Gaps and needs for pesticides reduction. Evidence in a multi actor value chain assessment

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Identify research gaps and needs

Objective:

Analyze gaps and needs in reduction of pesticides based on an innovative multi-actor approach

Methodology:

Method

- a multi-actor approach
- the innovation systems approach

Data collection

- 21 Concept – Knowledge workshops
- 1 Pan European workshop
- 14 countries
- 3 sectors

Data analysis

- content analysis
- the innovative systems functions

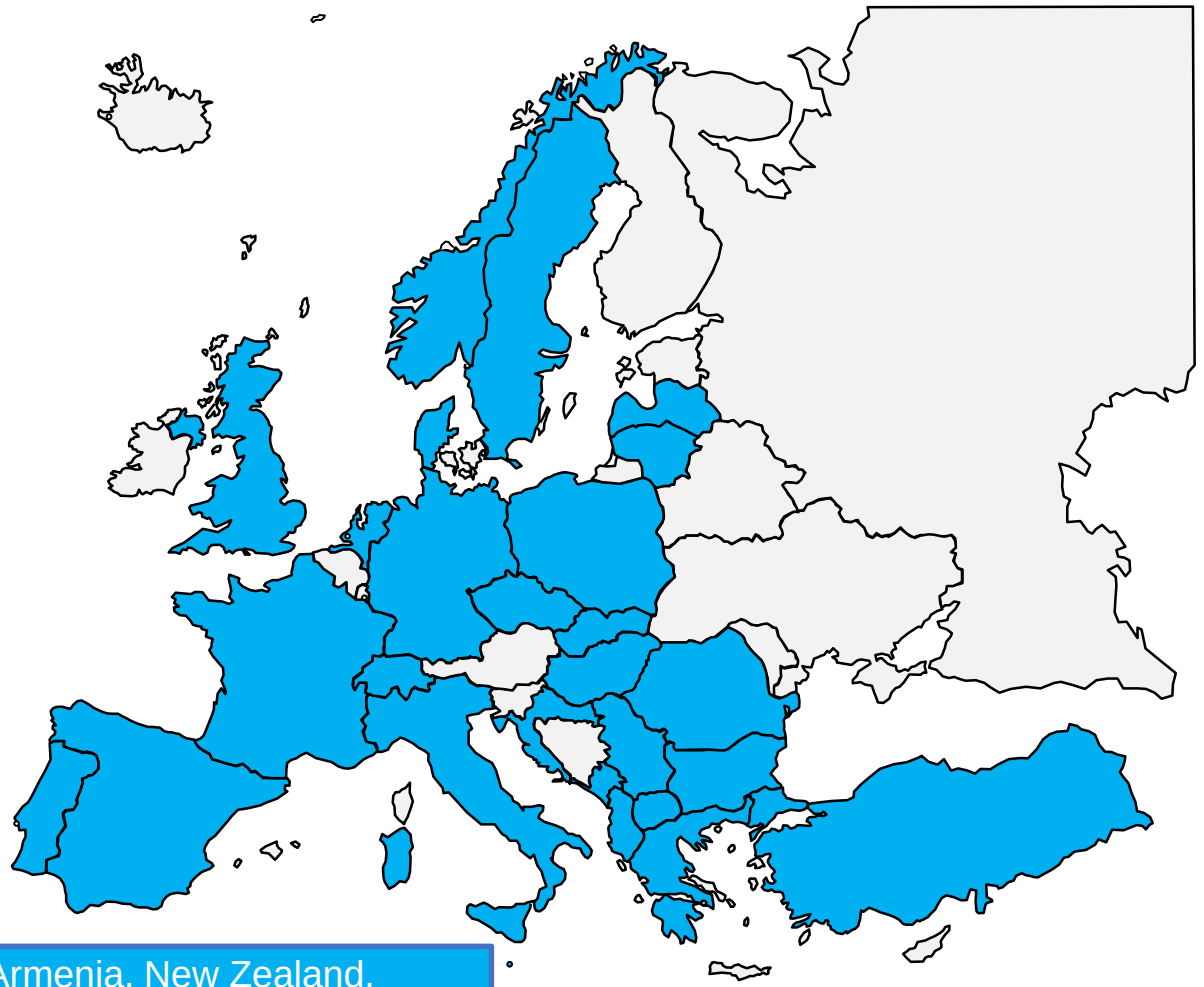
cost EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY
Funded by the European Union

