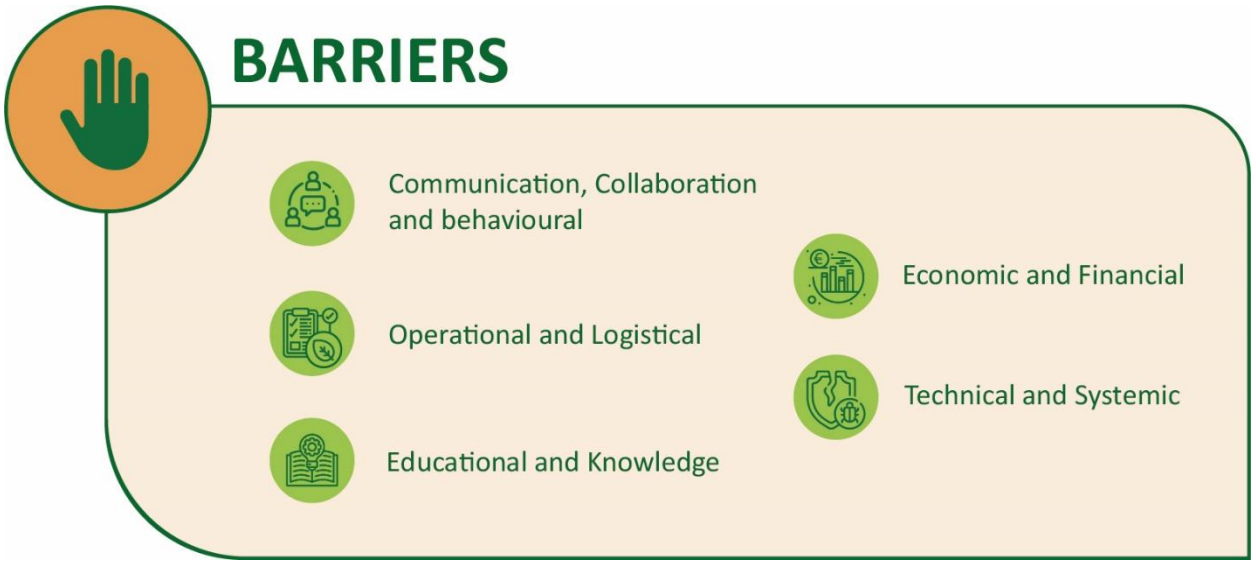

Figure 66. Barriers and Challenges in Scaling IPM Across HUBs.

The barriers identified can be clustered into five different categories:

1. **Economic and Financial Barriers**

- **Economic viability**: The low share of pricing for food products that goes to farmers can make it challenging to justify investments in labour-intensive IPM practices or to allocate resources for learning new methods. This economic constraint often discourages growers from adopting innovative but costly IPM strategies. For instance, implementing IPM practices like establishing wildflower strips can be economically burdensome due to seed costs and the opportunity cost of taking land out of production. Farmers may be hesitant to invest in these practices if the economic benefits are not immediately evident or guaranteed, particularly in small-scale farming where margins are already tight. To overcome these challenges, it is crucial to engage both agri-food

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chains and consumers in supportive initiatives that promote Integrated Pest Management (IPM) products produced with reduced pesticide inputs. Emphasizing crop diversification and enhancing economic value will be key components of these efforts, ensuring that all stakeholders are aligned in their commitment to sustainable agricultural practices. By fostering collaboration across the supply chain, we can drive the adoption of IPM strategies and create a more resilient and environmentally friendly agri-food system.

Comprehensive studies within HUBs should evaluate the economic impact of reduced pesticide use on various cropping systems. This data can support the development of realistic pesticide reduction goals that ensure crop viability. Additionally, promoting cost-effective alternative pest management practices, such as biological control agents, resistant crop varieties, and improved cultural practices, is crucial. However, the high cost of (some) beneficial organisms, skepticism about their effectiveness and the expense of advanced machinery can further hinder adoption.

- **Fear of adopting new practices due to concerns about potential yield loss**: Farmers may hesitate to adopt IPM practices due to concerns about potential yield loss. This fear often arises from uncertainty about how IPM techniques will perform compared to conventional pest management methods. Overcoming this barrier requires education and demonstration of the effectiveness of IPM practices through research and outreach programs. For instance, in the vegetable sector, spraying is often viewed as crucial for safeguarding high-value crops like Brussels sprouts, which can generate significantly higher turnover per hectare compared to other crops like wheat. This perception creates a barrier to adopting IPM practices, as farmers fear potential financial losses if they reduce spraying. In specific cases, such as among Serbian farmers, opinions on the food safety of final products under IPM can be mixed. Some may view IPM as beneficial due to reduced reliance on chemical pesticides, leading to fewer residues on crops. Others may have concerns about whether IPM methods can effectively control pests and diseases to meet food safety standards. These opinions are influenced by the farmers' knowledge of IPM, their personal experiences with IPM practices, and their trust in alternative pest management approaches. On a positive note, some IPM-based techniques can help mitigate risks. For example, diversifying crop rotation and growing seasons can be especially beneficial in the context of climate change, which introduces significant uncertainties regarding weather patterns during growing seasons. To further support the adoption of IPM, it is crucial to advocate for research into the complex relationships between IPM practices and economic risks. Networks of IPM demonstration farms could play a vital role in this effort by facilitating participatory research. Such initiatives would enable farmers to share their experiences, test various IPM strategies, and ultimately build confidence in these practices, thereby enhancing both environmental sustainability and economic resilience.
- **Labour shortage**: A major challenge in adopting the IPM practices that are labor-intensive, such as mechanical weeding and the use of beneficial organisms, is the shortage of labor. These practices demand significant time and expertise to implement effectively. In the vineyard sector, as observed in the project, one approach to mitigating these challenges is developing labor-sharing programs within HUBs, allowing farmers to collaborate on tasks like placing dispensers and thus reducing individual labor burdens. Additionally, exploring technological solutions could streamline the deployment process, making it more efficient and accessible for growers.

2. Educational and Knowledge Barriers

- **IPM measures are often perceived as complex:** IPM strategies can sometimes be perceived as complex or difficult to understand, leading to reluctance in adopting them. Farmers may feel

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intimidated by the technical language and concepts associated with IPM. To address this barrier, it's crucial to simplify and demystify IPM by providing clear and accessible information, training, and resources. This can help farmers better understand the principles and benefits of IPM and feel more confident in implementing its practices.

- **Transition period and adaptation**: IPM requires an adaptive approach tailored to local contexts, needs, and capacities. Rushing changes without consistent solutions for pest control can lead to resistance and ineffective adoption. Transition periods are needed to allow farmers time to adapt their strategies and practices gradually. The benefits of IPM, such as improved soil health or pest management outcomes, may not be immediately visible or measurable within a short timeframe (e.g., 4 years). This can make it difficult to demonstrate the effectiveness of IPM practices convincingly. Successful implementation of IPM relies on building a strong bond of trust between participants, including farmers and advisors. This trust-building process takes time and requires open communication and mutual understanding of each farm's unique circumstances.

- **Limited Reach to New Farmers**: Participation in IPM demo events and HUBs often include farmers who are already supportive of IPM benefits. However, attracting new participants, particularly those sceptical or unfamiliar with IPM, presents a challenge. Many farmers fail to see the immediate benefits of attending these events, as the advantages of networking and adopting new practices may not be immediately evident. Consequently, participation can be low. Despite being comprised of pioneer farmers committed to reducing pesticide use, these demo networks alone are insufficient for widespread adoption. Additionally, farmer organizations might not fully appreciate the value of HUBs or may lack the motivation to support them. To address this, it is crucial to educate and engage farmer organizations about the benefits and potential impacts of HUBs to secure their support and encourage broader participation.

3. Communication, Collaboration and behavioural Barriers

- **Lack of communication skills within networks:** Effective communication is crucial for the successful implementation of IPM, requiring collaboration among farmers, extension agents, researchers, and other stakeholders. Inadequate communication skills or barriers can obstruct the exchange of information and knowledge about IPM practices. To address this, improving communication within agricultural networks through targeted training, workshops, and networking events can enhance the sharing of experiences, best practices, and challenges, thereby facilitating more effective IPM implementation.

- **Strong competition and reluctance to share**: Intense competition among growers often impedes the sharing of innovations and best practices. HUBs can address this by demonstrating how IPM can offer a competitive edge through higher quality produce or reduced long-term costs. By showcasing case studies where IPM has improved profitability and sustainability, HUBs can encourage growers to overcome their reluctance to share information. It is particularly challenging to find farmers willing to openly discuss their experiences, especially if they involve failures or difficulties. In highly competitive sectors, like horticulture, growers may hesitate to share knowledge and data due to fear of judgment or a desire to maintain a competitive advantage. This competitive environment can hinder collaboration and limit the open exchange of information crucial for collective progress.

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4. **Operational and Logistical Barriers**

- **Work calendar conflicts**: Farmers and other agricultural stakeholders often face busy schedules and time constraints due to seasonal variations in agricultural activities, which can create conflicts with the timing of IPM interventions. Implementing certain IPM practices may require specific timing or coordination with other agricultural tasks, leading to difficulties in finding suitable windows of opportunity. Moreover, workload tight calendars are often a barrier for joining HUB activities designed for peer-to-peer knowledge exchange (meetings, demo events). Addressing this barrier means careful planning and coordination to develop IPM activities into existing work calendars and agricultural schedules, checking that they are implemented at the most appropriate times without causing disruptions to other farm activities and ensuring the success of the events, meetings or activities planned.

- **Unique farms situations**. The diversity in crops, farm sizes, and market strategies complicates the formation of cohesive and comparable groups for HUB activities. This variation makes it difficult to standardize approaches and ensure that HUB initiatives effectively address the unique needs and challenges of each participant. Customizing HUBS to cater to the specific needs and challenges of different subgroups within each sector is essential. This could involve creating specialized HUBS tailored to specific crop types or market segments, ensuring relevance and applicability of IPM strategies. Each farm operates under distinct conditions, including varying crop types, soil characteristics, and pest pressures, making it challenging to generalize successes from one farm to another. IPM strategies need to be tailored to fit specific contexts, as practices that work well for one farmer may not be effective for another. This variability complicates the task of scaling successful strategies. This variability complicates the task of scaling successful strategies, but it also underscores the need for tailored approaches that help each farmer develop solutions adapted to the specific conditions of their farm. This is precisely the goal of HUB activities: to support farmers in finding personalized strategies that align with the unique characteristics of their operations.

5. **Technical and Systemic Barriers**

- **Quality demand**: Stringent quality demands from the retail and food chain sectors can hinder the implementation of certain IPM practices. Growers may face pressure to meet specific standards that discourage practices like tolerance for certain pests or unusual crop appearances due to viruses. Some obstacles to effective IPM implementation, such as market demands for specific crop combinations or the availability of suitable outlets for diversified crops, require collaboration with external stakeholders beyond the immediate farming community.

