



UNISECO

UNDERSTANDING & IMPROVING THE
SUSTAINABILITY OF AGRO-ECOLOGICAL
FARMING SYSTEMS IN THE EU

Deliverable Report D5.1

Inventory of Market and Policy Incentives Supporting AEFS

AUTHORS	Andis Zilans (BEF-LV) Francesco Vanni (CREA) Andrea Povellato (CREA) with contributions from all project partners
APPROVED BY WORK PACKAGE MANAGER OF WP5	Andrea Povellato (CREA)
DATE OF APPROVAL:	18.01.2019
APPROVED BY PROJECT COORDINATOR:	Gerald Schwarz (Thünen Institute)
DATE OF APPROVAL:	18.01.2019
CALL H2020-SFS-2017-2	Sustainable Food Security-Resilient and Resource-Efficient Value Chains
WORK PROGRAMME Topic SFS-29-2017	Socio-eco-economics - socio-economics in ecological approaches
PROJECT WEB SITE:	www.uniseco-project.eu

This document was produced under the terms and conditions of Grant Agreement No. 773901 for the European Commission. It does not necessarily reflect the view of the European Union and in no way anticipates the Commission's future policy in this area.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.

This page is left blank deliberately



TABLE OF CONTENTS

ACRONYMS	3
EXECUTIVE SUMMARY	4
1. INTRODUCTION	7
1.1. PURPOSE OF THE REPORT	7
1.2. METHODOLOGY.....	8
2. INVENTORY OF MARKET AND POLICY INCENTIVES	10
2.1. CLASSIFICATION OF INCENTIVES	10
2.2. CLUSTERS DESCRIPTION	13
2.2.1. NATIONAL FOOD AND FARMING PLANS	13
2.2.2. AGRI-ENVIRONMENTAL PRACTICES	15
2.2.3. SUSTAINABLE FOOD STANDARDS.....	17
2.2.4. ORGANIC FOOD PROMOTION AND CERTIFICATION.....	18
2.2.5. LOCAL FOOD PROMOTION	20
2.2.6. ALTERNATIVE FOOD CHAINS	22
2.2.7. TERRITORIAL-BASED FARMING PRACTICES	23
2.2.8. RESEARCH AND CAPACITY-BUILDING	27
2.3. EXPENDITURE ON RURAL DEVELOPMENT POLICY	28
2.4. MARKET AND POLICY INCENTIVES IN NON-EU COUNTRIES.....	30
3. STAKEHOLDER VIEWS ON AGRO-ECOLOGY	35
3.1. THE INTERVIEWS	35
3.2. DATA ANALYSIS AND CODING	36
3.3. RESULTS	37
3.3.1. AGRO-ECOLOGY AND AGRO-ECOLOGICAL PRACTICES.....	37
3.3.2. CHARACTERISATION OF THE TRANSITION PROCESS	40
3.3.3. MAIN DRIVERS	42
3.3.4. THE ROLE OF POLICIES.....	44
3.3.5. THE ROLE OF MARKETS	48
3.4. SUMMARY OF STAKEHOLDERS' VIEWS	51
4. KEY MESSAGES	53
5. ACKNOWLEDGEMENTS	55
6. REFERENCES	56
ANNEX 1 - Annotated Bibliography (on separate pdf file)	
ANNEX 2 - Factsheets (on separate pdf file)	
ANNEX 3 - Summary Description of Market and Policy Incentives (on separate Excel file)	

ACRONYMS

AEFS	Agro-ecological farming system
CAP	Common Agricultural Policy
CSA	Community Supported Agriculture
EAFRD	European Agricultural Fund for Rural Development
EC	European Commission
EFTA	European Free Trade Association
EIP-AGRI	European Innovation Partnership for Agricultural Productivity and Sustainability
ENRD	European Network for Rural Development
ESIF	European Structural and Investment Funds
EU	European Union
GIEE	Economic and Environmental Interest Grouping
IFOAM	International Federation of Organic Agriculture Movements
MACAC	Campesino-to-Campesino Agroecology Movement
NGO	Non-Governmental Organisation
OAP	Organic Action Plan
PDPO	State Policy for Agro-ecology and Organic Production
PDO	Protected Designation of Origin
PGS	Participatory Guarantee System
PNAN	National Programme of Action and Nutrition
RDP	Rural Development Programme
UNISECO	Understanding and Improving the Sustainability of Agro-ecological Farming Systems in the EU
WFC	World Future Council
WP	Work Package
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

This report presents the results of the compilation of an up-to-date inventory of examples of market and policy incentives, implemented at different levels (EU, non-EU, national and local), that serve to support transition processes towards Agro-Ecological Farming Systems (AEFS). Policy support has been widely criticised for its failure to facilitate comprehensive, long-term and integrated approaches such as agro-ecology. Consequently, it is recognized that there is a need to improve and develop a policy and economic framework within agricultural policies that supports and enables farmers to implement agro-ecological practices and, more broadly, that facilitates the transition towards AEFS. In the context of this report, transition pathways are analysed by considering the continuum from conventional to agro-ecological (food) systems.

The market and policy incentives were identified by case area partners through a review of national agricultural policies and databases and consultations with stakeholders with knowledge of relevant national, regional and local market and policy incentives. The examples of market and policies tools included in the inventory were selected according two main criteria: (i) their “innovativeness” of the approach to stimulating the adoption of (more) sustainable practices at farm level; (ii) their potential for enabling a transformation of the entire food system, through their involvement of a broad range of rural and value chain actors in the design and implementation of the tools. The relevance and “innovativeness” of the tools, and their potential to stimulate transition, were assessed by the researchers and through semi-structured interviews with selected stakeholders both at the EU and national levels.

A total of 69 examples of policy and market incentives from European countries were included in the inventory. Of these, a similar number are policy instruments (30) and market instruments (27), and fewer mixed initiatives involving a joint participation of public and private sector institutions (12). These figures illustrate the role already played by the private sector in promoting agro-ecological initiatives, and the opportunity for greater cooperation between public and private sector institutions in supporting agro-ecology. The majority of initiatives are implemented at the national level (47, compared to 11 at the local level). Although in the EU, national and regional Rural Development Programmes (RDPs) are the major source of financing of agro-ecological measures, relatively few market and policy initiatives included in the inventory are funded by RDPs as the focus was not on RDPs as such, but the most innovative initiatives. Most instruments in the inventory are initiated by national or local government institutions or private or NGO sector organizations.

Each initiative was described using six key factors that have supported and acted as drivers for their design and implementation: the role of political leadership, economic, social and environmental considerations, the role of technology and legislative framework. Almost all initiatives have environmental drivers and to a lesser extent economic and social motivations. For initiatives based on market instruments, the economic and social drivers dominate, whereas for policy tools political leadership and technological and legislative frameworks have a greater role. To characterize the policy and market incentives, they were grouped into eight clusters:

1. National food and farming plans;
2. Agri-environmental practices;
3. Sustainable food standards;
4. Organic food promotion and certification;
5. Local food promotion;
6. Alternative food chains;
7. Territorial-based farming practices;
8. Research and capacity-building.

The clusters were plotted on the framework of key models of agriculture proposed by Therond *et al.* (2017) (Figure ES.1). The different agricultural models are distinguished according to the degree to which biotechnical functioning of farming systems is based on ecosystem services versus external inputs, and the degree to which their relationships with socio-economic contexts is based upon global market prices versus territorial embeddedness. The Therond model serves as a tool to highlight the main functional similarities within and differences between clusters. The descriptors used to characterize the clusters are of the main functions or features of the individual incentives.

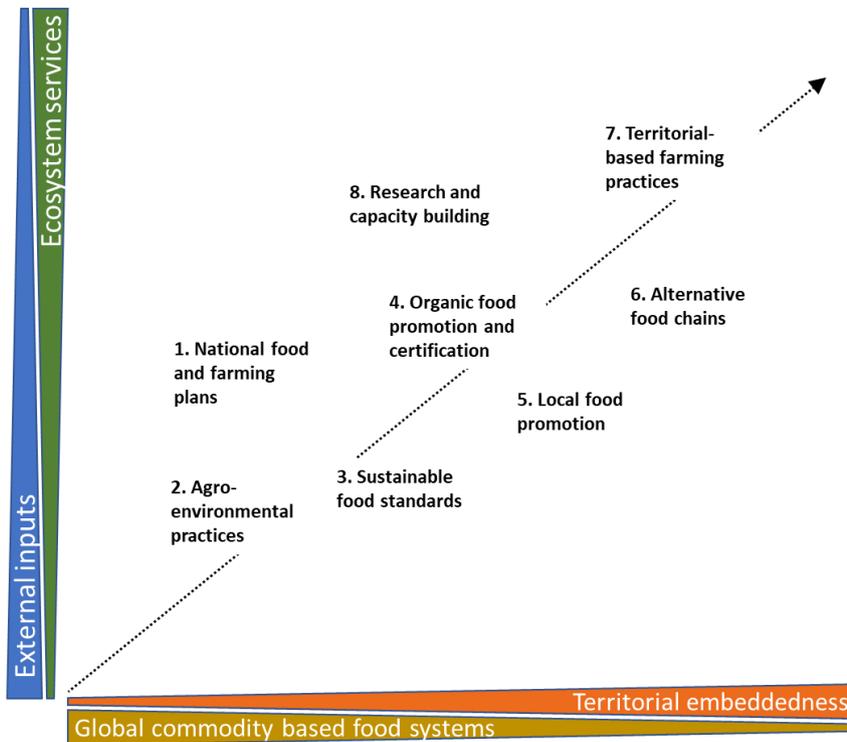


Figure ES.1: Distribution of clusters along the dimensions of farming systems and socio-economic contexts

Based on the undertaken research, a number of key lessons learnt emerge regarding the role of policy and market incentives for the agro-ecological transition.

- The scientific and public debate is increasingly focused on the role of agro-ecology in contributing to the overall sustainability of EU agricultural sector, but there is not a common understanding of the concept of agro-ecology amongst experts, producers and consumers across Europe.
- As historically, the agro-ecological transition started with different models of low-input farming, agro-ecological practices are being adopted most readily in association with integrated and organic production. In some countries agro-ecological practices are gaining traction more quickly in specific sectors (e.g. extensive and mixed farming systems).
- The “Agro-ecological Project for France” stands out as the only initiative that explicitly promotes agro-ecological farming and food production as part of a comprehensive policy framework with cross-cutting actions.
- Although an explicit decision was made to avoid the inclusion in the inventory of mainstream initiatives associated with RDPs, the identified initiatives nevertheless highlight the meaningful role already played by the private sector in promoting agro-ecological initiatives and the opportunity for greater cooperation between public and private sector institutions in supporting agro-ecology.
- RDPs are key tools in the promotion of agro-ecological thinking and practices in many EU countries, although CAP measures are too prescriptive, they lack flexibility and implementation rules that are too complex. RDP agri-environmental-climate measures remain relatively ineffective from the perspective of implementation. It is thought that greater cooperation/ collective action by land

managers territorially and the use of results-based payment schemes would increase the efficiency and effectiveness of implemented measures.

- CAP support should be adequately integrated with additional policies better targeted to local farming systems, local food chains and new consumer demands. In the future, local municipal councils and regions could play a more important role in relation to national or European agricultural policy.
- The presence of cultural and economic barriers may hinder the adoption of agro-ecological practices at a farm level, such as the age and education of farmers and their attitude and experience with agro-ecological approaches. EU and national research and national knowledge, training and advisory systems have a major role in the uptake of agro-ecological approaches.
- The economic sustainability of agro-ecological farming practices is a pre-condition for the transition. One of the biggest challenges is better incorporating the negative externalities of food production and the value of public goods produced by farmers into market prices.

1. INTRODUCTION

1.1. Purpose of the report

This report focuses on the results of UNISECO Task 5.1 of compiling an up-to-date inventory of innovative market and policy incentives that aim to increase the productivity, delivery of public goods and job creation, and which are relevant for agro-ecological farming.

The overall objective of the inventory was to identify and classify key examples of market and policy tools that have the greater potential to support the transition processes towards agro-ecological farming systems (AEFS). It does however not provide an exhaustive and systematic compilation of all the policies and market incentives adopted across a broad range of farming systems.

In the context of UNISECO, particular attention is paid to the transition of EU agriculture towards agro-ecological practices, where such transition takes place on a continuum of ecological modernisation between two extremes of efficiency/substitution-based agriculture and biodiversity-based agriculture (Duru *et al.*, 2015). Since UNISECO focuses on the transition processes affecting the whole continuum, from conventional to agro-ecological (food) systems, a broad range of policy and market incentives were considered, implemented at international level (EU & non-EU), national level, and at regional & local levels.

The market and policy tools included in the inventory were selected according two main criteria: (i) the “innovativeness” in stimulating the adoption of (more) sustainable practices at a farm level; (ii) their potential for enabling a transformation of the entire food system, by involving a broad range of rural and value chain actors in the design and implementation of the tools.

Internationally, there is an emphasis on the role of public policies for supporting the transition towards AEFS. However, in many contexts (including within the EU) policy support has been criticised because it fails to facilitate comprehensive, long-term and integrated approaches such as agro-ecology (FAO, 2018). So, there is a need to improve and develop a policy and economic framework, within agricultural policies, that supports and enables farmers implement agro-ecological practices and, more broadly, that facilitates the transition towards AEFS.

Some measures of the Common Agricultural Policy (CAP)¹ and other instruments, such as local food and agricultural policies and programmes, and Food Policy Councils at local, regional and national levels, offer the potential for recognising, valuing and supporting those innovations which could lead to a more rapid and effective transitions towards AEFS.

In the inventory, the policy tools were selected on the basis of their potential capacity to enable progress from conventional agriculture towards biodiversity-based approaches. Although the market and policy incentives selected are only a few of the approaches and practices in operation across the EU, this report provides an overview of the typologies of laws, regulations, economic and financial support by public institutions that are facilitating the transition. Particular attention was paid to the support for organic farming and other environmentally-friendly farming practices, and on tools for knowledge transfer, advice, cooperation and innovation.

In addition to support at the farm level, the collection includes a broad range of market and policy incentives involving different actors from farmers (ii), since when considering the transition towards AEFS, agricultural practices cannot be dissociated from food system organisation, because they are both needed in order to achieve sustainability from field to fork (Hatt *et al.*, 2016). Moreover, the transition towards AEFS cannot rely only on public policies, but the engagement of other value chain actors and the

¹ For example, within the context of the CAP, the European Innovation Partnership for Agricultural Productivity and Sustainability, or EIP-AGRI is a new policy instrument for more stakeholder and demand-driven research & innovation in agriculture. It contains several elements that are supportive of organic farming and agro-ecological innovation.

implementation of market incentives are also essential. The examples of market incentives collected in this inventory – that are adopted at different levels and promoted by different actors (including suppliers, traders, wholesalers, processors, retailers, distributors, financiers, shippers, etc.) - give a preliminary overview of the different types of incentives that may be activated across the value chains to facilitate the transition towards AEFS. Amongst the incentives identified, there are several examples which relate to the creation of short, decentralised supply chains, diversified markets based on solidarity and fair prices, community-led initiatives and other incentives aimed at the strengthening the links between producers and consumers locally and regionally.

The market and policy incentives were identified by case area partners through a review of national agricultural policies and databases and consultations with stakeholders with knowledge of relevant national, regional and local market and policy incentives. The relevance and “innovativeness” of the tools, and their potential to stimulate transition, were assessed by the researchers in this Task and through semi-structured interviews with selected stakeholders both at the EU and national levels. Details follow in Section 1.2.

1.2. Methodology

The following research methods were used for the compilation of the inventory of market and policy incentives in EU Member States, including European Free Trade Association (EFTA) countries, and non-EU countries supporting a transition towards agro-ecological farming approaches:

- a review of scientific publications and grey literature;
- a review of EU and international organization databases;
- the identification of relevant market and policy incentives in project partner countries;
- the implementation of semi-structured interviews with relevant national and EU stakeholders.

Review of scientific and non-scientific publications

Very few scientific studies focus on the scope and scale of the policies and market instruments currently in place and their role in supporting agro-ecological systems. To contextualize the relevance of market and policy incentives in the promotion of agro-ecology, a systematic review and compilation of scientific and non-scientific publications was undertaken. The compiled annotated bibliography includes the most recent and relevant contributions to the discussion on policy regulations as well as the most common market tools (e.g. organic and other green certifications, etc.) favouring the transition towards AEFS. Reviewed publications were summarized, annotated and compiled into a searchable database (Annex 1), categorized according to incentive type (policy, market) and geographic scope (local, regional, national, EU, non-EU).

Review of EU and international organization databases

The databases and good practice guides of several EU and international organizations were searched to identify examples of successful (i.e. effective in supporting policy objectives) policy and market incentives, which contain innovative elements that can contribute to the scaling up of or a transition to agro-ecology, and thus support change to more sustainable food and agriculture systems. The following sources of information were reviewed:

- Agro-ecology Knowledge Hub, Food and Agricultural Organization of the United Nations
www.fao.org/agro-ecology/en/
- World Future Council (WFC), Future Policy Award 2018: Agro-ecology
www.worldfuturecouncil.org/p/2018-agro-ecology/
- European Structural and Investment Funds (ESIF) 2014-2020
<https://cohesiondata.ec.europa.eu/EU-Level/ESIF-2014-2020-FINANCES-PLANNED-DETAILS/e4v6-qrrq/data>
- European Network for Rural Development (ENRD) Projects Database
https://enrd.ec.europa.eu/projects-practice_en

Identification of market and policy instruments in project partner countries

The compilation of policy and market incentives in case study countries was undertaken in two Steps. In Step 1, each case study partner was required to identify and analyse at least three examples of the most relevant national, regional or local market and policy incentives aimed at supporting the transition to AEFS. The identification and selection of policy and market incentives was based on a review of national agricultural policies and databases from, for example, national rural networks (e.g. in DE www.netzwerk-laendlicher-raum.de/service/foerderung-wettbewerbe/thematische-foerderungswegweiser/) and consultations with stakeholders with knowledge of relevant national, regional and local market and policy incentives.

Although the focus was on incentives promoting agro-ecological farming approaches and practices, other types of incentives were also considered, such as: promoting collective actions including organic product labelling, agro-ecological territories (e.g. bio-districts), geographical indications of product origin, short supply chains, public procurement, knowledge and capacity building (research, education, training, advice, demonstration projects), and food demand promotion etc..

When selecting incentives for inclusion in the inventory, consideration was given to market and policy incentives out with potential case studies in project partner countries. General descriptions of national/regional Rural Development Programmes (RDP) were not included in the inventory. However, if the national or regional RDP contained particularly innovative incentives supportive of AEFS (e.g. collective/cooperative measures targeting landscapes, result-based agri-environmental measures, agroforestry initiatives, initiatives supporting a circular economy, etc.) these were considered for inclusion in the inventory. Selected incentives were described in a standardized format for producing a Factsheet (Annex 2), and a summary description of the incentive was provided in an Excel Template (Annex 3).