Concept-knowledge (C-K) workshops

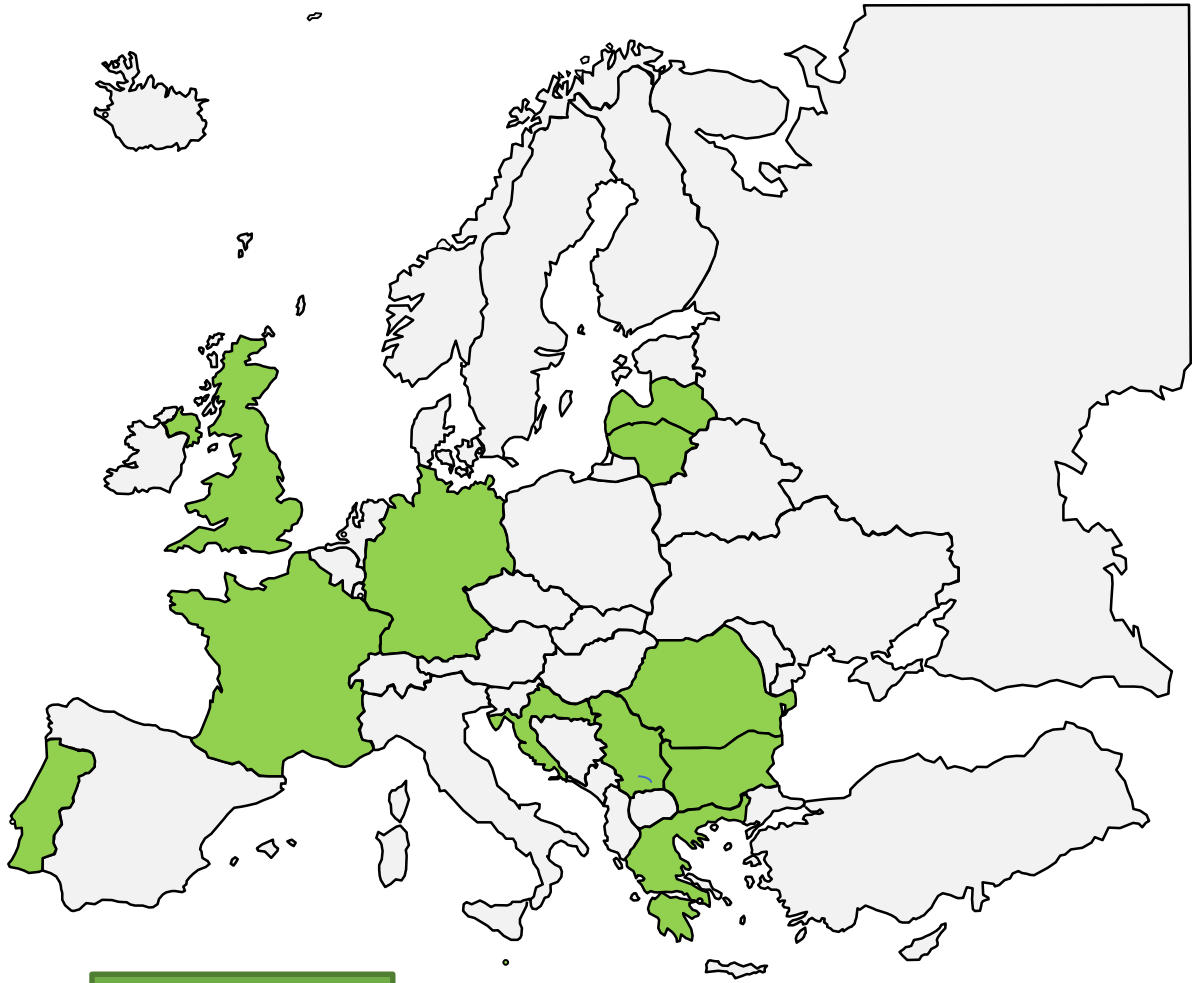
WG 1 member countries

From 34 partner countries, 14 expressed the intention to organize national Concept-Knowledge workshop.