- **Precision of Pest/Disease Warning Systems**: While growers often distrust pest and disease warning systems due to perceived issues with precision and timeliness, relying on personal field observations is not inherently a bad approach. In fact, informed decisions based on real-time field conditions can be highly effective. The problem arises when distrust in these systems leads farmers to adopt rigid, calendar-based treatment schedules without adapting to specific field conditions. To overcome this issue, it is important to develop contingency plans that account for varying conditions. This can involve integrating multiple IPM methods and using regular monitoring to make timely decisions. Additionally, evaluating and adapting decision support systems to local conditions can enhance their reliability. By focusing on creating tools that are relevant to specific contexts, farmers can make better-informed pest management decisions, leading to increased adoption of IPM practices.

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5. Boosting IPM networks effectiveness: strategic recommendations for scaling implementation measures

Chapter 5 focuses on strategies to improve the effectiveness and scalability of IPM networks. It offers a detailed exploration of methods to enhance the operation of IPM networks, with the goal of broadening their reach and impact across various agricultural settings.

The chapter is structured into the following key sections:

- **The HUB and HUB coach as change agents:** This section explores the central role of HUBs and HUB coaches in connecting stakeholders, fostering collaboration, and driving the adoption of IPM practices. It highlights the importance of these roles in facilitating knowledge exchange and overcoming common barriers.
- **Effective creation of IPM demo HUBs**: Recommendations for establishing and managing IPM demonstration HUBs are detailed here. This includes strategies for building local relationships, ensuring sustainability, and understanding IPM values to drive adoption.
- **Supporting good connectivity:** This section addresses the importance of creating personal connections, integrating local networks, and engaging with advisory services and the private sector to enhance the reach and effectiveness of IPM networks.
- **Effective facilitation**: Insights into the facilitation of HUB activities are provided, including the importance of adapting communication styles, developing high-quality materials, and maintaining continuous engagement with network members.
- **Communication and participation:** The chapter emphasizes promoting a culture of dialogue, facilitating knowledge exchange, and ensuring active participation through effective planning and suitable event locations.
- **IPM demonstrations:** Guidance on running successful IPM demonstration events is presented, focusing on strategic planning and tailoring IPM examples to farmers' needs.
- **Addressing external factors**: Strategies for navigating political, economic, and cultural challenges are discussed, including advocacy for support and understanding local cultural nuances.
- **Training and education:** The chapter concludes with recommendations for bridging the education gap in IPM, enhancing awareness, and integrating technology and innovation into training programs.

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By providing these strategic recommendations, this chapter aims to support the scaling of IPM practices and improve the overall effectiveness of IPM networks, contributing to more sustainable and resilient agricultural systems.

Recommendation clustering	Recommendations in a few words	Barriers overcome
Effective formation of IPM demo hubs	Proximity Sustainability Understanding IPM values	
Supporting good connectivity	Creating personal connections Reaching local networks Engage with advisory services Build relationships with private sector Involve other projects and speakers Enhance cross-country and cross-sectoral events	
Effective facilitation	Facilitation as a key Being a moderator more than a leader Use proper language and good translations Developing audiovisual materials Frequent communication with network members Continuous mentoring Use of surveys and polls	
Communication and participation	Embrace culture of dialogue Knowledge exchange Collaborative planning process Provide solid information Encourage participation Suitable locations Create a safe space Use of facilitation tools and methods	
IPM demonstrations	Run a successful demonstration event IPM approach on demonstration events	
Addressing external factors	Approaching political aspects and economic concerns Cultural considerations	
Training and education	Addressing the education gap in IPM Awareness and understanding about IPM measures Capacity building programs Bringing technology and innovation closer	

Figure 77. Table of recommendations and barriers overcome.

5.1. The HUB and HUB Coach as change agents

In analyzing the management, development, and use of IPM networks effectively, the emphasis has been placed on HUBs as the central nexus connecting various stakeholders in agriculture. These stakeholders include mainly farmers, but also advisors, educators, researchers, and local/regional government

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representatives. The objective is to collaboratively address agricultural concerns, resolve issues, and overcome challenges by learning from each other, sharing knowledge, and compiling best practices to apply to their respective situations.

Within the HUBs, the HUB coach assumes a crucial role as a guide and facilitator. Although integrated within the group context, either as an agricultural professional or a recognized community member, the Hub coach serves as an intermediary who ensures the efficient management and sustainability of the group. This intermediary role is essential to the success of the HUB or network and significantly influences the level of commitment among its members.

The significance of HUBs in disseminating and transferring IPM knowledge and values is vital. Establishing a HUB and adopting a HUB approach for the group of actors will foster enhanced connections, facilitating cooperation among the various stakeholders involved and overcoming common barriers. For the proper configuration and management of these HUBs, the following recommendations have emerged during the project.

5.2. Effective formation of IPM demo HUBs

Getting to know the local farmers is important in order to take advantage of their knowledge and experiences, and to build relationships that every actor involved can benefit from.

Professional and academic knowledge is achieved through formal education, but it is essential to integrate other sources of knowledge, such as social interaction and community practice, to develop a holistic understanding of a collective's situation, needs, and concerns. This comprehensive approach is crucial for translating the conceptual principles of IPM into practical measures and guidelines. To generate knowledge from the interaction of different agricultural stakeholders in a common network takes time, dedication and planification from all the members of the HUB, but it is one of the most efficient ways to inspire new synergies, learn about different contexts and adopt different techniques. That is why the role of HUBs is vital in ensuring these encounters between different agents and different points of view. In the following points we list the main recommendations for the successful creation of a HUB.

5.2.1. Proximity

Collaborating and meeting regularly with neighbouring farmers allows them to share knowledge, solve common problems, and support each other socially, leading to more effective and sustainable agricultural practices and a stronger farming community.

Farms in the same area often face similar problems related to their location, such as weather patterns, soil types, and pest pressures. By interacting and collaborating with neighboring farmers, they can learn from each other's experiences and share best practices for managing these challenges.

Facilitators from the local area are more likely to understand and navigate local dynamics, increasing their credibility and effectiveness in coordinating activities and engaging farmers. By leveraging proximity and

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fostering collaboration among neighboring farmers, it becomes possible to address common challenges more effectively and develop localized solutions for sustainable pest management. This collective approach promotes knowledge sharing, innovation, and the collective progress of agriculture within the region.

Also, recognizing the impact of farm size is essential. Larger farmers with better business organization typically find it easier to participate in activities like HUBs. In contrast, smaller farmers may face more challenges due to limited resources, time constraints, or initial reluctance towards new methodologies. Customizing HUBs to include examples and case studies relevant to different farm sizes can significantly increase participation and interest among smaller farmers.

Regular meetings among farmers offer a multitude of benefits that collectively contribute to the improvement of agricultural practices and the well-being of farming communities. One of the most significant advantages is the opportunity for knowledge sharing. Farmers can exchange insights, best practices, and innovative techniques that have proven successful in their respective operations. This knowledge transfer enhances productivity, efficiency, and the overall quality of agricultural output. Moreover, these meetings serve as a valuable platform for collective problem-solving. When farmers encounter challenges such as pest infestations, adverse weather conditions, or market fluctuations, group discussions enable them to brainstorm solutions collaboratively. This collective effort can help mitigate losses and reduce the risks associated with farming.

Emotionally, these gatherings offer a sense of camaraderie and solidarity within the farming profession. Farming can be a solitary endeavor, and regular meetings provide a chance for farmers to connect socially, share their experiences, and offer emotional support to one another.

In essence, regular meetings among farmers and other stakeholders contribute to a vibrant and resilient agricultural community. They promote knowledge sharing, problem-solving, networking, emotional well-being, and access to resources. Ultimately, these gatherings lead to improved farming practices, and a stronger sense of community among those involved in agriculture.

5.2.2. Sustainability

To ensure the HUB's sustainability, it should focus on long-term objectives, consistent event themes, and a clear pathway for development, while regularly assessing and responding to member needs to enhance skills and maintain effectiveness in promoting IPM measures.

To ensure the HUB's sustainability, it is crucial to shape its objectives around long-term viability. Continuity in events is key to effectively measuring the impact on its members. Therefore, the HUB should focus on organizing events with consistent themes and topics, ensuring they build on one another. This approach allows for a thorough analysis of the capacities needed by attendees to enhance their skills for future IPM implementation.

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A practical recommendation is to design the HUB's activities with a clear pathway and common flow, always considering the next steps required for continuous development. By doing so, the HUB and its HUB coach can ensure that every action contributes to a cohesive and sustained effort. Additionally, implementing a system for constant follow-up on the needs of the HUB members is essential. Regularly assessing what is important for members to address within the HUB will allow for timely adjustments and enhancements to the programs offered. This strategy helps identify and address skill gaps, provides ongoing capacity building and support, and fosters a culture of perseverance and progress among all stakeholders involved. By continuously monitoring and responding to member needs, the HUB can ensure its overall sustainability and effectiveness in promoting IPM measures.

5.2.3. Understanding IPM values

To enhance IPM adoption, emphasize its long-term environmental benefits and recognize farmers' efforts, leveraging their increased awareness of sustainability issues.

Among the various members of the IPM networks and HUBs engaged during the project, many have highlighted an increased awareness of issues concerning climate change, sustainable soil management, food, health and water pollution. This increased awareness is due to more direct and accessible information and studies on climate change, as well as its close connection to agriculture.

The growing concern for the sustainability of natural resources among agricultural stakeholders, particularly young farmers who play a pivotal role in ensuring generational continuity, often find political measures aimed at alleviating environmental problems arising from agriculture difficult to implement in the short term or economically risky.

To address these challenges and create value for the stakeholders, two key actions are crucial. Firstly, leveraging the rising environmental consciousness to emphasize the importance of IPM measures and their long-term environmental benefits. It is essential to dispel misconceptions surrounding the difficulty of implementing such measures or the perceived risk of crop failure.

Secondly, it is imperative for all stakeholders, particularly HUB coaches or network leaders, to recognize and appreciate the efforts of farmers in engaging, experimenting, and adopting alternative measures. This acknowledgment should extend to the time and commitment farmers invest in learning and participating in the group, considering their busy schedules.

By embracing this dual recognition, in the IPM demo HUBs a value proposition is built around the concept of IPM, fostering greater awareness and engagement among stakeholders towards the objectives of these measures.

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5.3. Supporting good connectivity

5.3.1. Creating personal connections

Establishing personal one-on-one communication with farmers can build trust, provide a safe space for sharing challenges, and tailor support to their needs, enhancing IPM adoption.

Making it personal by taking the time to have one-on-one communication with farmers can help to create a comfortable and safe space for them to share their experiences and challenges with IPM adoption. This is particularly important because farmers may be hesitant to share information about their practices if they feel like they will be judged or viewed negatively. By establishing a personal relationship with farmers, HUB coaches can better understand their needs and concerns and tailor their support accordingly. Additionally, personal communication can help build trust and credibility between the HUB coach and the farmer, which is important for long-term engagement and adoption of IPM practices.

5.3.2. Reaching local networks

Integrate existing local and regional farmer groups into the network to leverage their experience and connections, enhancing the impact and reach of sustainable agricultural practices without needing to increase the number of events.