In Step 2, semi-structured interviews were undertaken to:

- verify the relevance of the policy and market instruments identified in Step 1;
- fill gaps in information in the Factsheets;
- identify other innovative policy and market incentives and add these to the inventory;
- investigate the role of market and policy incentives in the transition to agro-ecology.

Interviews were conducted with 2 to 8 key national stakeholders with a good knowledge of national policy and market instruments supporting a transition to agro-ecological farming practices and alternative food systems. Stakeholders selected for the interviews included national representatives from governmental (e.g. Ministry of Agriculture) and non-governmental institutions and organizations (e.g. market scheme managers) responsible for the development and/ or implementation of market incentives. Additionally, where relevant, target groups or beneficiaries of policy and market incentives were consulted (e.g. farmer associations; consumer groups) to gain insight into the utility and effectiveness of the incentives. Whenever possible, interviews were carried out in person. However, due to time constraints and long travel distances in some project partner countries face-to-face interviews were not always feasible. In such cases interviews were conducted via telephone/Skype or alternatively, interviewees provided written or recorded responses.

To structure interviews and to ensure that the state-of-play in policy and market incentives supporting agro-ecology in the national contexts was systematically captured, a Stakeholder Interview Template with guiding questions was prepared. A separate Stakeholder Interview Template was prepared for each stakeholder interview. In the case of written interviews, for which interview questions were sent to interviewees, the Stakeholder Interview Template was completed by interviewees themselves.

For all formats, prior to the interview, written consent was obtained from the interviewee using a standardized Consent Form. The procedure described above was also followed for semi-structured interviews undertaken with EU stakeholders. Stakeholder Interview Templates from each country were analysed separately to produce a country summary. Subsequently, country summaries were compared to identify similarities and differences between EU countries with respect to the transition to agro-ecology and the role played by market and policy incentives. Results of the EU stakeholder interviews were integrated into the overall compilation of interviews.

2. INVENTORY OF MARKET AND POLICY INCENTIVES

2.1. Classification of incentives

Each initiative and incentive included in the inventory was classified according to two basic criteria: the institutional sector initiating the incentive and the geographical scope of the application. In the first case (institutional sector) a simple distinction was made between a public sector institution (policy) and a private sector institution (market). As the attribution to either is not always clear, a third category "mixed" was introduced when one of the two institutional sectors did not predominate. The geographical scope considers the spatial scale of implementation of initiatives within each country, at either a national or local scale. A regional scale designation was applied to large countries (e.g. Germany, Italy, France).

A total of 69 examples of policy and market incentives from European countries were included in the Inventory of Policy and Market Incentives. Sixty-two examples were selected in the project partner countries (14 EU Member States plus Switzerland) and 7 other initiatives were identified in other EU countries.

Table 1 presents the breakdown of incentives according to the institutional sector criterion, showing similar figures for policy instruments (30) and market instruments (27). There are fewer initiatives involving a joint participation of public and private sector institutions (12). According to the geographical scope criterion, most of the examples are applied at national level (47), whereas the number of local level initiatives is limited (11), perhaps due to the more limited dissemination of information.

Table 1 AEFS incentives by categories and geographical scope

	Market	Mixed (policy+market)	Policy	Total
National	20	8	19	47
Regional	2	1	8	11
Local	5	3	3	11
Total	27	12	30	69

There does not seem to be a clear correlation between the two criteria. However, a relatively greater role of market instruments emerges in initiatives at the local level where, probably, the community ties and the networks amongst local actors can activate an endogenous development which is also contingent upon the profitability of the proposed initiatives. The policy instruments have a greater prevalence at national and regional levels as they are more oriented towards activating a transition towards sustainability that is able to involve a large number of farmers. In the latter case, public institutions dealing with sustainable agriculture are likely to act at a national or regional level and therefore tend to create the conditions for the transition to AEFS approaches at this geographical level.

Each initiative was also described with respect to the key factors that have supported and acted as drivers for the design and implementation of the initiative. Factsheets include a short description of the most relevant drivers for each initiative. Six types of factors were used to describe potential drivers: the role of political leadership, economic, social and environmental considerations, the role of technology and the legislative framework.

As expected, almost all initiatives have an environmental driver, followed by economic and social motivations (Table 2). The role of political leadership seems less relevant and technological and legislative factors are even more distant. It is interesting to note that in the case of initiatives based on market instruments, the economic and social drivers prevail to a greater extent, while in policy tools political leadership and the technological and legislative framework assume a greater role. When incentives based on market instruments are designed, beyond the environmental objectives, there must also be an

economic and social motivation that guarantees an effective and widespread uptake. However, political leadership is also likely to play an important role when it is necessary to activate incentives that are more oriented towards the provision of public goods.

Table 2 AEFS initiatives by categories and drivers of transition

	Market	Mixed (policy + market)	Policy	Total
Political/ Leadership	6	10	22	38
Economic	25	11	22	58
Social	23	10	15	48
Technological	5	4	8	17
Legislative	3	9	15	27
Environmental	25	10	30	65

In order to characterize the policy and market incentives, they were clustered on the basis of the six key models of agriculture proposed by Therond *et al.* (2017). In this framework the different agricultural models are distinguished according to: i) the degree to which biotechnical functioning of farming systems is based upon ecosystem services versus external inputs, and ii) the degree to which their relationships with socio-economic contexts are based on global market prices versus territorial embeddedness. Some of the incentives included in the inventory individually address issues beyond farming systems and socio-economic market contexts. The classification of clusters and their plotting on the Therond model is intended to serve as a tool to highlight the main functional similarities within and differences between the clusters.

The descriptors used to characterize the clusters are intended to describe the main functions or features of the incentives included. This means that in some cases, where the main functions are heterogeneous, a single initiative can be classified into more than one cluster. In such cases, the most satisfactory and responsive descriptor for classification purposes was chosen.

The policy and market incentives from European countries were grouped into the following 8 clusters:

1. National food and farming plans;
2. Agri-environmental practices;
3. Sustainable food standards;
4. Organic food promotion and certification;
5. Local food promotion;
6. Alternative food chains;
7. Territorial-based farming practices;
8. Research and capacity-building.

Using the analytical framework of the diversity of agriculture models proposed by Therond *et al.* (2017), the 8 clusters were plotted on the two dimensions characterised by each agricultural model (Figure 1). Due to the substantial diversity that characterizes each initiative, the position of the cluster in the diagram is indicative and will not reflect each initiative exactly. However, the proposed classification helps to identify the most frequent typologies in the transition process towards an agro-ecological approach.

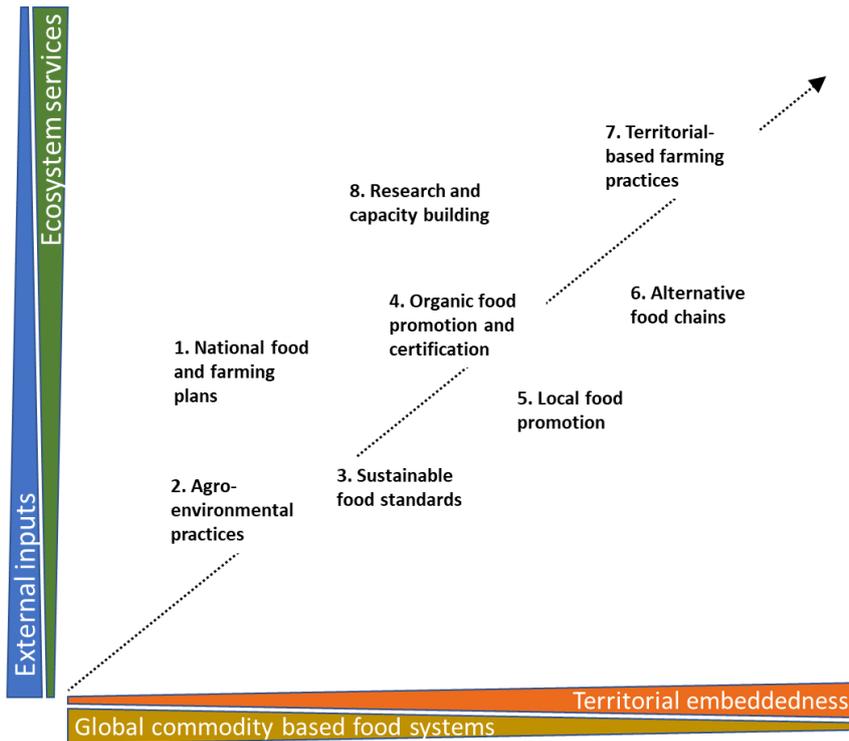


Figure 1 Distribution of clusters along the dimensions of farming systems and socio-economic contexts

The cluster relating to "National food and farming plans", has a broad spectrum of interventions which can also be adapted to production models focused on input substitution. The cluster of "Agri-environmental practices", groups those incentives which aim at improving specific farming techniques (typically the agri-environment schemes). The cluster on "Sustainable food standards", is aimed at implementation by a wide range of farmers, mostly interested in increasing eco-efficiency in a transition which stems from links with the food system and therefore with consumers. A similar approach, but oriented towards territorial embeddedness and the provision of public goods, characterises the incentives for "Organic food promotion and certification" and "Local food promotion".

The two most advanced clusters in the transition to more sustainable production models are represented by the "Alternative food chains" and the "Territorial-based farming practices". In these, the links with local communities and the enhancement of ecosystem services are essential elements in the design of interventions. The "Research and capacity building" cluster which groups the interventions on knowledge and information systems should represent a sort of transmission belt in the difficult transition from more conventional production models generally based on standard technological packages to models that emphasize the role of natural resources and social capital at the local level.

Table 2.3 presents the breakdown of initiatives according to the categories and types of cluster and the institutional sector criterion. The two most common clusters are:

- i. "Agri-environmental practices", representing the greater frequency of interventions, deriving in general from agri-environmental schemes, which in this inventory have innovative characteristics;
- ii. "Territorial-based farming practices", which represent the most interesting initiatives and a point of arrival in the transition to AEFS approaches.

The division between market and policy tools shows a substantial and understandable prevalence of policy tools in the clusters of National food and farming plans, Agri-environmental practices and Territorial-based farming practices. In the initiatives relating to food standards and organic food promotion and certification there is a higher prevalence of incentives developed by the private institutions. In the remaining cases the distribution is fairly balanced.

Table 3 AEFS initiatives by categories and type of cluster

	Market	Mixed (policy + market)	Policy	Total
1. National food and farming plans			8	8
2. Agri-environmental practices	1	1	11	13
3. Sustainable food standards	4			4
4. Organic food promotion and certification	7	1		8
5. Local food promotion	4	4		8
6. Alternative food chains	2	4	2	8
7. Territorial-based farming practices	7	1	7	15
8. Research and capacity-building	2	1	2	5
Total	27	12	30	69

2.2. Clusters description

The eight market and policy clusters are described in the following sub-sections.

2.2.1. National food and farming plans

The “National food and farming plans” cluster consists of eight strategic planning documents (Table 4). All are national integrated plans addressing organic and agro-ecological farming/ food production or protection of biodiversity for agriculture.

According to Meredith *et al.* (2018) and Schmid *et al.* (2015), based on a survey of 31 EU Member States and EFTA countries, national organic action plans (OAP) have been developed by 14 countries, whereas regional OAP (in some parts) have been developed by 5 countries.²

Within the context of the Therond *et al.* (2017) classification of farming systems the organic and agro-ecological farming incentives are predominantly promoting biological input-based farming systems where farming practices are oriented to “ecological intensification” to decrease impacts on biodiversity and human health. This is done by increasing the efficiency of external inputs and substitution of chemical fertilizers with organic fertilizers and chemical plant protection products with alternative plant protection products. Typically, farms are specialized with standardised practices in simplified crop sequences. The farming system addressed by these planning incentives although embedded in the global commodity-based food system have established links with alternative territorially-based food systems. All of these strategic plans, to varying degrees, promote both supply and demand/ consumption of organic products.

The “Organic Action Plan for Denmark” stands out in comparison to the other organic farming policies as it defines actions and has dedicated financial incentives for producers, processors, supply chain and research. Most other national and regional OAP in EU Member States and EFTA countries do not have clear budgets for all areas of activity, with only a budget for one specific area e.g. mainly payments under CAP Pillar 2 (Rural Development Programmes) or research for organic farming from national funding sources (Schmid *et al.*, 2015, Meredith *et al.*, 2018). Furthermore, the Danish plan supports demand for organic products through funding for information campaigns, promotion of products in public venues and the promotion of exports.

² Based on a survey of existing national and regional organic action plans (OAP) in EU Member States and EFTA countries conducted in October and November 2015 by Schmid *et al.* (2015), national OAP had been developed by 14 countries (Austria, Croatia, Czechia, Denmark, Estonia, Finland, France, Hungary, Ireland, Luxembourg, Poland, Romania, Slovenia, Sweden), and regional OAP (in some parts) had been developed by 5 countries (Belgium, Germany, Spain, Switzerland, United Kingdom). In 19 countries, there were no national OAP. Germany, Spain and Italy had national strategic plans for organic farming, whereas in Germany, Italy and Lithuania OAPs were in the process of development.

Table 4 National food and farming policies

Title of Initiative	Country
Action Plan for Development of Organic Farming	Czechia
Organic Action Plan for Denmark	Denmark
The Agro-Ecological Project For France	France
The “Organic Farming – Looking Forwards” Strategy	Germany
Organic Action Plan for Hungary	Hungary
National legislation on the protection and promotion of biodiversity for food and agriculture	Italy
National legislation for organic farming / ecological certification	Romania
Action Plan for Organic Food and Farming	Sweden

Similarly, the “Action Plan for Organic Food and Farming” in Sweden is a well-integrated plan that encourages and finances organic farming and the production, processing and supply of organic products to the market, as well as stimulation of consumption of organic grown products by consumers. Significantly, it contains specific targets intended to stimulate growth of the organic farming sector:

- 30% of the Swedish agricultural land will consist of certified organic farmland by 2030;
- 60% of public food consumption will consist of certified organic products by 2030.

Although the “Czech Action Plan for Development of Organic Farming” presents a broad approach to promoting organic farming, it is fragmented and without a dedicated budget for implementation. Similarly, although in Hungary many pre-conditions for the expansion of organic farming are met the “Organic Action Plan for Hungary” provides insufficient support for new product processing infrastructure, the development of value-added products, or for product supply chain coordination and product integration. Additionally, communication and marketing of organic products to consumers, research on organic farming practices and organic farming advisory services are not well supported.

The overall objective of the new “Organic Farming – Looking Forwards” Strategy in Germany is to promote organic farming and to increase the share of agricultural land farmed organically towards the target of “20% organic farming” included in the federal government’s sustainable development strategy (BMEL, 2019). The strategy has been designed to facilitate the development of an appropriate policy framework and to identify additional development prospects for organic farming. The new forward looking strategy attempts to integrate a wide range of different support activities for organic farming and food and has identified five key lines of actions which address the core challenges of organic farming, including:

- designing a viable and coherent legislative framework;
- facilitating access to organic farming;
- fully utilizing and expanding the demand potential;
- improving the productivity of organic farming systems;
- rewarding ecological contributions adequately.

The “Agro-ecological Project for France” is the only farming and food policy in this cluster that explicitly promotes agro-ecological farming and food production. It presents cross-cutting actions to achieve its objectives, including:

- steering and managing the Agro-ecological Project itself (e.g. setting up of a steering group, evaluation indicators and the regional implementation of the Project);
- engaging researchers to work alongside and train farmers;
- providing financial support to emerging agro-ecological initiatives through the CAP;
- fostering innovation;
- facilitating the emergence of bottom up initiatives;
- promotion of agro-ecology through CAP Pillar 2 measures, notably the agri-environment and climate Measure 10, the organic farming Measure 11 and the cooperation Measure 16 to support European Innovation Partnership (EIP-AGRI) groups and short supply chains, amongst others;
- fostering farm-wide agro-ecological approaches through options in RDPs;
- reform of educational programmes and training for farmers to encourage the adoption of agro-ecological practices and systems;
- creation of economic and environmental interest groupings (GIEEs) to encourage greater collaboration and cooperation among farmers and between farmers and other types of local actors in the pursuit of agro-ecological farming practices.

The “National legislation on the protection and promotion of biodiversity for food and agriculture” in Italy defines the principles for the establishment of a National system of protection and enhancement of biodiversity for food and agriculture interests, aimed to protect genetic resources from extinction and genetic erosion. This legislation is relevant for the full range of farming systems, including biological input-based and particularly biodiversity-based farming systems.

2.2.2. Agri-environmental practices

The 13 agri-environmental practice initiatives in this cluster are summarized in Table 5.

Table 5 Agri-environmental practices

Title of Initiative	Country
Soil fertility program and carbon sequestration certification	Austria
Water quality scheme in Flanders	Belgium
Demonstration farms for agri-environmental measures	Czechia
Support for biological plant protection products	Czechia
Pasture Bank - Laidunpankki	Finland
Payment by results species rich grassland	Germany
Agri-environmental measure for a collective plant protection management	Greece
Cooperative landscape farming	Hungary
Conservation Agriculture in the Rural Development Plan	Italy
Results-based payments for biodiversity	Romania
Payment for protection of the three priority bird species	Romania
Ecological Performance Record (ÖLN)	Switzerland
Biodiversity Payments	Switzerland

The cluster of agri-environmental practices contains policy and market incentives supporting agri-environmental farming practices that preserve biodiversity and cultural landscapes through the maintenance of traditional and/ or extensive farming practices or by adopting agro-ecological farming practices. Promoted agro-ecological farming practices include increasing the efficiency of fertilizer use or substituting chemical fertilizers with biological inputs. These include more efficient recycling; re-use of nutrients originating from manure and organic waste; alternative plant protection approaches to minimize the use and replace chemical-based plant protection products; reduced tillage; diversified crop rotations and cover crops; and continuous ground cover.

Most of the initiatives in this cluster are co-financed with the EU through national RDPs 2014 to 2020. However, some are nationally funded (Demonstration farms, Czechia; Pasture Bank, Finland; Results-Based Payments for Biodiversity, Romania). Two of the initiatives are being implemented as demonstration or pilot activities (Demonstration farms for agri-environmental measures, Czechia; Cooperative landscape farming, Hungary). Three of the initiatives (Water quality scheme in Flanders, Belgium; Payment by results species rich grassland Lower Saxony, Germany; Results-Based Payments for Biodiversity, Romania) are results-based payment schemes for ecosystem services rather than prescriptive management-based payment schemes. The “Water quality scheme in Flanders” initiative in Belgium is innovative, as it is one of the few schemes that attempt to measure the results of the application of a water protection measure on the basis of environmental indicators measured at a farm level. Typically, nitrate levels are measured in water courses, with the weakness that changes in concentrations cannot be attributed to specific farms, and might be influenced by non-agricultural factors. Consequently, conventional environmental monitoring does not ensure a suitable result indicator. Instead of measuring nitrate levels in water courses, the residual nitrogen left in the soil at the end of the season (one potential source of nitrogen pollution) can be measured for individual parcels of land and thus used as a result indicator.