WG 1 C-K workshops

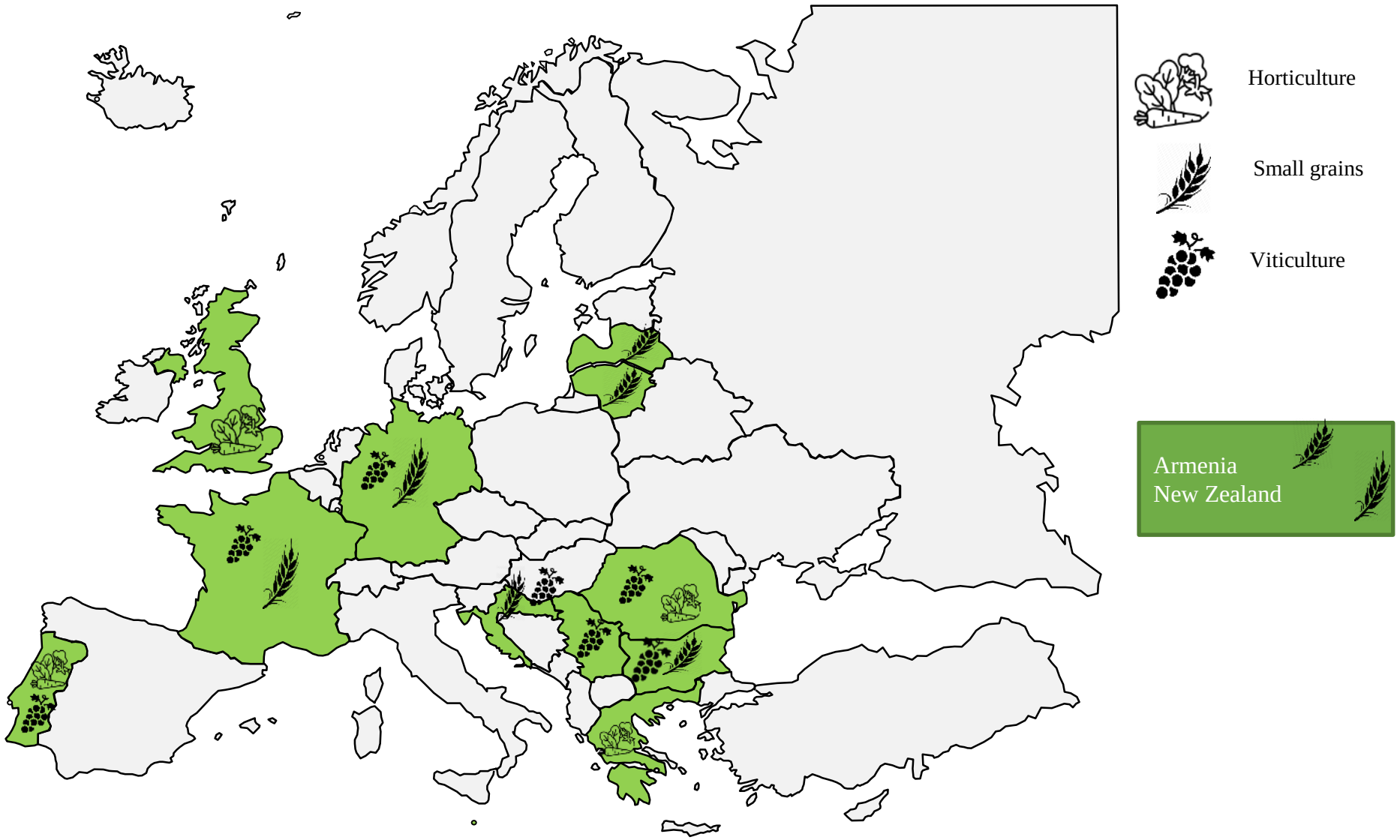


Armenia, New Zealand, Chile, Mexico, Israel, Benin



Armenia
New Zealand

Concept-knowledge (C-K) workshops



C-K workshops in 14 countries: 9 viticulture; 8 small grains; and 4 horticulture;

