



PEGASUS
Public Ecosystem Goods and Services from
land management – Unlocking the Synergies

DELIVERABLE 5.1

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**TRANSFORMING APPROACHES
TO RURAL LAND MANAGEMENT**

Stimulating long-lasting improvements in the delivery of social, economic and environmental benefits from EU agricultural and forest land

08/12/2017

Synthesis report on cross-cutting analysis from WP1-4



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Glossary of key terms

AES	Agri-environmental scheme
CAP	Common Agricultural Policy
CS	Case Study
ESBOs	Environmentally and socially beneficial outcomes (ESBOs)
ESS	Ecosystem Services
EU	European Union
GIS	Geographical Information Systems
HNV	High Nature Value
NGO	Non-governmental Organisation
LAG	Local Action Group
LEADER	"Liaison Entre Actions de Développement de l'Économie Rurale"
PDO	Product of Designated Origin
PG	Public Goods
RDP	Rural Development Programme
RSPB	Royal Society for the Protection of Birds
SES	Social-ecological System
WP	Work Package

Purpose of this report

This report provides a synthesis following the overarching objective of Work Package 5 of the PEGASUS project “to carry out a systematic cross-cutting comparative analysis of the findings from the case studies covering different regions and sectors in WP4 in conjunction with the analysis under WP2 and 3”. It constitutes an official deliverable (Deliverable 5.1 [D5.1]) of the project and is one of the main foundations for the subsequent tasks in Work Package 5.

The structure of this report is a result of a discussion among all WP5 team members to ensure that comparative analysis and synthesis is guided towards the subsequent tasks. It is composed of four thematic chapters:

- The status of ESBOs and how provision is influenced by changes in land management and the initiatives covered in the Case Studies
- Collective Actions and state of progress of the initiatives – where we are in the phases of collaboration, potentials, innovation and understanding how to motivate change
- Internal and external factors influencing the interplay between the commercial/private, public and voluntary aspects of the initiatives
- Matching the PEGASUS concept of ESBOs with the SES framework

It builds on the rich work undertaken by the project so far; in particular (see

References for details):

- Deliverable 1.1: Public Goods and Ecosystem Services from Agriculture and Forestry – a conceptual approach;
- Deliverable 1.2: Synthesis report - The PEGASUS conceptual framework;
- Deliverable 2.1: Review of approaches and datasets to categorise and map Public Goods and Ecosystem Services at EU level;
- Deliverable 2.2: Database and classification system of different types of PG/ESS in relation to farming/forestry systems;
- Deliverable 2.3: Report on patterns and trends of PG/ESS in relation to land management systems;
- Deliverable 3.1: Ten country reports on socio-political, economic and institutional drivers;
- Deliverable 3.3: Socio-political, economic and institutional drivers. A cross-country comparative analysis. Synthesis Report;
- Deliverable 4.1: 34 Case study reports – Step 1-2. "Developing innovative and participatory approaches for PG/ESS delivery" (WP4);
- Deliverable 4.2: Innovative approaches for the provision of environmental and social benefits from agriculture and forestry – Step 1-2 case study results;
- Deliverable 4.3: Twelve Case study reports – Step 3-4. Developing innovative and participatory approaches for PG/ESS delivery" (WP4);
- Deliverable 4.4: Summary report on findings from the in-depth case studies;
- Ten National Workshop reports from AT, CZ, DE, EE, FR, IT; NL; PT; SI, UK conducted between April and June 2017;
- EU-level workshop on "emerging lessons on public goods and ecosystem services for policy and practice" conducted on 22 in June 2017.

Table 1 provides a list of all 34 case studies including the 12 in-depth case studies (highlighted in bold letters) which were chosen from amongst the initial list.

Table 1 PEGASUS case study reports included in D4.1 and D4.3 (bold)

Partner	CS code	Title of the case study ¹	Authors
BABF	AT-1	Organic farming label in mountain region Murau	Nigmann, T.; Hovorka, G.; Dax, T.
	AT-2	S-E-S in the Biosphere Reserve Lungau (Salzburg region)	Nigmann, T.; Machold, I.; Hoppichler, J.; Dax, T.
	AT-3	Mountain forestry and ESBO provision in mountain area Pinzgau	Nigmann, T.; Hoppichler, J.; Dax, T.
UZEI	CZ-1	Biodiversity rich meadows payment in CZ	Prazan, J.; Mrnustik Konecna, M.

¹ In the report, references to case studies are either made by CS code or using a shortened title as listed in Table 7 in the Annex.

	CZ-2	Birds and amphibians support on wet meadows	Pražan, J.; Šejnohová, H.; Čámská, K.; Mrnustik-Konecna, M.
	CZ-3	Letting forests to their natural succession in Liberec region	Čámská, K.; Pražan, J.
IfLS	DE-1	GrünGürtel Frankfurt (Green Belt Frankfurt)	Sterly, S.; Mathias, C.
	DE-2	Traditional orchards	Hülemeyer, K.; Mathias, C.; Sterly, S.
	DE-3	"Regionalwert AG" Freiburg / Hamburg / Munich	Sterly, S.; Mathias, C.
CEET	EE-1	Marketing of local, organic and farm food	Mikk, M.; Peepson, A.
	EE-2	Grass-fed beef	Peepson, A.; Mikk, M.
	EE-3	State Forest Management Centre	Peepson, A.; Mikk, M.
INRA	FR-1	Agriculture and forestry in Pays de Langres, France	Berriet, M.; Lépiciér, D.; Piguét, V.
	FR-2	Volvic water catchment protection	Chervier, C.; Déprés, C.; Pham, H.-V.
	FR-3	Agriculture and forestry in Parc National des Cévennes	Lataste, F.G. ; Piguét, V.
CREA	IT-1	Processing Tomatoes of Northern Italy	Forcina, B.; Mantino, F.
	IT-2	Bergamot, conventional and organic production	Mantino, F.
	IT-3	Agriculture in natural parks in the Marche region, Italy	Coderoni, S.
	IT-4	Niche products and tourism in Tuscany	Vanni, F.
WUR	NL-1	Grazing payments in dairy farming	Brouwer, F.; Polman, N.
	NL-2	Farmer, beer and water – sustainable agriculture and sourcing in Limburg province	Brouwer, F.; Polman, N.; van der Heide, M.
	NL-3	Nature management and regional planning in Drenthe	Geerling-Eiff, F.; Terluin, I.
	NL-4	Skylark	Westerink, J.; van Doorn, A.
CCAM	PT-1	Montado extensive silvo-pastoral system in Portugal	Cruz, D.; Guiomar, N.; Juste, R.; Pinto Correia, T.
	PT-2	Small scale peri-urban mosaic in Montemor-o-Novo	Guiomar, N.; Pinto Correia, T.; Juste, R.
	PT-3	Intensive olive production in the Alentejo	Gomes, R.; Leitão, D.
ULJUB	SI-1	Mountain Wood and the products of traditional livestock breeds in Slovenian alpine space – an attempt to enhance market valorisation of ESBOs	Rac, I.; Erjavec, E.; Juvančič, L.; Kavčič, S.
	SI-2	Recreation in urban forests in Ljubljana, Slovenia	Rac, I.; Erjavec, E.; Japelj, A.; Juvančič, L.
	SI-3	Agriculture-based development strategies for areas hit by economic crisis	Erjavec, E.; Juvančič, L.; Rac, I.; Dešnik, S.
	SI-4	Nature conservation enabling social security in farming in Središče ob Dravi	Rac, I.; Denac, D.; Erjavec, E.; Juvančič, L.
CCRI	UK-1	Water and integrated local delivery (WILD) project	Short, C.; Kubinakova, K.; Fresnay, E.; Marsh, D.; Dwyer, J.
	UK-2	Hope Farm with intensive, sustainable arable farming in the east of England	Dwyer, J.; Hawketts, E.; Maréchal, A.
	UK-3	North Pennines multi-stakeholder partnership for sustainable uplands	Gaskell, P.; Lewis, N.; Dwyer, J.; Short, C.

	UK-4	Care farms	Keech, D.; Kubinakova, K.; Courtney, P.
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1 Introduction – The PEGASUS concept

The main starting point for the study was a sense that current approaches to increasing the supply of ecosystem services and/or public goods² related to rural land management were subject to certain limitations and weaknesses that were more than matters of detail. They rely rather heavily on certain policy mechanisms, notably agri-environment contracts with individual farmers (and foresters). The main limitations of current approaches are:

- Voluntary incentive schemes do not always attract the farmers required to deliver the objectives being pursued, especially if the outcome depends on the participation of a set of farms in a particular location or production sector.
- Landscape scale effects can be difficult to achieve.
- Individual contracts may not necessarily lead to the most appropriate form of management in specific conditions or the highest level of motivation and commitment by farmers.
- The land management obligations may be divorced from market opportunities, such as premium prices for the farmers concerned (with exceptions, such as organic producers).

Consequently, the case studies explored approaches that go beyond the conventional contractual model in one or more respects. In most cases the initiatives covered in the case studies represent some form of collective action, although this may utilise individual contractual measures as part of a toolkit. In a second set the focus was more on the role of the private sector in enhancing ESBO delivery, often in harness with publicly funded initiatives as well. Both approaches are apparent in several case studies. In the analysis presented here we have brought out these two particular characteristics of the case studies and arranged the analysis accordingly but a common theme was a higher level of engagement than in a conventional approach and, in many cases, the deployment of relatively innovative approaches.

Following a review of the theories and concepts of both public goods and ecosystem services in relation to rural land management particularly (Marechal et al. 2016), the term ‘environmentally and socially beneficial outcomes’ (ESBOs) was introduced as a working definition to be used as part of the PEGASUS project to capture not only the intrinsic characteristics of these concepts in this context but also the effects and impacts of their provision in a systemic approach. In the European context, ‘ESBOs’ are understood to be those outcomes in the environmental and social spheres that are delivered by agriculture and forestry and which benefit society. This term thus includes:

- Ecosystem services, and their resulting benefits, that have public goods characteristics (environmentally beneficial outcomes), and;
- Social and cultural outcomes delivered by farming and forestry with public goods characteristics (socially beneficial outcomes) – this includes ‘cultural’ ecosystem services as defined in the CICES framework³.

² Further below we will introduce the phrase "environmentally and socially beneficial outcomes (ESBOs)". This is to signal that commonly used concepts such as "public goods" and "ecosystem services" have significant limitations in terms of either, their explanatory power or their efficacy in policy development (REF WP1).

³ EEA - Common International Classification of Ecosystem Services <https://cices.eu/>

Located at the crossroads between the public goods and the ecosystem services concepts, the term **environmentally and socially beneficial outcomes (ESBOs)** brings forward the essential ideas that are at the core of the project:

1. It captures the insights from both concepts viewed through a societal prism, which determines what does or does not contribute to human well-being. The scope of the project is thus on outcomes that are beneficial to society, with ‘beneficial’ used in a broad sense as it embraces not only those positive practices enhancing the provision of ESBOs but also those reducing the occurrence and impact of negative practices that actively reduce the level or quality of their provision;
2. The term is also a reminder that PEGASUS is concerned with both the environmental and social dimensions of agriculture and forestry management.

The term environmentally and socially beneficial outcomes, or ESBOs, captures the scope of the desired social and environmental outcomes for agriculture and forestry which the project seeks to enhance, through a consideration of how their provision can be enhanced via agriculture and forest management at the same time as producing food, feed, fibre, timber, energy, etc.

We have identified 19 ESBOs (see Table 2) which have been categorised according to their objectives to be achieved and the more specific beneficial outcomes.

Table 2 Intended beneficial outcomes from activities in agriculture and forest ecosystems

Broad categories of objectives to be achieved:	#	Environmentally and socially beneficial outcomes - ESBOs -	Dominant dimension
Sustainable and sufficient production of food, timber and energy	#1	Food security: Achieving (or maintaining) a sustainable natural resource base to ensure a long-term food supply, hence security	Economic, social, environmental
High water quality and ensuring water availability	#2	Water quality: Achieving (or maintaining) good ecological status of surface water and good chemical status of groundwater	Economic, environmental and social
	#3	Water availability: Achieving (or maintaining) a regular supply of water (i.e. avoidance of water scarcity)	Economic, environmental and social
High air quality	#4	Air quality: Achieving (or maintaining) minimised levels of harmful emissions and odour levels	Environmental and social
Climate change mitigation objectives	#5	GHG emissions: Achieving (or maintaining) minimisation of greenhouse gas emissions	Environmental and social
	#6	Carbon sequestration/storage: Achieving (or maintaining) maximisation of carbon sequestration and storage	Environmental
Climate change adaptation	#7	Fire protection: Achieving (or maintaining) a high level of prevention and minimisation of impacts of potential fires	Environmental and social
	#8	Flood protection: Achieving (or maintaining) minimisation of impacts of potential floods	Economic, environmental and social
Healthy, functioning soils	#9	Soil functionality: Achieving (or maintaining) good biological and geochemical condition of soils	Environmental and social
	#10	Soil protection: Achieving (or maintaining) minimisation of soil degradation	Environmental and social

High levels of biodiversity	#11	Species and habitats: Achieving (or maintaining) the presence of diverse and sufficiently plentiful species and habitats (ecological diversity)	Environmental
	#12	Pollination: Achieving (or maintaining) high levels of pollination	Environmental
	#13	Biological pest and disease control through biodiversity: achieving (or maintaining) high levels of biological pest and disease prevention and minimisation of the impacts of potential outbreaks using biodiversity	Environmental
Protecting landscape character and cultural heritage	#14	Landscape character and cultural heritage: maintaining or restoring a high level of landscape character and cultural heritage	Social and environmental
Public recreation, education and health	#15	Outdoor recreation: Achieving (or maintaining) a good level of public access to the countryside to ensure public outdoor recreation and enjoyment	Social
	#16	Educational activities: Achieving (or maintaining) a good level of educational and demonstration activities in relation to farming and forestry	Social
	#17	Health and social inclusion: Achieving (or maintaining) an appropriate level of therapeutic /social rehabilitation activities in relation to farming and forestry	Social
High levels of farm animal welfare	#18	Farm animal welfare: achieving (or maintaining) the implementation of high farm animal welfare practices on farm	Social and environmental
Preserving and enhancing rural vitality	#19	Rural vitality: Achieving (or maintaining) active and socially resilient rural communities	Social

Agricultural and forestry activities are very diverse, and they can have both positive and negative environmental and social impacts (so-called ‘negative externalities’). The impact of production may vary considerably depending on the management systems and practices being implemented, the individual management operations undertaken as well as a range of other factors, notably the local biophysical context. Negative impacts generally are not intended to be damaging; the perception of the actions concerned are diverse. Ironically, some negative results may arise from positive intentions. With this in mind, mitigating the impacts or occurrence of practices that have a negative impact on ESBO provision is as important as enhancing practices that have a positive impact. Both are considered within the frame of this project.

Public goods and ecosystem services are not mutually exclusive – as concepts they overlap, and each approach illustrates different and valuable aspects of relations between farming and forestry and their natural and socio-cultural contexts. Therefore, a conceptual framework that was able to cover both concepts in an integrated way was adopted, with a choice to use the emerging **framework of Social-Ecological Systems (SES)** theory selected. The SES framework considers the health, resilience and other attributes of the whole systems within which EU farming and forestry operate – both human and natural, embracing economies and environment. The aim was to seek to assess the ‘health’ of whole systems, to determine and develop their potential for sustainability and resilience.