Several of the initiatives specifically incentivize collective action (e.g. the agri-environmental measure for collective plant protection management, in Greece; Cooperative landscape farming, in Hungary) to increase the efficiency and effectiveness of measures. This is achieved by, for example, creating good habitat conditions for rare species, improving the effectiveness of alternative plant protection measures and reducing soil compaction.

The two initiatives from Switzerland are agri-environmental schemes, one related to mandatory conditions that must be met to receive direct payments and the second a voluntary, results-based payment for supporting biodiversity. The policy initiative “Ecological Performance Record (ÖLN)” is part of the Swiss agri-environmental scheme that codifies the conditions relating to environmental performance and animal welfare that have to be fulfilled for a farm to be able to receive direct payments. All farms in Switzerland that receive direct payments have to meet the minimum requirements regarding these aspects and thus, with respect to agro-ecological criteria, their performance tends to be higher than the EU average. Performance is mixed. Areas for biodiversity support have increased, however performance regarding nutrient surplus and plant protection products is inadequate which is mainly due to a lack of monitoring and enforcement and some faults in the design of underlying nutrient balance calculations.

“Biodiversity Payments” is an initiative of the Swiss agri-environmental scheme, supporting biodiversity with two different quality levels and payments for projects aiming at connecting ecosystems above farm level. The initiative is voluntary and was developed to help improve the achievement of environmental goals set for agriculture. Result-oriented indicators are used such as grassland plant species, bushes and trees. Result-oriented payments leave farmers the freedom and flexibility to decide themselves how to achieve the pre-defined goals based on a large variety of focus areas and management options. Uptake of the initiative has been good, but it is still uncertain how the state of biodiversity has improved.

The “Pasture Bank” in Finland is an internet-based service which can be used by a farmer to acquire more grazing area for grazing animals (cattle, sheep or horses) or which can be utilized to hire grazing animals for landscape management purposes. The promotion of grazing opportunities is valuable in the context of

traditional agricultural biotope management, especially where these are disappearing rapidly. The contract between parties is not facilitated by the Pasture Bank service.

The initiative “Soil fertility program and carbon sequestration certification” in Austria is a regionally-based cooperative agri-environmental scheme. The overall objective of this bottom-up initiative is to establish an ecological circular-flow economy in the region, targeting different sectors, to combat climate change and develop mitigation strategies. The Association “Ökoregion Kaindorf” with 250 conventional and organic farmers is focusing on increasing soil fertility and carbon sequestration including more efficient and environmentally friendly use of nutrients originating from manure, compost and charcoal. Various technical, educational and monitoring tools are used to improve agro-ecology including: i) provision of information and training to farmers on soil fertility; ii) practical and research knowledge transfer to farmers on cultivation techniques, such as, reduced tillage, bio-char and compost application, green cover and mixed cropping, agro-forestry; iii) promotion of national and international networking and research; iv) issuance of certificates to farmers for carbon sequestration.

2.2.3. Sustainable food standards

Four market incentives are included in the “Sustainable food standards” cluster (Table 6).

Table 6 - Sustainable food standards

Title of Initiative	Country
AGRO 2 Standards	Greece
Global Gap Standards	Greece
Sustainable farming model for the production of high-quality durum wheat	Italy
Improvement of farming model for production of high-quality vegetables and fruits	Spain

All of the initiatives in the Sustainable Food Standards cluster are private sector market incentives based in quality certification systems. These systems focus on improving the environmental performance of farming operations by increasing crop fertilisation efficiency and in some cases by the substitution of chemical fertilizer inputs with biological inputs. In the context of the classification of farming system by Therond *et al.* (2017), these market incentives function in the global commodity-based food system. In relation to the biotechnical functioning of farm systems they are intended to shift farming systems from predominantly “sustainable intensification” farming practices to “ecological intensification” farming practices.

The market incentives “Sustainable Farming Model for the production of high-quality durum wheat” in Italy and “Improvement of farming model for the production of high-quality vegetables and fruits” in Spain are market incentives focussed on specific sectors (respectively, durum wheat production and vegetable and fruit production). In comparison, “AGRO 2 Standards” and “Global Gap Standards” in Greece are market incentives that promote improved farming practices in all agricultural sectors.

The “Sustainable Farming Model for the production of high-quality durum wheat” which is owned by the food company Barilla uses a life-cycle-assessment approach to analyse the environmental impact of durum wheat production for pasta from cultivation to delivery of the finished product. Farmers receive a production incentive from Barilla for adhering to ten farming practices rules related to crop rotation, soil tilling, seed material, timing of sowing, fertilizer application, weed and disease control and farm level practices, and for using a web-based decision support system. Preliminary results show that incentivizing low input agronomic practices results in good uptake by farmers and measurable environmental benefits. However, the approach is less applicable to small producers as they are less able to adopt modern ICT practices due to structural barriers.

The incentive “Improvement of farming model for the production of high-quality vegetables and fruits” in Spain is run by the company Florette Ibérica which specializes in the production of fruits and vegetables. The company has developed its own environmental management system based on ISO 14001 and the LEAF (Linking Environment and Farming) quality certification system. Issues addressed include agro-ecological practices such as minimizing the use of inorganic fertilizers and pesticides, reducing energy consumption, technical improvements in drip irrigation, sprinkler systems and irrigation programming, minimizing waste generation and employee awareness campaigns. The implementation of measures that promote the improvement of sustainability in a big multinational company such as Florette has a potentially significant, positive impact on the environment due to the size of its operations. However, presently, the transition pathway to agro-ecology is based on improving the efficiency of resource use and the substitution of inputs, rather than aiming to enhance ecosystem services with a redesign of the farming system.

The “Global Gap Standards” in Greece is a business-to-business quality certification scheme with the objectives of: i) food quality-safety assurance; ii) natural resources and biodiversity protection; iii) workers’ safety and well-being. Guidelines and check-lists are distributed to farmers and a third-party certifies the compliance of farmers with the standard. The third-party certifier is accredited by Global Gap. This is an end product certification process that is recognized by big retailers, however it does not deal with the production process as such, instead it monitors only the outcome. Farmers are not encouraged to coordinate their work and consumers do not see a quality label as it is strictly a business-to-business certification process. Additionally, production is commodified – it is not possible for farmers to differentiate their produce and have their work recognized.

In Greece, the Hellenic Agricultural Organisation “Demeter” runs the “AGRO 2 Standards”. The objective of the market incentive is to: i) improve access to markets; ii) co-ordinate the production process; iii) ensure continuous improvement of the collective environmental performance of participating farmers. The approach involves the implementation of a co-ordinated production system based on ISO 14000 which includes:

- a set of standardised procedures for the management of the farm and monitoring-auditing of its environmental performance;
- specific requirements for the implementation of crop production including management plans for water use, nutrients, crop protection, traceability, workers’ safety, biodiversity, etc.

The training of farmers and provision of advice is an essential part of the system. Farmers are encouraged to co-operate, control and document their activities. The production is labelled and identifiable. However, the certification is about the process and not the product and the AGRO 2 Standards are not recognized internationally.

2.2.4. Organic food promotion and certification

The “Organic food promotion and certification” cluster contains eight market incentives linked to agro-ecology (Table 7) which have objectives to: i) promote demand and consumption of organic produce and products; ii) promote sustainable food supply chains; iii) incentivize producers of organic products through increased demand and a premium price.

Table 7 Organic food promotion and certification

Name of Initiative	Country
Organic mountain haymilk production scheme	Austria
Organic GÄA standard	Czechia
Challenge for Poor Families Towards Quality and Organic Food	France
Latvian Organic Product Label Scheme	Latvia

Marketing of organic fruit and vegetables in the Carpathian	Poland
Information campaign of the Swedish NGO	Sweden
The KRAV organisation for promotion of organic farming and products	Sweden
Sustainable Supply Chain for Food	Sweden

Within the context of the Therond *et al.* (2017) classification of farming systems these market incentives are predominantly promoting biological input-based farming system products in which farming practices are oriented to “ecological intensification” in order to decrease impacts on biodiversity and human health.

With the exception of the incentive "Challenge For Poor Families Towards Quality And Organic Food", which is targeted at promoting organic food and healthy eating habits among poor families in France, these market incentives involve the promotion of organic farming and/ or products nationally and for export. The experiences in Sweden and Czechia are that, from a promotional standpoint, it is advantageous to adopt an organic food production standard that is higher than the EU regulation for organic farming in order to establish a clear market niche. Additionally, experience shows that consumers tend to be loyal to homegrown organic products distinguished by a high quality standard and a distinctive, clearly identifiable label. Czechia adopted the higher German organic standard (GÄA Ökologischer Landbau e.V. Production Guidelines) with the expectation that this would assist Czech organic products to access the German organic food market. Initially, this strategy met with success, but German interest in foreign organic production declined as the number of domestic suppliers grew and, they showed a preference for locally produced organic products.

The Swedish experience shows that successful promotion of organic farming and products benefits from multi-actor involvement along the supply chain. The Swedish KRAV organisation, for the promotion of organic farming and products, is a non-governmental association with 27 members representing farmers, processors, retailers, consumers, environmental and animal welfare interests. The rapid growth of the organic farming and food sector in Sweden can be, in part, attributed to: i) the high recognition factor of the KRAV label; ii) an organic standard which is higher than the EU standard; and iii) the marketing of organic products to ordinary retailers instead of selling them as niche products in small volumes in specialised stores. Furthermore, the organic food information campaign organized by “neutral” Swedish Society for Nature Conservation, the largest environmental NGO in Sweden, has engendered trust in organic products. The highly professional campaign which targeted environmentally and health conscious consumers who wish to “do the right thing” has proven to be effective.

The “Sustainable Supply Chain for Food” is a cross-sector market initiative developed by WWF Sweden in cooperation with the three largest retailers in Sweden and major food companies to increase the sustainability of the Swedish food chain. For a range of food groups, product practices/systems have been classified into three groups according to a traffic light system. Products in the green category are those that should be promoted by industry and retailers, whereas products in the red category should be phased out. Companies are guided on what is required to improve sustainability performance in terms of the products they produce and buy. In many of the food groups, organic products are within the green group. Consequently, if implemented by industry and retailers, this food classification system could help promote organic foods. This initiative highlights the importance of consensus building in the retail sector and industry regarding the level of sustainability of products, based on a transparent, science-based process resulting in a food classification that is clear and can be operationalised.

The Latvian Organic Product Label Scheme, which is run by the Organic Farming Association of Latvia, has served to encourage the consumption of locally produced organic products, thus supporting local producers and markets. However, as the organic standard underlying the Latvian Organic Product Label Scheme is equivalent to the EU organic standard, the Scheme is in competition with the equivalent EU organic logo for acceptance. Additionally, as the Organic Farming Association of Latvia represents only organic farmers and not downstream actors in the value chain, therefore there has not been uptake of the

label by food processors. More importantly, the organic label has not been effectively marketed through a targeted campaign, and consequently its recognition amongst consumers is low. The scheme is partly competing in the Latvian market with another quality scheme that has less demanding agro-ecological and product quality specifications (i.e. national quality scheme Green/ Bordeaux spoon label). That scheme is run by the public sector, receiving state support for marketing campaigns which has led to good recognition of the label amongst consumers.

The “Organic mountain haymilk production scheme” in Austria is a joint organic quality certification and marketing initiative. By linking the production of quality dairy products to alpine landscapes, the organic mountain haymilk scheme creates synergies between the improvement of the income of mountain farmers (e.g. higher organic haymilk premium, premium guarantee) and those of other parties along the value chain (i.e. dairies, retail chain, consultancy firms), and the maintenance of typical landscapes and high levels of biodiversity. The organic mountain haymilk scheme has more stringent requirements than those of EU organic regulation. Studies show that the organic dairy production systems, including haymilk, assessed at farm and product levels have significantly higher potential for supporting biodiversity than conventional systems.

The “Marketing organic fruit and vegetables in the Carpathian” initiative involves the creation of a local producer group to process and market local organic products for export with support from the Polish Rural Development Plan. Organic farming, based on old local varieties of fruits and vegetables, ensures the protection of agricultural biodiversity, and is considered a viable option for production in hilly terrain and the small farm structure of the Carpathians. The decision to pursue organic farming in the area led to many family farms to professionalize and increase the crop area devoted to raspberries, other soft fruit and a range of vegetables. Farmers have managed to achieve almost the same harvest output from organic as from conventional modes of production. The labour costs are the same for each mode, but the retail sales price for organic fruits is about 50% higher, which is a result of the high level of demand and the stable supply by the producer group. As a result, the added value to produce is increased which ensures higher incomes for producers. The price of organic fruit has remained stable. Practically, the whole production of the group is exported, which is the consequence of very limited domestic organic food market.

The incentive “Challenge For Poor Families Towards Quality And Organic Food” in France is a private sector market incentive focussed on the promotion of high quality food, including organic produce, to low income families and as such has a strong social dimension. However, it is dependent on on-going public financial support for the coordination and organisation of information and education events. Also, from the perspective of policy-makers, it is difficult to demonstrate concrete outcomes.

2.2.5. Local food promotion

Eight incentives are included in the cluster of local food promotion (Table 8). These incentives are either market or mixed policy/market incentives. All of these are publicly owned.

The incentives in this cluster serve to promote consumption of local foodstuffs produced in a specific geographic locale. In most cases, the products are not certified as organic. However, as the farming practices are extensive, traditional or are linked to a specific territory (e.g. bio-geographic zone, natural landscape) the products are claimed to be more environmentally friendly, fresher and more nutritious, and provide a greater share of product value to farmers. Marketing of these products is undertaken in alternative or short food chains facilitated by targeted promotional campaigns, product labelling, local specialty markets, separate sections in food stores or through preferential public procurement procedures. Promotion of these products serves to incentivize more sustainable farming practices and distances them from a global commodity-based food system and greater integration into a locally-based food system. In the context of the farming system classification by Therond *et al.* (2017), these market incentives promote products produced in biological input-based farming systems in which farming practices are oriented towards “ecological intensification”. Local food promotion incentives are equally suited to promote food from biodiversity-based systems.

Table 8 Local Food Promotion

Name of Initiative	Country
Guide to agroecology in wine growing	France
National Park Product Brand	Hungary
Collection of Hungarikums	Hungary
National Food Quality Scheme "Green and Bordeaux Spoon"	Latvia
Product brand symbol of protected areas	Lithuania
National quality agriculture and food products	Lithuania
Food and Drink Policy - Good Food Nation	(UK) Scotland
Climate Change	(UK) Scotland

The market incentives “Collection of Hungarikums” in Hungary, “National Food Quality Scheme” in Latvia, “National quality agriculture and food products” in Lithuania and “Food and Drink Policy” and “Climate Change” in the UK (Scotland) all encourage consumption of locally grown, fresh, seasonal and traditional products. This is achieved through product labelling, promotion and procurement. They all support local farmers, short supply chains and local food processors. The marketing approach used can provide a stepping-stone for local farmers to adopt more sustainable farming practices, and for food processors to produce new environmentally friendly products including organic products. “Climate Change”, in the UK (Scotland), through its promotion of low carbon economy aims to deliver sustainable economic growth, including in the farming sector by encouraging production for local markets.

Although promising environmentally friendly farming practices and higher food quality these schemes frequently lack clearly specified environmental criteria. Therefore, there is a lack of assurance regarding farming practices and thus the quality of the food products. In some cases, products labelled “local” can contain a significant percentage of non-locally (regionally) produced components. Additionally, successful marketing of local food to consumers can, in some cases, hinder further adoption of more sustainable farming practices by complacent farmers.

The “Product brand symbol of protected areas” in Lithuania, and the “National Park Product Brand” in Hungary use a nature-based territorial approach to encourage agro-ecological farming practices and associated local economic activity by farmers to maintain biodiversity, cultural landscapes and local communities. Typically, farmers managing land in national parks and protected areas face additional regulatory challenges (e.g. management prescriptions, restrictions on certain practices) in relation to protecting and managing biodiversity. The branding of products supports farming systems through the marketing of outputs and by enhancing public awareness of nature conservation efforts. Branding can also assist direct farming towards more sustainable practices. However, as with all incentives intended to promote local, more sustainable farming practices, the impact is largely dependent on the strength of the criteria and procedures for certification.

The policy and market incentive “Guide to agroecology in wine growing” in France is designed to increase the environmental performance of wine producers with the PDO and PGI designations. The approach uses the PDO and PGI quality marketing schemes, currently used to promote the specificity and the origin of a product, to encourage farmers and wine producers to improve the sustainability of their farming practices and their production methods. However, as PDO and PGI products are already successfully marketed, the impetus to upgrade the farming and production practices of these products is limited.

2.2.6. Alternative food chains

The eight incentives in the “Alternative food chains” cluster serve to promote the development of alternative food chains based on locally produced food (Table 9).

Table 9 Alternative food chains

Name of Initiative	Country
Fruit and vegetables to schools / Milk to school	Czechia
Milk and Fruit Scheme for Schools	Latvia
Mobile farmers markets	Lithuania
Romanian Milk and Fruit Scheme for Schools	Romania
Urban beekeeping supporting biodiversity and food self-sufficiency in Ljubljana	Slovenia
Development of agro-ecology in the municipality of Orduña/Urduña	Spain
Network of cities for agro-ecology	Spain
Promoting sustainable management of public catering and commercial food services	Spain

The food products in this cluster are not necessarily certified as organic, but they are produced using agro-ecological, extensive or traditional farming practices. So, they are claimed to be ecologically friendlier and fresher and provide a greater share of product value to the farmer. Marketing of these products is undertaken through targeted promotional campaigns, local specialty markets, commercial food services, separate sections in food stores, and preferential public procurement procedures by public service canteens and schools. Promotion of these products serves to incentivize more sustainable farming practices, distancing them from the global commodity-based food system, and providing greater integration within a locally-based food system. In the context of the farming system classification by Therond *et al.* (2017), these market incentives mainly promote products produced in biological input-based farming systems where farming practices are oriented to “ecological intensification”. Alternative food chains incentives can also be used to promote food from biodiversity-based systems.

The “Milk, fruit and vegetables for school schemes” of Czechia, Latvia and Romania represent an approach supported by the EU and national RDPs to educate and promote healthier eating habits among children and their families, provide nutritional support to children from disadvantaged families, promote production of local fruit, produce and milk, and to stabilize local milk, fruit and produce markets. Products included in the scheme are typically chosen on the basis of nutritional value, and environmental, seasonality, variety and availability criteria. Accordingly, this scheme supports local or regional procurement, short supply chains, and the production of local goods. As most programmes follow procurement procedures that to some degree incentivize the purchase of organic products, there is a promotion of sustainable farming, including organic farming and product processing. However, benefits to sustainable farmers frequently are not realized as national public procurement procedures also include the criteria “lowest price”, which tends to discriminate against small local producers including organic farmers.