It has been observed during the analysis of the different HUBs involved in the project that certain agricultural areas, particularly where farms are smaller in size, it's common to see farmers (together sometimes with other actors as advisors) forming groups or collectives at the local or regional level. These groups are typically established with the purpose of addressing shared challenges that affect all members. as pests or adverse weather conditions.

Local and regional governments frequently establish specialized groups to address various challenges, engage with diverse stakeholders, and conduct sectoral analyses. These groups often persist over time due to the tangible benefits of fostering communication among local actors and addressing shared concerns. Also, by forming partnerships with existing demonstration networks that promote sustainable agricultural practices. By collaborating, IPMWORKS can leverage established infrastructures and farmer networks to reach a broader audience without increasing the number of events.

These long-standing groups in regional contexts possess valuable experience and expertise that can significantly contribute to network development and connectivity. Moreover, given that the individuals

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involved often maintain professional relationships or overlap in membership across different groups, integrating these established entities into the network can enhance the impact and reach of the knowledge created in HUBs.

5.3.3. Engage with advisory services

Leverage agricultural advisors within the HUB network for their technical expertise and valuable role as trusted links between farmers and sectoral actors, enhancing support and confidence in best practices.

Agricultural advisory services can provide valuable support and guidance to farmers, particularly when it comes to technical assistance and best practices. However, the impact of these services depends on the advisors' approach. It's essential that advisors are motivated by IPM principles, rather than solely focusing on maximizing yields through high input use—a common mindset that views this as the only path to profitability in agriculture. Shifting advisory services towards more sustainable, IPM-driven strategies can help farmers balance productivity with environmental and economic resilience.

The role of agricultural advisors plays a very important role within the HUB network. As mentioned by Dockès and Chauvat (2018) their influence goes beyond technical knowledge and their advice on the application of best practices. The value of their contributions is based mainly on their knowledge of the environment and of the sectoral and regional actors, being a reference that generates confidence in the network of actors and to whom they transmit their concerns. Therefore, the value of the advisors often has to do with the social representation they have in the group, being a link between different players with the same interest in specific issues.

5.3.4. Build relationships with private sector

Include companies involved in IPM within the HUB network to leverage their resources, expertise, and market connections, enhancing sustainable agriculture and integrating IPM practices across the value chain.

Companies involved in IPM, such as agrochemical firms, biological control providers, crop protection specialists, advisory services for farmers and precision agriculture technology companies, as well as food sector, play a pivotal role in sustainable agriculture. They contribute essential resources, expertise, and market connections that directly benefit farmers and other stakeholders. For instance, agrochemical companies are increasingly developing biopesticides and supporting IPM strategies alongside traditional

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chemical solutions. Biological control firms supply beneficial insects and microbial agents that are crucial for natural pest control.

These companies not only enhance pest management efficacy but also influence market dynamics and consumer perception. By advocating for IPM practices and developing products aligned with sustainability, they shape how consumers perceive food products. Their initiatives promote environmentally friendly farming practices, reducing pesticide use and enhancing food safety.

Including these stakeholders in the HUB network is a key for fostering a comprehensive approach to agricultural sustainability. Their collaboration ensures that IPM practices are integrated across the agricultural value chain from the market perspective that allows a more holistic engagement.

5.3.5. Involve other projects and speakers

Incorporate speakers from other IPM related projects into your activities to leverage their expertise, avoid redundant efforts, and enrich stakeholder groups with valuable insights, while also organizing joint demo events with similar projects to streamline schedules and enhance farmer engagement.

Consider involving other projects as speakers in your activities. This can help to bring new perspectives and expertise to your events. The projects already finished within the study area of the IPMWORKS project can be of great help by acting as a repository of information and preventing the overlapping of efforts in areas that have already been studied but need continuity and updating.

The literature emerging from these previous projects serves as a knowledge base to trace the path to follow IPM demo HUBs and to take the necessary references to be considered in our analysis. The existing literature can significantly support in organizing stakeholder groups or HUBs to not only consider the latest information regarding the implementation of IPM measures but also in effectively managing these groups and HUBs. By applying successful methodologies from prior research, especially for those involving a multi-actor approach, it becomes possible to enhance the efficiency and success of these initiatives.

The participants from previous projects possess valuable expertise that could significantly benefit the IPM demo HUBs. It would be advantageous to include them as speakers at HUB events, particularly in their areas of specialization. Additionally, organizing joint demonstration events with other project networks with similar thematic frameworks can streamline schedules and reduce the time commitment for farmers. This integration allows farmers to benefit from multiple initiatives in a single event, making it more efficient and appealing.

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5.3.6. Enhance cross-country and cross-sectoral events

Organize cross-country events for farmers with similar crops, climates, or soils to facilitate valuable knowledge exchange, showcase diverse problem-solving approaches, and strengthen international networks, while addressing broad agricultural issues to promote open sharing and reduce competition.

Cross-country events (cross-visits) are highly interesting for farmers, especially those with the same type of crop, climate, or soil, as they tend to share the same concerns. Holding events where people from different countries with shared interests come together has been found to be highly enriching, as it facilitates the exchange of knowledge and the introduction of new measures that may not yet have been applied to every crop. In this way, farmers witness different ways of solving a common problem and have the opportunity to apply it in their own case. Cross-visits help to collect more visions than their own one and make them aware of the problems of other communities. Additionally, it has been shown that such events can strengthen relationships among visiting farmers within the network, as they spend substantial time together. This may be the basis for more exchange/collaboration in the future. As these events are less frequent due to their greater logistical complexity, they tend to be more attractive. Due to this complexity, it is not uncommon that some attendants do not attend the event or have agenda overlapping as farmers use to have very tight schedules. Although attendance problems at cross-country events are common at certain times of the year, many farmers make a greater effort to attend as it is a unique opportunity to get to know each other and do international networking.

On the other hand, addressing cross-sectoral themes and actors on broad agricultural issues such as irrigation, climate resilience, and disease management focusing on common challenges rather than specific crops can reduce competition-related reluctance and encourage more open knowledge sharing among farmers.

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5.4. Effective facilitation

5.4.1. Facilitation is key

Facilitators should adapt their approach and tools to match group preferences, using effective communication to engage participants and address their specific needs, especially in agricultural settings.

Facilitation is a trained art that combines inherent natural skills with a proactive attitude. Effective facilitators connect better with attendees by understanding their audience and adapting their tone, narrative, and energy accordingly. Some groups prefer a relaxed and trusting atmosphere, while others lean towards a more serious and professional setting. It's up to the facilitator to recognize and adjust to these preferences to ensure effective discourse.

To enhance engagement, facilitators can employ various tools discussed in this report. The smooth flow of group events and meetings relies on the facilitator's adeptness in soft skills and the appropriateness of the tools used, ensuring they align with the context and content. It is crucial for facilitators to undergo constant training in group management techniques and to be willing to continuously improve the quality of group meetings.

Skilled communication is particularly crucial in contexts like local farms and agricultural systems, where understanding the realities and needs of farmers is essential. Farmers are interested in HUB activities, but the quality of communication and facilitation is key. Clear and relevant content delivery, combined with deep subject knowledge and effective facilitation skills, will increase the likelihood of farmers wanting to participate again. Developing facilitation skills of HUB coaches is an objective of IPMWORKS, based on peer-to-peer learning at the HUB coach levels. Specific training sessions, sector meetings and project meetings are opportunities to discuss about the facilitation process, to share tips and best practices to engage farmers in the HUB activities.

5.4.2. Being a moderator more than a leader

Adopt an empathetic approach and actively listen to farmers' concerns about pest treatment to build trust and mutual understanding, adjusting your leadership style to guide new groups more and empower confident ones.

It is crucial to adopt an empathetic approach and be a good listener, recognizing that pest management is a critical issue for farmers. A poor decision in this area can have severe consequences for their yield and significantly impact their annual income. Supporting skeptical farmers by addressing their concerns about

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implementing IPM can promote better mutual understanding and strengthen their relationship with the HUB coach.

Effectively leading a HUB requires aligning the approach with the group's current stage. When participants are new and unsure of what to expect, more direction and guidance are needed. However, as the group gains confidence and begins generating ideas, it's important to provide them with the space to take on a more active leadership role.

5.4.3. Use proper language and good translations

Pay careful attention to language and cultural nuances in hub activities by adapting materials and presentations to the local context and ensuring clear, non-literal translations, while using informal and engaging communication to build trust and understanding.

Language and cultural aspects can have a strong impact in HUB activities. Therefore, it is important to be mindful of language and translations (when using translated materials) in presentations, slides, documents, and dissemination materials to ensure clearer, more direct communication and better understanding with farmers. This attention to detail helps facilitate smoother and more effective interactions. It is also important to be aware of other forms of communication such as videos, photographs, drawings, etc. to be as standardized as possible without falling into double interpretations and ensuring that they clearly bring the message they are intended to convey.

Adapting discourse to the local language and context, not just translating the materials literally, helps to better understand the content and helps to avoid misunderstandings. It is recommended that a group member from the country where the materials are shared double-check the translation and adaptation to regional language and expressions before sharing the content.

The language can also influence the closeness or professionalism of the speech, being advisable to present an informal form without falling into extensive explanations that can lose the attention or disconnect the audience from the speaker. Informal, lighthearted discourse helps build group trust and comfort at the event or meeting at which it is presented.

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5.4.4. Developing audiovisual materials

Use high-quality, consistently edited audiovisual materials to boost professionalism, attract stakeholders, and maintain engagement before, during, and after HUB events.

Videos, presentations, photos, social media, etc. make the HUB or network more professional and attractive. A higher quality in the design of the audiovisual material produced from the events enhances confidence in the project, as it demonstrates attention to detail and expertise. This not only leads to greater satisfaction with the work done at the event but also increases participants' willingness to attend future events.

Additionally, the material gathered will serve as audiovisual content for future learning resources for those unable to attend the event. Therefore, it is crucial to record everything as clearly and accurately as possible to ensure its value for future use.

It is advisable to share these audiovisual materials before, during and after the event to keep the event's attention both among attendees and with external stakeholders who may be interested in its content. This provides a careful view of the details of the development of the event, making it more professional and attracting potential stakeholders.

Additionally, it enables a visual record that captures not only the content and summary of the session but also details such as the location, attendees, and speakers. This provides a comprehensive overview for future references.

Following the same editing criteria and graphic templates is recommended when editing any audiovisual material to maintain a corporate identity that helps to create a more professional and committed image of the group or event.

5.4.5. Frequent communication with network members

Use communication tools for frequent updates and community building, while adapting to preferred communication methods to keep network actors engaged and foster ongoing dialogue among farmers.

To keep all actors of the network engaged and informed, frequent communication is crucial. Creating a WhatsApp group was found to be a useful tool to achieve this by various HUBs participating in the project. It allows for quick and easy communication between HUB coaches and farmers, enabling them to share

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updates, ask questions, and address any concerns that may arise. This also fosters a sense of community and collaboration among farmers, as they can share their experiences and learn from each other.

Another good practice is to provide a report after each demo event. This can include direct verbal exchanges during HUB meetings or phone calls, informal conversations during farm visits, or indirect communication through email, WhatsApp, or follow-up messages. These indirect channels can be used to share additional information or to address questions that couldn't be answered during the event.