In WP2 PEGASUS aimed to describe, in a spatially explicit way, the patterns of Public Goods (PG)/Ecosystem Services (ESS) occurrence in relation to the diversity of EU agricultural and forestry

systems across Europe. Based on aggregated statistical data available at a suitable resolution, a spatially distributed agricultural systems map was produced. Concomitantly, a representative set of data on forest use intensity has been prepared ad hoc. This new information was used to gain knowledge specifically on the relationships between intensity of management and delivery of PG/ESS.

In WP3 of the PEGASUS project (an analysis of socio-political, economic and institutional drivers), we investigated the range of drivers and factors that influence the provision of ESBOs in the different countries and the types of policy instruments that play a major role in providing the necessary conditions to stimulate or permit collective action. Reviews of those two elements have been carried out in the 10 Member States in which case studies for the PEGASUS project were carried out.

WP4 (the case studies) aimed to underpin the emerging findings from WP2 (exploring the linkages between farming/forestry management systems and public goods/ecosystem services through maps) and WP3 by conducting 34 case studies on initiatives fostering the provision of ESBOs through agriculture and forestry. The case studies were carried out in consortium partner countries, namely Austria, Czech Republic, Estonia, France, Germany, Italy, the Netherlands, Portugal, Slovenia, and the United Kingdom. We started our analysis of 34 case studies (CS) by considering them as initiatives which foster provision of environmentally and socially beneficial outcomes through different mechanisms. Our focus here was particularly on **market-based and other collaborative** mechanisms that targeted land use and land management (for example its intensity) in very different forms. Also of interest are the various factors driving the development and the functioning of the initiatives and through them the provision of ESBOs.

The overall approach in the case studies was to use the Social-Ecological Systems (SES) framework as further developed and discussed by McGinnis and Ostrom (2014) alongside an action orientated and transdisciplinary approach to deliver the SES framework. Particular attention was paid to effective communication and interaction with practitioner partners and stakeholders in each case study. All researchers participating in the case studies received targeted guidance and training on relevant methods (Task 4.2). Training and the related materials were provided by IfLS (Partner 4) and CCRI (Partner 2), and delivered at the first project meeting held in Portugal in January 2016. Particular attention was paid to giving partners sufficient degrees of freedom to adjust the methodology to the actual institutional environment in each case study, so that actions would be acceptable and appropriate to local conditions.

Steps 1-2 of the case study work started with the definition and sketching out of the SES outline in each case study area. The analysis encompassed the identification of the key ESBOs, a first appraisal of their appreciation and/or related demands for them in society, and the potential for their provision (Step 1). The analysis also covered the conditions for a successful ESBO provision in the particular system, taking account of the changes that might be required for these to be enhanced and issues of longer term sustainability that may arise. (Step 2). The description and analysis were based on local, regional or national data sets complemented by a substantial number of key person interviews as well as triangulation with local environmental and socio-economic data.

The main idea of the following steps, Steps 3-4, was to deepen the analysis of enhanced provision of ESBOs from farming and forestry systems and to explore, together with practitioner partners and stakeholders, current impacts of land management and future actions. The responses of the system in question to different drivers or initiatives in policy, markets or institutional changes were to be identified, as well as the main challenges and the main limiting or enabling factors. Attention was paid to situations where the appreciation and/or provision of benefits was judged to be at risk and to understanding the inter-relations between different system components (e.g. actors, governance regimes, resources, drivers and action situations). Both the holistic systems approach and the focus on inter-relations, were considered more important than an in-depth assessment of specific, partial issues. Gathering and collating quantitative data on levels of specific ESBO provision, for example, would have required considerable use of resources which would have distracted teams from building a good understanding of how systemic interlinkages function, given our relatively limited time and resource frame for this element of PEGASUS.

Table 3 provides an overview of the key terms used in the PEGASUS concept.

Table 3 Main focus and terminology used in PEGASUS

PEGASUS terminology	PEGASUS definition
Initiatives (collective action)	Different types of collective action have the result of maintaining or changing particular land use and management practices; with the explicit or implicit objective to maintain or increase the level of provision of ESBOs.
Environmentally and Socially Beneficial Outcomes (ESBOs)	Environmentally and socially beneficial outcomes. The provision of ESBOs is directly or indirectly linked to appropriate land management and land use; ESBOs are defined and target levels determined through societal and political actors.
Land use and land management	The combination of certain types of land use and land management practices is often a determining factor in the level of ESBO provision by agriculture and forestry.
Drivers / factors for collective action	Exogenous and endogenous factors are driving the emergence and continuation of collective and new market based actions; these are interrelated to factors affecting land use and management practice Amongst those factors are the changing awareness and appreciation of ESBOs by society.

An overview of the main mechanisms deployed to manage land and influence ESBO provision is offered in Table 4. It is not surprising that CAP pillar 1 and 2 subsidies are important in many of the initiatives and are a key mechanism in providing ESBOs. However, the focus of much of this work is on market-based and other collaborative mechanisms, rather than policy support instruments per se. Section 4.4 explores the interrelation between policy instruments and collaborative actions in detail.

Table 4 Types of case study initiatives and main mechanisms supporting the provision of ESBOs

No.	Case Study Title	Main mechanisms of initiatives
Producer/land owner-driven		
IT-1	Processed tomato supply chain in the Tomato District of northern Italy	Interregional large-scale supply chain; innovative agricultural practices to reduce costs and increase crop competitiveness
IT-4	Niche products and tourism in Tuscany	Coordinated and integrated initiatives and policies, some CAP support for niche products and tourism in order to maintain and sustain the “rural identity”
PT-1	Montado extensive silvo-pastoral system in Portugal	Market drivers mixed with socioeconomic and political drivers and the need to ensure income are leading land managers to focus rather on short-term benefits, leading to intensification in grazing which have serious implications on montado loss.
PT-3	Intensive olive production in the Alentejo	Intensification in relation to irrigation infrastructure development, CAP subsidies, NATURA 2000 management
Private (non-land management)		
AT-1	Organic farming label in the mountain Murau region	Price premium for high quality milk from specific and localised production system
FR-2	Volvic water company, management agreements and agri-forestry	Provision of subsidies to farmers/foresters for appropriate land management and technical innovations to manage the risk of water contamination
NL-1	Grazing systems in dairy production	Branded cheese ‘Beemsterkaas’ is produced from defined outdoor-grazing systems
NL-2	Farmer, beer and water – sustainable agriculture and sourcing in Limburg province	Social platform (Farmer, Beer and Water) initiates sustainability projects aimed at conserving groundwater resources
UK-4	Care farms	Therapeutic use of farming practices; and an organisation, in the form of the Care Farming UK network
Producer – private sector		
IT-2	Bergamot, niche and organic products in Calabria	Consortia trying maintaining the economic viability of distinctive bergamot production through market integration and cooperation in the food chain as well as CAP derived aid
EE-1	Marketing of local, organic and farm food	Marketing of local farm, artisan and organic food from small-scale producers/processors through the shop-in-shop approach
EE-2	Grass-fed beef	Whole value chain approach (production-processing-marketing) of grass-fed organic beef led by farmers NGO Liivimaa Livaheis
FR-1	Agriculture and forestry in Pays de Langres, France	New quality labels in dairy production (PDO), territorialized farming systems, innovative forest management
NL-4	Skylark foundation: a farmers’ association for sustainable arable farming, supported by supply chain partners	Sector based funding mechanism (farmers and production related companies) to improve management in intensive systems e.g. to support buffer strips along field margins in return for land to be leased elsewhere
Producer - citizens		
PT-2	Small scale peri-urban mosaic in Montemor-o-Novo	Collective action by farmers and the linkage with other actors; Raising awareness about the value of rural life and increasing appreciation of aspects of it. Reviving/re-establishing local supply chains and more direct connections between smaller-scale producers and consumers.
SI-1	Mountain wood certification project	Private initiatives connecting producers and consumers (re mountain wood)
Producer - public		
FR-3	Agriculture and forestry in Parc National des Cévennes	Permanently inhabited national park with UNESCO world heritage status, interactions with land managers
IT-3	Agriculture in natural parks in the Marche region	Agri-Environmental Agreement (AEA) with a package of RDP measures including advanced IPM techniques and information

		actions. Farmers adopt new techniques helped by local extension agency
NL-3	Nature management and regional planning in Drenthe	Landscape management through local actors ('Boermarke' institute) Bottom-up process: initiatives by local people are practically supported by a landscape management facilitator and financed by the municipalities and the region Drenthe
Citizens		
SI-3	Agriculture-based development strategies for areas hit by economic crisis	Spreading innovative farming practices; key are extension services, nature park organisation, and individuals
AT-2	S-E-S in the Biosphere Reserve Lungau (Salzburg region)	Biosphere reserve in combination with different support schemes
CZ-3	Letting forests to their natural succession in Liberec region	Enrichment of commercial forest to near-natural forest, purchase of land
NGO		
AT-3	Mountain forestry and ESBO provision in mountain area Pinzgau	Forest management under the Federal Forest Act (ForstG 1975) and various other legislations
CZ-2	Birds and amphibians support on wet meadows	Ecological enrichment of managed grassland through modified irrigation system and nature-friendly agriculture on a private reserve „for birds and for the people“ (purchase of land)
SI-4	Nature conservation enabling social security in farming in Središče ob Dravi	Potential nature park establishment in riparian forest and mosaic landscape
UK-2	Hope Farm with intensive, sustainable arable farming in the east of England	NGO-owned and managed farm to test and demonstrate management practices to support and enhance farmland bird populations
Public		
CZ-1	Biodiversity rich meadows payment in CZ	Agreed tailoring of national and CAP measures (contracts) between administrations and farmers, NGOs filling the gaps in management – complementing the government incentives
DE-1	GrünGürtel Frankfurt (Green Belt Frankfurt)	Spatial planning in combination with nature conservation legislation and landscape protection
EE-3	State Forest Management Centre	Public management of campsites, study trails and educational infrastructure by the Estonian State Forest Management Centre
SI-2	Recreation in urban forests in Ljubljana, Slovenia	Mainly public management in a symbiotic relationship between owners, managers and visitors
Multi-actor		
DE-2	Traditional orchard meadows in Hessen/Baden-Wurttemberg	Surcharge initiative; value chain development based on organic certification and regional branding that can be connected back to traditional orchards
DE-3	"Regionalwert AG" Freiburg / Hamburg / Munich	Provision of capital for investments in organic farms and businesses through a citizen shareholder corporation
UK-1	WILD river basin management initiative	The strategy is to involve farmers and local communities in developing the understanding and commitment to the actions needed and sustained effort.
UK-3	North Pennines multi-stakeholder partnership for sustainable uplands	UK Lottery Funding for a Heritage Landscape Partnership project, to generate environmental and community benefits by encouraging organisations and agencies to work together on various local initiatives

2 ESBOs, land management and our case studies

ESBOs associated with rural land management cover a wide range in Europe and vary considerably in character, as noted in many PEGASUS outputs. In PEGASUS we took two approaches in assessing the provision of ESBOs through different types of land uses and management practices. In WP2, EU-level data was processed to develop maps illustrating the provision of certain ESBOs. In the case studies we used a bottom up approach to identify ESBOs provision fostered by initiatives at different scales in 10 Member States. Before confronting questions about the status of ESBOs and their provision as revealed in the case studies, it is worth considering issues of scope and coverage briefly.

2.1 Scope and coverage of the ESBOs considered

ESBOs arising from agriculture and forestry and their management practices are the primary concern of PEGASUS. Data availability at an aggregate European level is limited, thus only a few of the 19 ESBOs could be covered in the assessment of patterns of provision at the European level through Geographical Information Systems (GIS)-based mapping. PG/ESS indicators / proxies included in the analysis are (proxy indicator for current delivery):

- Food provision (energy content output of agricultural biomass);
- Pollination (pollination potential index);
- Natural pest control (biological control potential index);
- Rural vitality (quantity of human labour in agricultural systems, jobs in agriculture, population change in rural areas);
- Water quantity (water abstraction by irrigation);
- Soil functionality (soil organic carbon content).

For the forestry systems the availability of data differs substantially to the agricultural systems, which also shows in the coverage of ecosystem services in the analyses of WP2:

- Wood production (a private good),
- Soil erosion protection,
- Carbon storage, and
- Biodiversity (using tree species diversity as proxy).

Although biodiversity does not feature as an ecosystem service, it is considered to underpin the delivery of most ecosystem functions and services (MAES 2013, 2014).

The CS cover various types of agricultural and forestry management systems and practices in a range of EU countries and also examples where nature conservation or recreation are the main concerns of the managers. No major rural land use is missing from the CS series which provides a good foundation for the analysis. The coverage of agricultural systems is also fairly wide for a study of this kind, including a range of predominantly arable, grassland, permanent crop and horticultural systems as well as more mixed patterns of production (Table 5). Both cropping and livestock systems are well represented, at varying levels of production intensity and including organic and agri-forestry systems. Different forms of forestry and approaches to management are also represented, with a

stronger focus on conservation and recreation management than on more intensively managed forests, not surprisingly perhaps given the focus of the study.