The “Mobile farmers markets” in Lithuania is a market incentive that encourages the production and marketing of products by small farmers, producers and processors. It supports cooperation in the organization markets at various locations around the country and by cooperation in the selling of products in special sections of supermarkets. Although supporting small farmers who typically adhere to less intensive farming practices, no criteria have been defined to specify the quality of products sold or farming practices employed.

“Promoting sustainable management of public catering and commercial food services” in Spain is the initiative of a private sector consultancy which advises public catering (school canteens, hospitals, nursing homes, hotels, and more), and commercial food services (restaurants) in Spain, on sustainable management of their businesses. This includes advice on promoting sustainable purchasing through the acquisition of local, organic and seasonal products that guarantee animal welfare and sustainable fishing, and that meet the criteria of fair trade. The main objectives are to help businesses to reduce their environmental impact, become more socially responsible, and to reduce operating costs. Sustainability criteria are used to assess the performance of public food services and restaurants. Advice is provided on implementing waste (including food waste) prevention and management strategies, water and energy saving, and the use of renewable energy. Communication activities are used to highlight the progress of restaurants towards sustainable management including the transition to locally produced agro-ecological products.

The initiatives “Development of agro-ecology in the municipality of Orduña/Urduña”, the “Network of Cities for Agro-ecology” in Spain, and “Urban beekeeping supporting biodiversity and food self-sufficiency in Ljubljana” Slovenia are public policy/market incentives run by municipalities. The “Development of agro-ecology in the municipality of Orduña/Urduña” is a multi-actor municipal strategy for the development of agro-ecology based on a local food system. It includes the development of a local food council, provides support and technical assistance for the conversion of farms to agro-ecology, particularly by young people, supports commercialization of local products, and promotes local products in public consumption. This initiative demonstrates an integrated approach to the promotion of agro-ecology from the production of food by farmers to the involvement of relevant actors in the value chain, and fostering local public and private consumption of agro-ecologically produced food.

The “Network of Cities for Agro-ecology” is a national network of cities in Spain which cooperate on the exchange of knowledge and initiatives relating to supporting local agro-ecology and food sovereignty. The initiative demonstrates a high level of public commitment to agro-ecological development and promotion of local food chains and systems by cities across Spain.

The City of Ljubljana promotes urban beekeeping to preserve urban biodiversity, increase pollination ecosystem services and support urban food self-sufficiency. Key to the success of the policy is strong cross-sectoral cooperation by municipal institutions, beekeepers and civic society stakeholders.

2.2.7. Territorial-based farming practices

The cluster of “Territorial-based farming practices” includes 15 market and policy incentives (Table 10).

Table 10 Territorial-based farming practices

Name of Initiative	Country
Certificate for beef and lamb meat from natural pastures	Finland
Palopuro Agro-ecological Symbiosis	Finland
GIEE - Economic and Environmental Interest Groupings	France
Flowering Meadows in Alb	Germany
Water Protection Bread	Germany
Landcare Associations	Germany
Landscape protection agri-environmental measure Santorini vineyards	Greece
Results-based Agri-environmental Scheme: the Burren approach	Ireland
The experience of Bio-districts	Italy

Agri-environmental collective agreements	Italy
Collective agri-environmental measures	Netherlands
Holistic community supported agro-ecological approach	Portugal
Sustainable grazing-based livestock production	Spain
Land Reform	UK (Scotland)
Environmental Co-operation Action Fund	UK (Scotland)

These initiatives are largely territorially-based incentives supporting farming systems that preserve biodiversity and natural landscapes through the maintenance of traditional and extensive farming practices, or by promoting less intensive farming systems by adopting agro-ecological farming and/or circular economy practices - promotion of more efficient and environmentally friendly use of nutrients originating from waste such as manure, wastewater sludge, etc. Many of these incentives also promote cooperative farming practices, and the development of alternative food chains and quality food labelling. In the context of the Therond *et al.* (2017) classification of farming systems, these incentives support a transition to biological input-based farming practices (ecological intensification), the maintenance of cultural landscapes, and the provision of multiple ecosystem services.

The following policy initiatives are financed from national RDPs:

- Support to Economic and Environmental Interest Groupings to foster agro-ecological farming practices, France;
- Landscape protection agri-environmental measure Santorini vineyards, Greece;
- Results-based agri-environmental scheme Burren, Ireland;
- Agri-environmental collective agreements, Italy;
- Collective agri-environmental measures, The Netherlands;
- Environmental Co-operation Action Fund, UK (Scotland).

The policy initiative “Support to Economic and Environmental Interest Groupings to foster agro-ecological farming practices” incentivises farmer groups to collaborate and undertake collective agro-ecological practices to improve the sustainability of local farming systems and landscapes. The incentives “Landscape protection agri-environmental measure Santorini vineyards” and “Results-based agri-environmental scheme Burren” support farmers who undertake agro-ecological farming practices for the preservation of traditional landscapes and biodiversity. The “Agri-environmental collective agreements” in Italy support collective agri-environmental actions promoting of low-input/integrated and organic agriculture at a territorial scale.

In the RDP 2014-2020, The Netherlands has developed a new regional collective approach “Collective agri-environmental measures” for agri-environmental and climate measures nationwide. Farmers cooperate voluntarily to achieve goals for ecosystem services (biodiversity and water) by making use of the added value of collectives. Collective measures focus on the creation of benefits from ecosystem services at a territorial level instead of meeting commitments at the farm level.

The “Environmental Co-operation Action Fund” in the UK (Scotland) facilitates cooperation between land managers in the management of landscapes and provision of ecosystem services, by promoting the delivery of landscape-scale environmental projects by groups of farmers, foresters and other land managers. It provides funding to support the costs of planning, facilitating and overseeing cooperative projects, principally by funding the activities of a facilitator. It supports collaborative projects aimed at increasing biodiversity, improving water quality and managing flooding. Once the cooperative group has been established and the landscape scale action has been planned, applications can be made to the RDP Agri-Environment Climate Scheme and/or Forestry Grant Scheme, or an alternative source of funding to implement these environmental projects.

The policy of land reform in Scotland has led to a series of land reform legislation (e.g. Land Reform (Scotland) Acts 2003 and 2016). Such legislation has created new rights for those who live and work on the land, such as providing crofting communities that adhere to traditional extensive farming practices, the right to acquire and control the land where they live and work from the land owner. Similar rights have been gained by tenants in all types of farm systems. These land buy-outs, which are collaborative community initiatives, have been most common in the areas of north and western Scotland where crofting systems predominate. Such systems use traditional land management practices, characteristic of which is the preservation of biodiversity and multi-functional landscapes.

The following are private or mixed ownership market initiatives where cooperation between multiple actors is central to implementing territorial- or landscape-based agro-ecological farming practices that produce multiple ecosystem service benefits:

- Flowering Meadows Alb, Germany;
- Water Protection Bread, Germany;
- Landcare Association, Germany;
- Certificate for beef and lamb meat from natural pastures, Finland;
- Palopuro Agro-ecological Symbiosis, Finland;
- Bio-districts, Italy;
- Holistic community supported agro-ecological approach, Portugal;
- Sustainable grazing-based livestock production, Spain.

These initiatives, reward farmers for adopting agro-ecological farming practices and promote economic, social and cultural community development.

“Flowering Meadows Alb” initiative is run by a society of the same name that includes farming, nature protection, county administration, local communities, scientific community and private individuals who promote the conservation of flowering meadows and cultural landscapes with high biodiversity value in the Alb region of Germany. It aims to integrate biodiversity management and the generation of added value for farmers operating low-input and extensive livestock systems. The initiative promotes direct and quality marketing, diversification, certification and labelling, and raising awareness of the initiative to increase the potential of establishing farm shops and local markets directly selling cheeses, meat and vegetables from specific flowering meadows.

“Water Protection Bread” is an initiative targeted at improving water quality through the agro-ecological practice of fertiliser management which reduces nitrate leaching. Value chain actors cooperate to make farm management more sustainable. The initiative combines financial support from the local government administration (e.g. for the management of the initiative) and the private sector. Farmers located in the water catchment of a public drinking water supply receive “financial compensation” from the water utility company for the lower protein content in wheat resulting from reduced applications of fertilizer. Mills process the wheat separately and sell the flour to participating bakeries. Bread can be labelled as “Water Protection Bread”, if the bread contains at least 60% of its wheat from the initiative. The initiative demonstrates cooperation along a regional value chain from farmers to bakeries with the water utility as financier and beneficiary.

Landcare associations implement integrated and sustainable land management practices in many rural areas in Germany. Landcare associations are regional non-governmental organizations that link nature conservation groups with local farmers and local communities to care for the cultural landscape and traditional farming systems. The Landcare initiative is linked to different agro-ecological practices such as the extensive use of permanent meadows, agroforestry systems and the protection and integration of landscape mosaics and elements, and promotes a diverse cultural landscape and traditional farming systems with high biodiversity value. Both traditional knowledge and new scientific results are used. Additionally, support is provided for regional development and regional value chains to help farmers market their quality products, which can be labelled as “nature-conservation-products”. A key strength of

the initiative is that cooperation between different interest groups leads to solutions which would otherwise not be economically viable.

The “Palopuro Agro-ecological Symbiosis” initiative in Finland is run by the Knehtilä Farm, developed in cooperation with the University of Helsinki and other research organisations. It aims to produce local, organic food using bioenergy produced from its own biomass and recycled nutrients. It serves as a model for organic food production and processing, enhancing energy and nutrient self-sufficiency. There is also a strong social dimension as consumers are invited to tour the operations and participating farms are open to visitors. Recycling of nutrients and self-sufficiency in energy production are at the core of operations. From the agro-ecological and socio-ecological perspectives, the shortening of the food supply chain is relevant as it brings producers and consumers closer to each other.

The initiative “Certificate for beef and lamb meat from natural forest pastures” in Finland is a joint initiative of World Wildlife Fund Finland, the governmental Forest Center Tapio, the Finnish Sheep Association and the Beef Cattle Association. The objective of the Certificate of quality is to gain a premium price for producers who help to maintain endangered traditional biotopes in agro-forestry settings using extensive farming practices. Multi-actor involvement in supply chain (farmers, NGOs, government, producer organisations) gives the initiative broad acceptability and support.

The initiative “Sustainable grazing-based livestock production” in Spain is a market incentive operated by a meat processing company similar to the “Palopuro Agro-ecological Symbiosis” initiative in Finland, but without formalized certification. The initiative involves a national network of sustainable grazing-based livestock production which has, as its main objectives, to rear livestock entirely on grazed grassland in a manner that benefits the environment, promotes animal welfare, produces nutritious food, and helps to revitalize the local rural economy and community. All the producers must comply with an internal protocol of the network, which requires the use of specific agro-ecological practices. Communication with consumers is through a dedicated web page, which provides detailed information about the production practices of farmers and collaborating restaurants and consumer groups. Resources are available to farmers who want to be part of the network and to learn about holistic and rational management of livestock, and how to make the transition to a grazing-based livestock production system. The initiative supports the local economy by fostering direct contact between producers and consumers.

The Italian Association for Organic Agriculture has developed a set of rules for “bio-districts”, together with a specific label. A bio-district is a geographical area in which where farmers, citizens, tourist operators, associations and public authorities enter into an agreement for the sustainable management of local resources, based on organic production and consumption (short food chains, purchasing groups, organic canteens in public offices and schools). In bio-districts, the promotion of organic produce is inextricably linked with the promotion of the territory and its special characteristics. Bio-districts are implemented to facilitate and simplify environmental and territorial certification, to favour the development of organic agricultural practices, and to safeguard local cultural heritage and agricultural and natural biodiversity. Bio-districts may be a viable tool for the development of organic agriculture at a territorial scale. They offer an organizational and administrative model, providing technical services to the farmers, promoting valorisation paths for local products, and pursuing environmental goals.

The “Holistic community supported agro-ecological approach” in Portugal is a cooperative working in the agroforestry and pastureland farming system (*dehesa* in Spanish, *montado* in Portuguese). It produces, processes and commercializes a wide variety of products from organic farming (agriculture and livestock), as well as offering ecotourism services and producing 50% of the energy consumed by solar farms. The main objective of this initiative is the construction of a democratic, inclusive, transparent, autonomous and resilient community around the *dehesa/montado* of Freixo do Meio. All products are processed and commercialized according to the principles of Community Supported Agriculture (CSA), based on a mutual commitment between producers and co-producers (who are consumers linked to the programme) to make the practice of agro-ecology viable, treating food as a common asset and placing value in personal relationships. A direct relationship with consumers is maintained through visits to the *dehesa/montado*,

and the use of a dedicated a website. The initiative represents an integrated approach to agro-ecology, comprising - production, processing, commercialization and marketing, training, and consumer commitment.

2.2.8. Research and capacity-building

The five initiatives in the cluster of research and capacity building are policy and market incentives. They are for promoting education, training and research for organic and sustainable farming and agro-ecological practices, rural agrarian territorial development, and the promotion of alternative food chains and organic food (Table 11).

Table 11 Research and capacity-building

Name of Initiative	Country
Upper Austrian Soil and Water Protection Advisory Service	Austria
Nutrient recycling: Making use of agricultural nutrients	Finland
Federal Scheme for Organic Farming and Other Forms of Sustainable Agriculture - BÖLN	Germany
Promotion and transmission of knowledge on agro-ecology	Spain
Knowledge Support for Organic Cattle Husbandry – PROVIEH	Switzerland

The policy initiative “Nutrient recycling: Making use of agricultural nutrients”, in Finland, supports the national goal of bringing at least 50% of the manure and municipal sewage sludge into advanced processing by the year 2025 in pollution risk areas of the Baltic Sea and other water systems. The initiative promotes more efficient and environment-friendly uses of nutrients originating from manure and organic waste through balanced nutrient recycling, contributing to better soil and growing conditions as well as reduced nutrient leaching into water bodies. Tools used to achieve these objectives include the: i) provision of information on funding opportunities related to the recycling of nutrients; ii) promotion of networking and nutrient recycling trialling; iii) provision of essential research knowledge to practitioners; iv) compilation of results of research and pilot projects and identification of new research needs; v) identification and elimination of bottlenecks in nutrient recycling. The initiative supports biological input-based farming systems in a circular economy.

The German “Federal Scheme for Organic Farming and Other Forms of Sustainable Agriculture” is a national programme that deals with the coordination of research on organic and other forms of sustainable farming and food production. Since the start of the programme in 2002, more than 1,000 research projects have been supported with a funding volume of some € 150 million. In addition, measures for knowledge transfer and advanced training programmes for representatives of the entire value-added chain, as well as guidelines supporting participation at trade fairs and sales promotion projects on organic farming were developed and implemented (BMEL, 2019). It does not coordinate wider activities to promote organic and other forms of sustainable farming and food. Within the context of the Therond *et al.* (2017) classification of farming systems this initiative is predominantly promoting biological input-based farming systems. These farming practices are oriented towards “ecological intensification” by increasing the efficiency of external inputs and substitution of chemical fertilizers and plant protection products with organic fertilizers and alternative plant protection products. The farming systems addressed by the Scheme are linked both to the global commodity-based food system, and alternative, territorially-based food systems.

The initiative “Promotion and transmission of knowledge on agro-ecology” in Spain is led by The Association of Rural University of Paulo Freire (URPF). During the years of highest activity (currently the association has changed and become smaller) the objective was to promote rural development in agrarian terms through pedagogy inspired by the methodologies of Popular Education, the Farmers’ Schools and

Paulo Freire's legacy. The intent was to recover farm culture and promote a balance between rural development and the environment from an agro-ecological approach. The initiative was funded by EU Leader and Proder funds. The rural territory was used as the educational space to deepen historical identity. Academic research was used to link popular and scientific knowledge. A key focus of the initiative was to keep rural villages alive and to promote rural culture through traditional farming activities as an alternative to the agro-industrial model. In the context of the Therond *et al.* (2017) classification of farming systems this initiative is focussed on biological input-based and biodiversity-based farming systems situated in alternative food systems and multi-functional landscapes.

The initiative "PROVIEH", in Switzerland, was developed by the Swiss association of organic farmers (Bio Suisse) in collaboration with cantonal advisory services, research (FiBL) and regional associations of organic farmers. It is a platform for knowledge and experience exchange amongst farmers (peer-to-peer) on organic cattle husbandry. The format includes stable visits by farmers, sometimes accompanied by veterinarians, consultants, advisers and researchers, working groups and demonstration events. Topics discussed are animal health, including reducing the use of antibiotics, the use of natural medicine, animal welfare, site-specific breeds, as well as fodder, including namely grassland-based fodder regimes. The initiative offers a participatory and protected learning environment in which farmers shape the sessions and define the content. According to the Therond *et al.* (2017) classification of farming systems, the "PROVIEH" initiative is positioned mainly in a biological input-based farming system, containing some elements of a biodiversity-based farming system.

The "Upper Austrian Soil and Water Protection Advisory Service" is an initiative of the federal government of Upper Austria to reduce soil, nutrient and pollutant transfer from arable land to surface and ground waters through the implementation of soil and water conservation measures. The scheme is focused on improved extension services and knowledge transfer to farmers. The Soil and Water Protection Advisory Service (BWSB) provides support to over 55 working groups on soil and water protection for both conventional and organic farming. So-called "water farmers" (more than 40), supported by BWSB, lead working groups and assist in the transfer of knowledge between farmers and extension services. "Water farmers" manage farm-based experimental and research demonstration plots for water and soil conservation using the farmer-to-farmer approach. Measures implemented to reduce water contamination include erosion control, green cover on arable, buffer and riparian strips, reduced and no-tillage, and improved pesticide and fertilizer management. Inclusion of the "water farmers" approach as part of the advisory service has facilitated awareness-raising among farmers regarding soil and water conservation issues. Targeting soil erosion and water contamination "hot-spots" has resulted in positive impacts in only a few years. Compared to other federal states Upper Austria has made a bigger impact on soil and water protection. The initiative has benefitted from the close cooperation between the federal state, the Upper Austrian Chamber for Agriculture and support from civil society organisations.

2.3. Expenditure on Rural Development Policy

Many of the incentives presented in previous sections are measures of Rural Development Programmes. These agri-environmental policies are the most significant source of financial resources made available by the Member States in the RDPs to improve the environmental performance of farms.

The measures that have been activated and that, at least potentially, are capable of facilitating the transition to agro-ecological approaches are Measure 11 (Organic Agriculture) and Measure 10 (Agri-Environment-Climate). These directly stimulate the introduction of more sustainable production methods at a farm level. Two additional measures that can have an indirect role are: Measure 3, dedicated to the quality scheme that seeks to encourage the use of sustainable methods through marketing; and, Measure 16 (Cooperation), that encourages the creation of innovative and experimental initiatives, mainly in the field of sustainable agriculture.

There are a number of other policies concerning the first and second Pillar of the CAP that encourage agro-forestry through the conservation of ecological networks based on unfarmed features (cross compliance

and environmental focus areas), and the implementation of new crop systems based on agro-forestry. The factsheets describing these measures can be found in Annex 2.