Concept-knowledge (C-K) workshops

Viticulture

No.	State	Region	Location	Number of participants	Types of participants
1	France	Nouvelle-Aquitaine	Face to face	49	19 farmers; 5 advisors; 10 representatives from business in an agricultural area; 15 scientists and other stakeholders
2	Serbia	National	Online	12	1 advisor; 5 scientist; 2 educator; 2 farmer; 2 implementer of regulations
3	Romania	Transylvania	Online	12	3 farmers; 2 input suppliers; 1distributor; 3 advisors (product quality laboratory), 3 researchers
4	Croatia	National	Face to face	20	5 advisors, 10 scientists (plant protection viticulture), 5 state agencies (regulatory and advisory role)
5	Kosovo	National	Face to face	12	3 input suppliers, 7 farmers, 2 academia
6	Germany	National	Online	13	1 scientist (COST Action), 3 researchers from national research institute (plant breeding, plant protection), 1 agro-chemical industry, 3 researchers national research institute (plant protection, advisors), 3 scientists
7	Portugal	North and Centre	Online	9	4 farmers, 2 technicians from pesticide companies, 2 researchers/universities
8		South	Online	9	2 advisors, 2 crop protection industry, 2 farmer association, 3 farmers
9	Bulgaria	National	Face to face	19	10 scientists , 5 farmers, 1 advisors, 3 government employees

Concept-knowledge (C-K) workshops

Small grains

No.	State	Region	Location	Number of participants	Types of participants
1	Armenia	Yerevan	Face to face	10	2 farm representatives, 1 agronomist, 2 manufacturers of biological preparations, 3 microbiologist, 1 biotechnologist, 1 entomologist
2	Lithuania	Baltic	Face to face	133	17 farmers; 7 advisors; 10 representatives from business in an agricultural area; 99 scientists and other stakeholders
3	Croatia	National	Face to face	15	4 breeders, 8 scientists (plant protection, small grain production), 3 state agencies (regulatory and advisory role)
4	Bulgaria	Sofia	Face to face	20	6 researchers; 4 agribusiness; 3 advisors; 3 consulting organizations; 4 government employees
5	Germany	National	Online	6	1 organic farm manager, 1 advisor, 2 agro-chemical industry, 2 researchers
6	France	National	Online	15	5 research, 3 experimentation centers, 1 inputs industry, 2 cooperatives and growers groups, 2 processing industry and distribution, 1 advisors, 1 regulatory organizations
7	Latvia	National	Online	10	3 farmers, 4 scientists (plant protection, environmental pollution, weed specialist, phytopathology), 1 state agencies (advisory role), 1 NGO, 1plant protection product association
8	New Zealand	National	Online	10	2 breeders, 6 scientists, 2 agrichemical companies 3 research agencies

Concept-knowledge (C-K) workshops

Horticulture

No.	State	Region	Location	Number of participants	Types of participants
1	Portugal	National	Online	14	4 farmers, 2 advisors, 2 technic staff official services, 3 biocontrol & pesticide enterprises, 3 academic, 1 operative center, and Portuguese WG1 team
2	UK	National	Online	8	3 consultants 1 cooperative, 2 growers, 2 researchers
3	Romania	National	Online	17	9 researchers, 2 farmers, 3 industry representatives, 1 central administration rep., 1 civil society rep.
4	Greece	Larisa-Thessaly	Face to Face	1000	400 agronomists/advisors, 100 people from Industry, 50 stakeholders (Ministry of Agriculture, National Regions, Municipalities), 100 farmers, 200 scientists, 150 undergraduate and graduate students

Pan European workshop

To identify the most stringent barriers and needs towards zero pesticides from technological, social-marker and regulations aspects based on the results from national workshops.

Cluj-Napoca, Romania

Hybrid

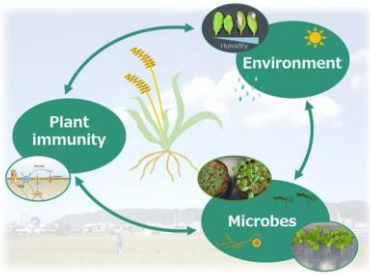
8 participants on site,
16 participants on-line

Concept-knowledge (C-K) workshops: Results

Technological

BARRIERS:

1. Lack in demonstrating the efficiency of bio stimulants/alternative solutions – cost/benefit;
2. Insufficient national funding of fundamental and applied research related to agriculture incl. interdisciplinary studies;
3. Investment costs in alternative precision farming and mechanical tools;
4. Lack of appropriate solutions/ available resources for farmers;
5. Lack of knowledge and agro technologies for multi cropping, multifunctional crops.