Table 5 Land use and ESBO provision in the case studies

CS code	Short title	Prevailing / concerned land use and management practices	Primary ESBOs targeted
Mixed land use systems			
FR-3	FR Parc National de Cévennes	Disappearing landscape elements, conversion of permanent pastures into crop area, abandonment of pastoralism; but also increasing grazing in forest areas (chestnuts);	Water availability, Landscape and cultural heritage, Rural vitality
PT-2	PT peri-urban mosaic	Mixed small-scale land use: olives, sheep, vegetables, fruits; gravity irrigation; some bee keeping, hunting	Food security, Rural vitality
FR-2	FR Volvic water management	Mixed forest (53%), mainly unmanaged; dominant agri land use: pasture, beef production, some (limited crop area);	Water quality, Water availability, Species and habitats, Landscape and cultural heritage, Rural vitality
UK-1	UK integrated catchment management	Agriculture mostly commercial arable agriculture with some grazing land, small amounts of private woodland; major shifts from cattle production, increasing sheep counts; introducing herbal ley, increased arable land	Water quality, Flood protection, Soil protection, Rural vitality
UK-4	UK care farms	Beef, lamb, vegetables, one organic farm, geese, one farm with woodland	Health and social inclusion
NL-3	NL landscape management with citizens	Agricultural land, management of landscape elements	Landscape and cultural heritage
DE-1	DE Green Belt	Forestry divided in recreational, protected and productive forest; arable land (wheat, sugar beet and oilseed rape), permanent grasslands, traditional orchards, horticulture and vineyard (wine)	Species and habitats, Food security, Outdoor recreation, Education
DE-3	DE Regional Value shareholder corporation	Organic, various (dairy, arable, horticulture, viticulture)	Water quality, Soil functionality, Species and habitats
EE-1	EE Talu-Toidab local food label	Small scale, organic	Rural vitality
Arable crops and horticulture			
SI-3	SI agriculture as a growth strategy	Decreasing livestock breeding; arable crops are dominant followed by grassland and orchards. Abandoned grassland is afforested	Food security, Landscape and cultural heritage, Food security
UK-2	UK arable and AES farm-scale	Land use change, reducing tillage, diversifying cropping patterns, catch crops	Species and habitats, water quality
NL-2	NL Farmer, beer and water	Barley production, irrigation option; change from maize production	Water quality, Water availability, Soil functionality, Soil protection, Species and habitats, Landscape and cultural heritage, Outdoor recreation, Rural vitality
NL-4	NL arable farmer association	Arable farms, with irrigation, some livestock keeping; intensive, innovations towards sustainable principles	Water quality, Water availability, Soil functionality,
IT-1	IT tomatoes supply chain	Focus on tomatoes production (IPM and micro-irrigation introduction), in general: agriculture, mostly arable crops (wheat, maize) and forage. But also significant livestock farming	Water quality, Water availability. Soil functionality, Soil protection

Pastures (combined with dairy or meat production)			
AT-1	AT haymilk label	Extensive, organic production, hay farming, dairy farming, cattle breeding, also forestry	Species and habitats, Landscape and cultural heritage
NL-1	NL outdoor grazing scheme	Grazing of dairy cows, manure management; rather intensive, but trend towards more animal welfare: trade-off between manure legislation and outdoor-grazing: increasing the scale of production tends to be more efficient with in-house production systems	Soil functionality, Species and habitats, Landscape and cultural heritage, Animal welfare
AT-2	AT biosphere reserve	Mountain meadows, wetland meadows, alpine pastures, woodland areas, alluvial and mixed forests, bogs, marsh areas, glaciers	Species and habitats, Landscape and cultural heritage, Rural vitality
CZ-2	CZ wet meadows	Irrigated (extensive) grassland for hay production, hunting	Species and habitats, Education
UK-3	UK partnership for sustainable uplands	HNV farming: extensive livestock (sheep); hunting	Species and habitats, Landscape and cultural heritage, Rural vitality
CZ-1	CZ biodiversity rich meadows	Extensive beef cattle grazing, grassland	Species and habitats
EE-2	EE Liivimaa Livaheis grass fed beef label	Grass-fed organic beef production	Species and habitats, Landscape and cultural heritage, Animal welfare, Rural vitality
IT-4	IT niche products and tourism in Tuscany	Traditional breeds (beef, sheep), varieties (crops, fruits), chestnuts	Species and habitats, Landscape and cultural heritage, Rural vitality
Permanent crops			
DE-2	DE traditional orchards association	Traditional orchard meadows, very extensive, organic production,	Species and habitats, Landscape and cultural heritage, Education
IT-3	IT IPM in fruit production in Valdaso	Fruit production in orchards, relatively intensive	Water quality, Soil functionality
IT-2	IT bergamot production	Citrus production, conventional and organic; irrigated, fertilizing not so relevant, larger and smaller scale producers, intensification is generally linked to more attention to the landscape, more water-saving methods of irrigation and finally higher shares of organic production	Water availability, Species and habitats, Landscape and cultural heritage, Rural vitality
PT-3	PT intensive olive production	High intensity olive production, with irrigation, intensifying	Soil protection
PT-1	PT montado silvo-pastoral system	Cork oak (cork extraction), pastoralism (beef); intensive, innovations towards sustainable principles; competing with intensive olive production and eucalyptus	Species and habitats, Landscape and cultural heritage
Forestry			
SI-2	SI urban forests	Recreational forests, managed under sustainability criteria	Outdoor recreation, Health and social inclusion
AT-3	AT mountain forestry	Forestry, game keeping / hunting (conflicting)	Flood protection, Soil protection, Rural vitality
CZ-3	CZ natural restoration of forest	Alluvial forests, conversion of commercial forest to near-natural forest, hunting	Soil protection, Species and habitats,
EE-3	EE State Forest Management Centre	Forest with some timber extraction,	Landscape and cultural heritage, Outdoor recreation, Education,

FR-1	FR Pays de Langres	Lowland hardwood forest, hunting as regulator; meadows (also for fodder production for regional brand), some crop area	Species and habitats, Landscape and cultural heritage
SI-1	SI mountain wood certification project	Mostly mountain forests, scattered rather large farms: ruminants, dairy and meat (sheep, cattle), managed forests	Species and habitats, Landscape and cultural heritage, Rural vitality
SI-4	SI landscape park project	Riparian forest and agricultural mosaic land use in a valley; forest is unmanaged for hunting, pastures have been turned into arable land;	Species and habitats, Landscape and cultural heritage

The case study teams have chosen different approaches in identifying the primary and secondary ESBOs. Primary ESBOs are mostly those that relate to the main objectives or the main purpose of the initiative described in the case study. Secondary ESBOs refer to those beneficial outcomes that are relevant, but their provision is less of an objective and/or is indirectly related to the actions taken within the initiatives or to the land management practices of particular concern. In some cases, the ESBOs were identified or prioritised by stakeholders in participatory events. Figure 1 provides an overview of the frequency of all ESBOs covered in the 34 case studies. Most cases are found to refer to five ESBOs, but some focus on only one. In many cases there is also an order of importance evident. Secondary ESBOs have not been defined in all cases, in particular seven case studies do not distinguish primary or secondary order ESBO provision. Given the above, there is a degree of subjectivity with regard to the choice of ESBOs and delineation of primary and secondary ESBOs covered in the case studies reports.

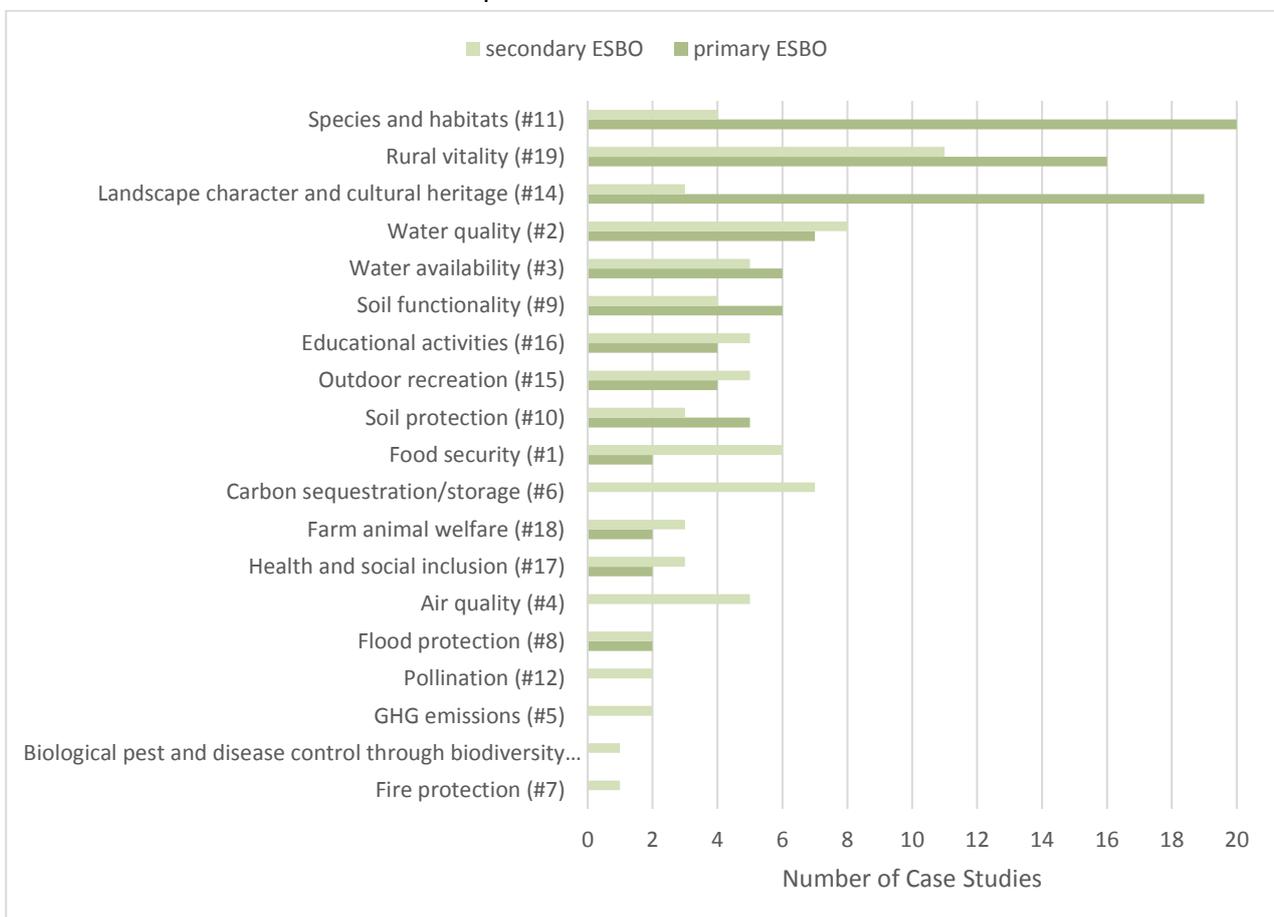


Figure 1 Coverage of ESBOs in PEGASUS case studies

There is a clear focus in the 34 case studies on three key ESBOs: Species and habitats (#11)⁴, rural vitality (#19) and Landscape character and cultural heritage (#14). The co-provision of these three is a common pattern observed. The prominence of species and habitats (#11) and landscape character and cultural heritage (#14) is likely to be linked to the designation of many of the areas for their special landscape or biodiversity value and thus a justification for the initiatives. ESBO rural vitality (#19) can be interpreted as evidence of a loss of rural vitality and thus a need for action. The ESBOs GHG emissions (#5), Pollination (#12), Fire protection (#7) and biological pest and disease control (#13) are only covered to a very limited extent. Several reasons explain this: first, the Case Studies have mainly been selected during the preparation of the original project proposal when there was no precise definition of the ESBO concept developed yet, and second it could be that there is less knowledge of their positive impacts and the need to enhance them, or that they are wrapped-up in others, e.g. pollination (#12) with species and habitat (#11). This distribution of ESBOs among the case studies however, is a result of preferences and choices in the case study selection process, and should not be seen as a measurement of importance or occurrence.

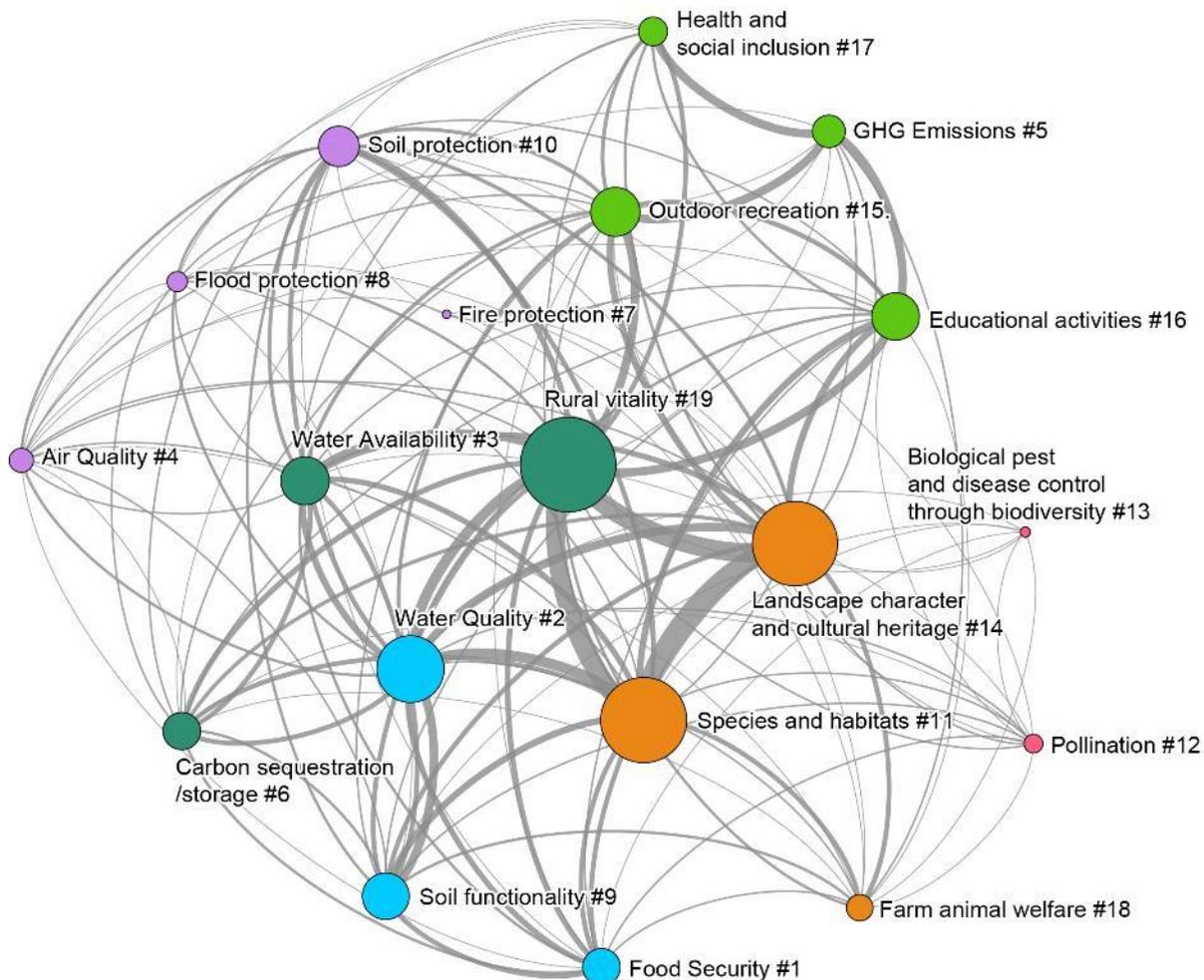


Figure 2 Centrality of ESBOs based on joint provision in the 34 PEGASUS case studies (nodes of one colour form one cluster).

⁴ The numbers in brackets refer to the order number of the List of ESBOs developed as part of WP 1.

Likewise, the illustration of joint provision of the different ESBOs in the 34 case studies presented in Figure 2 is based on the analysis of joint coverage in a single case study. It does not show any quantification of ESBO provision nor the qualification of the interlinkages (i.e. they can also be negative). The weight of connections between each pair of ESBOs indicates how often the pair is covered in case studies. The centrality relates to the sum of the weight of the edges. The size of the node indicates the centrality, i.e. the sum of all interlinkages. The clusters (nodes of same colour) have been calculated using the Louvain algorithm.

2.1.1 Defining and understanding ESBOs

One of the objectives of the CS was to test the application of the concept of environmentally and social beneficial outcomes (ESBOs) developed as part of WP1 (Deliverable 1.2). Some ESBOs can in principle be relatively precisely defined e.g. in relation to water quality standards that are specified in legislation or for commercial products, as illustrated in the mineral water catchment CS in France (FR-2). This relative precision is also underlined by e.g. the unambiguous illustration of water availability and agricultural water use in the mapping of the provision of environmentally beneficial outcomes (D2.3).