According to the European Commission, the expenditure programmed for the 118 RDPs in the European Agricultural Fund for Rural Development (EAFRD) for the period 2014 to 2020, including national co-financing, amounts to €151.6 billion (Table 12).

For Measures 10 (Agri-Environment-Climate) and 11 (Organic Farming) the total expenditure allocated was 25.5 billion Euros and 10.9 billion Euros respectively, with smaller figures allocated to Measure 16 (Cooperation) of 2.7 billion Euros and Measure 3 (Quality Scheme) of 0.6 billion Euros.

Table 12 Total amount (Euros) Allocated to Measures in European Agricultural Fund for Rural Development (EAFRD)

	M03 Quality Schemes	M10 Agri-environment- Climate	M11 Organic Farming	M16 Cooperation	Total
Austria	133,000,001	2,067,694,580	784,000,001	117,437,796	7,698,430,486
Belgium		270,888,125	107,804,321	19,821,730	1,324,855,716
Bulgaria		223,346,669	151,593,439	32,573,723	2,908,712,772
Croatia	7,058,824	138,830,280	128,309,623	8,333,333	2,383,294,500
Cyprus	3,000,000	60,000,000	14,000,000	1,501,500	239,214,245
Czechia		1,021,911,721	389,756,770	150,286,387	3,770,639,543
Denmark		196,495,261	267,257,532	32,944,662	1,198,733,046
Estonia	1,000,000	228,153,667	86,730,000	20,700,000	986,596,021
Finland		1,598,900,152	333,153,000	160,000,000	5,672,536,322
France	44,573,223	1,640,656,734	994,215,860	221,525,285	16,635,502,921
Germany		3,005,066,665	1,785,539,247	193,607,063	14,109,416,723
Greece	48,071,543	445,512,943	799,108,873	77,836,111	5,805,504,353
Hungary	33,578,353	757,200,887	207,598,705	51,162,705	4,176,963,451
Ireland		1,527,835,630	56,000,000	62,000,000	3,920,360,893
Italy	190,057,679	2,511,561,220	1,912,192,809	686,620,706	20,851,277,715
Latvia		83,789,619	194,279,325	21,663,034	1,531,595,209
Lithuania	4,224,706	139,999,143	150,784,677	22,218,728	2,027,038,396
Luxembourg		110,000,000	7,023,327		368,137,198
Malta	1,100,000	7,000,000	200	1,751,975	123,520,452
Netherlands	30,000,000	350,893,333		61,800,000	1,271,264,053
Poland	28,003,300	1,366,679,125	699,942,890	67,998,186	13,612,211,430
Portugal		632,385,199	108,982,937	44,180,955	4,726,958,969
Romania	10,181,232	1,090,617,510	240,783,233	31,356,903	9,644,992,671
Slovakia		141,863,208	91,886,792	48,500,000	2,097,301,598
Slovenia	4,400,000	203,607,387	65,300,000	20,062,500	1,106,588,291
Spain	81,964,370	1,286,595,641	801,829,932	245,728,140	12,243,754,396
Sweden		987,538,156	511,801,772	153,272,808	4,411,494,228
United Kingdom	843,620	3,376,912,820	53,942,952	193,963,346	6,768,434,612
Total	621,056,955	25,471,935,675	10,943,818,217	2,748,847,578	151,615,330,211

Source: ESIF 2014-2020 Financed Planned Details (downloaded December 2018).

The percentage of Measures 10 and 11 of total RDP expenditure varies considerably between Member States, from a minimum of 5.7% in Malta to 50.7% in the United Kingdom (Figure 2). At an EU level, the combined expenditure allocated to those Measures equates to 24% of the total for all RDPs, with 17% allocated to Measure 10 and 7% to Measure 11. The expenditure on Organic Farming exceeds those allocated to Agri-Environment-Climate Schemes in 4 Member States (Denmark, Greece, Latvia and Lithuania).

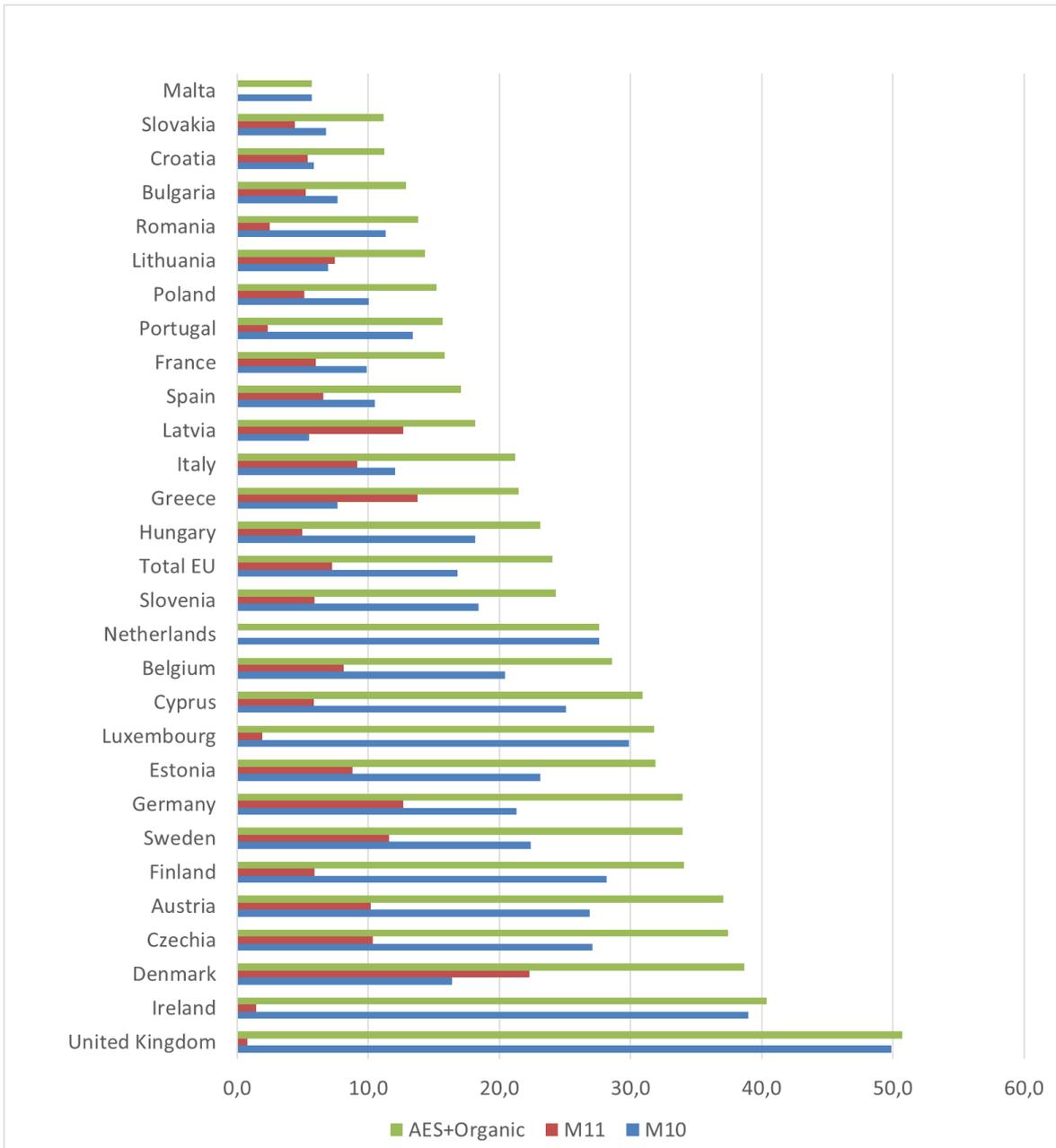


Figure 2 Percentage of programmed expenditure for Measure 10 and 11 on total RDP expenditure (Source: ESIF 2014-2020 Financed Planned Details, downloaded December 2018).

2.4. Market and policy incentives in non-EU countries

To obtain a wider perspective on the use and application of policy and market incentives for promoting agro-ecological farming and food production, examples from non-EU countries were reviewed. The selected examples are not representative of non-EU experiences with policies and market instruments.

They were selected due to references in scientific literature or identified by the Future Policy Award 2018 (World Future Council, 2018) as examples of legal frameworks and policies, containing innovative elements, which can contribute to scaling up, or a transition to, agro-ecology to support change more sustainable food and agriculture systems. The five examples of policies supporting agro-ecology are from Africa, Central America, South America and North America (Table 13). Although in many cases the political, social and cultural context and policy drivers for the selected policy examples are country specific and differ from those in the EU, they highlight approaches of relevance to supporting the transition to agro-ecology in the EU.

Table 13 Non-EU food and farming policies

Name of Initiative	Country
Participatory Guarantee System National Technical Standard	Bolivia
The State Policy for Agro-ecology and Organic Production	Brazil
National Programme of Action and Nutrition	Cuba
Los Angeles Good Food Purchasing Policy	United States
The Organic Standard and Certification Scheme	Tunisia

Four of the examples shown in Table 2.13 are national level policies supporting agro-ecological or organic food production and consumption. The fifth, the “Los Angeles Good Food Purchasing Policy”, deals with the promotion of good sustainable food consumption. Detailed descriptions of these initiatives are provided in separate Factsheets and an Excel Template in Annexes 2 and 3.

Participatory Guarantee System National Technical Standard, Bolivia

Food sovereignty is included in the constitution of Bolivia which forms the rationale for the “Participatory Guarantee System (PGS) National Technical Standard” (McKay *et al.*, 2014). Agro-ecological certification is differentiated between export or international trade, and local or national trade. The PGS National Technical Standard establishes it as a domestic certification system, which is an alternative to third party certification. PGS are locally focused quality assurance systems for organic or agro-ecological production. They certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange. Similar to conventional organic certification systems, PGSs relies on the basic norms and standards of organic agriculture. The difference lies in that PGS aims to adapt such standards to the realities of local farmers, taking into account cultural traditions, climate conditions, livelihoods, access to financial support and prices on the local market (McKay *et al.*, 2014).

The PGS National Technical Standard promotes: i) ecological production, processing and consumption; ii) consumption of local and national products; iii) community consolidation; iv) the protection and sustainable use of natural resources; v) genetic equity; vi) strengthening of local economies; and, vii) inclusion and participation of families in markets where they can sell and exchange their products for a fair price and where their labour is appreciated.

The adoption of the PGS National Technical Standard has resulted in:

- more consumers buying agro-ecological products and interested in agro-ecological practices at ecofairs and in speciality shops;
- the involvement of consumers in markets has increased the diversity of products in demand, in response to which producers have gradually adapted their production;
- more producers being involved in the market channels available for agro-ecological products;
- the opening of two new market channels to promote agro-ecological products, in addition to classic market channels such as on-farm sales, ecofairs and the public procurement market;

- the participation of more consumers and diversity of products offered have generated an increase in sales for producers and intermediaries, a subsequent increase in incomes, and better living conditions.

PGS systems can have positive impacts on the social, political and economic situation of small scale farmers, and can improve the nutrition of the local population. A publicly recognized PGS provides a trustworthy mechanism for public procurement, opportunities for external support for product diversification, and greater visibility for agro-ecological products.

State Policy for Agro-ecology and Organic Production, Brazil

The “State Policy for Agro-ecology and Organic Production (PDAPO)” in Brazil aims to promote organic and agro-ecological production to ensure food sovereignty and nutritional security. The agro-ecological agenda has been an emerging, grassroots process. Agro-ecology enabled the establishment of connections with other policy and stakeholder agendas (Altieri and Toledo, 2011), gradually encouraging society to adopt the programme through its introduction on several fronts, e.g. the environmental and technological agenda, public health, education, and research. Synergies between issues of food and nutrition security, and other topics were cultivated, such as tackling human hunger and misery, food culture, healthy eating, and the strengthening of family farming and peasant agriculture.

The PDAPO was implemented using an integrated policy approach that included the following elements:

- i) Ensuring markets for products and supporting short chain markets:
 - promoting the acquisition of products from family farms by public agencies;
 - encouraging consumption of healthy, sustainable and value-added local and regional food crops;
 - strengthening the production, processing and consumption of organic and agro-ecological transition products, with the emphasis on local and regional markets.
- ii) Financial support for traditional practices/ agrobiodiversity/ organic farming/ agro-ecology:
 - creating and implementing regulatory, fiscal, credit, incentive and payment instruments for environmental services. These are to protect and valorise traditional practices for the use and conservation of agro-biodiversity, and the expansion of organic and agro-ecological transitions. Therefore, these promote and consolidate access, use and conservation of natural assets by farmers.
- iii) Support for local knowledge, agro-ecology education and research:
 - increasing capacity for the generation and dissemination of knowledge regarding organic production and agro-ecological transition. This has been through developing the locally available knowledge of agro-ecological approaches within educational and research institutions;
 - strengthening state-based and non-state participatory research programmes based on agro-ecology and related topics.

Implementation of the PDAPO has: i) created 100,000 agro-ecology based family farmers; ii) resulted in increases of average yield of 100% to 300%; iii) resolved issues of soil management, fertilisation, pest controls, production of traditional varieties of seeds and improvements, agroforestry; iv) recovery of traditional crop varieties including beans, corn, potatoes, rice, wheat, manioc (International Policy Centre for Inclusive Growth Research Brief, 2012).

National Programme of Action and Nutrition, Cuba

The “National Programme of Action and Nutrition (PNAN)” for Cuba was developed to promote a transition towards more sustainable means of farming, using agro-ecology and self-sufficiency as guiding principles. The driver for this initiative was the collapse of the Soviet Union in 1991, whereby Cuba lost its trade preferences with the Soviet Bloc (e.g. loss of petroleum-based imports, machinery, fertilisers, pesticides), and suffered an immediate 40% reduction in agricultural production. This necessitated moving away from a

system of chemical input-intensive, commodity mono-cropping, to alleviate food shortages across the country (International Policy Centre for Inclusive Growth Research Brief, 2012). The PNAN consisted of multiple policy initiatives and included cooperation between multiple actors to bring about a restructuring of Cuban agriculture towards agro-ecology. Examples of these initiatives and their impacts were:

- PNAN implemented a widespread decentralisation of landholdings, management and production;
- more autonomy was given to small farmers and peasants who, ultimately, became the key actors in the transformation process;
- the Cuban Association of Agricultural and Forest Technicians was a key component of this agro-ecological movement, providing training and extension based on their research activities;
- research and technical advice was coupled with traditional knowledge of strong peasant organisations such as the National Association of Small Farmers and the Campesino-a-Campesino (farmer-to-farmer) Agro-ecology Movement;
- small family farms that owned their own land established Credit and Service Cooperatives in which they collaborated and grouped together to achieve economies of scale in marketing their produce, obtaining credit and sharing equipment, knowledge and practices;
- landless peasants joined together to form Agriculture Production Cooperatives in which all assets, including the land, are owned collectively;
- the promotion of urban agriculture has led to Cuba becoming a world leader in this area.

The Cuban model of agro-ecology in both rural and urban areas produced impressive results largely due to strong farmer-to-farmer networks, organisation and the dissemination of knowledge through organisations characterised by participation and sharing. The Campesino-to-Campesino Agroecology Movement (MACAC) has proven to be one of the most effective participatory farmer networks in the country, enabling farmers to access support services and expert advice and share production practices in an inclusive framework. It is estimated that 46% to 72% of small family farms use agro-ecological techniques. Family farms in Cuba occupy just 25% of total arable land and produce over 65% of the domestic food supply. Compared to the conventional model, agro-ecology offers Cuba food sustainability, sovereignty, and security, assuring: 1) Greater resilience in the face of climatic adversities; 2) Restoration of soils degraded by intensive agrochemical use; 3) Healthy food; 4) Greater productivity; 5) Savings in foreign exchange, inputs, and investments (Altieri and Toledo, 2011).

Los Angeles Good Food Purchasing Policy, USA

The “Los Angeles Good Food Purchasing Programme” was created to encourage public institutions to procure food produced through values-driven purchasing standards. The aim was to foster the provision and consumption of healthy, affordable, fair and sustainable food in Los Angeles through food services in the public sector, including schools. Improving access to healthy food is intended to contribute towards reducing long-term health risks to students. The City of Los Angeles requires that all departments that spend more than \$10,000 on food annually to participate in the Good Food Purchasing Programme.

Political leadership shown by the City Mayor by their establishment of a Food Policy Task Force led to the setting-up of the Food Policy Council and the formulation of the Good Food Purchasing Policy for the city. Under this policy, the city pledges to procure food from local and regional producers and processors, as part of ensuring and supporting food produced in a sustainable manner:

- avoiding the use of synthetic fertilizers and pesticides, antibiotics and hormones;
- avoiding genetic engineering, protecting biodiversity and conserving resources, reducing emissions of greenhouse gases;
- ensuring safe, healthy working conditions and fair compensation for workers in the food supply chain;
- ensuring humane and healthy conditions for livestock;
- promoting healthy, nutritious and balanced diets eliminating unnecessary artificial additives, fats, sugar, salt.

The key tool to implement the Good Food Purchasing Policy is the specific criteria or guidelines for procurement. The Good Food Purchasing Guidelines emphasize five key values: 1) Local Economies, 2) Environmental Sustainability, 3) Valued Workforce, 4) Animal Welfare, and 5) Nutrition. Participating institutions must meet the baseline criteria for purchasing described in the “Good Food Purchasing Guidelines”. A tiered, points-based system enables participants to choose the level of commitment which best suits the Good Food goals of their organization. Participants are then awarded one to five stars based on their total score. The following key features have been critical to the success of the campaign:

- cross-sector collaboration within a city administration to advance changes towards a holistic food system;
- multiple criteria defined to guide achievement of a cross-sectoral food policy;
- a voluntary approach that enables participation and increases performance in relation to the city food procurement policy based on the progressive 5 star scoring system.

By harnessing the buying power of public institutions, the policy has already led to significant shifts in local purchasing and created health and economic benefits for students, food suppliers, producers, entrepreneurs, and distributors (PolicyLink, 2016).

National organic standard and certification scheme, Tunisia

The aim of the “National organic standard and certification scheme” of Tunisia is to promote organic farming by adopting and adapting an internationally recognized organic farming certification scheme in order to add value to export products and diversify organic production. The IFOAM (and EU and French) standards were used as the basis for the Tunisian organic certification scheme. The key motivating factor was the belief that these represented best practice in organic standards, and that working from these models would help Tunisian organic legislation be considered credible and gain international recognition. Working from internationally recognised standards helped Tunisia obtain and maintain access to international markets. Specific details of some standards differ to respond better to national priorities to protect the rights of Tunisian organic producers and operators.

In 1999, the Government set up a Commission to explore organic agriculture. This resulted in the adoption of the *Loi 99-30 du 5 Avril 1999, relative à l’agriculture biologique*. Several government departments were involved in the consultation, taking six months, leading to the introduction of the legislation (Ministry of Commerce, Ministry of Industry, Ministry of Health, Ministry of Environment, Ministry of Finance, Ministry of Customs and National Agency for Agricultural Investment). Their continued involvement reflects the extent of the strategic, consultative and inclusive approach the government has taken to organic certification.