Nevertheless, some individuals may still be unfamiliar with using WhatsApp as a work tool or may not regularly engage with email, Teams, Zoom, or other messaging applications. It's important to stay open to alternative communication channels and adapt to the most common method used by the group to ensure that news about upcoming events or project achievements reaches the widest possible audience.

Encourage ongoing communication among farmers, even outside of demo events and HUB meetings. For example, Portuguese IPMWORKS HUB members often communicate to clarify doubts about implementing specific practices, fostering a continuous learning environment.

5.4.6. Continuous mentoring

Successful network communication hinges on continuous engagement and skill development, with HUB coaches and experienced members driving progress and collaboration.

Within the facets of effective communication, success transcends mere attention to content, methodology, and discourse. It needs continuous vigilance over the network's pulse, a concerted effort to inspire active engagement, facilitate skill development, and stimulate growth in both membership and the variety of activities and meetings. These efforts collectively enrich and reinforce the knowledge and proficiency of every participant involved.

Among the many events that took place in the HUBs of the project, the indispensable roles of the HUB coach or network lead and the most enthusiastic and experienced members in IPM, stand out prominently. These individuals serve as the beating heart of the network, orchestrating its vitality and ensuring its motivation. Their dedication, expertise, and proactive involvement are instrumental in driving forward progress, fostering collaboration, and nurturing a culture of continual learning and improvement.

Within this context, the HUB coach or network lead plays a crucial role in guiding efforts, providing guidance, and fostering unity among members, setting the network's tone and direction.

Similarly, the committed and experienced members of the network play an indispensable role in shaping its trajectory. Their wealth of knowledge, practical insights, and unwavering dedication serve as a source of inspiration and guidance for others. Through their active participation, mentorship, and contributions, they not only elevate the collective expertise of the network but also cultivate a nurturing environment conducive to innovation and growth. For those uncertainties that farmers may have about their specific

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crops and how this affects their production, it is helpful to have a pioneering colleague to give advice by his own IPM measures example.

The partnership between the HUB coach or network lead and committed members is vital for the continuous mentoring—guiding and supporting individuals to develop their skills and knowledge—of a successful IPM network. Their teamwork drives progress and resilience, achieving collective success beyond individual efforts. Together, they embody the spirit of collaboration and sustained improvement essential for the network's impact.

5.4.7. Surveys and polls

Use surveys and polls to gather direct feedback from stakeholders, monitor project progress, and tailor HUB activities to address key issues, ensuring questions are clear and focused on applicability, needs, satisfaction, and new practices.

Surveys and polls are one of the main tools that can be found when gathering direct information from relevant stakeholders. They allow access to the issues that most interest the target audience as well as their common problems, main concerns, and general feedback. With the information extracted, the next steps and actions of HUB activities can be oriented to align it with the information obtained in the surveys.

The use of surveys and polls to gather information and draw conclusions is a direct way to access the knowledge we want to get from a group or HUB members. They can be a useful tool to make a comparative analysis of the perception of the different actors. Repeating these surveys or pools on a regular basis helps to get a general idea of the evolution of members' skills and capabilities or the progress of their understanding of the IPM field and, of course, to get their feedback on the performance of the HUB, what are their areas for improvement and what helps them the most.

Surveys and polls have different objectives and roles; therefore, they are organized in different ways.

On the one hand, surveys serve to monitor the situation to achieve a better understanding of the project status. The use of surveys is essential to draw conclusions about the real situation of what we want to analyse and to know our starting point. For example, Survey n.3 from IPMWORKS (Annex 5) falls into this category, as it measures the progress made in adopting holistic IPM practices during the project. Its purpose was to assess the advancements made by IPMWORKS farmers in holistic IPM throughout the project.

On the other hand, the polls allow to evaluate, improve, and adapt the IPM plan by correcting what is not showing to be working. Polls allow us to give a measurable character to our study and to make comparative analyses that enables us to know if we are on the right direction.

These surveys and polls must be done in an appropriate way and with clear questions to facilitate response. It is important that the questions are direct and not muddled so that they can be understood without problems. The number of questions should be moderate, a very extensive survey may demotivate

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and decrease the number and quality of responses, and questions should be short so that it does not take too much time to complete.

The questions should focus on four main areas: determining the applicability of the conveyed information to the participants, identifying topics or needs for future HUB events, assessing overall satisfaction with the event, and gathering new good practices from attendees that could serve as guides for future events.

In Annex 6, an example of the demo exit poll used in the IPMWORKS project can be found. This survey is designed to gather feedback from participants after demonstration events, helping to assess the effectiveness of the methods used, gauge participants' expectations and experiences, and identify areas for improvement.

The exit poll covers key topics such as:

- Participant demographics (e.g., profession, gender)
- How participants learned about the event
- Reasons for attending
- Satisfaction with the event and its organization
- Effectiveness of various demonstration methods
- Suggestions for future events and specific topics of interest in plant health management

This feedback is invaluable for improving future demo events, ensuring they are more aligned with the needs and expectations of participants, and refining the strategies and approaches used to promote holistic IPM.

5.5. Communication and participation

5.5.1. Culture of dialogue

Promote a culture of dialogue among farmers by encouraging open, respectful communication, accommodating cultural sensitivities, and establishing trust through clear rules, to facilitate mutual learning and adoption of sustainable practices.

Fostering a culture of dialogue (openness to interact and learn together from each other) specially among farmers (peer-to-peer) is essential for facilitating mutual learning, sharing experiences, and exchanging knowledge within the agricultural community. Nonetheless, it is crucial to recognize the different sensitivities in sharing information about their crops out of fear of revealing confidential information to competitors and to accommodate cultural differences to ensure effective communication. By embracing strategies such as encouraging participation, establishing a safe environment, facilitating discussions, and

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providing relevant information, the promotion of a robust culture of discussion in agriculture can be achieved.

A culture of discussion can be a valuable tool in promoting IPM options and helping farmers to adopt sustainable farming practices as a more open attitude to new ideas and common reflection could generate valuable knowledge among farmers that could maybe apply in their own farms. However, the extent to which farmers are comfortable with discussion can vary depending on their culture, background, and other factors.

Observations across various networks and HUBs involved in the IPMWORKS have revealed a direct and logical connection: groups with a longstanding tradition of hosting regular meetings and events, coupled with a strong commitment among members, tend to demonstrate greater ease in reflecting on and discussing their concerns and progress. In contrast, groups less committed to the HUB or whose members are more disconnected often struggle in these aspects.

The discrepancy lies in the establishment of a culture of dialogue. In groups with a history of regular interaction and a high level of commitment, trust forms the foundation for discussions to flow smoothly. This trust is indispensable for fostering the fluidity of the group's activities.

It is necessary to ensure that differences should serve only to enrich the contributions of the group and not to separate group members or create an atmosphere of unreliability. This is why trust among group members is very essential. This can be achieved by establishing rules of participation and confidentiality that allow all members to feel comfortable discussing their ideas or sharing their knowledge with others.

This can be accomplished through the establishment of rules of participation and confidentiality that promote open and respectful communication. Here are some key considerations:

- **Clear communication guidelines:** Clearly communicate the expectations for participation, emphasizing the importance of active listening, mutual respect, and constructive feedback. Encourage members to express their opinions and ideas freely, while also emphasizing the need for respectful dialogue and avoiding personal attacks.
- **Facilitated discussions:** Appoint a skilled facilitator who can guide discussions, ensuring that all members have an equal opportunity to contribute and that conversations remain focused and productive. Encourage active participation from all members and provide opportunities for quieter or less assertive individuals to voice their opinions.
- **Constructive conflict resolution:** Acknowledge that differences of opinion may arise and emphasize the importance of addressing conflicts in a constructive manner.

  Encourage members to listen to and understand differing viewpoints, seeking common ground, and working towards consensus whenever possible.
- **Celebrate diversity:** Emphasize the value of diverse perspectives and experiences within the group. Encourage members to appreciate and learn from the unique insights brought by individuals with different backgrounds and expertise.

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5.5.2. Knowledge exchange

Facilitate effective knowledge exchange in agriculture by organizing activities that connect farmers with experienced peers, researchers, and industry professionals to share relevant IPM solutions and address evolving challenges.

In rapidly evolving fields like agriculture, where various stakeholders in the Agricultural Knowledge and Innovation System (AKIS) need to continuously learn and update their practices, facilitating knowledge exchange becomes paramount. In particular, farmers often rely on their own problem-solving skills and may not readily seek out external solutions, posing a challenge when exchanging Integrated Pest Management (IPM) measures. This is because innovative solutions from other actors, with whom farmers may not have direct contact, could effectively address current issues.

Effective knowledge exchange is critical in agriculture, especially in technical and innovative areas like IPM, which can vary significantly across different crops and may still be relatively new in certain contexts. During network and HUB meetings and events, it's essential to organize activities that promote knowledge exchange. This includes opportunities for experienced actors or external experts to directly interact with group members, facilitating the transmission of knowledge.

Moreover, it is observed that farmers often benefit more from advice and experiences shared by similar actors, such as those who grow the same crops or operate in similar geographic areas with shared professional concerns. These peers are better able to tailor their input to the specific needs of farmers, enhancing the relevance and applicability of the information exchanged.

Similarly, the transfer of knowledge between researchers and practitioners often fails to translate into tangible benefits for farmers, resulting in a disconnect between these two groups. To address this, it's advisable and essential to involve both researchers and practitioners, including farmers, in the network. This direct interaction enables researchers to better understand the specific context of farmers and facilitates more effective knowledge exchange.

Additionally, involving other key stakeholders such as advisors and industry professionals is valuable, as they have direct connections with farmers in their daily professional lives. Engaging these stakeholders in knowledge exchange activities holds significant potential for enhancing the network and enriching its activities, ultimately leading to improvements in agricultural practices and outcomes.

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5.5.3. Collaborative planning process

Involve farmers in planning to ensure events align with their needs, build trust, and encourage future participation by considering their diverse perspectives and priorities in developing the work plan.

To attract and engage farmers, it is important to involve them in the planning process. Building a work plan together with farmers can help ensure that the demonstrations and events align with their needs and interests. This collaborative approach can also help to build trust, a sense of ownership and encourage farmers to participate in future events. The work plan should consider the specific objective of the meetings, timing of events, the specific crops and pests that will be targeted, and the availability of resources and expertise.

By working closely with farmers and taking their input into account, the IPM demo networks can better meet their needs and increase their participation in the adoption of IPM practices. It is important to recognize that different HUB members may have various perspectives and priorities when it comes to IPM. Some members may be more focused on reducing chemical use, while others may prioritize economic sustainability or social responsibility. By actively soliciting and considering input from all members, the HUB can ensure that it is meeting the diverse needs and interests of the community. This can be achieved through regular meetings, brainstorming sessions, and other collaborative activities that foster a participative and inclusive atmosphere. By working together in this way, the HUB can develop innovative solutions that are tailored to the specific context and needs of the local community.