<u>Sector specific:</u>

Viticulture:

1. Old vineyards create challenges to modern equipment and technology;
2. More manual labour required in horticulture farming;
3. Many solutions that work in small grains production cannot be implemented here (e.g. crop rotations, rapid change of crop variety/type from one year to the next).

Small grains:

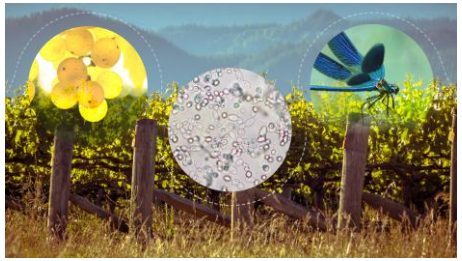
1. Expensive implements and machinery are required, economically efficient only in large intensive farms.

Concept-knowledge (C-K) workshops: Results

Technological

NEEDS:

1. Training for advisory services;
2. Implement participatory research methods (living labs) involving all stakeholders from the value chain;
3. Need for experimentation at the local level;
4. Better national and local support for organic production certification;
5. Better describe and understand the role of microbiota in production quality and plant immunity;



<u>Sector specific:</u>

Viticulture:

1. Specific equipment for row weed control;
2. Better understand the competition between plant biomass between rows and grape development;
3. Increasing the soil life (more micro-organisms and more organic matter) for more vine resistance to stress.

***Small grains*:**

1. Suitable trap plants in intercropping with target crops, plant defence stimulators in combination with optimized nutrition;
2. Lack of knowledge and agrotechnology for multi cropping, multifunctional crops.

Concept-knowledge (C-K) workshops: Results

Social/market:

BARIERS:

1. Lack of knowledge for producers and consumers (lack of farmers' motivation to participate to educational seminars);
2. Low market drivers;
3. Confusion between zero-pesticide and organic;
4. Consumer reluctance to change consumer habits, lack of awareness campaigns;
5. Lack of integration protocols for pesticides free agriculture;

NEEDS:

1. Educate producers, policy makers and consumers about the negative effects of pesticides on human health & environment;
2. Quality schemes which are promoting pesticides free production and pesticides free products;
3. Need to adapt curricula to zero pesticides alternative approaches;
4. Fair distribution of the profits along the value chain;
5. Improving product traceability and stimulating the development of short supply chains.

Concept-knowledge (C-K) workshops: Results

Regulation

BARRIERS:

1. Conflict of interest within regulatory organizations and their connections with phytosanitary industry;
2. Mandatory requirements are different comparing the EU products and non-EU products – unfair competition;
3. EU biopesticides registration consider to be too expensive and taking a tot of time;
4. Lack of knowledge and poor connections between the scientific community and farmers community;
5. Policies are intransigent without adaptation to the reality of the farmer.

NEEDS:

1. Need for the interaction of legislators, scientists, industry; clear political objectives;
2. Development of funding programs (from the CAP) to help farmers implement alternative measures and reduce pesticide use;
3. Development of public advisory system based on monitoring data and mathematical models for prognosis the occurrence and development of economically important pests in strategic agricultural crops;
4. Appropriate regulatory framework for ecosystem services of pest control;
5. Reduce regulatory pressure on the primary production sector to give producers more room to maneuver.

The functions of the innovative system for a pesticide-free agriculture

Function 1 –Entrepreneurial activities

farmers, suppliers, distributors, processors

-Businesses that are on the value chain and can influence the reduction of pesticides

Function 5 – Market formation

farmers, suppliers, distributors, processors, consumers

-Niche market for pesticide free products
-Specific tax measures
-New policy measures for market

Function 2 –Knowledge development and Function 3 –Knowledge exchange

education, academic, advisers, researchers

-Actors who create knowledge and share it
-Increase in performance by learning
-Involvement of relevant actors and cross connections
-Networks

Function 6 – Resource (human, material, financial) mobilisation

all actors in the chain

-Types of resources availability
-Perception of accessibility to sufficient resources by actors involved