The Tunisian Government supports organic agriculture through a package of tax breaks and financial incentives which, combined, can cover up to 70% of the costs of certification. Additionally, there are incentives for agricultural projects that are entirely export-oriented. A coherent and comprehensive policy framework underpins Tunisia’s success. Tunisia’s national organic legislation, subsequent orders and decrees, as well as its research institutions and technical support to farmers, subsidies and fiscal incentives have provided a coherent and comprehensive policy framework with which to organise and develop Tunisia’s organic agricultural sector.

Tunisia’s organic legislation has resulted in several positive impacts in the areas of trade, environment, conventional farming, applied research, academic and professional training. Tunisia has the largest area of certified organic land in Africa. The number of certified organic farms has grown rapidly. The yields and quality of organic olives, Tunisia’s main agricultural export, have increased through the beneficial effects of organic farming practices. Due to the adoption of the organic certification scheme, Tunisia’s organic agricultural sector has significantly expanded and improved its commercial and trade performance. Most of the organic production is for export, largely because of the price premium it can command. The uptake of organic farming, coupled with government support, has helped drive diversification of the crops produced for export (ISEAL Alliance, 2008).

3. STAKEHOLDER VIEWS ON AGRO-ECOLOGY

3.1. The interviews

As described in the Methodology (section 1.2), compilation of the inventory of policy and market incentives in case study countries has been integrated with 52 semi-structured interviews at EU level and in several EU Member States. The objectives of these interviews were:

1. to verify the relevance of the policy and market instruments identified in the inventory, as well as identifying the most innovative and effective incentives;
2. analysing, in a more detailed and articulated way, the points of view of national and EU stakeholders with specific knowledge and experience on policy and market incentives.

This section deals with the second objective, providing an overview of the points of view of the stakeholders regarding different transition pathways towards agro-ecology both at EU and at Member State levels, with particular attention paid to the role of policy and market incentives.

The interviews were conducted on the basis of the following open-ended questions:

1. How would you characterize the transition to agro-ecology in your country? Is the role of agro-ecology increasing, decreasing or unchanged in relation to conventional agriculture?
2. Are there specific agricultural sectors or specific areas where the transition to agro-ecological practices/ activities is occurring more quickly? What are the reasons?
3. Are there specific agro-ecological practices/ activities that are being adopted more quickly due to the implementation of policy and market incentives? What practices/ activities? What incentives?
4. Are there any specific drivers that are facilitating the development and implementation (and acceptance) of the policy and market instruments supporting a transition to agro-ecology? What drivers?
5. Are there any specific barriers that are hindering the development and implementation (and acceptance) of the policy and market instruments supporting a transition to agro-ecology? What barriers?

Stakeholder interviews were undertaken in thirteen partner countries with a total of 49 interviewees participating. In addition to respondents in EU Member States, three EU-level experts working as independent experts or affiliated with EU agricultural research and policy issues were interviewed to gain a wider EU perspective on market and policy incentives supporting agro-ecology.

Typically, three interviews were carried out in each country, with a maximum of eight held in Czechia, and only two in Austria and in the United Kingdom. Interviewees are classified into eight groups: Agricultural Consultants; Consumer NGOs; Farmers; Farmer Associations; Ministry of Agriculture; Ministry of Environment, Environmental NGO; and Researchers. The category “Ministry of Agriculture” includes national and regional level agriculture ministry representatives (e.g. Spain), representatives from joint agriculture, food and forestry ministries (e.g. Finland), as well as representatives of national (e.g. Germany) and EU rural networks and agriculture support payment agencies (e.g. Romania). The category “Ministry of Environment” also includes representatives of environment ministries that are joined-up with agriculture and rural development. Farmer Associations included representatives from both conventional and organic farming associations. A larger number of interviewees were from Agriculture Ministries (14), the research community (11), Environmental NGOs (9) and Farmer Associations (9). Fewer were agricultural consultants, consumer NGOs, farmers and representatives of Environment Ministries. Table 14 summarises the interviews according to the type of stakeholder and country. In the subsequent text, interviewee views include direct and paraphrased quotes.

Table 14 Number of interviews per country and per types of stakeholder

Country	Number of Interviews	Types of Stakeholder*							
		AC	CNGO	F	FA	MA	ME	NGO	RE
Austria (AT)	2				1	1			
Czechia (CZ)	8				1	2	1	1	3
Finland (FI)	3					1	1		1
France (FR)	4				1	1		1	1
Germany (DE)	3					2		1	
Greece (GR)	3	1							2
Hungary (HU)	4	1	1		1	1			
Italy (IT)	3				1			1	1
Latvia (LV)	3				2	1			
Lithuania (LT)	3				1	1			1
Romania (RO)	3			1		1		1	
Spain (ES)	5		1			1		2	1
Sweden (SE)	3					1		2	
United Kingdom (UK)	2			1	1				
EU Experts (EU)	3	1				1			1
Total	52	3	2	2	9	14	2	9	11

*AC: Agricultural Consultant; CNGO: Consumer Non-Governmental Organization; F: Farmer; FA: Farmers' Association; MA: Ministry of Agriculture; ME: Ministry of Environment; NGO: Environmental Non-Governmental Organization; RE: Researcher.

3.2. Data analysis and coding

Interview responses were analysed from written interview reports or taped transcripts, by extracting statements that were considered particularly relevant in relation to the different issues. Such statements were analysed in a two-step coding process. In the first round of coding statements were divided into similar groupings to produce a first categorisation. After this first coding, the categories identified were brought into additional groupings (second categories). In this way, statements were sorted and organised into a hierarchical structure, as shown in Table 15.

Table 15 Text coding

1 st Category	2 nd Category
Agro-ecology and agro-ecological practices	The concept of agro-ecology
	Links with integrated and organic agriculture
	Farming systems
	Barriers to adoption
Characterisation of the transition process	Perceptions of agro-ecology transitions
	Country differentiations
	Territorial differentiations
Main drivers	Environmental drivers
	Economic drivers
	Social drivers
The role of policies	CAP measures
	Other policies
	Policy barriers
	Policy recommendations
The role of markets	Value chains
	New market dynamics
	Consumer choices
	Market barriers

3.3. Results

3.3.1. Agro-ecology and agro-ecological practices

The concept of agro-ecology

Most stakeholders interviewed acknowledged the increasing emphasis and public debate on the role of agro-ecology in contributing to the overall sustainability of the EU agricultural sector. One issue which was mentioned repeatedly is the lack of a common understanding of the concept of agro-ecology amongst experts, producers and consumers across Europe. Finally, they also acknowledged the broad range of visions regarding the meaning of the terms “agro-ecology”, as well as the different implications for policy and practice.

Until very recently the concept of agro-ecology was very restricted, known only among experts in the fields of agriculture and environment, and in the academia. In the last 10 years its use has greatly increased in the context of sustainable farming systems and the concept has expanded also among farmers who have begun to implement certain practices although not always knowing that what they do is called agro-ecology [IT-RE].

The concept of agro-ecology as now shared by all the main stakeholders is seen not only a set of farming techniques, but rather also a social and political movement. This is an important assumption, which necessitates that the transition to agro-ecology be considered not only in technical terms, but from a broader perspective - agro-ecology should be a tool to deal with the main social and environmental challenges of the current globalised agro-food system [IT-RE].

From a consumers' point of view currently it is difficult to communicate the agro-ecology concept, whereas the meaning of “organic products” and “local products” is commonly understood [HU-CNGO].

Two different agro-ecological agendas can be identified: a conforming and a transforming agenda. The conforming agenda includes agro-ecological practices that are aligned with the dominant agro-food regime and where the neo-productivist paradigm is still prevalent. In opposition to this is a transformative approach, whereby agro-ecology combines science with farmers' knowledge and citizens' groups in order stimulate a collective involvement in shaping research and policy agendas. In Europe most commonly the conforming agro-ecological agenda is the dominant one and is associated with organic farming [IT-RE].

Links with integrated and organic agriculture

Most of stakeholders interviewed indicated that agro-ecological practices are being adopted most readily in association with integrated and organic production, as historically the agro-ecological transition started with different models of low-input farming. Especially organic farming played a key role, partly because it has been supported by EU policies but also because of the positive market trends.

In many EU Member states agro-ecology is almost entirely associated with organic farming. Recently the growth of organic production has levelled off, although demand for organic products continues to grow, but less quickly [FI-RE].

I think this follows the organic movement – I do not think agro-ecology is well known outside of the farming and policy world. Farmers I think there is an increasing desire to be more self-sufficient in terms of inputs (because of costs and regulatory concerns) and to appeal to the organic/biodynamic markets for their produce. Organic farming is obviously supported through incentive schemes as well [EU-RE1].

In Italy agro-ecology is equated mainly with organic farming and two types of organic farming can be identified: certified organic and non-certified organic. The development of each of these

organic farming strands has its own rationale. Certified organic farming is most commonly associated with large farms that use organic production as a marketing strategy towards the global market. Non-certified organic farming is most often associated with younger and smaller farmers that believe that organic farming is a means towards an alternative economic model. As the latter rely on local markets and have a direct link with consumers, they do not involve themselves with the agro-industry and big retailers. Typically, their land is certified organic, but certification on production is lacking since they have direct ties with local markets [IT-NGO].

In France, in addition to the marked growth of organic farming, some agro-ecological practices have been adopted more widely by farmers on arable land in part due to policy incentives. These include: (i) reintroduction of legumes in crop rotation; (ii) forage legume intercropping in grain production; (iii) introducing green manure crops or catch crops; (iv) reduced soil tillage and more soil conservation practices, including covering the soil in the winter time. Farming practices adopted in the animal husbandry sector include: (i) improvement of the feed autonomy in livestock farms; (ii) providing access to outdoor grazing areas for livestock; (iii) providing more indoor space for livestock; (iv) using less antibiotics.

Presently, of the farms applying agro-ecological practices, it is mainly only those producing organic products that receive a premium price on the market [HU-MA].

Although some of the conversion has been to extensive organic farming using agro-ecological practices, in many cases the organic farms are rather specialised using intensive organic practices [DE-NGO].

A massive expansion of organic agriculture or an implementation of the basic organic principles would be the best option for improving agro-ecology. In combination with the existing certification system and almost one hundred years of experience, reliable progress could be made quickly [AT-FA].

Farming systems

Generally, agro-ecological practices appear to be developing in all sectors (arable, grassland, animal husbandry, fruit, vegetable). At the same time, while few stakeholders emphasised that agro-ecological practices are gaining ground more quickly in extensive and mixed farming systems, a consistent number of stakeholders highlighted the increasing adoption of agro-ecological practices also in traditionally intensive farming systems such as specialised vineyards as well as fruit and vegetable sector, especially in Mediterranean countries.

To the best of my knowledge and taking the example of Greece I see that the cases in which either substitution of inputs is easier, or the sectors are already extensive or low-input are the ones in which transition occurs more quickly [EU-RE2].

In mixed farming systems (with both plant and animal production) it is easier to introduce agro-ecological practices: it is also easier to demonstrate that there are already agro-ecological practices in such systems [FR-MA].

In Greece practices and activities that are already considered more sustainable and environmentally friendly are being mainstreamed more quickly. These include extensive and transhumance goat grazing practices with local breeds on small farms in remote and isolated areas. These farming practices are producing meat and milk of high quality, as well as maintain rural viability [GR-RE1].

Perennial cropping systems (e.g. olive and citrus orchards and vineyards), especially in remote areas, non-plain and non-irrigated areas as well as in isolated and small islands with geographical and economic handicaps (Less Favoured Areas, Areas with Natural Handicaps) are undergoing easier conversion due to their extensive and low-input character [GR-RE2].

In **Finland**, several big farms that are undertaking suckler cow production have been actively promoting grazing on semi-natural and natural pastures and have favoured agro-ecological farming practices. This is in many cases connected to farm tourism and direct farm sale business that benefit from attractive countryside landscapes. Owners of big beef cattle farms are often more knowledgeable and usually more environmentally conscious than farmers in general and can afford to implement agro-ecological farming practices in cases and conditions where their short-term profitability is expected to be low [FI-ME].

In **Scotland**, the fruit and vegetables sectors are exhibiting transitions more quickly towards organic or low input production. In general cropping where there is increasing pressure to reduce the loss of natural resources (e.g. soil management) and for more efficient use of scarce resources (e.g. water) testing innovative solutions is increasing [UK-F].

In **Italy**, the fruit and vegetable and wine sectors are those that appear to be moving more quickly towards agro-ecology or more in general towards sustainability. Recently, also within the livestock sector there is an increasing orientation towards more extensive practices [IT-FA].

In **Spain**, the development of agro-ecology varies regionally and between sectors. Typically, in sectors where traditional practices are close to agro-ecology, the transition is easier and is already taking place successfully. In this regard, perennial crops such as organic olive oil and wine are developing well as they have a differential price in the market, which makes them viable to farmers [ES-NGO2].

The production of nuts such as almonds and pistachios is also developing very well as organic management practices of these crops are similar to traditional practices, where fertilizers and phytosanitary products are scarcely applied [ES-MA].

Notwithstanding their more complex management needs, the transition to agro-ecology is also taking place relatively quickly in the fruit and vegetable sector due to consumer demand and because the market differentiates well the final product [ES-RE].

In **Scotland**, increased interest in agro-ecological practices is shown by intensive producers of vegetables who are concerned by depleting soil fertility and are counteracting this by the use of legumes and green manures to rebalance the nitrogen in the soil. This also contributes to reducing greenhouse gas emissions through reduced use of nitrogen-based fertilisers and thus emissions of N₂O [UK-FA].

In the **Czech Republic** organic and integrated production viticulture has grown rapidly over the last five years not so much because of RDP support, but due to the ability of the already prospering sector to secure expert know-how and working support and to effectively lobby their interests [CZ-RE2]. On the other hand, farmers cropping arable land have less incentive to invest in innovation since the added value to their production is more limited [CZ-MA2].

Barriers to adoption

Stakeholders acknowledged the presence of several cultural and economic barriers that may hinder the adoption of agro-ecological practices at a farm level, such as attitudes towards ecological perspectives. In many countries, even years after the introduction of organic farming, the complementarity of agricultural and ecological practices is not recognised – and farming systems are still characterised as a dichotomy between conventional and ecological farming. Amongst the main reasons identified by stakeholders it is worth mentioning the resistance to change of farming communities for both cultural and economic reasons, as well as the lack of an adequate training and advisory system. Some stakeholders also highlighted the influence of large corporations and lobbies as a very strong barrier for the development of agro-ecology.

For most farmers the major factor when considering adopting agro-ecological practices is the long-term economic viability of the farming operations. A farmer cannot deliver on environmental sustainability if there is not sufficient financial support and return on investments. If a farm is on

a financial 'knife edge', the first activities to go are those which produce no financial return (e.g. environmental activities) [UK-FA].

Persuading farmers to change their mind-set is exceedingly difficult and most changes or innovations are initially met with scepticism. Older farmers, particularly, lack motivation and incentives to make changes to their farming practices and are thus a major barrier to agro-ecological innovation [LT-MA].

Farmers' willingness and ability to pursue agro-ecological farming practices is also dependent on their degree of openness to ecological perspectives which can be related to the agricultural education and training received. Frequently, tertiary agricultural education is still largely oriented towards the productivist model of farming system which does not instill in farmers the knowledge and skills to pursue alternative farming practices [GR-AC].

Farm extension services are not always equipped to offer farmers training and advisory services on alternative farming practices including agro-ecological. Furthermore, in some countries there is a lack of suitable organic seed varieties, organic research and farm machinery tailored to agro-ecological production [CZ-RE2].

Farmers are represented by national farmers' associations who tend to lobby the interests of large conventional and intensive organic farmers leaving small and alternative production farms without representation in discussions on policy and financial support and training needs. Insufficient consultation with farmers has produced research-practice and policy-practice gaps that can hinder adoption of appropriate policies and market instruments and agro-ecological practices. Furthermore, limited cooperation and networking among farmers and with other stakeholders slows innovation in farming practices and hinders receipt of fair compensation in the value chain [GR-AC].

Authorities are influenced by large corporations, which is a gigantic barrier for the development of agro-ecology, since governments are not capable of developing an autonomous and independent policy over large corporations, which makes companies more powerful than governments. This also involves control of information, control of the media, and even control of research [ES-NGO1].

During times of market/economic crisis, transition to agro-ecology is hindered for some farmers due to increased uncertainty, while for others, it is a triggering event that spurs them to change to another farming system [FR-MA].

The volatility of market prices creates uncertainty for farmers in relation to the introduction of new farming practices [FR-RE].

Integration between crop and livestock production farms to close nutrient cycles at a territorial level or even between territories, although appearing to be promising, is proving to be more difficult to implement [FR-RE].

3.3.2. Characterisation of the transition process

Perceptions of agro-ecology transitions

Many of those interviewed indicated that a transition to agro-ecology has been taking place over the last 10 to 15 years, mainly expressed as an increased interest in organic farming and in organic food consumption.

In absolute terms the role of agro-ecology is more and more important. However, it is difficult to judge whether the uptakes of more extensive means of production and of agro-ecology has increased in proportion as compared to conventional production. Innovations and technological improvements allow conventional producers to grow faster and faster. The perception - also as a buyer - is that the offer of products obtained through means of production more respectful of the environment is increasing around us [EU-MA].

The on-going intensification of conventional agriculture in some sectors threatens agro-ecologically desirable development [FI-ME].

*In **Italy** increasing attention is being directed to the agro-ecological transition, especially on the role of policy and market mechanisms supporting environmental sustainability and economic performance at farm level [IT-NGO].*

I think that the transition towards agro-ecology is characterised by three challenges requiring integration: 1) the innovation challenge related to different types of innovations, such as digital, agronomic, genetic, etc.; 2) the social/institutional challenge of reinforcing the role of farming in rural areas through bottom-up and collective initiatives linked to the different territories; 3) value chain/system challenge of combining farming with other activities and sectors, not only related to agri-food markets, but more broadly to circular economy [IT-FA].

A wider adoption of agro-ecological farming practices (at a global scale) is contingent on whether a land sparing approach is adopted as the leading food security principle or instead the more agro-ecologically oriented land sharing approach is pursued. In land sparing, some land is farmed intensively to maximize yields while other land is left entirely alone and protected as a nature reserve. In land sharing, all the land in a region is farmed, but using ecosystem-friendly techniques, but which may reduce yields somewhat [FI-RE].

Country differentiations

Some stakeholders highlighted that in some countries the transition process is more evident than in others. Northern European countries, for example, have numerous advantages for structural, economic and cultural reasons, but the reasons of such differences may also relate to other matters. In France, for example, the policy support to agro-ecology ensured by the Agro-ecological Project was considered a key factor in stimulating the transition.