5.5.4. Provide solid information

Ensure events provide clear, relevant content tailored to attendees' interests, with separate sessions for advanced farmers, and space out events to maintain quality and engagement.

Enhancing the quality of information dissemination at events and meetings is highly important, particularly for farmers who allocate their limited time judiciously. It is imperative to curate content that is not only clear and robust but also steers clear of trivialities. Attendees, especially farmers, highly value events that offer pertinent insights aligning with their interests. Therefore, organizing events in an engaging manner and handpicking information based on attendees' preferences is crucial a strategy. Seeking familiar sources recognized by the attendees fosters trust and confidence in the content's quality, thereby ensuring sustained participation.

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Organizing separate sessions within HUBs dedicated to experienced farmers is another key strategy. These sessions can focus on advancing innovations in IPM, exploring cutting-edge strategies, and addressing complex challenges that seasoned farmers face. This targeted approach ensures that advanced practitioners can continue to push the boundaries of IPM adoption. Rather than burdening attendees with multiple events featuring trivial content, it is prudent to adopt a strategic approach. Spacing out events allows for the accumulation of substantial information across various topics of interest with substantiated information. This ensures that each event offers valuable insights, mitigating the risk of attendee disillusionment and preserving the credibility and efficacy of the group/ HUB.

5.5.5. Encourage participation

To maintain active participation, facilitators should address diverse interests by ensuring equitable attention to all topics and staying attuned to evolving member concerns, preventing disengagement.

Ensuring active participation from all group members is a crucial task for the facilitator. However, this can pose a complex challenge due to the diverse interests within the group. Depending on the discussion topics or where the focus of the meetings/events lies, certain members may not be engaged enough if the subject matter isn't directly relevant to their specific crop type, regional/local concerns, or crop-related issues.

It's essential to identify the areas of interest for all members to demonstrate that each topic receives equitable attention. Remaining attuned to the evolution of the individual concerns over time enhances the group's commitment. This proactive approach helps to prevent group disengagement or unequal participation, ensuring that all segments remain involved and interested in contributing.

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5.5.6. Suitable locations

Choose an event location that supports both fieldwork and presentations with adequate technical equipment and comfort to ensure smooth operations and effective communication.

The location of the event is important in many ways. One of them is that it must be a place where you can develop the event both in the field and at the time of presentations or with group activities. The site should be well conditioned in terms of technical equipment to be able to carry out the event in a practical and comfortable way for both the speaker and the attendants avoiding problems of compatibility, connectivity, visualization of images and videos, bad acoustic conditioning for public address system (such as microphones or loudspeakers) or presentations, etc.

5.5.7. Create a safe space

Leverage familiar, trusted spaces for face-to-face events to build a safe, respectful atmosphere, encouraging open dialogue and effective networking among farmers.

The agricultural community, like any other specialized professional environment, naturally fosters shared spaces where all its members converge. Over time, a tight-knit circle of trust forms within a specific geographic area, where individuals frequent the same locations and build familiarity. Utilizing these spaces during face-to-face events can cultivate an atmosphere conducive to trust.

It's crucial to ensure that discussions create a safe space where farmers feel secure in sharing their thoughts and opinions. Encouraging respect and open-mindedness is paramount. Establishing such a safe space transcends physical settings; it entails fostering a trustworthy atmosphere where every participant feels empowered to contribute.

Dedicated networking sessions during demo events among HUB members facilitate the exchange of knowledge and experiences, allowing farmers to learn from each other's successes and challenges. Structured opportunities for networking at demo events and within HUBs further promote the sharing of practical experiences and solutions.

Throughout various HUB events in the IPMWORKS project, informal moments such as coffee breaks provided opportunities for attendees to interact in a relaxed environment, fostering closer relationships among participants.

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5.5.8. Facilitation tools and methods

Utilize dynamization tools like interactive apps, role plays, and gamification to engage all participants, bridge activity gaps, and make IPM measures more understandable and practical.

The use of dynamization tools such as apps for interactive participation, roll plays, common brainstorming, etc. during the event can be a great help, especially at the beginning or when dealing with dense topics that need to be summarized and where we are looking for the farmers to transmit their opinions and ideas. As we saw before, each audience may vary their behavior at events, making some to be more active than others. The use of these facilitation tools during the meeting can help to bridge the gaps between those attendees who are less active and those who participate more. It is important to focus the use of tools in a way that helps IPM measures to be more understandable and practice-oriented specially for farmers.

On the other hand, gamification is getting more present in HUB events. By implementing serious gaming methods within HUB activities adapted to the event thematic framework, it is possible to enhance the recording and utilization of informal knowledge shared by farmers. Structured gaming can make learning more interactive and engaging, facilitating the capture and dissemination of practical insights and solutions among participants.

5.6. IPM demonstrations

During the validation workshops, it became evident that demonstrations play a crucial role in promoting the adoption of IPM. These events underscored the importance of hands-on, practical examples in conveying the principles and benefits of IPM effectively.

By showcasing IPM techniques in action, participants gain a clearer understanding of how to implement these practices on their own farms. This approach not only enhances learning but also encourages collaboration and knowledge-sharing among farmers. Ultimately, the emphasis on demonstrations helps to bridge the gap between theory and practice, fostering greater acceptance and implementation of IPM strategies across agricultural communities.

Even though some practices within IPM are well-known, farmers frequently express a sense of isolation when attempting to adopt these methods. This feeling stems from limited interaction with the broader agricultural community, despite the familiarity with certain IPM techniques.

Technicians often face information overload and time constraints, making traditional training methods less effective. In contrast, demonstrative activities offer a more efficient use of time. They allow technicians to invest their time directly in practical demonstrations and interactions with farmers, which leads to quicker trust-building and more effective knowledge transfer. The more demonstrative the approach becomes and the more farms that participate in showcasing IPM practices, the greater the

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influence on wider adoption. This collaborative effort not only spreads knowledge but also shares valuable experiences in pest management, amplifying the impact of this methodology. These events not only showcase successful IPM implementations but also provide platforms for farmers to exchange ideas, challenges, and solutions.

5.6.1. How to run a successful demonstration event

Prepare and manage demo events with a strategic plan, including goals, location, audience, and IPM strategies, to effectively showcase IPM practices and maintain flexibility for adapting to changes and ensuring stakeholder engagement.

Preparing and managing a demo event correctly will enable us to get closer to the stakeholders to whom we intend to convey the potential benefits of the project.

IPMWORKS provided guidelines for the demonstration events organized within the IPMWORKS project. The main objective of these demonstration events is to showcase the effectiveness of IPM (Integrated Pest Management) practices to farmers outside the network, emphasizing the reduction of pesticide reliance while maintaining or enhancing farm profitability through holistic IPM strategies.

Each Farm HUB is required to create an annual strategic demonstration plan based on the guidelines provided. The plan should cover key elements like the demonstration's goals, location, target audience, IPM strategy details, field comparisons (if relevant), promotion, dissemination materials, and monitoring methods. A well-organized plan is essential for effective event management, helping track progress and adapt to any unforeseen changes. Since not everyone may attend, quick adjustments may be needed to keep the event aligned with its original objectives.

Demonstration events serve as platforms for knowledge exchange, innovation sharing, and peer-to-peer learning among farmers and advisors. They should be designed to demonstrate IPM practices within a farm context and highlight the possibilities of reducing pesticide reliance while maintaining profitability. The FarmDemo H2020 project's demonstration design guide can be used as a resource for planning and organizing these events.

These are the main key points and recommendations to develop a successful and well-structured demo event:

Preparation

Planning ahead can ensure that all necessary resources, including personnel, equipment, and materials, are available and that the demonstrations run smoothly. This may involve conducting site visits to assess the demonstration location, identifying suitable crops and pests to demonstrate IPM practices.

According to the guide provided by the results of the FarmDemo platform, a correct preparation of the event must follow these essential points:

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- **Build the team.** More than one point of view is needed to organize a demo-event. A broad variety of actors from different fields could provide a more insightful enriched input.
- **Know the audience.** Focusing on the group of people we want to target is crucial to ensure that we are reaching the right actors. This point will be further developed in this report.
- **Select a host farmer.** Ideally, the farmer who hosts the event should be aligned with the objectives of the project and be aware of its development.
- **Define the content.** It is important to reach a common methodology to identify the most important topics that will shape the future agendas of the events and give them a logical structure to maintain a continuous message and not to lose the thread of what is intended. To this end, it is necessary to consider the opinions of the farmers and to see which topics they want to deal with in greater depth. Additionally, it's crucial to incorporate a holistic approach to IPM throughout the event. While a specific entry point, such as a particular piece of equipment, can effectively draw a larger audience, it's important to dedicate at least one session to placing that specific topic within the broader context of an integrated pest management strategy. This session can explore how the equipment complements other pest control methods, its role within a wider farm strategy, and the economic implications at the farm level. This balanced approach ensures that specific interests are addressed while keeping the broader IPM strategy in view.
- **Encourage interactions.** Creating a safe and comfortable space for participants at the event is essential to obtain clear conclusions. Actions such as setting up small groups or giving practical examples from participants present at the meeting can be helpful approaches to encourage interaction between attendees.
- **Advertise the event.** Both the advertising done before the event and the communication of the results obtained afterwards are important to convey the status of the project and to make all the progress known to those stakeholders interested in participating or learning from the conclusions reached. In this way we can further enhance the project's network of contacts and bring a higher reputation to the project.

All these aspects will be further developed throughout this report to analyse all the parties involved in the correct management of an event and the actions to be taken by both the organisers and participants, with the aim of making the most of each meeting and drawing the most enriching and useful conclusions that can be provided to our project.

In summary, by investing time and effort into thorough preparations, demo events can be more successful in promoting the adoption of sustainable pest management practices among farmers.

Involving right actors

When planning and organizing demo events to promote the adoption of Integrated Pest Management (IPM) practices, involving experts will in many cases add value. IPM is a complex and multi-disciplinary field that requires specialized knowledge and skills. Therefore, involving experts in relevant areas such as entomology, plant pathology, and agronomy can provide valuable insights and guidance in designing and delivering effective demos. Experts can also offer technical support and advice during the demo event, which can be particularly useful if unexpected challenges or questions arise. Inviting a local professional, informed about IPM issues, who has previously worked with the farmers in the field can bring greater confidence in the message, especially to those farmers less experienced with the subject and those who may still be skeptical, which may be because they do not yet have a thorough understanding of IPM, or are hesitant because of e.g., investments involved, or other implications.

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Inviting advisory professionals experienced to IPM brings a higher degree of professionalism to the event. If he/she is someone they trust or someone well-known with a good reputation among farmers, the interest in attending and actively participating in the event increases. IPM sector is such a specialized sector where most of them know each other. Reputation has a greater weight since farmers value the expert criteria of the specialists in the field and give more veracity to the subject of the project. Those professionals dedicated to consultancy and experienced in giving talks for an audience have better communication skills to energize the group and give the specific information that farmers are looking for, without going into other topics that are not so important to them.