Others however tend to be understood much more broadly e.g. biodiversity or landscape protection or, especially, rural vitality. This illustrates our understanding of the state of the ESBOs in the CS areas; there are only a few ESBO parameters where we have evidence of state and change in the form of time series data (showing changes in nutrient contamination of water or farmland bird populations for example) and many more where we do not. In some cases, the non-specialist public understanding of an ESBO may differ from that of the “experts” and legislators. Farm animal welfare is probably an example. Questions arise over whether the premium payments for milk from cows grazed outdoors for 6 hours per day 120 days a year in North-Holland (NI-1) reflect a real welfare benefit for the cows concerned, or are perceived to do so by consumers, while it is considered a clear benefit for the quality of the cheese. There is also a danger to oversimplify the definition of an ESBO when trying to measure them in a quantitative way, based on available data.

The CS were not intended to define ESBOs and their provision and generally did not attempt to do so. The list of 19 beneficial outcomes that form the focus to this study was widely used in the CS reports so that there was a consistency in the presentation of the research. It is clear that the ESBOs can, and not infrequently do, mean different things to different stakeholders and individuals and differences in understanding between places and languages seem likely to occur as well, especially in ordinary parlance outside the academic vocabulary. As these concepts become more familiar to people, both within the CS and more generally, then meanings and understandings can change as well, as emerged from some of the CS. The action research process has the potential to increase understanding of these concepts and their relevance in different contexts.

However, it is worth noting that considerable common ground does apply to all the CS. For example as they are all within the EU, the same or similar formal definitions of environmental standards and expectations related to ESBOs apply in the shape of outcomes from EU and dependent national or regional regulation. Such regulations lay down standards for clean water and several aspects of biodiversity for example. Interestingly, these standards and the pressure to meet them did not

receive a lot of attention in most of the CS and meeting formal goals required by regulations was not often mentioned as a key objective. Many CS referred to regulatory standards as a significant background or framing factor but their importance as drivers of action and as a rationale for public authorities to offer incentives to land managers, for example to meet favourable conservation status in designated Natura 2000 sites, was often played down. This may be because it was not perceived as important by the stakeholders or participants or perhaps taken for granted or possibly not fully understood in some cases (a significant proportion of CS included NATURA 2000 sites).

In the case of the intensive tomato production in Parma and Piacenza (IT-1) it is clear that pressures from agriculture on water quality and resource management have been strong and was growing, at least in 2003-2008 and that there has been a need to meet regulatory standards generally derived from the EU (see section 3.1). However, it is less clear how far this driver has motivated other actors, including processors and retailers to demand higher standards and compliance at farm level. If it has, this may not be seen as a motivating force in its own right.

“Integrated production and precise agricultural practices.....are at present widely adopted primarily for economic reasons. Nevertheless, economic rationale, financial support provided from public policies and new consumption trends favoured the adoption of European, national and regional protection measures and voluntary certifications private and public schemes....and respect of legislative and quality standard requirements, thus guaranteeing high quality standards and environmental sustainability as well as complete traceability.” (IT-1 p.7)

This example shows that the understanding of ESBOs and their relationship to private benefit can be shaped by a variety of influences, including market forces in this and a number of other cases. Meeting consumer demand – and the demand of the private (Danone in FR-2) or quasi-private water company (UK-1) – for higher quality products is a key consideration in several case studies, with a perception of sustainability in a broad sense standing in for more precise definitions of ESBOs.

The language in which they were described, either by authors or those quoted in the CS sometimes was different from the “benchmark” descriptions used in PEGASUS but no major departures from the core list were identified. Naturally, there were different understandings of certain ESBOs, such as rural vitality (#19) and food security (#1) but this reflects the position in the wider world, including debates in the academic community.

In the following paragraphs we reflect on the definitions of the various ESBOs based on their use in the case studies. We put particular emphasis on the most relevant ESBOs, namely species and habitats (#11), landscape character and cultural heritage (#14), rural vitality (#19), water quality (#2) as well as on those where we found ambiguity in the use of terms: food security (#1), outdoor recreation (#15) and health and social inclusion (#17).

Species and habitats (#11): Achieving (or maintaining) the presence of diverse and sufficiently plentiful species and habitats (ecological diversity)

The conceptual framework of PEGASUS (D1.2) divides the objective of “high levels of biodiversity” into three ESBOs: species and habitats (#11), Pollination (#12), and biological pest and disease control through biodiversity (#13).

In general we found in the CS that the conservation of species and habitats was used in a way synonymous with biodiversity as a whole and neither seems well-defined; in addition, some CS differentiate between the three subcategories of biodiversity while most do not, and in most cases, it is unclear which category is referred to. Indicators are used to describe the level of diverse and sufficiently plentiful species and habitats, and include the following:

- Plant, bird, endangered or flagship species richness and their populations (AT-1, CZ-1, DE-2, EE-2, FR-2, NL-1, SI-1, UK-1);
- Number of plant or animal breeds and herd sizes (genetic resources in SI-1, DE-1); and,
- Quantities of small-scale mosaic-like structures, protected biotopes, and status of semi-natural habitats (AT-1, DE-2, EE-2).

As these indicators already reveal, there is a great degree of interconnectedness and, to some extent, overlap between species/habitats and landscapes, which is further elaborated in the section on landscape character and cultural heritage below.

Landscape character and cultural heritage (#14): maintaining or restoring a high level of landscape character and cultural heritage

Landscape character has been described as the distinctness of the landscape, especially through particular types of land use such as permanent alpine grassland or outdoor grazing, attractive mosaic landscapes and scenic views, and landscape elements like stone walls, hedges or bogs (SI-3, UK-3, FR-1, FR-2, EE-3).

The agricultural landscape of the North Pennines is the physical expression of agricultural production processes. Low intensity sheep and cattle farming has created an agricultural landscape of meadows and pastures enclosed by stone walls and hedges, interspersed with traditional stone built farmsteads, on the valley bottoms and lower slopes. Further up the valley sides the enclosed fields give way to large areas of unenclosed rough pasture and grouse moor. The landscape character of the grouse moors is largely determined by the management policies followed by the grouse shooting estates. (UK-3)

Cultural heritage is described in different dimensions. Most commonly it refers to permanent structures with historical value, e.g. boundary objects, farmsteads build from local stone (UK-3) but also e.g. “relics of former lead mining, most dating from the 18th and 19th centuries” (UK-3). Some also include particular field patterns or local breeds originating from historical agricultural practices. Intangible cultural heritage is also referred to such as maintained traditional practices related to agriculture and forests (SL-4), or the Greek cultural heritage existing in the Italian Bergamot region (IT-2).

There is a certain overlap between the cultural heritage described in this ESBO and the cultural dimension covered by ESBO rural vitality (#19):

[...] the bergamot cultivation is a way to maintain landscape (bergamot is part of the image and identity of the area), biodiversity and rural vitality. (IT-2)

The other key ESBO is landscape character and cultural heritage that plays an important role at landscape level (Pinto-Correia & Primdahl, 2009). This ESBO has a high level of importance in the Alentejo regional identity. (PT-1)

The interlinkages between (#14) landscape character and cultural heritage with rural vitality (#19) are most important; cultural practices and identity are binding elements between those two ESBOs, but they also blur the demarcation of both ESBO concepts. There has been evidence that besides the mostly positive effects of the interrelations there can also be negative interrelations between the two.

Rural vitality (#19): Achieving (or maintaining) active and socially resilient rural communities

Three main indicators were identified in Deliverable 2.1 as being related to rural vitality: 1) the Agri-environmental indicator n. 14 “risk of land abandonment” 2) Diversification of employment; 3) Social capital. As data for these indicators are not available at a grid level on a full European scale, significant final choice for the mapping exercise, reported in Deliverable 2.3, were two indicators; one “Employment in the primary sector” and the other “Population density”.

The CS however, have applied a much broader understanding of rural vitality including elements that are difficult to quantify and map. Social dimensions addressed in the CS are:

- Demography: maintaining or increasing population in rural communities;
- Social “fabric”, networking, inclusion of community members, civil society development, sense of community (PT-2, UK-1);
- Learning and know-how, innovative capacities (FR-3, SI-3, PT-2);

There is an overlap between this social dimension of rural vitality and the social inclusion component of ESBO #17, concerned with health and social inclusion more widely (PT-2).

The **economic dimension** of rural vitality describes employment opportunities and income potential in the area, which is a result of *inter alia* the development of value chains, additional markets (including the tourism sector) or higher prices (EE-2, SI-3, SI-4, IT-2).

The **cultural dimension** is expressed in the Italian bergamot CS: “A certain surprise on the discussion on ESBOs, because interviewees highlighted as farmers prioritised cultural identity as a form of ESBO (as part of rural vitality)” (IT-2). Other aspects of the cultural dimension include:

- Keeping traditions among members of the community, e.g. in food processing, maintenance of cultural heritage, e.g. dry walls, irrigation systems (EE-1);
- Regional or cultural identity, sense of place e.g. through the intrinsic values of cultural landscapes (CZ-2), enhanced public image of the area at the national and international levels (IT-2).

The Austrian mountain forest (AT-3) case introduces another dimension to rural vitality – the one of **(physical) safety**: “Mountain forests play a crucial role in protecting people and infrastructure (Weiss, 2000). An adequate quantity and quality of forest ecosystems is therefore necessary for permanent human settlements and any economic activities within Alpine setting allowing people to inhabit the area.”

Quality of life is a concept related to rural (or urban) vitality and is particularly mentioned in some cases. It describes the attractiveness of an area for inhabitants and tourists determined by biodiversity, desirable landscapes and elements of cultural heritage (AT-1, FR-3, SI-2), by environmental quality such as microclimate or water quality (DE-Green Belt), as well as by the availability of services. This attractiveness is a major factor for motivating inhabitants to remain, for new inhabitants looking e.g. ‘for green “quality of life”’ (PT-2) or for tourists and recreational visitors to the area. A particular type of land management, such as traditional outdoor grazing, can be the mechanism a specific enhancement to the quality of life for certain people, but it could also just be the agricultural or forestry land use as opposed to the alternative of a built-up area, that is appreciated. Generally, quality of life is regarded as supporting and reinforcing rural vitality:

Neo-rural immigration in Cevennes favours innovations, local associations’ dynamism and rural vitality. This rural vitality has a positive spill over/feedback effect on the attractiveness of the territory because some people consider dynamic and preserved territory as a promise of a good quality of life. (FR-3)

However the FR Parc National de Cévennes case also describes negative interrelations:

The UNESCO label increases also the residential and touristic attractiveness of the territory, contributing to its vitality. Paradoxically, the attractiveness of the territory and its quality of life promote second housing residence. Some permanent inhabitants critic this phenomenon because it creates a dumping effect on housing rents and principal residence markets, but also because they consider that second homes harm the rural vitality, especially in winter when houses are empty.

One interesting strand of the presentation of rural vitality (#19) and landscape character and cultural heritage (#14), was the fairly frequent mention of regionally characteristic/traditional forms of production, forming part of the identity of the locality. While there were often specifically landscape components to this identity (Bergamot citrus trees in Calabria but more often grassland, as in Austria, Estonia, the UK amongst others), this was not necessarily dominant and often there was an accent on the production chain as a whole, including processing.

Such production chains may in many cases contribute significantly to rural vitality in a more economic sense but that was not always clear and not necessarily presented as such in the CS (alternative, less traditional crops might produce a more prosperous foundation for rural communities for example). Typical or traditional regional products often were seen as offering market opportunities inside and outside agriculture but their value often was perceived to extend to a deeper form of rural identity and satisfaction. The frequent clustering of ESBOs in this area in the CS points to a spectrum of culturally related ESBOs reflecting rural tradition. This was not necessarily captured by ESBOs #14 and #19 when considered in isolation.

Water quality (#2)

In the case of relatively intensive tomato production in Parma and Piacenza (It-1) it is clear that pressure on the aquatic environment from agriculture is strong and was increasing, at least in 2003-2008 and that there has been a need to meet regulatory standards generally derived from the EU.

“Integrated production and precise agricultural practices are at present widely adopted primarily for economic reasons. Nevertheless, economic rationale, financial support provided from public policies and new consumption trends favoured the adoption of European, national and regional protection measures and voluntary certifications private and public schemes....and respect of legislative and quality standard requirements, thus guaranteeing high quality standards and environmental sustainability as well as complete traceability.” (IT-1 p. 7)

This example shows that the understanding of ESBOs and their relationship to private benefit can be shaped by a variety of influences, including market forces in this and a number of other cases. Meeting consumer demand for higher quality products is a key consideration in several case studies, with a perception of sustainability in a broad sense standing in for more precise definitions of ESBOs.

Food security (#1): Achieving (or maintaining) a sustainable natural resource base to ensure a long-term food supply hence security

As discussed in D1.2, the objective of food security as a public good (#1) includes different dimensions, which are not all considered under the ESBO concept. (i) Access to affordable and safe food and (ii) Adequate food supply are NOT in the remit of PEGASUS. The only dimension relevant for PEGASUS is (iii) Maintenance / increase of a sustainable resource base, as a means to secure the long-term capacity of the land to produce food/fibre, etc. We observed that the CS refer to food security mainly with respect to what was supposed to be 'outside the PEGASUS remit'. The only suitable indicator for this ESBO was provided by PT-2: “diversity of products and the traditional production techniques”.

We found other aspects that need consideration in further development of the concept of ESBOs. In addition to those discussed above, substantial overlaps in the understanding and use of terms have also been found between the ESBO **Outdoor Recreation** (#15), and **Health and social inclusion** (#17), as well as with **Rural Vitality** (#19). The cool air generated by agricultural land and forest (particularly arable land and especially in contrast to urbanised areas) as well as air corridors over agricultural land, whilst seen as a benefit in certain cases, are not captured by the existing set of ESBOs. They relate to high air quality (#4) but would rather fall under the dimension of (micro-)climate regulation if a new list of ESBOs were to be drawn up.

2.1.2 Evidence of ESBOs in the case studies

Concrete evidence of the presence of ESBOs derived from appropriate land management in the CS was in many cases rather limited. Given the methodology adopted for the CS, sources of evidence about their presence could include:

- The views of stakeholders
- The views of the research team
- Independent scientific sources, which could include surveys and the evaluation of projects
- Photographs taken, data collected and direct observation during the study
- Relevant maps, including those being developed within the PEGASUS project

- The agreed objective of projects, initiatives, applicable rural development programmes etc. which implicitly suggest that ESBOs are present or should be once the necessary action is taken

These sources were used to varying extents in the CS and there was no standard, systematic approach to establishing the presence and status of ESBOs or how they might change over time. This was not the core aim of the project, rather the intention was to test the use of the SES framework as a key methodological approach. The limited resources for conducting the CS are also important to recognise. However, the limited evidence presented does give rise to a number of limitations in the evidence base for the project and the extent to which conclusions can be drawn about the provision of ESBOs by different means adopted in the CS.

The mapping exercise in PEGASUS covering the distribution of many ESBOs on a European scale has been taking place in parallel and has informed the CS process but only partially given the large scale on which it has been conducted. These maps will however be a useful source of evidence about ESBO provision in the CS areas as well as Europe more widely.