*Several northern European countries such as **Germany** and the **Netherlands** are ahead in the process of transitioning to agro-ecological practices, mainly thanks to: (i) Investments in research and innovation; (ii) Better attitude towards innovations – less conservative approach; (iii) Being traditionally ‘green countries’ with a longer ‘green culture’ does make a difference (this is also reflected in the consumers’ higher demand for green and more environmentally sustainable products); (iv) Better capacity of working together: farmers are often organised in cooperatives, this allows to lower the costs of production, which also allows to test more innovative practices which might otherwise be too expensive for individual producers; (v) These Member States are also ‘younger’ as compared to Southern Europe, which is aging faster (young consumers are indeed a driver for an increasing demand of green products and for agro-ecology to become more and more relevant); (vi) the above mentioned society can also rely on higher wages as compared to Southern Europe this is also likely to facilitate the shift towards the production and the marketing of more green/but also more expensive products [EU-MA].*

***France** is a notable example of where agro-ecology is seeing some traction in the policy and practical sense. I am unsure about other countries in the EU. Reasons – growing concern about the dependency of imported protein crops which can be mitigated by integrating livestock and crop production with a shift in production patterns; concerns over pesticide and health impacts [EU-RE1].*

*In **Spain** due to its climate, soil, diversity of farming systems and the traditional practices that are carried out in many of the Mediterranean crops, which are very close to agro-ecology [ES-CNGO].*

Territorial differentiations

In relation to the different transition pathways, stakeholders reported territorial differences, mainly relating to generation renewal, marginal or intensive land uses, peri-urban or rural areas, depending on the specific socio-economic and institutional context.

In **Germany**, agro-ecological approaches are of great importance in less profitable regions and are being adopted more often by young farmers [DE-ME].

In many cases the adoption of agro-ecological practices is occurring more rapidly near big urban centres and in areas with tourism activities as consumer demand and preferences and the sustainability image can play an important role in the transition to more sustainable farming practices [DE-ME].

Agro-ecological approaches are growing in importance in extensive grasslands in mountainous regions or in other unfavourable areas with poor soils. Extensive livestock grazers use grassland locations which would otherwise not be used to provide ecological services often in combination with traditional breeds, the use of agro-environmental measures and nature protection contracts for grassland protection and special marketing approaches [DE-MA1]

In **Spain**, agro-ecology has grown especially in the region of Andalusia, due to an increase in demand, mainly by European consumers for fruits and vegetables, although the growth in demand has decreased somewhat recently [ES-RE].

The transition to agro-ecology in **Italy** is related to several factors, with economic drivers being the most important in differentiating two different streams of agro-ecological development. In marginal areas, characterised by extensive agriculture, the transition is usually the result of the development of diversification activities (e.g. agri-tourism) and of the production of quality products (traditional, local, organic food). Usually the economic sustainability of farming is ensured by this mix of activities. However, even though such areas often have the most suitable environmental conditions to test agro-ecological approaches, there are very few young and innovative farmers due to the problem of generational turnover. In more productive and intensively farmed areas with arable crops, it is more difficult to change conventional practices and here a key role is played by private and value chain actors [IT-NGO].

In **France**, in Auvergne Rhône-Alpes, which is characterized by extensive and mixed farming systems (with both crops and livestock) farmers are already quite engaged in the agro-ecological transition [FR-FA].

In the south of France and in the western part of France, in areas where organic or PDO/PGI production was already well developed the transition to agro-ecological farming is taking place more quickly [FR-RE].

In **Czech Republic** over 90% of organic farming takes place in less favourable areas where intensification is not economically feasible [CZ-NGO].

Small traditional family farms that are inherited have a long-term relationship with the soil and landscape and thus are more open to the adoption of agro-ecological practices. These farmers are aware that they will never be competitive through size and efficiency, but rather through quality production and farming differently [CZ-NGO].

3.3.3. Main drivers

Stakeholders identified key drivers which are influencing the transition towards agro-ecological practices in Europe. These can be categorised as: environmental drivers, economic drivers and social drivers.

Environmental drivers

According to several stakeholders, concerns regarding environmental problems are increasingly gaining traction amongst farmers. In many countries, farmers are demonstrating an increasing awareness of the need to implement adaptation strategies for the climate change, as well the need to experiment with agro-ecological practices to better address problems of soil fertility, and more in general, for environmental protection.

In **Italy** a type of factors that are stimulating the transition to agro-ecological farming approaches are the changing environmental conditions, which can be considered as “push” factors. I refer in particular to climate change, that are pushing farmers towards new production methods and new practices, which often are supported by policies [IT-FA].

In some countries such as **Lithuania** agro-ecological approaches are being adopted due to the traditional close relationship between land management and nature protection practices, and also to a desire to maintain an image as a country that produces healthy food [LT-MA].

In **Finland**, farmers are increasingly encountering soil quality problems on arable land, which make them more aware of the benefits of agro-ecological measures such as grass leys in crop rotation [FI-RE].

In **Spain** farmers are also increasingly interested in appropriate crop rotation, which allows for better adaptation to climate change than monoculture cultivation [ES-NGO2].

Economic drivers

As expected, several interviewees emphasised the economic sustainability of agro-ecological farming practices as a pre-condition to favour the transition. In this regard, several drivers have been identified, such as the role of new technologies and fair price as key aspects to ensure a long-term adoption of more sustainable practices at farm level.

The development and diffusion of new technologies are likely to help farmers reducing the costs of adopting and implementing environment-friendly practices. Therefore, investments in research and innovation and the further steps ahead achieved by technology do represent a major driver [EU-MA].

A key driver for the transition to agro-ecology is farm income. Farm management changes are driven by economic motivation. If the implementation of agro-ecological practices is to be successful and durable, then it is important that the implementation does not negatively affect the profitability of the farming system [DE-NGO].

It is clear that a fair price paid for products produced by farmers using sound environmental and social practices is one of the key conditions for a sustainable implementation of agro-ecological approaches [FR-RE].

Only if additional expenses are reflected in additional revenues, can this work in the long term. Here it is important to integrate the whole value chain including the consumer [DE-MA2].

In the UK, a key driver of future agricultural policies is Brexit. An example concerns the beef sector and the future positioning of Scottish beef in the competitive international markets, as a high value product. To help keep the price of beef competitive an approach practiced by some Scottish beef producers is to breed cattle to a smaller frame and to keep them outdoors and fed on pasture for longer to reduce feed costs and demands on infrastructure [UK-F].

Social drivers

Adequate agricultural knowledge and innovation systems, effective cooperation amongst farmers and a recognition by society of the important role played by farmers are important social drivers that may play a key role in favouring the transition process.

In Finland, administrative actions such as the inventory of traditional agricultural biotopes have raised public interest towards agro-ecological issues [FI-ME].

In Spain, consumer collectives can also be a decisive driver of local agro-ecological farming practices. For example, over the last eight years, in a district of Madrid, the number of local consumer cooperatives has grown from three to more than 30 simply through word of mouth.

Such grass-root consumer initiatives, if made more visible, can serve as a vehicle to increase demand for and thus strengthen the supply of local agro-ecological products. The expansion of agro-ecology is dependent on demand from consumers, and for that to happen it is essential to raise consumer awareness so that they are willing to pay a little more in return for better and healthier food [ES-NGO].

It is also important to demonstrate that organic products are more nutritional and environmentally less harmful than conventional production and that from a social standpoint agro-ecological farms being often smaller and more familiar benefit rural communities more [ES-RE].

*In **Greece**, the organization of farmers' cooperatives /associations is seen as a mean to strengthen agro-ecology as in this way farmers gain power and access to market by themselves, without being dependent on intermediaries and build a direct and trusting relationship with consumers [GR-RE1].*

*In **France** agricultural knowledge and innovation systems at the farm level are key factors to enable transition towards agro-ecology: a change is needed in the way farmers are trained, advised and guided by farm extension services. A more effective strategy for advisory services promoting transition and innovation is to combine local and traditional knowledge with the scientific knowledge and training not only for farmers, but for all stakeholders in the supply chain (advisors, farmers, suppliers, processors, etc.) which can be an important driver for change [FR-MA].*

*In **Italy** agricultural knowledge and innovation systems at the farm level are key factors to enable the transition [IT-FA].*

*In **Spain** demonstration projects are particularly important vehicles for trialling of new agro-ecological farming practices, sharing experiences and results and fostering uptake by others elsewhere [ES-MA].*

3.3.4. The role of policies

Several stakeholders reported that an increasing cross-cutting priority within the framework of EU policies over the years is the transition to agro-ecology, and more generally towards management and farming practices which are respectful of the environment and contribute to the mitigation of climate change.

CAP measures

The role of RDPs, and especially agri-environmental and organic support schemes, were recognised as key tools in the promotion of agro-ecological thinking and practices in many EU countries.

*In **Germany**, support via the first pillar of the CAP is still very important - farmers continue to focus on high yields, and plant diversification through production of other ecosystem services is not a priority [DE-ME].*

In addition to the application of RDP agri-environmental measures, agro-ecological practices to some degree have been promoted by CAP direct payment "greening" practices [LT-FA2]

*The CAP "greening" obligations as implemented in the **UK** and **Scotland** are consistent with a transition to agro-ecological systems [UK-FA].*

Today RD Policy contribute to the delivery of a broad number of environmental priorities: it directly contributes to biodiversity conservation, water quality - reducing the risk of diffuse pollution and water abstraction for agricultural use - soil quality, climate change mitigation (reducing GHG and Ammonia). And it does so through a combination of different interventions including area-based payment schemes, land-management schemes, organic farming, forestry

measures, environment-related investments, basic services and village renewal, knowledge transfer and advisory services, cooperation and innovation, and LEADER [EU-MA].

In **Finland**, agri-environmental support schemes of the RDP have facilitated the maintenance of traditional agricultural biotopes [FI-ME].

Support payments have been sufficiently high to encourage the most environmentally conscious farmers to choose the measure, but greater uptake by farmers is contingent on increased level of support payments [FI-ME].

Several agro-ecological practices/activities are being adopted more quickly due to the implementation of policy and market incentives. Development of organic farming has been actively promoted by the EU agricultural policy for over 15 years and results are demonstrated through a marked increase in the share of organically cultivated land in most EU countries [FI-MA].

In **Italy**, during the last ten years, RDP Measure 10 (Agri-environment-climate payments) and Measure 11 (Organic Agriculture) have played a key role in the adoption of several agro-ecological practices [IT-RE].

In addition to the strong support for organic agriculture, integrated agriculture has been actively promoted at a large scale by national and regional regulations. This has resulted in a very high reduction in the use of pesticides. The same approach is suggested for soil and water management by implementing a coherent mix of policy initiatives aimed at reducing soil erosion and at improving organic matter, as well as in facilitating more sustainable use of water [IT-FA].

Other policies

Since the transition towards agro-ecology involves a broad spectrum of actions at different levels, the policy support ensured by the CAP should be adequately integrated with additional policies better targeted to local farming systems, specific food chains and new consumers demands. Examples of key policies that should stimulate the adoption of agro-ecological practices and which should integrate CAP interventions identified by stakeholders are: national and local initiatives on agro-ecology (i.e. the Agro-ecological Project for France), green public procurement projects and AKIS systems more oriented to the agro-ecological principles and practices.

In **Finland** a number of agro-ecological practices/ activities have recently been up-taken largely due to national and EU agricultural policy initiatives: (i) recycling of nutrients and use of organic fertilizers; (ii) increased area under grass production as a result of agri-environmental schemes, and recently, as a part of attempts to mitigate climate change; (iii) new crop rotation patterns; (iv) a preference for locally produced food and vegetarian food [FI-RE].

In **France**, political leadership shown by the adoption of public policies (i.e. The Agro-ecological Project for France) have raised the profile of agro-ecology and the interest of farmers and strong expectations from consumers [FR-FA].

In **Sweden**, in addition to an already steady increase in organic production driven by consumer demand, including an urban trend to buy organic and vegetarian, the “Action Plan for Organic Food and Farming” contains specific targets that are intended to stimulate further growth of the organic farming sector: (i) 30% of the Swedish agricultural land will consist of certified organic farmland by 2030; (ii) 60% of public food consumption will consist of certified organic products by 2030 [SE-MA].

Green Public Procurement has significant purchasing power across public authorities to help mainstream agro-ecological/organic produce and educate consumers [EU-RE1].

I believe that a shift in the priorities of AKIS will have to occur. For the successful implementation of agro-ecology changes will have to occur in all the three pillars of sustainability (economy, society and environment) [EU-RE2].

Policy barriers

Interviewees also cited a large number of policy factors that are hindering the development of agro-ecology, since in many cases support measures, especially those of the CAP, are too prescriptive, they lack flexibility and have implementation rules that are too complex.

Agricultural policies, strategies and programmes should be driven forward with adequate political support and long-term funding. Similarly, investments and project-based support for the conversion of operational practices are still very often lacking. Investments concentrate on conventional farm infrastructure, whereas promotion of marketing and promotion of innovation (EIP) are still relatively small programmes [DE-MA1].

*In **France** an obstacle to the adoption of agro-ecological practices is the lack of a clear public policy for a transition to agro-ecology. There is a huge gap between the declared political will and the means dedicated to putting it into practice. Additionally, clearly defined obligations and a means to control whether the transition to agro-ecology is happening are lacking. In practice, the incentives to encourage farmers to change their practices are weak and have limited implementation scope (e.g. Economic and Environmental Interest Groupings - GIEE) [FR-NGO].*

*The high degree of dependence on the RDP for support is in itself a barrier to a transition to agro-ecology: in **Hungary** when support payments for the implementation of agri-environment measures were discontinued a majority of producers ceased compliance with agri-environmental farming criteria. The compliance approach to the implementation of agri-environment measures did not bring about a change in environmental awareness amongst farmers [HU-MA].*

The CAP does not sufficiently support efforts to inform consumers regarding the health benefits and risks associated with different foodstuffs. For example, the current product traceability labelling does not require provision of information about the agrochemical nor the veterinary treatments applied to specific food products. If provided, such information would allow consumers to make better informed choices about food they purchase [ES-NGO1].

Although the importance of agro-ecology has been increasing due to environmental and climatic pressures (climate change, water quality, biodiversity), concrete actions to promote agro-ecologically sound practices are still lacking behind in agricultural and environmental policies, and measures have not been sufficiently effective to maintain especially biodiversity (e.g. loss of pollinators) [FI-ME].

Although not all of the measures of the agri-environmental support schemes have been agro-ecologically well-founded, the general goal-setting and related discourse has nevertheless encouraged the adoption of increasingly more agro-ecological farming practices [FI-RE].

Agricultural education programmes lack an agro-ecology or a transition towards agro-ecology orientation [FR-NGO].

The rules on the calculation of compensation payments are important barriers, since they lead to too low payments. The compensation payments for practicing AE-friendly RDP measures are based on the calculation of income foregone and/or additional costs occurred. They do not allow for any additional stimulation. E.g. 30% higher stimulation payments above the income foregone and/or additional costs occurred. For instance, why a farmer should postpone grass cutting in order to preserve biodiversity if at the end he gets the same financial gain and harvests less hay – meaning that his livestock either has to starve or that he has to buy additional hay from somewhere else – costs of which are rarely taken into account. Take into account environmental costs and benefits from (non) practicing AE-friendly RDP measures. They are based on pure conventional economics, not on environmental accounting [EU-AC].

In **Spain**, even after many years of promotion, RDP agri-environmental measures remain ineffective both from the perspective of implementation by farmers and administration by paying agencies [ES-MA].

In **Spain** there have been initiatives that have approached green taxation, but this tax had to be removed because of the pressure put by the food industry [ES-NGO2].

Administrative burdens act as a barrier to the implementation of RDP measures. Procedures designed by Managing Authorities are still often overly bureaucratic and complex as they function more to protect public administrators from legal risks rather than addressing the needs of beneficiaries. Similarly, beneficiaries receiving RDP support are subject to controls on administrative and technical issues, which can be sufficiently severe to dissuade risk adverse farmers from participating [IT-NGO].

Delay of payments is not an uncommon problem. Another important barrier is the lack of differentiation in the level of payments. For instance, in **Italy**, in many cases integrated agriculture is unjustifiably receiving the same or higher payment amount compared to organic agriculture [IT-RE].

CAP instruments lack flexibility in relation to meeting the specific needs of producers and consumers. For example, support to young farmers has been provided for many years, but has not adapted to address the issue that many young potential farmers do not have access to land, which is relevant for a transition to agro-ecology [ES-NGO1].

In relation to the participation of farmers in demonstration projects, which are important in persuading farmers to adopt new management practices, under the present CAP, farmers can lose part of their decoupled support payment for land included in demonstration projects, but left uncultivated. This can act as a barrier to farmers participating in the trialling of new agro-ecological practices [ES-MA].

The present funding structure of the CAP acts as a barrier to the implementation of agro-ecology. On the one hand, basic payments are designed based on so-called historical rights, which continues to support more intensive production models. On the other hand, the investment schemes that promote intensive and polluting production account for a large part of the RDP funding. This, consequently, significantly reduces the budget available for innovative agro-ecological schemes, such as well-designed agri-environmental measures, payments to Natura 2000 Network and non-productive investments [ES-NGO2].

Large national institutions such as agronomy research institutes, farmers' unions and chambers of commerce display a reluctance to change in relation to integration of environmental issues in agricultural policies [FR-NGO].

Policy recommendations

Stakeholders also identified several policy recommendations to deliver better results on the ground such as the need to simplify RDP procedures, ensuring an adequate support to the development of local farmers networks, as well as a better integration between economic and environmental objectives of policies and regulations.

Overall RD Policy allowed to achieve important goals and higher environmental standards, which make of the EU a unique model in the world, but more can be done to deliver even better results, with the tools that are already there. And this is where networking can add value, in terms of sharing knowledge and disseminate information about successful models and good practices that deserve to be replicated to maximise the opportunities offered by the EU funding sources and – specifically – by the EAFRD and Rural Development Programmes across Europe [EU-MA].

Transition to agro-ecology is embedded in the wider context of rural renaissance or revitalization of rural areas by innovation, including in agriculture. In this regard, public funding should be

made available to build rural networks and ownership of regional development. Rural areas should become the subject of research for both technical and social innovation, combined with a shift of decision-making authority [DE-ME].

CAP planning is too far removed from on the ground needs of agro-ecology, in the future local municipal councils and regions could play a more important role in relation to national or European agricultural policy [ES-CNGO].

More importantly, incentives should motivate farmers to innovate and improve their performance through agro-ecological practices in a non-prescriptive fashion and in the long-term. Incentives should also be provided to farmers to process and thus add value to products prior to placing them on the market [RO-F].

More investment in research, policy development and communication should be directed to agro-forestry and agro-silvo-pastoral systems, which have a great potential to be promoted as alternatives to the dominant conventional farming systems and, above all, they can be very important in demonstrating possible transition pathways [IT-RE].

In order to foster a transition to agro-ecological farming systems policy tools intended for this purpose need to provide sufficiently simple incentives and financial tools to motivate uptake by farmers [GR-AC].

3.3.5. The role of markets

In addition to the support ensured by policies, a high number of stakeholders highlighted that market incentives may give an equal and more important impetus towards the transition.