Additionally, collaborating with other organizations or stakeholders, such as farmer associations, research institutions, or extension services, can help to ensure that demo events are well-coordinated and effectively reaching target audience. By involving experts and working collaboratively with others, demo events can be more successful in promoting the adoption of sustainable pest management practices among farmers. Adequate planning can also help ensure that the demonstrations are well-promoted to attract enough participants, and that the event is structured in a way that allows for effective learning and engagement.

Receiving a positive message from a trusted individual in their professional environment greatly enhances the success of implementing IPM in their fields, ensuring effective transmission of the message. When farmers or agricultural practitioners are supported by someone they trust and respect within their sector, the impact of the message is significantly amplified. Such positive reinforcement not only bolsters their confidence but also strengthens their commitment to adopting IPM practices.

The influence of a trusted ally in the professional sphere cannot be underestimated when it comes to implementing IPM strategies. This individual, who may be an experienced colleague, a knowledgeable consultant, or a respected authority figure, possesses the power to instill belief in the effectiveness of IPM methods. Their positive message serves as a catalyst, igniting enthusiasm and a sense of assurance in the farmers or practitioners. As a result, they are more likely to embrace IPM principles wholeheartedly and dedicate the necessary time, effort, and resources to make it a success.

Moreover, the positive message from a trusted source creates a ripple effect within the professional community. As farmers witness the success and positive outcomes experienced by their peers who have adopted IPM, they become more receptive to the message and are motivated to follow suit. This shared endorsement within the industry fosters a supportive network of individuals who are eager to share their experiences, provide guidance, and offer encouragement to their colleagues venturing into IPM implementation.

This influential support system not only enhances the chances of effective message transmission but also reinforces farmers' belief in IPM, encourages widespread adoption, and cultivates a community of practitioners committed to sustainable and environmentally friendly agricultural practices.

The benefits of including external agents on an occasional basis to consider their point of view is obvious, but it is essential to create a total climate of trust beforehand. On certain occasions the information provided by someone from outside the group may be biased or influenced by other characteristics not linked to the concerns and interests of the group. In this case, a guest who is far removed from the group's opinion could create a climate of distrust that farmers would not feel comfortable sharing their opinion with. It’s crucial to understand the audience and choose the right external expert for each event. The right

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match can lead to a rich, collaborative experience where participants learn and share insights. On the other hand, mismatched interests can hinder open communication and the flow of information.

Timing

It is essential to keep in mind that farmers may be more receptive to learning about and adopting IPM practices when they are facing pest problems in their crops. Therefore, it is crucial to plan demo events in relation to the farming calendar, focusing on the seasons when pests are most active. For example, if a particular pest is not present in the area during a specific season, it may not be effective to organize a demo event on that topic during that period. However, this may vary depending on the region and the specific pest or crop in question. By aligning demo events with the farming calendar and pest pressure, farmers can see the relevance and applicability of IPM practices in their specific context, increasing their interest and motivation to adopt these practices.

One of the challenges for IPM demo HUBs is that the most opportune time to showcase IPM practices may coincide with the busiest time for farmers. To take advantage of these opportunities, both the HUB coach, network organization and the farmers must remain flexible. One way to address this challenge is to view demonstrations as an ongoing process rather than a one-time event. This includes following up with observations and trial results, including yields and economic outcomes, during the winter season. This approach ensures that farmers who were unable to attend the initial demonstration can still benefit from the knowledge and insights gained. By maintaining continuous dialogue and sharing results, farmers can maximize the value of the demonstration and improve their understanding and adoption of IPM practices.

Bearing this in mind and understanding that IPM measures applied may take a long time before results are visible, it is important to focus the demonstrations on the necessary field preparations and to apply preventive measures to ensure that integrated pest management is well integrated, and the chances of success are as high as possible. It is essential to plan the event in advance and focus on the preparatory work. Making all actors involved in the HUB (specially farmers) involve in the preparatory work to take their time needs into consideration and let them know when the date is approaching and remind them of the topics to be discussed.

Establishing a regular schedule for the meetings also helps to create a sense of responsibility for the project and to make them aware that, in the time between events, they have room to apply what they have learned and to gather new insights and questions that arise from what was discussed at previous meetings.

Provide farmers with successful stories and "brilliant failures"

Provide farmers with success stories and examples of farms that have experience in IPM application. This can help to inspire and encourage farmers and give them confidence in their ability to adopt these practices themselves. As not all crops have the same characteristics, it is important to provide farmers with information on successful examples and cases of previous experiences in IPM application that are relevant to their specific crops and growing conditions. For example, if a farmer is growing strawberries, they may be more interested in hearing about successful IPM strategies used by other strawberry farmers in the same region. By sharing success stories and examples of IPM applications, farmers can see firsthand the benefits of using these practices, such as proper IPM specific to their crop, reduced pesticide use and

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cut costs of fertilizers and chemicals. Additionally, hearing from other farmers who have successfully implemented IPM can help to build trust and credibility, as farmers are more likely to believe and adopt practices that have been proven successful by their peers. In summary, providing farmers with success stories and examples of IPM application can be an effective way to encourage their interest and build confidence in their ability to adopt sustainable pest management practices. By tailoring these examples to the specific crops and growing conditions of the farmers, you can increase their relevance and impact.

Not only successful stories define the reality of IPM. It is also important to communicate cases in which the IPM measures did not have the expected result and explain what solution was applied to solve the problem. It is crucial to acknowledge that not every attempt will yield favorable results. By creating opportunities to discuss "brilliant failures," farmers can learn from mistakes and obtain a realistic understanding of the challenges they may face when implementing IPM practices. Sharing both successes and failures can help create a supportive and collaborative environment that promotes learning and improvement.

In this way we will also be able to convey more realistic ideas and explain how to solve possible problems that may arise in the application of IPM.

5.6.2. IPM approach to demonstration events

Tailor IPM examples to match farmers' resources and capacities, ensuring they are feasible for different farm sizes and types, to encourage adoption and demonstrate IPM's adaptability.

When promoting IPM practices to farmers, it is important to showcase good examples of successful implementation. However, it is equally important to present these examples in a way that is feasible and achievable for the farmers themselves. This means paying close attention to the resources and capacities that are available to them, such as the type of machinery or equipment they have access to, the size of their farm, and their financial capabilities. If the examples presented require expensive machinery or resources that are not readily available to the farmers, it may discourage them from adopting IPM practices altogether. Instead, it is important to adjust the IPM options to fit within the farmers' available capacities and opportunities, and to create a strategy around this combination. This can involve showcasing examples of successful IPM implementation by farmers with similar resources and capacities or providing alternative solutions that are more accessible to the farmers. By tailoring the examples and options to the farmers' specific capacities and opportunities, it can help to build their confidence and encourage them to adopt IPM practices. It can also help to demonstrate that IPM is a flexible approach that can be adapted to different situations, rather than a one-size-fits-all solution.

Also. ensure that the practices demonstrated are applicable to different scales of production, making them relevant to both small-scale and large-scale farmers. This inclusivity helps to broaden the adoption of IPM practices across diverse farming contexts. Highlight versatile IPM techniques that can be adapted to various farm sizes and types, ensuring that all farmers can benefit from the demonstrations.

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5.7. Addressing external factors

5.7.1. Approaching political aspects and economic concerns

Recommend advocating for regional or local government support to mitigate production loss from IPM measures, providing tailored advice based on crop type and conditions, and organizing dedicated events to share and clarify funding and regulatory information with farmers.

As analysed in the section on barriers and challenges detected, one of the main concerns of farmers is the loss of production when applying IPM measures.

On several occasions they have shown their interest in the need for regional/local government measures to offer aid in the face of production loss. This would be an option to consider in the analysis of measures and recommendations to policy makers. From the point of view of strengthening the network, it is not possible to implement or ensure that such a measure can be applied. What can be done is to keep the issue present and active in the group, so that farmers and other actors know the reality of the current regional, national and European regulations. The network can be a forum where to discuss needs regarding solutions to alleviated IPM-related risks, and to transmit them in the form of proposals or recommendations to local/regional governance actors, seeking their support or even participating in European projects that address these issues.

On the other hand, several farmers have mentioned that it would be advisable to have access to better adapted and tailor-made advice to tackle the fear of production loss, since IPM measures do not affect all crops in the same way, nor do they act in the same way in different climatic conditions (arid zones, humid zones, etc.). They point out the need for analysis of comparative multi-criteria strategies where different indicators such as crop type, soil and climatic conditions are measured and related to other indicators such as technical efficiency, sustainability, economic evolution, and risk of loss. However, the challenge of this approach lies in the data collection, which proved difficult to carry out effectively. Gathering reliable and comprehensive data across these diverse criteria remains a critical hurdle for advancing such analyses. Such an analysis would provide a holistic and global vision since technical assistance should not only be limited to mechanical or implementation issues, but also to an economic extent too. This would help to address the barriers and beliefs of many farmers that IPM measures are complex or can lead to large losses.

On the public-financial side, many concerns about regional/national funding system arose during the HUB events in the project. Identifying and accessing funding by HUB facilitators can be challenging. Many funding sources require applications to be made by organizations rather than individuals, necessitating the formation of legal entities which can be complex and time-consuming for farmers. It is crucial to share this information with the group and to organize dedicated events for disseminating regional public

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management issues. These topics are highly significant for various stakeholders within the group, yet they often remain inaccessible or difficult to fully comprehend.

5.7.2. Cultural considerations

Facilitators should understand local cultural nuances to engage farmers effectively, address collaboration barriers, and leverage younger farmers' openness to new practices.

In every community or region, there exist cultural nuances that significantly influence the behaviours of various stakeholders, particularly farmers. Their daily routines often immerse them in traditional practices, and they frequently rely on inherited wisdom when making decisions in the field. This traditional knowledge is deeply ingrained and often perceived as the most effective approach.

However, identifying the extent to which cultural factors shape the decisions and attitudes of farmers and others is a complex and delicate task. It requires a nuanced understanding of the cultural dynamics at play. While some farmers are motivated by knowledge sharing, many require tangible incentives such as financial rewards, provision of inputs, or recognition as educators to sustain their participation. Overcoming individualistic cultures, competition, and reluctance to admit mistakes are critical barriers to collaboration and knowledge sharing among growers. Addressing these challenges is essential for creating an environment where growers can learn from each other and adopt best practices effectively.

This is why one of the essential roles of a facilitator within a community or HUB is to possess an intimate familiarity with the cultural context. By being a part of the same cultural environment, the facilitator can discern the diverse sensitivities, norms, and beliefs prevalent within the community. This understanding enables the facilitator to tailor their communication and engagement strategies, accordingly, ensuring effective interaction with the group.

5.8. Training and education

The domain of education and training in IPM emerges as a crucial and influential tool in facilitating the adoption of IPM strategies and managing the obstacles that impede their execution among different stakeholders. Upon examining various information sources, several needs have been discerned regarding the insufficient practical knowledge in diverse agricultural fields. Consequently, this analysis reveals potential recommendations across different aspects of education and training.

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5.8.1. Addressing the education gap in IPM

To address the IPM knowledge gap, integrate IPM-focused content into agronomy and agricultural training programs.