In many CS, the presence of ESBOs was assumed or stated broadly. In a few cases, the main source of evidence was the views of stakeholders, who had been asked for their own assessments. Evaluation studies or similar sources of independent appraisal were used in some case studies. However in a limited number of cases fairly precise measurements of environmental parameters were taking place, even if the results were not necessarily reported in any detail in the CS. Particularly good examples include the French CS Volvic water management (FR-2) and UK arable and AES farm-scale (UK-2), but even here the evidence was stronger in some areas than others. The Skylark Foundation initiative in Midden Brabant in the Netherlands is unusual in having a systematic approach to improving both environmental and social ESBOs in an intensively managed region with considerable pollution loads and using a spectrum of 10 indicators to measure progress (NL-4).

Generally, ESBOs are considered to be present in the CS areas at some level, prior to the influence of the initiative being considered in the CS. In the case of environmental ESBOs this is sometimes because of the general characteristics of the area, usually because it is well forested or low intensity agriculture (e.g. AT-1, AT-2, EE-3, FR-3, IT-4, PT-1 etc.). In some cases, this character is reinforced by the designation of some or all of the area as a protected landscape, reserve, Natura 2000 site, or UNESCO cultural heritage site (FR-3, PT-1). Examples include the French Parc National de Cévennes (FR-3), the Lungau biosphere reserve (AT-2), the White Carpathians biodiversity rich meadows (CZ-1) and the North Pennines partnership for sustainable uplands (UK-3) a form of protected landscape. Landscape and biodiversity are perhaps the most prominent ESBOs in these cases.

In several CS, **organic agriculture** is clearly widely practised or dominant (e.g. AT-1) although its role is not entirely clear in a variety of others. In a number of CS it is one of several systems being employed, as in Italian bergamot production (IT-2) or German traditional orchards (DE-2). This provides evidence of an appropriate form of land management to deliver a number of ESBOs although not necessarily of the outcome in practice. Similarly, High Nature Value (HNV) farming systems, predominantly extensive farming systems, are being practised in several CS areas (AT-1, SI-1, UK-3, PT-1, SI-4), and again providing evidence of activities closely associated with certain ESBOs.

The counterpart for forestry is less developed but the type of certification system being developed in Slovenia (SI-1) for those following nature friendly practices would be expected to be in this category.

In a few cases, environmental ESBOs are present because of the specific action of the stakeholders and may have been more limited previously. Examples are the restored wet meadows in the Czech Republic (CZ-2) and another case of NGO land acquisition, Hope Farm (UK-2). In CZ-3, NGOs and others enrich relatively low environmental value forest by planting or establishing new species, augmenting the ESBO level.

In the CS with a focus on **forestry, urban fringe and non-agricultural land management**, there is typically a “baseline” level of ESBOs provided by the land use and management system e.g. conventional forestry in some cases or the landscape associated with settlements in the case of Drenthe (NL-3) or a combination of both in the case of the Frankfurt Green Belt (DE-1), which is 50% forest. The precise nature and intensity of ESBO provision in these CS is generally not spelt out but it covers a range of services, including cultural landscape, amenity and recreation in a variety of forms, some biodiversity and perhaps air and water quality (compared to a more urban counterfactual). Local climate regulation is also mentioned in several case studies (DE-1, CZ-2, PT-2, UK-1, and UK-3). Where forest and more natural vegetation is dominant, as opposed to agriculture, the task for management as presented in the CS is perhaps most clearly to enhance the level of provision of existing ESBOs, especially recreation and amenity value. Regional planning in Drenthe (NL-3) is one example while the two Slovenian municipal forests examined in SL-2 is another. This may have less direct benefits for rural vitality (#19) although, not unnaturally, this is difficult to pinpoint.

The provision of socio-economic ESBOs is generally assumed rather than demonstrated in the CS. This is inherently a more difficult area in which to marshal the evidence and make the links to particular forms of land management and so it would not be reasonable to expect detailed or quantified evidence in most cases, but the overall lack of evidence is a concern. The exception is social capital or institutional richness, which is demonstrated in detail in many CS with a common theme of enhanced relationships between stakeholders and/or individuals arising from the initiative studied in a majority of CS. In some cases, the engagement of a wider public or key target group is also described. The Care Farms initiative in the UK (UK-4) is a good example.

Many CS treat an actual or hoped for increase in revenue from agriculture or forestry in the area of study as a result of the initiative as a proxy for enhanced rural vitality. This is marked in the CS which focus on marketing initiatives such as hay milk (AT-1), marketing food (EE-1), grass-fed beef (EE-2) and dairy grazing systems (NL-1). As a broad indicator this is reasonable, but it is not informative about the impact on farm viability and structures, the quality of employment and lifestyle, the health of relationships and social structures or the robustness of institutions. The marketing initiatives controlled or heavily influenced by the primary producers, e.g. as in EE-2, could be expected to contribute more to rural vitality in a broad sense than those driven by external players. This is hinted at in the case of bergamot production (IT-2) but not set out in detail.

One issue is the lack of precision about what is meant by rural vitality (see also 2.1.1) and so an absence of clear indicators to use. It is interesting to note that the indicators used in the Skylark foundation CS (NL-4) include:

- Product value (divided between economic sustainability and the balance of revenues and costs);
- Human capital, with a sub-sector for social capital;
- Local economy, with sub-sections for relationships with, first, other farms and, second, other firms.

This is perhaps the clearest example of a more “bottom up “approach to defining rural vitality, although it is not so clear how these parameters are measured.

Whilst there is little doubt that ESBO provision is taking place in the CS, in many cases, it is difficult to be certain at what level or whether the particular ESBOs mentioned in the reports are in fact the most significant amongst those being supplied in the locality by rural land managers. The distinction in many but not all CS between the primary and secondary ESBOs being supplied is not treated consistently in the CS and some authors report more fully than others. It seems unlikely that a very rigorous analysis of the pattern and intensity of ESBO provision in the CS could be made without further work.

One conclusion is that the provision of many ESBOs in many of the CS areas (although not all) is on a declining trend and often there is a growing appreciation of some ESBOs that is not being met by a Business as Usual approach. Hence there is a need for initiatives and interventions of different kinds, such as those portrayed in the CS. The counterfactual is difficult to assess and not referred to often in the CS. Of course there are many interventions in place as a result of ongoing public policy (e.g. RDPs) and private action and some of the CS describe the operation of these policies as part of a business as usual approach, in the absence of a special and noteworthy initiative. This is broadly true of the Portuguese CS in Montemor-o-Novo (PT-2) for example or the LAG driven initiative in Garfagnana niche products and tourism (IT-4). The CS help to explore more deeply the added value of more ambitious collective action but the line between this and normal good practice in RDP deployment sometimes is difficult to separate from local conditions and variations.

2.2 Linking land use and land management to the provision of ESBOs

In PEGASUS we combined two approaches to assess the linkages between land use and land management on the one hand and the provision of ESBOs on the other. First, WP2 mapped the entire European region and, based on available aggregate data, land use intensity for agriculture and forestry systems alongside the provision of certain selected public goods and ecosystem services for which this data existed. The case studies on the other hand illustrate these linkages for a fuller range of ESBOs in a series of specific contexts

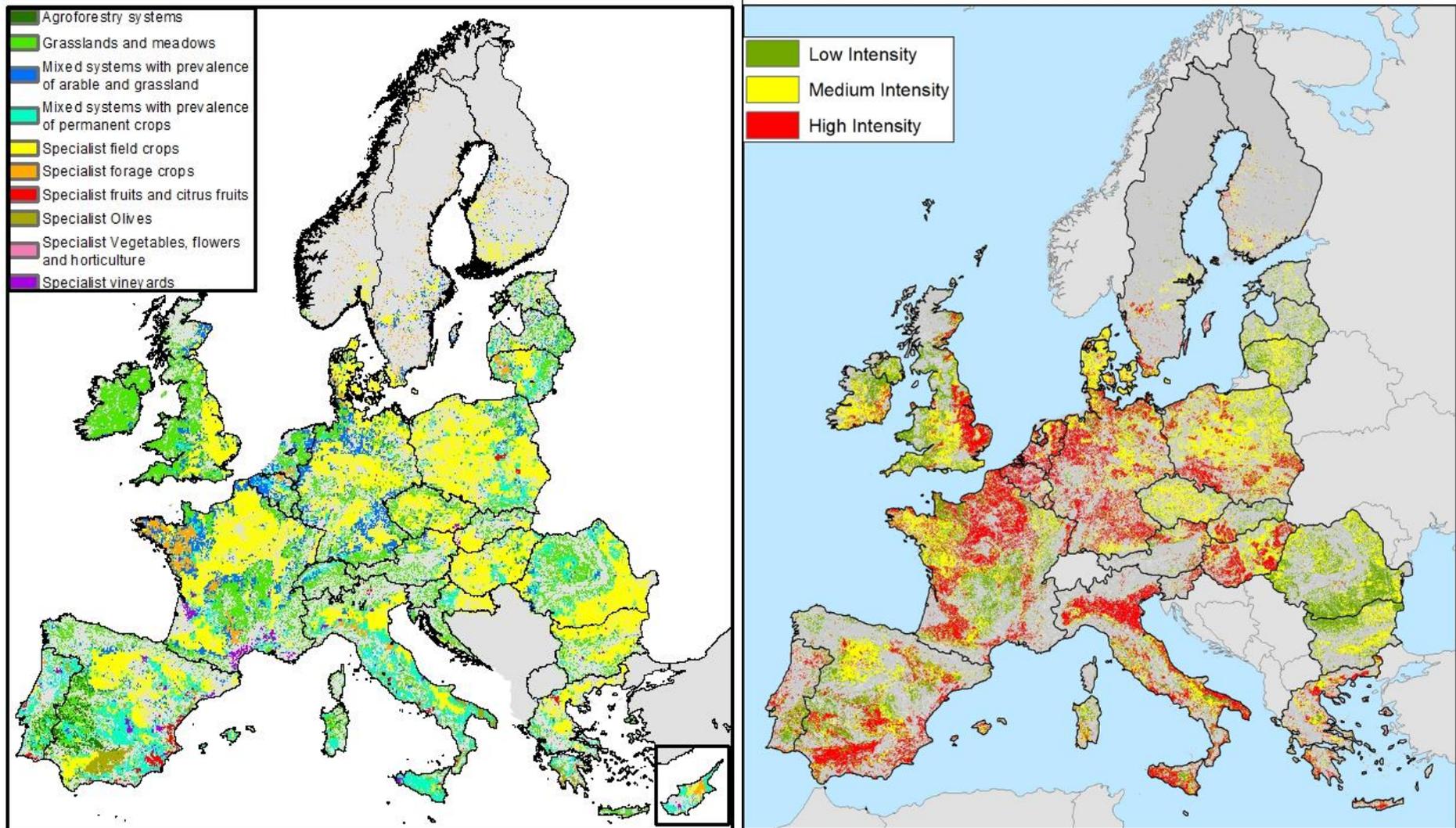
2.2.1 at an aggregate European level

Thanks to the availability of aggregated statistical data, available at a suitable resolution, a spatially distributed crop systems map was produced (Figure 3, left). A novel methodology to describe the

intensity of management in agriculture was used, based on the aggregation of different inputs (fertilizer, irrigation, machinery) measured in energetic terms (Figure 3, right). This allowed the identification of different cropping systems, defined as a combination of predominant crop type and level of intensity.

Subsequently, the map derived from this exercise was overlaid on different maps representing the distribution of PG/ES or suitable proxies. PG/ES indicator/proxies included in the analysis are reported in section 2.1.1 above.

Figure 3 Left: Map of agricultural systems; right: map of intensity of management



Source: JRC, Alterra, 2018. Report on patterns and trends of Public Goods/Ecosystem Services in relation to land management systems. Deliverable 2.3. of the PEGASUS project.

The results of the analysis enable the identification of the different level of PG/ES occurring in different cropping systems and so an appreciation of the similarities and differences between systems and across different regions in Europe.

Figure 4 provides an example by showing the level of potential pest control in the analysed crop systems.

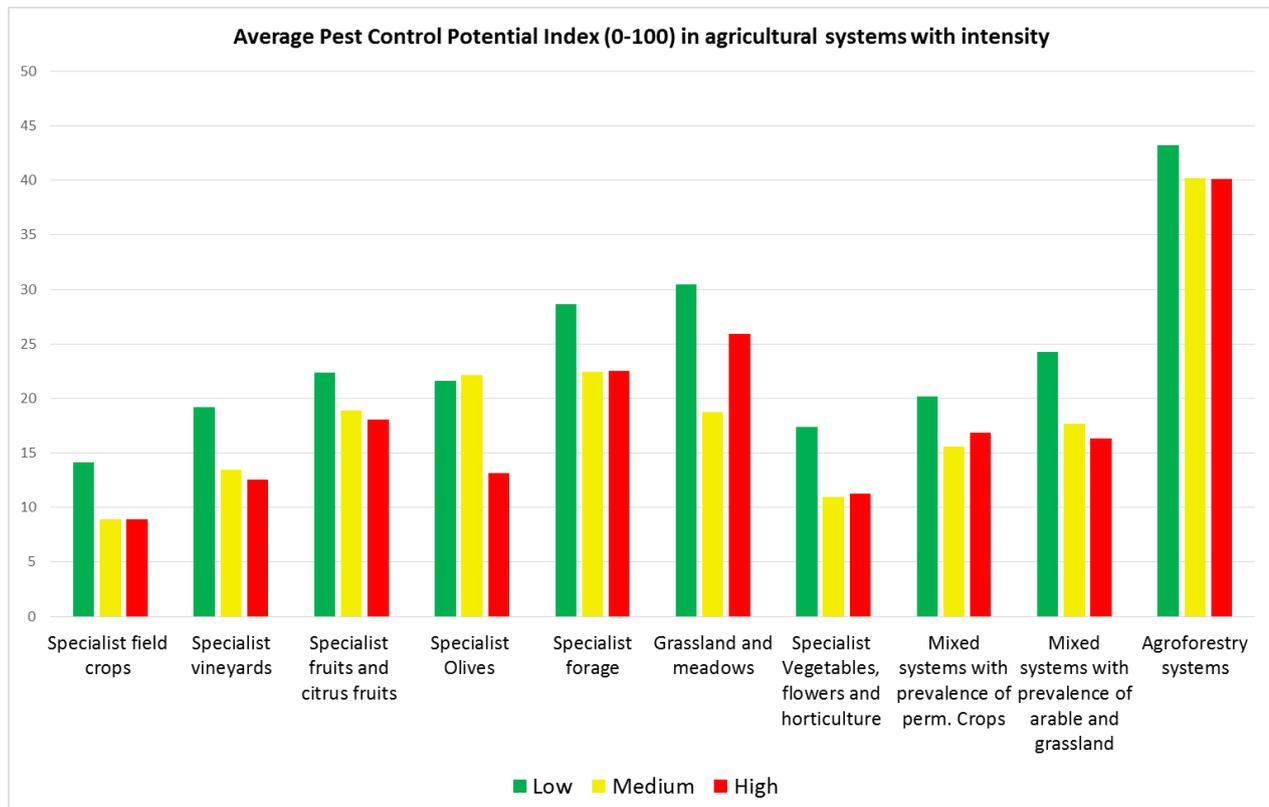


Figure 4 Average pest control potential in crop systems – all Europe

Source: JRC, Alterra, 2018. Report on patterns and trends of Public Goods/Ecosystem Services in relation to land management systems. Deliverable 2.3. of the PEGASUS project.