Function 4 –Guidance of the search

policy makers, farmers, researchers

- Creating common vision
- Clear objection for transition
-The extent and direction given to the search process

Function 7 – Counteract resistance to change

all actors in the chain

- Strengthening resilience
-Mechanisms for resistance

Source: after Hekkert et al., (2007)

The functions of the innovative system for a pesticide-free agriculture

Function 1 –Entrepreneurial activities

farmers, suppliers, distributors, processors

Barriers

- the availability and know-how of free-pesticides alternatives;
- the costs in time and money to produce and to use alternative methods;
- and the capacity and the adaptability of business to changes (especially for farm business).

Needs

- the availability and know-how of free-pesticides alternatives;
- the financial support for the transition towards zero pesticides agriculture;
- implementation of a participatory research method (living labs).

Function 2 –Knowledge development and Function 3 –Knowledge exchange

education, academic, advisers, researchers

Barriers

- the lack of resources to develop research related to methods and alternatives for pesticide-free agriculture;
- low research prioritization to the real needs of the key value chain actors;
- lack of advisory services;
- poor dissemination of research results.

Needs

- collaboration between farmers and researchers;
- to create platforms for disseminating results to the general public;
- public and private advisory services so that the exchange of knowledge and information.

Function 4 –Guidance of the search

policy makers, farmers, researchers

Barriers

- lack of clarity, consistency and coordination between EU, national and local policy makers;
- sometimes EU policy maker's vision is too ambiguous and therefore not sufficiently clear for the actors involved at the local level;
- lack of cooperation between the key actors of the value chain and policy makers.

Needs

- the creation of a clear and concise legislative framework;
- the financial support, to be able to implement projects based on which to establish priorities and the real vision;
- more effective cooperation between policy makers and the other actors of the value chain.

Source: after Hekkert et al., (2007)

The functions of the innovative system for a pesticide-free agriculture

Function 5 – Market formation

farmers, suppliers, distributors, processors, consumers

Barriers

- the willingness to pay a premium price for products obtained from pesticide-free agriculture;
- lack of a specific label developed for pesticide-free product;
- lack of communication/cooperation between the actors of the value chain

Needs

- to create organizations/associations
- Creating a payment-based market for environmental services
- the creation of a quality brand and its labelling
- Improving product traceability and stimulating the development of short supply chains

Function 6 – Resource (human, material, financial) mobilisation

all actors in the chain

Barriers

- lack of financial resources to use alternatives to pesticides, new technologies and to bear the additional costs or losses incurred due to the non-use of pesticides (risk mitigation).
- (HR) lack of education regarding alternatives in pesticides use,
- (HR) the high age of farmers that makes difficult the adaptions to changes.

Needs

- development of financial support measures for all levels (farm, market, research) through CAP;
- the efficient management of resources by prioritizing needs;
- (HR) to attract young farmers and educate them.

Function 7 – Counteract resistance to change

all actors in the chain

Barriers

- conceptual clarity, lower productivity, and feasibility of such farming system;
- This approach would be too ambitious for most farmers.

Needs

- creating regional living lab to promote resilience;
- develop public-private partnership;
- clear and explicit national legal framework for all levels.

Source: after Hekkert et al., (2007)

Conclusions

The identified barriers can be summarized at four distinct levels. This framework provides a structured understanding of the various challenges inhibiting the adoption of pesticide-free agriculture, facilitating a more holistic approach to overcoming obstacles and promoting the transition to sustainable and ecological agricultural practices.

Farm level	Market level	Policy level	Research level
The challenges center on efficiency, cost and adaptability	The challenges focuses on market organization, pricing and communication	The challenges are related to the quality of legislation and its alignment with practical realities	The challenges are associated with research prioritization and effective research design

Our research suggests that achieving pesticide-free agriculture requires **regulatory changes** to ensure fair competition in the sector. Transition strategies must consider **socioeconomic and cultural factors**, involving **dialogue** with affected parties in policy development. Our findings offer insights for policymakers to establish measures and regulations aligned with the needs of those directly involved in transitioning to pesticide-free agriculture.

COST Action - Towards zer0 Pesticide AGRIculture

Thank you for your attention!

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