The absence of specific content on IPM within agronomy and other agricultural-field study training programs, including those offered by universities or vocational training institutions, is apparent. It is essential to augment the educational curriculum in these domains with an increasing focus on IPM-related topics. Additionally, organizing specialized courses for individuals actively involved in agriculture endeavors is important to mitigate the knowledge deficit in IPM aspects that is often responsible for fostering skepticism towards IPM methodologies.

5.8.2. Engagement of agri-food chains and consumers

To advance IPM adoption, all food chain stakeholders must engage in education and advocacy, sharing the responsibility for promoting sustainable pest management.

One significant recommendation involves organizing educational or demonstration workshops. The organization of such training programs should be incorporated into courses at agricultural high schools, colleges, universities, or applied research organizations, or by national or regional extension services. Awareness and engagement of agri-food chains and consumers

A more sustainable and environmentally friendly approach to pest management is not just a matter of agricultural concern; it is intricately linked with effective food chain management. IPM practices offer a holistic solution that not only addresses pest control but also promotes ecosystem health and safeguards biodiversity.

Despite the evident benefits of IPM, there's a prevalent perception among farmers that the burden of responsibility for learning, implementing, and executing these practices falls entirely on their shoulders. This perception is reinforced by the lack of recognition from other stakeholders, notably the private sector and consumers.

To truly realize the potential of IPM and foster its widespread adoption, it's imperative that all members of the value chain recognize and embrace their role in promoting sustainable pest management practices. This includes stakeholders across the food sector and other industries that rely on agricultural products.

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Raising awareness about IPM is key to shifting this paradigm. It requires a multifaceted approach that encompasses education, advocacy, and collaboration. Educational initiatives tailored to different stakeholders can help demystify IPM, dispel misconceptions, and highlight its benefits from various perspectives.

Furthermore, it is crucial to recognize that the responsibility for promoting IPM extends beyond farmers alone. While farmers play a pivotal role in implementing these practices, other stakeholders such as input suppliers, retailers, policymakers, and consumers also wield significant influence within their networks. By participating in multi-actor groups related to agriculture, with a specific focus on IPM, these stakeholders can disseminate information within their respective spheres of influence. This fosters a collective understanding and commitment to IPM, highlighting their crucial role as agents of change.

5.8.3. Capacity building programs

Engagement in training initiatives is crucial for gaining expertise in IPM practices and enhances facilitators' ability to manage stakeholder groups effectively, fostering collaboration and continuous learning in agriculture.

Engagement in training initiatives plays a pivotal role in acquiring tangible expertise tailored to specific domains such as IPM practices.

On one hand, these programs impart practical know-how to individuals directly involved in agricultural practices within their professional contexts. They serve as a platform for acquiring technical proficiency essential for tailoring methodologies to fit IPM in their realities. Moreover, they cultivate an immersive environment wherein both instructors and participants actively contribute to networks and communities centred around IPM issues. This collaborative setting often fosters valuable connections among members, facilitating firsthand exchanges of experiences and insights related to IPM.

On the other hand, for facilitators operating within HUBs or networks, capacity-building programs serve to enhance their ability to effectively manage stakeholder groups. By equipping them with tools for event facilitation and meeting management, as well as methodologies for needs assessment and group analysis, these initiatives empower facilitators to navigate the complexities of group dynamics with greater efficacy.

Both agriculture in general and IPM practices specifically needs continuous re-education and a proactive mindset to anticipate and adapt to forthcoming developments. Embracing continuous learning on facilitating training or capacity building programs with groups ensures heightened adaptability and resilience the HUB coach within these domains.

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5.8.4. Bringing technology and innovation closer

Integrating digital and technical skills into IPM training programs, leveraging online platforms for outreach, and embracing innovative technologies in crop management are crucial for effective implementation and dissemination of IPM measures.

Some IPM solutions are based on technology, encompassing both digital and technical skills. Therefore, whenever relevant, training programs aiming at implementing IPM measures and disseminating them effectively should integrate relevant technologies. Additionally, embracing innovative methods that streamline crop management processes is crucial.

Foremost, leveraging digital tools for communication and establishing a strong online presence through social media channels represent a widely adopted strategy to expand outreach beyond immediate stakeholders. This approach allows for broader engagement with the public, fostering a more inclusive and enriched network. Active participation in various online platforms and repositories of best practices and other agricultural data at both European and national levels is a must. By engaging with these platforms, not only the presence within the online community is more cultivated but also establishes credibility and professionality within their specific field of interest.

Similarly, access to interactive tutorials, online courses, and forums serves as a catalyst for knowledge acquisition on specialized topics and facilitates networking opportunities with fellow practitioners.

Moreover, the escalating integration of technology into farm management practices underscores its growing indispensability in mitigating risks and optimizing crop productivity. Whether through the utilization of drones for pest detection, robotics for soil analysis, or innovative applications of pheromones, technology has paved the way for transformative advancements in agriculture. Ensuring accessibility of these technological advancements whenever relevant is vital. Familiarity with such tools by adding them in the educational programs not only empowers stakeholders on the field but also equips them with the necessary tools to realize sustainable objectives in the long term.

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6. Conclusions

The **IPMWORKS** project has demonstrated the complexities and potential of scaling **IPM practices** across Europe through a **multi-stakeholder approach**. The key to overcoming barriers and ensuring the widespread adoption of IPM lies in the coordinated efforts of various actors, each playing a specific role. In this, farmer demo HUBs can play a pivotal role.

HUB coaches, who can come from diverse backgrounds such as farmer associations, cooperatives, academia, and advisory groups, must possess a deep understanding of local contexts and existing networks. Their primary tasks include **identifying motivated actors, promoting cooperation, explaining and illustrating IPM values, and facilitating hands-on learning on IPM**. Essential characteristics for each stakeholder include openness to explore and learn collaboratively for farmers, knowledge and communication skills for advisors, organizational strength for associations, policy support for policymakers, and practical research for academic institutions.

Effective connectivity, communication, and dissemination are crucial for HUB sustainability. All actors, not just HUB coaches, must engage actively. Farmers and advisors, in particular, should share insights, participate in discussions, and build relationships with other stakeholders, ensuring a vibrant and effective HUB.

Demonstration events are vital for showcasing IPM measures. HUB coaches and farmers must manage preparations, align content with stakeholder interests, and involve experienced practitioners and educational institutions. These events foster an environment of **trust** and facilitate the practical application of IPM strategies.

Addressing external factors is essential for a **holistic approach**. The HUB coach must integrate diverse perspectives and address economic and political issues, with policymakers engaging directly with the group's needs. **Education and training** actors must increase their participation, enriching their knowledge of IPM to incorporate it into future curricula. Additionally, whenever relevant, technology that contributes to the design of IPM strategies should be effectively shared within the HUB, with industry actors providing their expertise. However, it is important to recognize that technology is not always essential for developing IPM strategies. A balanced approach that includes a variety of tools and methods will ensure more adaptable and effective pest management strategies.

By embracing these recommendations, stakeholders can ensure the successful implementation and **scalability** of IPM measures, ultimately leading to more sustainable and effective pest management practices across Europe. IPMWORKS represents a crucial step towards **transforming the European agricultural sector** into one that is more resilient, cost-effective, and environmentally responsible. Through its EU-wide farm network, training sessions, and peer-to-peer learning, the project demonstrates that holistic IPM practices not only reduce pesticide reliance but also improve pest control, reduce costs, and increase profitability for farmers.

This collaborative effort will help pave the way for a future where sustainable farming becomes the norm, benefiting both the environment and agricultural communities across Europe. With its comprehensive

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multi-actor network and continuous dissemination of IPM success stories, IPMWORKS is set **to inspire widespread adoption** of these methods, significantly contributing to the overarching goal of achieving food security, protecting ecosystems, and promoting a bioeconomy that serves the needs of both current and future generations.

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Annex 1. IPMWORKS network questionnaire

1. What are the key distinctions in the operation of your project compared to IPMWORKS, and are there any noteworthy elements that could be emulated to enhance the adoption of IPM?

2. Can you share examples of successful knowledge sharing and best practices that have improved agricultural practices in your region?

3. Are there any country/regional/local-specific factors that contribute to the success of your project?

4. Is the progress in IPM reduction consistent across all crops, or are some proving more challenging than others?

5. What are the key elements of fostering a collaborative environment among neighboring farmers, and how do these elements contribute to the well-being of farming communities?

6. What specific instances or strategies have led to fruitful exchanges of knowledge and experiences among farmers with more experience?

7. What specific types of support and guidance do you think the HUB can provide to farmers to improve their technical knowledge and best practices?

8. Can you share any challenges or concerns you've encountered when adopting IPM practices in your farming operations?

9. What educational resources or programs have you found helpful in improving your understanding of IPM principles and practices?

10. Are there any misconceptions or fears about IPM that you've encountered among your peers, and how have you addressed them?

11. In your experience, what role has formal education (e.g., agricultural courses or programs) played in promoting IPM practices among farmers?

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Annex 2. National Focal Points and Their Organizations

- **EVILVO (Belgium):** A research institute focusing on agricultural innovation and sustainable practices.
- **DELPHY (The Netherlands):** A consultancy and research organization specializing in horticulture, agriculture, and agribusiness.
- **CONSULAI (Portugal):** A consultancy firm providing services in agriculture, rural development, and agri-food industries.
- **AU (Denmark):** Aarhus University, a leading research university with a strong focus on agricultural sciences.
- **ACTA (France) :** Association de Coordination Technique Agricole, a national association coordinating technical agricultural institutes.
- **LEAF (United Kingdom):** Linking Environment and Farming, an organization promoting sustainable farming practices.
- **KGZS (Slovenia):** Kmetijsko gozdarska zbornica Slovenije, the Chamber of Agriculture and Forestry of Slovenia.
- **ProAgria (Finland):** A network of regional advisory services providing agricultural advice and support.
- **TEAGASC (Ireland):** The Agriculture and Food Development Authority, providing research, advisory, and education in agriculture and food sectors.
- **COEXPHAL (Spain):** Association of Fruit and Vegetable Producer Organizations of Almería, focusing on horticultural production and marketing.
- **SSSA (Italy):** Scuola Superiore Sant'Anna, a public university offering postgraduate education and research in applied sciences.
- **Agroscope (Switzerland):** The Swiss center of excellence for agricultural research.
- **BIOSENSE (Serbia):** BioSense Institute, focusing on research and development in the field of information technologies for agriculture.
- **KPODR (Poland):** Agricultural advisory centre in Poland, providing education, support, and consultancy services to farmers in the Kujawsko-Pomorskie region.
- **AUA (Greece):** Agricultural University of Athens is specialized in agricultural sciences, research, and education to advance sustainable agricultural practices.