The overarching result of the analysis is that the level of PG/ESS is indeed affected by the intensity of management. The strength of this relationship however changes across crop systems and space, highlighting the importance of spatially explicit indicators. In general, food provision per hectare is consistently higher in more intensive systems. Pest control and pollination are significantly higher in low intensity systems, while their value is similar in medium to high-intensive systems. The spatial pattern of water abstraction by irrigation for agriculture is clearly driven by geographic/climatic conditions. However at EU aggregate level, intensive systems have a significantly higher water consumption, while medium low systems have similar figures. Concerning social variables (population change, jobs in agriculture), variations are explained by variables describing a regional typology (peri-urban, rural, deep rural) rather than the management intensity.

Anthropogenic pressures affecting forest ecosystems are often a direct consequence of using the services provided by forests, or an indirect consequence due to human activities in general (MAES 2013; Trumbore *et al.* 2015). In this schema, the most important forest use from the point of view of

forest owners is logging, or the cutting of trees, which are then processed and converted into products such as timber, fuel-wood, paper, etc. Therefore, logging and other silvicultural activities have an effect on the forest ecosystem, which in turn alter the services provided by the forest.

In this study we described observed effects of forest use intensity on forest ecosystem services based on proxy indicators of public goods/ecosystem services and empirical information concerning forest use intensity. We assessed four ecosystem services (see section 2.1) in a gradient of three forest use intensity categories across different ecological regions in Europe. Using previous knowledge as a basis (Biber et al. 2015; Duncker et al. 2012; Pukkala 2016; Verkerk et al. 2014), the underlying hypothesis of this assessment is that there is a trade-off between the provision of non-wood forest ecosystem services and ESBO provision/public service characteristics and between more intensive forest management systems and increased wood production.

In order to alleviate the lack of spatially explicit information of forest management at pan-European level, we created a spatially explicit empirical dataset of forest use intensity in Europe representing a gradient of three categories of forest use intensity, from passive-low to very high, described from remotely sensed data of the amount of forest cover change (Hansen et al. 2013). The dataset of forest use intensity is a collection of 1 km grid cells distributed across a range of ecological zones in Europe.

The analysis identified trade-offs between wood production and public goods/ecosystem services provision. Our results highlight a quantitative association between increasing forest use intensity and the services that are likely to be provided. The associations described appear to confirm the hypothesis that higher levels of public goods/ecosystem services are found under low to moderate forest use intensity systems. In 20 out of 21 cases (95%), the assessed public goods/ecosystem services were significantly larger in the passive-low forest use intensity category than in the very-high use intensity category. Figure 1 shows a summary of the results, indicating three types of relationships, i.e. positive, negative and mixed, between forest use intensity and the level of provision of ecosystem services per ecological zone. Positive or negative relationships were found in 20 out of 28 cases, and mixed in eight out of 28.

The figure illustrates, as expected, a positive relationship between forest use intensity and wood production in five out of the seven ecological zones. In contrast, forest use intensity is inversely related with soil erosion protection, carbon storage and tree species diversity in five, four and six out of the seven ecological zones, respectively. Associations in boreal coniferous forest between forest use intensity and wood production, carbon storage and tree species diversity appear to be less robust. However, the reasons for this remain to be determined.

Ecological zone	Soil erosion protection	Carbon storage	Tree species diversity	Wood production
Boreal mountain system	2	3	3	3
Boreal coniferous forest	3	3	3	3
Temperate oceanic forest	3	2	3	3
Temperate continental forest	3	3	3	3
Temperate mountain system	3	3	3	2
Subtropical dry forest	3	3	3	2
Subtropical mountain system	2	3	2	3

Positive	Negative	Mixed
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Figure 5 Summary assessment of the effects of forest use intensity on ecosystem services.

Source: JRC, Alterra, 2018. Report on patterns and trends of Public Goods/Ecosystem Services in relation to land management systems. Deliverable 2.3. of the PEGASUS project.

In Figure 5, a positive relationship describes monotonically increasing levels of the ecosystem services with increasing forest use intensity; a negative relationship describes monotonically decreasing levels of the ecosystem service with increasing forest use intensity; and a mixed relationship describes cases where a decrease or increase of the ecosystem service is not evident with increasing forest use intensity. Numbers represent significance differences between pairs of categories of forest use intensity. For example, 3 means that there is a significant statistical difference in the mean of three categories of forest use intensity for a given ecosystem service in a given ecological zone.

There are therefore evident trade-offs between wood production and other forest public goods/ecosystem services (Duncker et al. 2012; Verkerk et al. 2014). This means that more intense forest use systems, with increased wood production for round-wood or bio-energy for example, often have negative effects on the level or quality of public goods/ecosystem services provided by forests. When considering the effects of forest use intensity in all the ecosystem services together, our results indicate synergistic relationships between soil erosion protection, carbon storage and tree species diversity. In most cases (red cells in figure 1), the availability of these public goods/ecosystem services decreases with increases in forest use intensity.

In summary, our results shed light on the associations between more intensive forest use and management approaches, exhibiting higher levels of wood production, and the lower levels of delivery of three forest ecosystem services with public good characteristics. However, the findings of this study should not be used to define optimal forest use intensity levels. Rather, they provide useful information for supporting decisions on the effects of forest use intensity in the delivery of ecosystem services. A comprehensive assessment of the ecosystem services provided by forests requires taking into consideration the effects of forest management as a key factor that influences the delivery of the public goods/ecosystem services considered here.

2.2.2 at case study level

Land use and management choices influence the provision of these ESBOs in a variety of ways and over differing timescales. The CSs provide a useful panorama of how this occurs in different parts of Europe. The case studies vary substantially in the scope, scale and time dimensions of land use and land management changes they cover.

The scope of the CS in this respect ranges from specific types of land uses and changes in their management (tomatoes, bergamot, traditional orchards, wet meadows for hay making, grazing of beef and dairy cows and sheep, forest succession), through those focussing on the whole farm structure of participating farms (often in relation to organic production principles, but also to regional marketing schemes). A few have a wider scope still embracing all agricultural and forestry land uses within an area, changes to them, and to management practices in use (e.g. UK-1, FR-2).

The scales range from very local to national level initiatives (EE-2), while the land area influenced directly by the initiatives varies from as small as 70ha (CZ-2), to very large areas (941,000ha in EE-3). In some cases the land use covered is scattered in a larger region and thus make it difficult to draw boundaries of the social-ecological system.

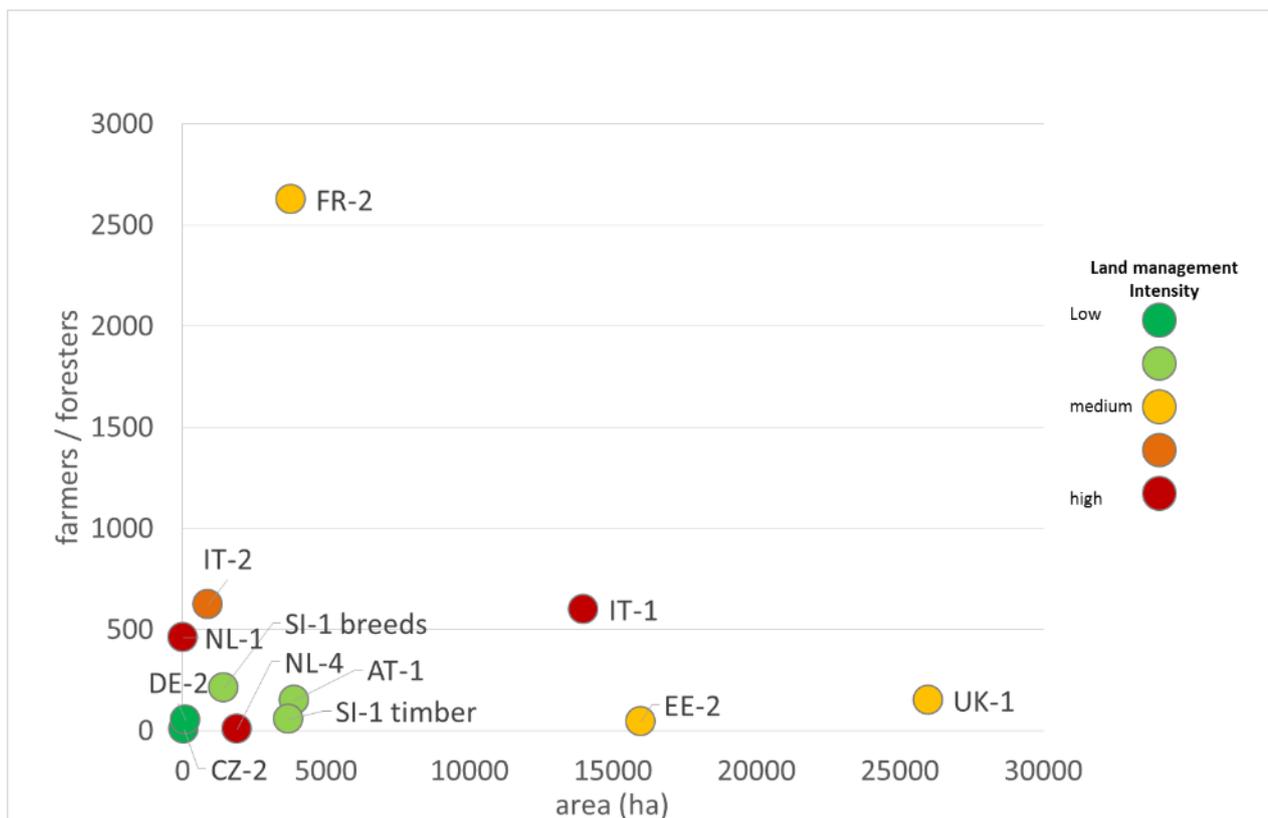


Figure 6 Area (ha) and number of land managers involved in the 12 in-depth case studies

A mix of farming types, covering arable and livestock production and often some mixed farming systems, including organics, was the most common pattern in the areas covered by the CS initiatives. This was most often the case, where either entire farms, or a territorial approach were central to the integrating goals and wider character of the initiatives (UK-1). Those farms in the CS that focus on

arable crops, e.g. cereals, maize (NL-2, NL-4, SI-2, UK-2), horticulture (IT-2) tend to be more strongly production-oriented (intensive production), more so than most of those engaging with pasture based livestock production (CZ-2, with dairy AT-2, or beef production CZ-1, EE-2, AT-2, UK-3).

Many cases consider land use and management changes over 50 years or so, some looking back over even longer periods. They report on general trends in land use and management changes, and accompanying changes in ESBO provision. However, in these observations the more social components of beneficial outcomes are usually not covered. In order to identify the impacts of the CS initiatives themselves, shorter time-scales are used to describe changes in land use and land management from before the onset of the initiative. Still, these time scales vary from 30 to 5 years depending on the time over which the initiative has been running.

Overall and longer-term trends in land use changes can be identified across all cases studied; and initiatives are often a response to the negative implications that those land use changes have had on ESBO provision. The most frequently observed land use change is the **decline in permanent pastures** either through abandonment (SI-3), ploughing up, draining of pastures (SI-4, UK-2) and heather areas to use as arable land (FR-1), or afforestation (FR-3, SI-3). This goes hand in hand in some cases with a **reduction in livestock numbers** (particular cattle) (UK-3, SL3, UK-2). Two cases however report increasing numbers of sheep (UK-1), and in a more urban region in Germany (DE-1), horse keeping on agricultural land as increasingly important economic uses for pastures DE-1. A **conversion of permanent crops** is taking place in the Montado system with a disappearance of traditional cork oaks, following little regeneration and an increase of intensive olive and eucalyptus production (PT-2).

Traditional orchards, usually with large trees, have become increasingly under threat (DE-1, DE-2), while the long-term decline of bergamot production (IT2) has been recently reversed, because of changing market conditions and policy interventions. In terms of arable land use, more variable trends are reported, such as a decline in cereal (wheat) production in certain areas, and an increase in spring barley, oilseed rape, maize (UK Wild), but also, much less typically, the replacement of maize by barley production (NL-2). Other land use changes that have impacted on ESBO provision are the conversion of agricultural land (arable and pastures) for mineral exploitation (UK Wild), or built up areas (DE-1), as well as the restructuring of agricultural land and holdings, often leading to the disappearance of landscape elements (hedges, walls, etc., field boundaries, small woodlands) (UK2, FR3).

Less is reported on trends in forest management and land use; those cases concerned with forests either have the general preservation and/or exploitation of forest areas, or the improvement of their environmental value as an objective. Improved recreational value and use is also an objective in some cases.

To some extent it is possible to differentiate between the main farming systems/land uses in the CS areas when considering the main ESBOs being targeted by the initiatives in those areas and the mechanisms being used. The intervention mechanisms and the principal management practices being targeted in five groups of case studies are summarised in Table 6 below.

Table 6 Mechanisms supporting land management practices to target ESBOs provision

Land uses/ farming systems	Intended management practices	Main ESBOs targeted	Mechanisms	Case studies
Mixed systems farm or territorial scale	Sustainable production, Organic production, maintenance of traditional practices (cork extraction, pastoralism, landscape elements), input management, field margins	Water quality, Landscape and cultural heritage, various incl. health and social inclusion, soil management, outdoor recreation, biodiversity, rural vitality	Spatial planning, water and nature conservation & protection legislation, investment aid, support for marketing and value chain integration, agri-environment and organic farming agreements, collective actions of farmers and local actors	PT-1 DE-1 DE-3 EE-1 FR-3 NL-3 PT-2 UK-1 UK-4 FR-2
Arable crops and horticulture (cereals, tomatoes)	Reducing tillage, diversifying cropping patterns, promoting catch crops, improved nutrient management, IPM and micro-irrigation introduction, change from maize production to other arable crops, sustainability innovations, buffer strips, field margins	Water quality, water availability, soil functionality, biodiversity, human health, rural vitality	Various engagements with the supply chain, social platform initiating sustainability projects, extension services, nature park organisation, NGO-owned and managed areas, agri-environment agreements	IT-1 NL-2 NL-4 SI-3 UK-2
Pastures (combined with dairy or meat production)	Re-establishing hay making on wet meadows, dairy production based on hay fodder, ecologically sustainable outdoor grazing, organic production	Species and habitats, Landscape character and cultural heritage, rural vitality, animal welfare	Price premium using brands and labels, organic standards, Biosphere reserve combined with support schemes, NGO-owned and farmer managed, agri-environment agreements	AT-1 IT-4 NL-1 CZ-2 EE-2 AT-2 UK-3 CZ-1
Permanent crops: olives, bergamot, orchards, cork oak	Maintaining (traditional) production; intensification with water saving methods (Olives, Bergamot), organic production	Species and habitats, Water availability, water quality, landscape, rural vitality	Market integration in value chains, Agri-environment agreements including IPM techniques, promoted through extension services	IT-2 IT-3 PT-3 DE-2
Forestry: alluvial, lowland, mountain, chestnuts	Timber extraction, hunting, sustainably managed forests, more natural forests with greater species diversity	Species and habitats, Landscape character and cultural heritage, soil protection, outdoor recreation, water	Forest legislation, public management, integration in value chain, management payments	AT-3 CZ-3 EE-3 FR-1 SI-1 SI-2 SI-4

		management, carbon sequestration		
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However, the outcome of interventions can be difficult to measure very exactly at reasonable cost and so the evidence of the relationship between management and outcome can be rather patchy. This is generally true in the CS. In some cases, the evidence is more in the process of emerging than available now in a very concrete and measurable form and the case studies reflect this. Few include detailed analysis of the evidence to link the initiative in question to measurable changes in the management of land and from this to the desired outcomes, not least because the connections are difficult to determine and measure, especially from an ecological or natural science perspective.