Value chains

With regard to value chains, stakeholders identified several types of incentives, mainly related to private schemes, which may facilitate interactions between different actors in the food supply chain and foster an integrated approach to the agro-ecological transition.

In Sweden, a number of influential large companies that have engaged sincerely in sustainability (e.g. IKEA) have also been important market drivers for organic consumption and production. Additionally, the Swedish consensus culture and flat organisation model has helped to mainstream the organic farming and food agenda by giving persons working with sustainability issues a stronger voice in planning and decision-making [SE-NGO2].

In Austria, in recent years, big supermarket chains have developed private label programmes based on various agro-ecological criteria. An example is 'Zurück zum Ursprung' ("Back to the roots"), an initiative by the biggest Austrian hard discount format Hofer (which is the Austrian Aldi) [AT-MA].

In most countries in Europe, retail trade is very centralised, and the market power of retail operators is considerable which has led to an emphasis on price as the key marketing attribute of products. In most cases agricultural products and foodstuffs, which have been produced using agro-ecological practices are more expensive making them less appealing to retail operators [FI-ME].

As food retailing in many countries is concentrated amongst a very few powerful actors, they can dictate the price paid to farmers or alternatively chose lower-priced import products [FR-RE].

When big corporations such as Barilla implement initiatives related to the sustainability of farming practices such initiatives are usually more effective than those driven by public support. Contractual issues between the food processor and farmers are relevant, but also additional forms of certification, labelling etc. that aim at ensuring better environmental performance with decreasing costs are equally important [IT-NGO].

Facilitating interaction between different actors of the food supply chain could be a means to foster an integrated approach to the agro-ecological transition through shared objectives and a better understanding of each other's constraints, instead of focussing only on technical practices at the farm level [FR-FA].

*In **France**, there are now also actors in supply chains (processors, distributors) that encourage farmers to adopt certain agro-ecological practices, but it is not easy to get added value for this effort on the final products as there are no distinct agro-ecological labels. In lieu of this, the strategy employed is rather to create their own rules or to use existing private labels. There are also cases where private companies initiate an internal corporate social responsibility process which necessitates cooperation at the farm level to improve the sustainability of production methods [FR-FA].*

In addition to agro-ecological farming practices fostered by national and EU agricultural schemes, product certification and labelling schemes have greatly grown in popularity amongst consumers in many European countries as they are recognizable and provide a guarantee of product quality. Public sector procurement contracts that favour companies catering sustainable food are becoming more common and serve as a tool to stimulate demand for and the provision of agro-ecological products [ES-RE].

New market dynamics

The increasing attention of big companies and big retail outlets to organic products and more generally to sustainability certification processes reflects changing consumer demand for safer, healthier and environmentally friendly products.

*In **Greece**, the most recent economic crisis gave greater impetus to organic farming as have the demands of the markets and consumers for more safe, healthy and environmentally friendly products [GR-AC].*

Due to consumer demand, the organic market is growing so quickly that all the value chains are reconfiguring their processes towards the production, processing and retailing of organic food. This type of consumer driven market trend is a particularly effective driver that can stimulate the transition to agro-ecology [IT-NGO].

The growing interest of organic products among consumers and the media is causing food retailers, food industries and food processors to adapt to be able to meet this demand. Major retail chains are very active in introducing organic products in their shops and some of them are even opening subsidiaries dedicated to distribution of organic products [FR-RE].

In some cases, specific territorial dynamics initiated by local actors and organisations in municipalities and natural areas have promoted the adoption of agro-ecology. The transition to agro-ecology is also taking place more quickly for farmers selling their products via short supply chains as these farmers are in closer contact with consumers and thus more likely to perceive consumer expectations in relation to protection of the environment. For farmers working in short supply chains, it can also be easier to valorise environmental friendly practices and even get added value for them [FR-NGO].

*The end of the economic crisis in **Spain** has brought about a change in purchasing decisions. There has been an increased sensitivity to matters other than simply price, such as environment issues and healthy diets [ES-MA].*

*In **Romania**, higher purchasing power and increased awareness of the benefits of healthy food and eating habits is supporting the adoption of alternative agricultural practices and supply chains [RO-NGO].*

Consumer choices

Although for many consumers price is still the decisive factor when buying food products, in some contexts short supply chains could be a good solution to valorise environmentally friendly practices and get added value for farmers.

In Italy economic drivers act as “pull” factors, such as new market dynamics and new consumer trends, that are increasingly oriented towards sustainability. Consumer choices can make the biggest difference as was demonstrated recently by how quickly palm oil was almost totally excluded from the market based on the consumer demand for palm oil free products [IT-FA].

There has been a growing awareness amongst consumers regarding fair trade, sustainable food and food waste reduction issues [FI-RE].

There has been an increased awareness by consumers and citizens of the value of organic food and the environmental benefits of agro-ecological farming [RO-NGO].

Overall, there has been an increase awareness amongst the general public concerning environmental, healthy eating and food safety issues which has been in part actualized by sanitary issues and outbreaks of disease amongst livestock raised in conventional farms [FR-NGO].

Organic farming/agro-ecological thinking, production and demand has been driven by an increased importance of environmental and healthy food issues amongst consumers and subsequently by agricultural policy-making including more agro-ecological objectives and conventional agriculture adopting agro-ecological farming practices [FI-RE].

Organic agriculture has certainly increased and has become more mainstream in many EU countries. The purchasing of biodynamic, organic and similar produce has also risen, but appears to be limited to certain societal groups in the UK (educated and with reasonable net-disposable income), but I am not sure about other countries in Europe [EU-RE1].

Throughout the EU increased appreciation of food and culinary art and the importance of local food and various food related cultural issues are impacting on household behaviour and making consumers more receptive to agro-ecologically sound food production [FI-MA].

Consumer choices can be influenced by environmental education resulting in a greater public awareness of the negative environmental impacts of food production and consumption. This includes overall concerns related to climate change and, for some, a vegetarian diet as a means to combat climate change [FI-RE].

Market barriers

There are still several economic and market barriers to agro-ecological transitions. As long as negative externalities of food production and the value of public goods produced by farmers are not incorporated into market prices, it is difficult to influence consumer choices towards agro-ecological products. A big challenge is better incorporation of the negative externalities of food production and the value of public goods produced by farmers into market prices.

In many countries there are few if any market incentives (e.g. certification schemes) to encourage demand for agro-ecological products [CZ-NGO].

The implementation of digital agriculture may hinder agro-ecological farming development as digital technologies are frequently used to intensify and specialize production practices even more instead of supporting the implementation of agro-ecological farming systems by reducing the work load associated with agro-ecological practices [DE-NGO].

When agricultural products are obtained through more expensive practices, their prices on the market will – as a reflection of the production costs – be generally higher (i.e. organic farmed products). Even a well-educated public, with due understanding of the environmental impacts of a product and of the benefits associated to organic farming, will not opt for an organic farmed product if it costs twice as much as conventionally farmed goods [EU-MA].

Both producers and consumers are reluctant to make major changes in the existing food system as long as consumption patterns and production practices work reasonably well [FI-MA].

Unfortunately, people are losing their “sense of food” and are starting to believe that with radical innovations in food technology and in synthetic biology and chemistry food production could in the future take place in industrial type and scale facilities [FI-RE].

In Sweden, organic products have lost of their former attractiveness and people are beginning to prefer simply locally produced foods. This points to the need to communicate in a clever way the benefits of agricultural products [SE-MA].

Amongst some consumers, doubt continues to exist whether organic production “is really better” [SE-NGO1].

Some attitudinal barriers in relation to organic products continue to exist. For example, some wine tasters and wine experts are pre-disposed to think that organic wine cannot be of good quality. There are even prominent wineries that are practicing agro-ecology, but do not promote this on their labels to avoid a negative reaction on the part of consumers. Others perceive fruits and vegetables as being unattractive or organic milk as being “unclean”. Attitudinal barriers can be partly overcome by bringing to the market excellent products under the certification of organic production [ES-RE].

By using the right communication approach and market incentives, consumers can be motivated to change their consumption habits. Nevertheless, for many consumers’ price is still the decisive factor when buying food products even though a relatively small share of household budgets is dedicated to food compared to spending on, for example, communication technologies and leisure activities [FI-MA].

As long as negative externalities of food production and the value of public goods produced by farmers are not incorporated into market prices, it is very difficult to influence consumer choices towards agro-ecological products. Externalities include both environmental and social externalities, for example, the working conditions of workers in intensive farms [ES-NGO2].

If externalities not taken into consideration, the market is flooded with cheap products that disadvantage those producers who practice agro-ecology. For example, meat is under-priced compared to plant products and without effective policy instruments the situation is unlikely to change [FI-MA].

3.4. Summary of stakeholders’ views

Table 16 below provides a general overview of the key points raised by the interviewees organised according to the 1st category of the two-step coding process.

Table 16 Summary of stakeholders’ views

Agro-ecology and agro-ecological practices	<ul style="list-style-type: none"> - The scientific and public debate is increasingly focused on the role of agro-ecology in contributing to the overall sustainability of EU agricultural sector, but there is not a common understanding of the concept of agro-ecology amongst experts, producers and consumers across Europe. - As historically, the agro-ecological transition started with different models of low-input farming, agro-ecological practices are being adopted most readily in
--	---

	<p>association with integrated and organic production.</p> <ul style="list-style-type: none"> - There is increasing adoption of agro-ecological practices also in traditionally intensive farming systems. - Several cultural and economic barriers may still hinder the adoption of agro-ecological practices at a farm level, such as attitudes towards ecological perspectives and the lack of adequate training and advisory system.
Characterisation of the transition process	<ul style="list-style-type: none"> - In Europe, the transition to agro-ecology has been taking place over the last 10 to 15 years, mainly expressed as an increased interest in organic farming and in organic food consumption. - In some countries the transition process is more evident than in others as a result of structural, economic and cultural reasons (e.g., northern European countries), while in other countries the transition is highly supported by national policies and strategies (e.g., France). - There are relevant territorial differences in relation to the different transition pathways, depending on the specific socio-economic and institutional context (generation renewal, marginal or intensive land uses, peri-urban/rural areas).
Main drivers	<ul style="list-style-type: none"> - Farmers are demonstrating an increasing awareness on the need to implement adaptation strategies for climate change, as well as the need to experiment with agro-ecological practices to better address environmental problems. - The economic sustainability of agro-ecological farming practices is a pre-condition for the transition. - Agricultural knowledge and innovation systems and cooperation amongst farmers are key drivers in fostering the transition process.
The role of policies	<ul style="list-style-type: none"> - RDPs are key tools in the promotion of agro-ecological thinking and practices in many EU countries, although CAP measures are too prescriptive, they lack flexibility and implementation rules that are too complex. - CAP support should be adequately integrated with additional policies better targeted to local farming systems, local food chains and new consumer demands. - Policies should ensure stronger support for the development of local farmer networks, as well as a better integration between economic and environmental objectives.
The role of markets	<ul style="list-style-type: none"> - Private schemes and value chain initiatives have a great potential in facilitating interactions between different actors of the food supply chain and foster agro-ecological transition. - The increasing attention of big companies and big retailers to organic products and more generally to sustainability certification processes reflects changing consumer demand for safer, healthier and environmentally friendly products. - In some contexts short supply chains could be a good solution to valorise environmentally friendly practices and get added value for farmers. - One of the biggest challenges is better incorporating the negative externalities of food production and the value of public goods produced by farmers into market prices.

4. KEY MESSAGES

The inventory of market and policy initiatives highlights the diverse range of instruments supporting agro-ecological farming practices and supply and demand for agro-ecological food in the EU. In the subsequent case study work in UNISECO, it was particularly relevant to understand the link between the uptake of agro-ecological practices in different farming sectors and the role of policy and market instruments in this process, as well as the added value of specific instruments in strengthening the transition process.

Using information and data collected for this report, it is possible to formulate key emerging issues on the role of policy and market incentives for the agro-ecological transition.

1. Of the 69 EU initiatives included in the inventory, an equal number are policy instruments (30) and market instruments (27), while there are fewer mixed initiatives involving joint participation of public and private sector institutions (12). Although an explicit decision was made to avoid the inclusion in the inventory of mainstream initiatives associated with RDPs, the identified initiatives nevertheless highlight the meaningful role already played by the private sector in promoting agro-ecological initiatives and the opportunity for greater cooperation between public and private sector institutions in supporting agro-ecology.
2. The scientific and public debate is increasingly focused on the role of agro-ecology in contributing to the overall sustainability of EU agricultural sector, but there is not a common understanding of the concept of agro-ecology amongst experts, producers and consumers across Europe.
3. As historically, the agro-ecological transition started with different models of low-input farming, agro-ecological practices are being adopted most readily in association with integrated and organic production. In some countries agro-ecological practices are gaining traction more quickly in specific sectors (e.g. extensive and mixed farming systems).
4. RDPs are key tools in the promotion of agro-ecological thinking and practices in many EU countries, although CAP measures are too prescriptive, they lack flexibility and implementation rules that are too complex.
5. RDP agri-environmental-climate measures remain relatively ineffective from the perspective of implementation (e.g. EU farmland bird population is still in decline; many water bodies do not have good quality status). It is thought that greater cooperation/ collective action by land managers territorially and the use of results-based payment schemes would increase the efficiency and effectiveness of implemented measures. Additionally, a longer perspective needs to be adopted for measures in the RDP to allow for a transition to agro-ecological farming systems.
6. CAP support should be adequately integrated with additional policies better targeted to local farming systems, local food chains and new consumer demands. In future, local municipal councils and regions could play a more important role in relation to national or European agricultural policy.
7. The presence of cultural and economic barriers may hinder the adoption of agro-ecological practices at a farm level, such as the age and education of farmers and their attitude and experience with agro-ecological approaches. EU and national research and national knowledge, training and advisory systems have a major role in the uptake of agro-ecological approaches.
8. The economic sustainability of agro-ecological farming practices is a pre-condition for the transition. One of the biggest challenges is better incorporating the negative externalities of food production and the value of public goods produced by farmers into market prices.
9. The “Agro-ecological Project for France” stands out as the only initiative that explicitly promotes agro-ecological farming and food production as part of a comprehensive policy framework with cross-cutting actions. The initiative supports: i) the uptake of agro-ecological initiatives by farmers, including farm-wide agro-ecological approaches; ii) reforms in educational programmes and

training for farmers to encourage the adoption of agro-ecological practices and systems; iii) fostering of innovation and engaging researchers to work alongside and train farmers; iv) facilitation of the emergence of bottom up initiatives, including short supply chains and the creation of economic and environmental interest groupings (GIEEs) to encourage greater collaboration and cooperation among farmers and between farmers and other types of local actors.

10. The non-EU examples of initiatives from Brazil and Cuba highlight how the adoption of a national policy on agro-ecology can create a coherent and comprehensive policy framework to help steer the transition to agro-ecology nationally. In particular, these policies:

- Recognize the key role of different stakeholders including small farmers, farmer associations and cooperatives, agricultural support, training and extension services and researchers, in the transfer, uptake and mainstreaming of agro-ecological practices;
- Support farmer cooperatives towards achieving economies of scale, in marketing production, obtaining credit, sharing equipment and farmer-to-farmer knowledge and practices;
- Support agro-ecological education for those providing farmers with training, technical advice and research-based guidance;
- Recognize that farmers require a market and a fair price for their agro-ecological production. Policies have been adopted to stimulate consumer demand through the creation of public procurement initiatives that favour large-scale preferential public sector purchase of agro-ecological produce at a fair price.

5. ACKNOWLEDGEMENTS

This document has been prepared with the assistance of colleagues in the UNISECO project. Colleagues at partner organisations have contributed factsheets of the market and policy incentives and carried out and reported on the stakeholder interviews. We would also like to thank the stakeholders who took part in the interviews for sharing their views in the consultation. This work is funded by the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.



6. REFERENCES

- Altieri, M. and Toledo, V. M. (2011). The agro-ecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants, *Journal of Peasant Studies*, 38 (3), 587–612.
- BMEL (2019). Organic Farming in Germany. https://www.bmel.de/SharedDocs/Downloads/EN/Agriculture/OrganicFarming/Organic-Farming-in-Germany.pdf?__blob=publicationFile
- Duru, M., Therond, O. and Fares, M. (2015). Designing agroecological transitions; A review, *Agronomy for Sustainable Development* 35, 1237–1257.
- FAO (2018). Catalysing dialogue and cooperation to scale up agroecology: outcomes of the FAO regional seminars on Agroecology, Food and Agriculture Organization of the United Nations, Rome.
- Hatt, S., Artu, S., Brédart, D., Lassois, L., Francis, F., Haubruge, É., Garré, S., Stassart, P. M. , Dufrêne, M., Monty, A. and Boeraeve, F. (2016). Towards sustainable food systems: The concept of agroecology and how it questions current research practices. A review, *Biotechnology, Agronomy and Society and Environment*, 20, 215-224.
- International Policy Centre for Inclusive Growth Research Brief (2012). A Socially Inclusive Pathway to Food Security: The Agro-ecological Alternative, www.ipc-undp.org, No. 23. June 2012.
- ISEAL Alliance (2008). E054 Governmental Use of Voluntary Standards Case Study 9: Tunisia’s Organic Standard https://community.isealalliance.org/sites/default/files/E054_Tunisia_Organic.pdf
- Los Angeles Food Policy Council Good Food Purchasing Policy (xx). <http://goodfoodla.org/policymaking/good-food-procurement/goodfoodpurchasing.org>
- McKay, B., Nehring, R. and Walsh-Dilley, M. (2014). The ‘state’ of food sovereignty in Latin America: political projects and alternative pathways in Venezuela, Ecuador and Bolivia, *The Journal of Peasant Studies*, 41(6), 1175-1200.
- Meredith, S., Lampkin, N. and Schmid, O. (2018). Organic Action Plans: Development, implementation and evaluation, Second edition, IFOAM EU, Brussels.
- PolicyLink (2016). The Los Angeles Good Food Purchasing Program: Changing Local Food Systems, One School, Supplier, and Farmer at a Time. http://www.policylink.org/sites/default/files/LA_GFFP_FINAL_0.pdf
- Schmid O., Padel S., Lampkin N. and Meredith S. (2015). Organic Action Plans: A Guide for Stakeholders. IFOAM EU, Brussels.
- The Swedish Government (2018). <https://www.regeringen.se/pressmeddelanden/2017/06/satsning-pa-ekologiska-livsmedel/>
- Therond O., Duru M., Roger-Estrade J. and Richard G. (2017). A new analytical framework of farming system and agriculture model diversities. A review. *Agronomy for Sustainable Development*, 37(3), 1-24.
- World Future Council (2018). Future Policy Award 2018: Agro-ecology <https://www.worldfuturecouncil.org/p/2018-agro-ecology/>

ANNEX 1 - Annotated Bibliography (in separate pdf file)

ANNEX 2 - Factsheets (in separate pdf file)

ANNEX 3 - Summary Description of Market and Policy Incentives (in separate Excel file)