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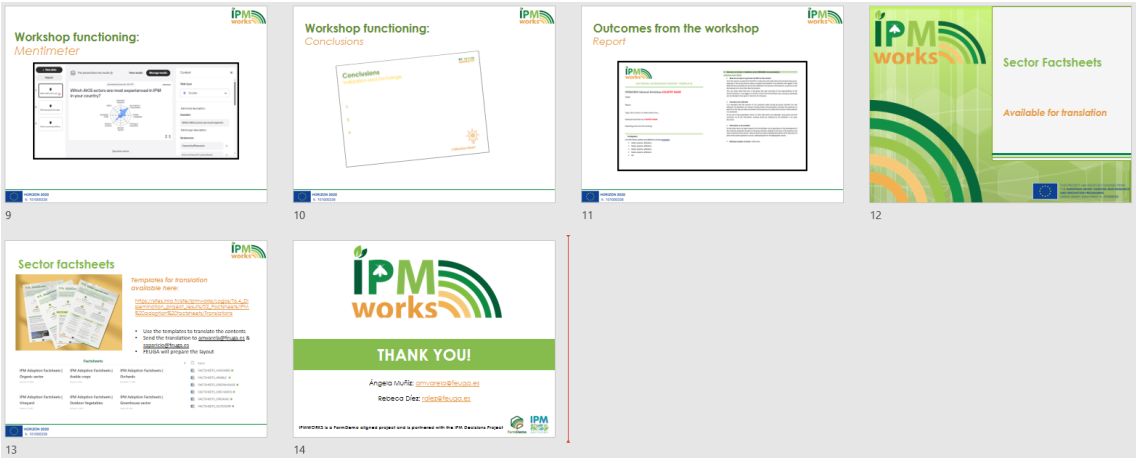
Annex 3. National Focal Points workshop



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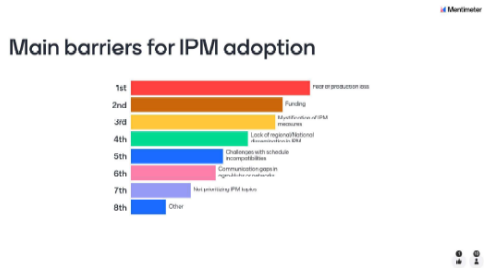
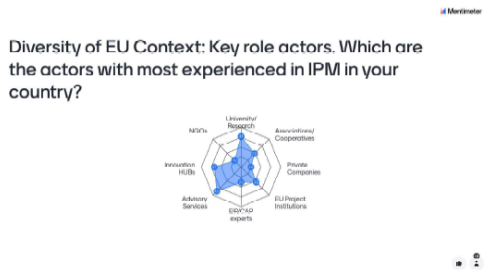
Annex 4. EU Level workshop results

Workshop 1





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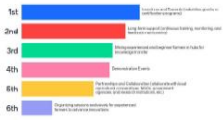
What os these concrete measures have more impact to upscale IPM practices?



What are the educational/traning strategies that contribute the most to IPM scalability

Mentimeter

What more is needed to scaling IPM measures?

Have more interaction from network hubs to outside farmers. More open demo events	Time to support more farmers	Try to convince farmers with the positive aspects of IPM	Involve other kind of advisors (coop, product sellers...) to avoid contradictory messages.
Success stories that will make farmers want to replicate this "stories"	Continued professional development should be mandatory	Increase communication across the value chain, with and among the institutions	Stop distributors and work to find solutions for farmers

Mentimeter

What more is needed to scaling IPM measures?

Reaching out to more farmers. Specifically the farmers that have very little knowledge or interest in IPM. Use other farmers as an example or a motivation	Involve the value chain in the dynamic	All actors spreading same message. Consistency for farmers	Involve the whole value chain and make all the actors communicate better

Mentimeter

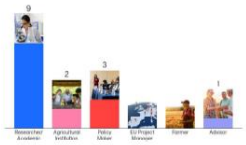
Workshop 2

First, where are we from?

13 responses

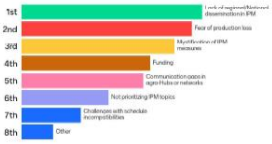
Mentimeter

What is your profile?



Mentimeter

Main barriers for IPM adoption



Mentimeter

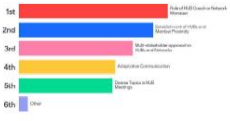
Any other challenge?

9 responses

Mentimeter

Diversity of EU Context: Key role actors. Which are the actors with most experience in IPM in your country?

Which strategie have the greattest impact?



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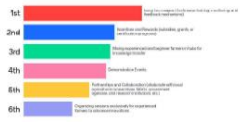
What os these concrete measures have more impact to upscale IPM practices?



What are the educational/traning strategies that contribute the most to IPM scalability

What more is needed to scaling IPM measures?

Network of group of farmers	Long term demonstrations	Increase the communication about the network results	Having videos presenting results
Funding of hubs (incl coaches, demos, etc)		Education and knowledge	Pests monitoring

What more is needed to scaling IPM measures?

Examples with videos	Involve even students	More hubs!	Market demands
Peer to peer exchange	Policy decisions involving stakeholders	Link with climate	Expanding amount of hubs on coordinators Expand communication about positive results and feasibility

What more is needed to scaling IPM measures?

Combining long term research (proof of concept) and on farm demos	Common long term approach by different stakeholders (advisors, research, governments).	More interaction with food chain stakeholders

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Annex 5. IPMWORKS Survey n.3

Changes in IPM awareness

5. **Tick boxes that best fit with the changes of farmer's perception of IPM along the course of the IPMWORKS project ***

Please choose your answer on a scale ("decreased" to "increased") and rate each statement.

	Decreased	Slightly decreased	Did not change	Slightly increased	Increased
During the last 4 years, my motivation to adopt IPM...	○	○	○	○	○
During the last 4 years, my motivation to decrease pesticide use...	○	○	○	○	○

Validate

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Drivers of changes in IPM awareness

6. **The IPMWORKS hub coach and other farmers of the IPMWORKS group played a role in the change in my perception of IPM and Pesticides** *
Tick the box that best fits *

Not at all true	Not really true	Intermediate	Rather true	Fully true
○	○	○	○	○

7. If relevant, please cite other sources of information that have been driving changes in my perception of IPM and pesticides *

- ☐ IPM Resource Toolbox
- ☐ Contracts for my productions
- ☐ Changes in regulation
- ☐ Advisory services
- ☐ Societal pressure
- ☐ Others

Enter text here

Validate

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8. **Changes in cultural practices - Farm level**
Please answer based on changes in your practices during the course of the project *

	Not at all true	Not really true	Intermediate	Rather true	Fully true
During the last years, I introduced new crops to diversify my crop rotation	○	○	○	○	○
During the last years, I adapted the landscape around my fields to favour biodiversity and attract beneficial organisms	○	○	○	○	○

9. Comments

Enter text here

Validate

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10. **Changes in cultural practices - Farm level**
Please answer based on changes in your practices during the course of the project *

	Not at all true	Not really true	Intermediate	Rather true	Fully true
During the last years, I changed my spraying equipment so as to reduce doses or amount of pesticides applied	○	○	○	○	○
During the last years, I changed my spraying equipment so as to reduce drifts and possible impacts of treatments	○	○	○	○	○

11. **Comments**

Enter text here

Validate

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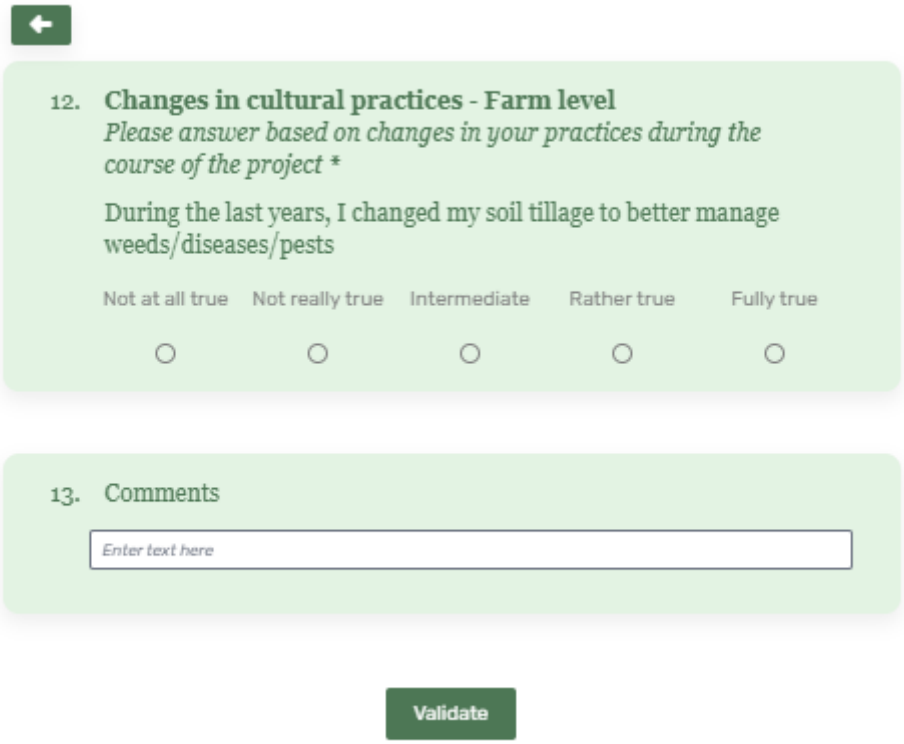

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Annex 6. Demo exit poll

1. ***I am a ....***

- Farmer
- Farm employee
- Public or private adviser
- Supply chain actor
- Consumer
- Researcher
- Student
- Policy maker
- Other (Please specify)

2. ***Gender***

- M
- F
- X

3. ***I found out about the event through...***

- Personal invitation
- Mailing list
- Social media
- Newspaper
- Radio
- TV
- Leaflet and poster
- SMS

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4. ***I am here today because I...***

- Was just curious in general
- Wanted to meet other farmers to be able to discuss things with and hear from them
- Wanted to learn more about IPM in general
- Had specific questions on IPM that I wanted to get answers to
- Was interested in a specific demonstration that I knew would be shown

5. My expectations...

- Were not met at all
- Were met to some degree
- Were mostly met
- Were fully met
- Were exceded

6. On a scale of 0 (ineffective) - 4 (very effective) this is what I thought about the various methods used in this demonstration (please put N/A if you have not seen it used):

Methods	**N/A**	**0**	**1**	**2**	**3**	**4**
Oral presentations						
Equipment/ machinery demonstration						
Farm/ field walks						
Videos						
On-line tutorial						
Hands-on experience/ training sessions/ workshop						
Interactive discussion						
Other (Please specify)						

7. The following is what I thought about the demonstrations

[Hub Coach to complete in advance with brief description of techniques/ methods/ practices demonstrated]

- I did not see this demo
- I did not find this interesting/ useful

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- I found this interesting but still have some questions
- I intend to apply this
- I am already applying this

8. The most useful thing I learnt today was... *(free writing)*

9. I think the demonstration event was ...

- Not well run
- Okay run
- Quite well run
- Very well run

10. I think this event could have been better if there had been ....

- Better logistics/planning
- More time for discussion/asking questions
- More time for informal interaction
- A more compact programme (less time and/or fewer demos)
- More interesting choice of demonstrations

11. In future demo events on plant health management options and strategies, I would like to learn more about ... *(free writing)*

- Preventing pests and diseases, specifically:
- Detecting pests and diseases, specifically:
- Controlling pests and diseases, specifically:
- Evaluating options and strategies, specifically:

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