In many cases it seems likely from the accounts presented in the case studies that the key actors are not particularly troubled by this. Building agreement about a direction of travel, and in some cases a set of activities, often on a contractual basis, is in itself a key outcome and in certain respects the results either are broadly self-evident or satisfactory for the stakeholders without the need for more empirical proof of results. While changes in the physical or human environment might be the clearest indicator for success in most CS a sense of achievement/progress might be more important to many of the stakeholders in the shorter term at least. Many of the CS report such satisfaction or progress towards it.

A different indicator of success is increased sales or profitability of a product. This is not an ESBO per se but it may lead to the enhanced provision of certain ESBOs as is set out clearly in some CS, such as EE-2 and AT-1. Often action is undertaken because there is a need to preserve certain ESBOs at risk, as with the grazed habitats in both these examples and the quality of groundwater in FR-2. In these cases, there were also benefits arising from the increased value of production. In EE-2, rather exceptionally, the actual quantity of beef produced was increased as well as the grazed area preserved.

In more intensively farmed areas, such as FR-1, NL-2, NL-4, IT-1, PT-3 and UK-2, the aim typically is to contain and reduce negative pressures on the environment, meet regulatory and market requirements and increase the sustainability of the production system. Indirect indicators of success include continued sales and freedom from prosecution by the authorities. Generally, these conditions seem to have been met although this is not always entirely clear, especially with respect to regulatory issues. Hope Farm is more ambitious in wanting to create substantially more favourable conditions for biodiversity than those required by law and cross-compliance. Success seems to have been achieved on the farm itself (and well documented) but the demonstration effect has been weak, perhaps because it is not seen by neighbouring holdings as a typical farm.

Rigorous control of pollution within certain parameters and with measured results is needed in the Volvic catchment (FR-2) and this has been achieved by a public-private partnership. This model seems compatible with the continuation of commercial agriculture and could be replicated in other areas where there is a motivated private actor involved

Several CS address more marginal agricultural areas, often with HNV farms. Here the picture is mixed. DE-2 illustrates a case where the sharp decline in a traditional practice (managing small scale HNV

orchards) proved difficult to address with a conventional RDP intervention while success seemed possible using a new approach involving more participation and a marketing element. Combatting underlying decline can prove challenging in these conditions. This was clear from PT-1 where it had been possible to continue a form of farm management within the challenging conditions of the montado landscape, but this was not compatible with the renewal of the characteristic trees in the system and a long-term pattern of over-grazing and landscape change had been established and supported by policy. By contrast, focussed management interventions in a low input system can be effective, as illustrated by CZ-2, the case of wet meadows where an intervention led by an NGO helped to restore biodiversity and a cultural landscape and also contributed to wider environmental education. Interestingly, the authors comment that certain conditions are necessary for successful collective action of this kind, including a certain level of social demand, sufficient social capital and a competent/motivated key actor, who may be an individual. Without these conditions a radical change in property rights might be a second-best option.

WILD, UK-1, offers considerable evidence of results attributed to a multi-stakeholder initiative, which was reviewed by a sponsoring public body before being accepted for the next stage of support. This highlights the need to assess whether an approach will deliver ESBOs over the longer term as rapid results are often relatively limited. In these cases, the strength of the partnership created may be the critical factor in deciding whether support is justified. This CS also reports on the perceptions of ESBO provision by stakeholders, showing considerable variation, especially from the farmers. The authors comment that “The breadth of the response from the farmers suggests that they believe a range of factors underpin the challenges to meet WFD objectives, as well as the range of issues covered by the WILD project.” (UK-1 p5)

Several CS do provide insights about the perception of success, which does seem to vary according to the actors and nature of the initiative as well as the formal objectives. This has different implications for those initiatives led by the private sector, where good results in the market may be the touchstone of success, to those dependent on public sector funding, where measurable and secure outcomes may be more central to the objectives and to the principle of accountability. This hypothesis could be further tested.

2.3 Patterns of joint provision and interrelations between ESBOs – synergies and conflicts

As mentioned above, a level of subjectivity has been applied as to how many and in which level of detail ESBOs have been covered in the case studies. Common to all however is the agreement that ESBOs are not provided in isolation but that their provision is interlinked and often complex. A few cases provide details of the nature of these interrelations; what determines their synergies or conflicts, and examples of the changing nature of interrelationships over time.

Landscape character and cultural heritage with rural vitality: People are the main factor connecting landscape character and cultural heritage (ESBO #14) with rural vitality (#19) in both directions. Local actors are the main caretakers of the landscape, whether these are farmers, NGOs, the general public or other actors. Attention to the quality of the landscape is, on one hand, regarded as an act

maintaining the cultural heritage and creating local identity, (or, in the NL-3 case, even promoting social cohesion); on the other hand, rural communities can benefit from this through tourism.

Benefits of managing the landscape in and around villages by local actors are that their sense of responsibility for the landscape increases and that social cohesion among local people is enhanced. Moreover, the inclusion of farmers in the local groups may both strengthen the understanding of local actors for farmers' behaviour and activities, and the connection of landscape management on agricultural and non-agricultural land. (NL-3)

An adequate agricultural income for extensive land management systems reduces the trend of land abandonment and thereby preserves and maintains cultural landscapes and their intrinsic value (i.e. regional identity, leisure appeal). (AT-3)

The relationship between ESBO delivery and rural vitality was described as being complex. Rural vitality underpinned the provision of ESBOs from farming and forestry in the area, but it was also argued that ESBOs such as landscape and cultural heritage and species and habitats helped to create rural vitality because they underpinned the tourism industry. (UK-3)

Concerning landscape, the regional tourism agency is promoting Alentejo landscape character as the key regional identity element. Landscape, and particularly the landscape in the region of Alentejo, related with montado, is actuality more widespread in the media discourse than biodiversity. (PT-1)

The largely positive interrelations between maintaining landscape character and cultural heritage on one side and rural vitality on the other can turn negative, as two cases highlight with respect to the official recognition of cultural heritage:

The UNESCO label increases also the residential and touristic attractiveness of the territory, contributing to its vitality. Paradoxically, the attractiveness of the territory and its quality of life promote second housing residence. Some permanent inhabitants critic this phenomenon because it creates a dumping effect on housing rents and principal residence markets, but also because they consider that second homes harm the rural vitality, especially in winter when houses are empty. (FR-3)

For instance, whereas landscape features are widely contributing to residential quality of life and to tourism attractiveness, some farmers consider them as constraints and source of productivity loss. (FR-3)

The cultural recognition could thus be a synergy basis for different actors and actions in the montado. Nevertheless, cultural heritage needs to be combined with today's management requirements and constraints, and also with the income basis in the montado – and this has so far been kept quite aside in the process of World Heritage application. Thus, it is creating more conflicts than synergies, being land owners concerned about possible limitations to their room for manoeuvre. (PT-1)

Despite its prominence across the case studies, the interrelation between the conservation of species and habitats (ESBO #11) and landscape and cultural heritage (#14) is mostly not specified or discussed

very much. Across all 34 case studies, there was hardly any commentary or analysis of the interrelationships between environmentally beneficial outcomes.

However, rather as an exception, an interesting approach to assess the interlinkages between the different ESBOs was undertaken in the German case study on the Green Belt (DE-1) where the quality of linkages between two ESBOs was analysed:

The provision of the ESBOs are strongly interlinked; these linkages have been assessed using an adjacent matrix indicating strong influence (2), and weaker or indirect influence (1) from one ESBO to another. The assessment shows that landscape and species and habitats are the most active ESBOs; while outdoor recreation and education are the most central ESBOs [...]. The last three ESBOs (vital urban community, water quality and air quality) are passive in that they largely depend on the provision of the other ESBOs and do not actively or strongly contribute to provision of the active ones. (DE-1)

3 Collective actions and state of progress of the initiatives

This chapter explores the forms and extent of collaboration and collective action in the case study initiatives, the ways in which they have developed and any innovations involved, their potential for the future and the issue of how change can be motivated.

A collective action has been described by Marshall (1998) as “the action taken by a group (either directly or on its behalf through an organization) in pursuit of members’ perceived shared interests”. Based on a literature review and reviews of institutional frameworks in the 10 countries, where PEGASUS has carried out case studies, WP3 developed a typology of collective actions aimed at characterising the PEGASUS case studies, as follows (Deliverable D3.3):

- a) Individual action;
- b) Collective action-public policy driven;
- c) Collective action-private actors driven; and,
- d) Collective action-public/private partnership driven

This has been a helpful starting point for the case study work and for the subsequent analysis. However, the initiatives described in the case studies were also found to be at very different stages in their development, including in relation to their institutional frameworks, and their objectives of supporting an enhanced ESBOs provision from farming or forestry. By considering the processes, pathways and histories of case study development, we have sought to identify common organising factors and distinguishing features shaping them.

The key steps in the process of setting up and developing an initiative could be categorised as follows:

1. Testing the ground,
2. Initiation,
3. Development; and,
4. Review, monitor and feedback

We plotted most of the 34 case studies (CS) against a development timeline comprising the following stages: embryonic, fledgling, still growing and established. Amongst those qualified as “established CS”, we found some that have encountered a need for renewal/adjustment and others that are apparently stable and successful. We also considered the relative scale of development of the CS, in respect of how many actors are involved and the degree of collective action achieved. These two axes of differentiation enable us to explore and demonstrate the variety in our cases.

Overall, we can identify that the majority of CS have a defined ‘timeline’ to their story, with a beginning, and then various stages in development and, in some cases, an end. However, there are a few CS, which heavily relate to a certain area or a location, where the study is a snapshot of the situation at the time of the research and less of an account of a specific initiative. In these cases, it has been more difficult to distinguish one concrete initiative or "action" with a clear "starting time" or developmental status, as the CS deals with ongoing interrelated processes.

Just 5 of the 34 PEGASUS case studies appear to have this character, as follows:

- AT-2 S-E-S in the Biosphere Reserve Lungau (Salzburg region);
- AT-3 Mountain forestry and ESBO provision in mountain area Pinzgau;
- FR-3 Agriculture and forestry in the Parc National des Cévennes;
- IT-4 Niche products and tourism in Tuscany;
- PT-1 the Montado extensive silvo-pastoral system in Portugal.

Another point worthy of note is the very different pace of development of the different initiatives studied. This can be a reflection of their scale, context and level of complexity. For instance the history of how the transition to widespread uptake of integrated agriculture techniques in the processed tomato supply chain in northern Italy became established and has developed is a long story of more than 20 years. This is because it has taken time for so many farmers and organisations to come together to form, first a producer organisation, then a federation of organisations and, more recently, an inter-branch organisation which oversees the action plans and commitments across a range of POs and private processing companies. By contrast, the work involved to build the collective action in the Estonian grass-fed organic beef initiative has taken only around 8 years so far, to develop a multi-actor network across the country. Nevertheless, most initiatives have taken more time than what would commonly be considered eligible for ‘project funding’ under many regional and rural development programmes.

We have sought to plot a majority of the PEGASUS case studies onto a two-axis-graph, identifying the **development status or stage of progress** (X-axis) and the **level of complexity of (collective) development** (Y-axis). As outlined above, for this purpose the progress of the cases was divided into four stages:

1. Planning
2. Initiation/development/growth
3. Well-developed/established, but with a need for adjustment and
4. Well w developed/established, stable/successful – no apparent need for change.

While the character of collective development of cases was divided into three categories, as follows:

1. Ringleader (individual person)-based, i.e. a person crucial in establishing a group action
2. Collective, a joint effort but still with strong leadership from an individual or institution
3. Collective, joint effort between multiple stakeholders and inter-connected groups, no single leader.

Despite the diversity and sometimes the complexity of the individual cases, several distinct groups are evident. Many well-developed, stable and successful cases seem to be those of collective, joint efforts but *with strong leadership* – this makes up the largest number of cases (EE-3, FR-2, IT3, NL-1, NL-2, DE-1, DE-3 - see Figure). The second most common typology in this part of the graph is the group where strong leadership is ensured by a (private) company or organisation (FR-2, NL-1, NL-2, DE-3), by the state or a local municipality (EE-3, DE-1) or by a farmers` association (IT-3). The group of case studies, representing still developing initiatives, is also quite large (UK-2, UK-4, PT-3).

Another group is formed by i) well-developed/established, stable successful cases of “fully” collective/joint efforts (UK-1, AT-1, NL-4), where there is no obvious need for renewal or adjustments,

and ii) successful and stable cases, where the role of ringleaders (individuals) in initiation and development of the cases is crucial (EE and CZ cases and in fact probably also UK-1, to an extent). The SI-2 and UK-4 case study initiatives are joint efforts with a strong leadership, and are developing and successful, but in need of adjustments for various reasons. The SI-2 case is a bit special in that it really consists of two “cases” of which one is successful, with no need for adjustments, while the other needs improvement. All the other Slovenian cases (SI-1, SI-3, SI-4) are the only cases plotted as being in a planning or initiation phase, while UK2 is at a turning point in its development, after an initial but limited phase of success. It is less easy to define the level of collective development in these cases because it has not been extensively tested as yet.

SI-1 and SI-3 seem to be more collective/joint efforts than SI-4 and UK-2 which appear to depend on one lead individual or organisation. The NL-3 collective/joint effort case study was started recently and is in a currently successful developing phase. The DE-2 case is rather difficult to plot: although a relatively long-established and relatively well-functioning initiative, its leading organisation is threatened by a lack of successors and there is a feeling that it has somehow been ‘left behind’ as other organisations move into the same territory. Thus, the problem of no interchange with other similar initiatives was specifically pointed out by the case study authors.

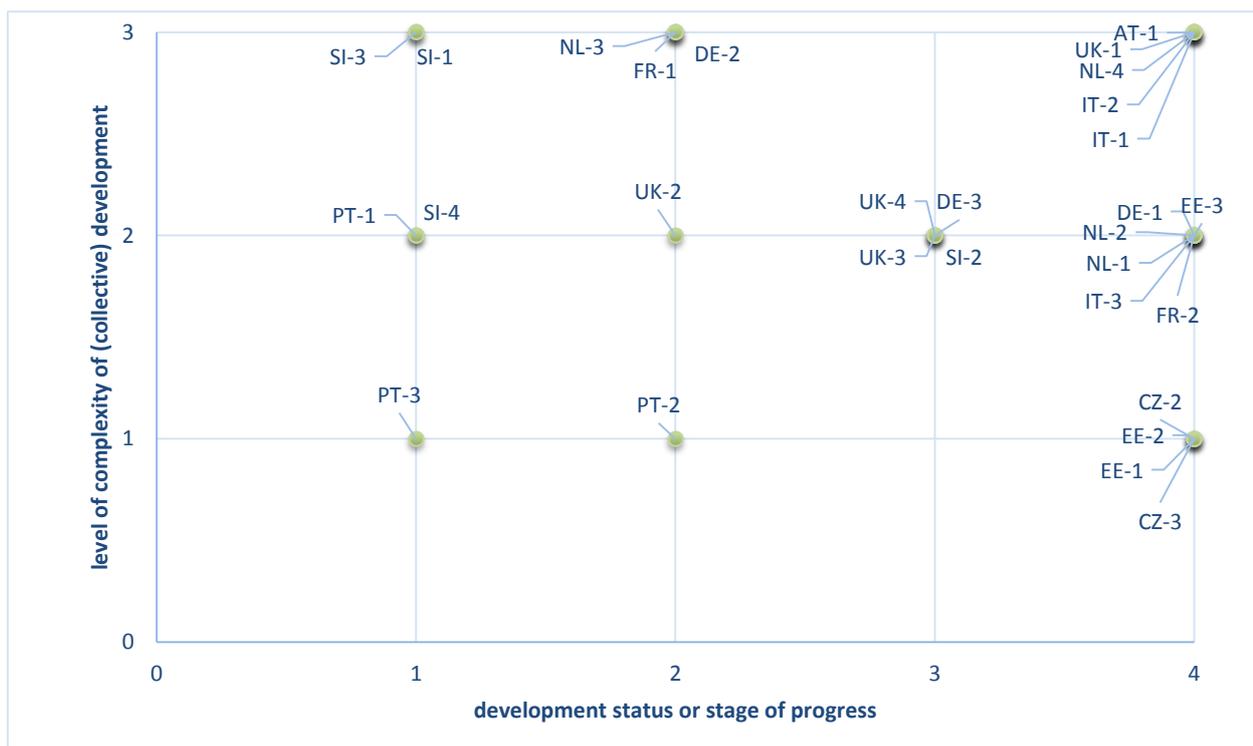


Figure 7 Distribution of PEGASUS CS in terms of development status and level of complexity of this (collective) development. ⁵

A number of key questions concerning the case study initiatives and their stages of development have been considered and are discussed in the following sections.

⁵ See Table 1 for reference titles

3.1 Triggers and rationale for the initiatives

There is a wide range of drivers or specific factors and events identified that have been identified as appearing to trigger the setting up of the differing initiatives studied. These drivers are also associated with an equally diverse set of rationales for putting in place the types of collective action studied. Some began via the actions of corporate institutions or policy makers; whilst others started due to more local circumstances – opportunities or threats arising to a group or an individual actor, which were recognised and responded to by setting up the initiative.

To create the conditions in which such initiatives start requires communication, confidence and the courage to take a risk. It also frequently relies upon individuals or groups who have a particular knowledge, awareness of or interest in ESBOs and how they interact with farmers and foresters in a positive way at local level. There is clearly an entrepreneurial aspect to many of the cases – starting in the same way as a small business venture, where some individual or group identifies a new opportunity to take action in respect of some aspect of SES management or development. Even when an initiative begins in response to a large corporate stimulus, as in the French Volvic water management case (FR-2), there is an element of corporate innovation with respect to the notion of co-operating with local municipalities to encourage enhanced land management in the catchment. In this case, the fact that Danone had previously done something quite similar in the catchment for its Evian water company gave it confidence to initiate the process in Volvic.

The cases include some which are starting something new or trying to move in another direction from an existing one, as well as those wishing to improve or further develop a current situation. Frequently, these occurrences need an internal or external driver, or trigger.

When looking at all 34 PEGASUS cases, we distinguish three main groups of triggers leading to the initiation of actions or projects, or a first testing of the case for an initiative:

1. Changes in social/societal-appreciation of an ESBO;
2. Economic pressures (on farmers and other actors) and opportunities (often to market a product or service);
3. Changes to regulations/ policy measures and payment schemes/ institutions and market conditions,
4. Environmental challenges which require action,
5. The emergence of strong ringleaders with an ambition to make a difference.

In many instances more than one of these types of trigger act together. It is not therefore always possible to distinguish only one single trigger and it can be difficult to decide which of these is the most significant. However, there are cases where it is possible to point out the dominant trigger, whether social/societal appreciation (e.g. AT-1, FR-2, IT-2, NL-1, SI-4, UK-4), the vision brought by strong ringleaders (e.g. CZ-2, CZ-3, EE-2, FR-1) or changes to regulations, policy situations, or the behaviour of institutions (e.g. CZ-1, AT-3, EE-3, PT-3).

1) One trigger common to nearly all the cases is **growing societal appreciation** of one or more ESBOs. This can arise both from the recognition of an (unsatisfactory) situation related to agriculture and

forestry, whether environmental or socio-economic (e.g. economic decline, depopulation etc. leading to an increased focus upon rural vitality), or from more positive situations where societal demand for more of a specific benefit – water quality, wildlife – or of a farming system itself (e.g. outdoor grazed beef in NL-1, organic mountain hay milk farming AT-1) is helping an initiative to grow and develop. Societal-appreciation can often be related to market trends (e.g. for healthy, local food), consumers' or wider societal needs, or a demand by society for a certain service or good (outdoor recreation, health, social inclusion).

There are also triggers for actors to seek positively to influence the public image of an enterprise or company – while at the same time meeting legal standards – like the farmer, beer and water case in the Netherlands (NL-2) or the Volvic case in France (FR-2) providing the key stimulus for a particular project or action. Making use of this public appreciation and turning it into consumer demand has often enabled the economic opportunities identified by the initiatives, e.g. branding of products, agro-tourism etc. to succeed.

The growing demand for recreation/leisure/health is another expression of the appreciation of certain ESBOs by society. In a few cases, the driver behind the initiative relates to a wish to increase the access to the countryside and outdoor recreation opportunities. The latter applies most often in the forest and semi-urban cases (e.g. DE-1, EE-3, SI-2 etc.) but also in the more traditional rural areas (IT-2, IT-4). New cultural/social demands often lie behind these initiatives (see economic opportunities) but they are partly shaped by regulation as well, particularly in the case of forests where their use as a public resource is often stipulated in national forest legislation.

2) Economic pressures and opportunities: Economic pressures on farms and other rural enterprises are the most commonly cited driver for action in the PEGASUS case studies. They relate either to the rural area or locality in general, or are specific to a particular sector (both the primary production sectors as a whole (e.g. agriculture and/or forestry) and production systems/ products within these sectors). For example:

- a) In many cases, economic pressures are seen to have put at risk the economic stability of rural areas (with a particular focus often on the agriculture sector and agricultural employment within this) and often are seen to be linked to threats to the long term social resilience of rural communities more generally. In many cases this is related to farm/forestry management systems and/or traditional structures being at risk – both from economic rationalisation and intensification – thereby threatening the character of the landscape, valued by the public, in many cases the levels of biodiversity (often dependent on specific land management) and sometimes the overall rural vitality of the area, particularly where farming is the key employment sector. This is the case in: AT-1, AT2, DE-2, EE-1, NL-1 (where the practice of outdoor grazing is declining since the abolition of milk quota has made technological change and robotic milking more attractive but there is less threat to farm viability or structures), SI1 (where traditional sheep breeds and woodland are at risk), SI-3 (abandonment of areas within a NATURA 2000 area – Goricko Landscape Park), AT-1, AT-2, IT-4 (restructuring of the local economy, with a decline of traditional activities and their associated environmental and cultural attributes), UK-3, PT-3 (rural depopulation). Often the specific environmental ESBOs are more implicit than explicit.

- b) Where economic pressures are specific to a particular sector – for example where a sector is experiencing considerable competitive pressures, for example as a result of low prices from the market for their products, or low farm incomes. This is the case in: DE-2 (for apples from traditional orchard meadows), FR-1 (low milk prices), IT-1 (tomatoes), IT-2 (Bergamot), EE-1 (organic products) and many more. In NL-1 the abolition of milk quotas led to an increase in the number of dairy cattle, increasing the pressure on land and making outdoor grazing more difficult. Competitive pressures in the market do not only put more sustainable agricultural systems at risk of becoming more intensive, but also can lead to the abandonment of agriculture in the most fragile systems;
- c) Where new opportunities emerge from unexplored and very attractive markets created by increasing demand for quality and niche/local products, leisure and green tourism. This is the case for new uses of bergamot production and alternative forms of tourism in Calabria (IT-2) or in Garfagnana (IT-4), for example.

3) Regulations/policy/institutions-led cases have generally been triggered by EU, regional, national or local level political decisions and legislation, creating a need for changes or introducing new requirements which lead to actions, projects and approaches to meet them. They can act as driver in a number of different ways:

- a) By stimulating action to comply with legislation. Most of the clearest examples we have relate to water quality and quantity – as in the cases of IT-1, FR-2 (where drinking water quality is key), NL-2 (obligation to reduce the discharge of pollutants into watercourses), NL-4 (where water quality is poor as a result of intensive management, water quantity – both too much and too little, and vulnerability of soils), UK-1 (to address issues with achieving good ecological status and preventing flooding) as well as in respect of the regulations on the formation and the basic requirements of producer organisations, in the Fruit and Vegetable regimes of the CAP (which were a critical trigger for the tomato-processing case in Italy). The rules associated with protected areas, e.g. Natura 2000 areas, also stimulate action in several case study initiatives
- b) By being a driver of the problem that the initiative is trying to solve (e.g. manure regulations in the NL help to drive farmers towards indoor production to control emissions and dispose more easily of manure).
- c) Another driver is changes in the budget for public financing, whether increases allowing new schemes or budget cuts which can lead actors to search for new opportunities and actions, like one of the cases in the Netherlands – nature management and regional planning in Drenthe:

“In fact this shift meant a reduction of regional expenditure as the Province did not foresee in any subsidies for municipalities to manage the landscape. [...] In the end, this resulted in the pilot Project “Landscape is managed together” with a budget for both landscape and agricultural nature management”. (NL-3)

- d) There are also several cases where the legislative framework itself provides a fundamental basis for or leads directly to the initiation of actions, like the protected areas and biosphere reserves/UNESCO sites, (AT-2, CZ-1, FR-3, IT-3, SI-4) or other designations, such as the Area of Outstanding Natural Beauty in UK-3.

4) Environmental challenges – less frequently, local concern about the environmental challenges faced in a particular area or sector, (separately from regulatory and policy drivers), leads directly to

the setting up of the initiative. This is particularly the case in relation to water and soils, both in response to extreme weather events like flooding (UK-1, NL-4), droughts or lack of water availability (NL-4), the need to keep water quality high (overlap with regulation) as well as issues with soil health / vulnerability (e.g. NL4 addressing issues on sandy soils and decades of high manure application and heavy machinery use). In other cases it is concern for biodiversity and habitat decline that drive action (e.g. CZ-2, CZ-3). One specific variant of this driver is the desire to demonstrate that nature protection/environmental sustainability can go hand in hand with viable agricultural activity. This has driven the initiatives studied in SI-4 and UK-2. Land use changes that are often a direct cause of or at least are contributing to the environmental challenges have also been a trigger of initiatives, as has already been described in section 2.2.2.

5) Finally, the entrepreneurial culture and goals of certain individuals, groups of people, NGOs and private companies can also be seen as drivers, especially where they create economic opportunities, which in turn leads to action. They are often the vital catalysts for action, responding to one or more of the triggers identified above. Without the entrepreneurial spirit or environmental/social idealism of these people, often the initiatives would not have got off the ground (e.g. AT-1, AT-2, EE-1, EE-2, IT-4 and many others). In the Czech Republic CS on natural succession in forests (CZ-3) the trigger was *“first of all the enthusiasm of a few ecologists, who managed to meet demand of public for improvement of nature in forestry”*. In the Estonian case: *„Central to the whole system is the NGO created by some active persons who are initiators and ringleaders of the whole approach: initiative and action of certain persons is very important for this case”* (EE-2). The motivation of certain key person(s), whom we can call ringleaders, sometimes is purely or largely altruistic or idealistic, a kind of “swimming against the tide” of land use management and perhaps local opinion, as illustrated in those cases in the Czech Republic, where nature and environment protection goals have been primary. In other cases it may be related to actors’ own economic interests and search for new ways to earn income (Estonian case). Nevertheless, key to both types of trigger is a strong belief that the individual or group can help to change wider public appreciation, through their actions and the outcomes of the initiative.

In terms of the underpinning **rationales of the initiatives**, as identified by the CS experts (which may or may not be formally recognised in the objectives of the initiative), these follow the drivers fairly closely. In some cases, the rationale for taking action is primarily economic, with the environmental and social benefits being secondary (e.g. IT-1, IT-2). Often the two are considered together, with the ESBOs sometimes underpinning the market initiatives (e.g. in most of the cases where branding and labels are developed for an area or a specific product), and in a few cases, the rationale is primarily environmental (DE-2, CZ-3, CZ-2, UK-2 etc.), although this is less common in the examples we have examined. Some of the main objectives found in the case studies are:

- In many cases the overarching rationale for the initiatives has been to enhance the long term **economic stability and resilience of rural areas** (often to sustain their cultural identity and retain rural vitality), particularly in areas where this is perceived to be at risk. This objective has taken a number of different forms. For example:
 - o In some places, the strong regional identity (in cultural, environmental and landscape character terms) is seen as a marketing opportunity, both to add value to products and to

the area as a whole (e.g. mountain areas – AT-1, FR-1, SI-1, IT-3, IT-4, PT-2). In some cases, these initiatives also aim explicitly to create market drivers for the provision of specific environmental benefits – e.g. water quality.

- In others, it is the relationship of the specific farming system itself with a valued landscape and/or its environmental and social value that provides the opportunity and rationale for action (e.g. organic haymilk in AT-1, SI-3, UK-3 etc.)
- In other cases, the rationale is to **increase the profitability and competitiveness of the agricultural sector or particular products** within this:
 - In some cases, the motivation is focussed more on benefits for individuals, often to **increase prices for producers** (and often at the same time to maintain the landscape associated with the farming system involved). Examples include projects to increase the milk price and maintenance of grassland management in Pays de Langres (FR-2) and NL-1, beef prices in EE-2, organic producer prices in EE1 and in Calabria to stabilise the market price of bergamot essential oil (IT-2). Other examples include olive prices in PT-3, adding value to sheep and wood products in SI1 and the returns on apples from traditional orchard management in DE-2. This is often linked to finding business opportunities linked to increased appreciation of certain ESBOs.
 - In a number of cases, the rationale for action has been to **strengthen the competitive position of the sector as a whole** in international and national markets or improve market access (e.g. IT-1; IT-2). One approach to this is through inter-branch organisation, pursuing consistent product quality, lower costs and greater negotiating power in the market place (in the tomato supply chain example the way to do this has been to promote sustainable management practices, mainly to comply with national legislation on irrigation etc.). For the organic bergamot producers, the rationale was partly to escape the oligopolistic structure of the bergamot value chain and in PT-2 the challenge was to improve the competitiveness of olive producers in an expanding market. NL-4 (an arable farmer association) provides an example of seeking an advantage with some market parties via a certification scheme linked to sustainable management practices. Some of these examples are initiated by farmers, some by other players in the supply chain.
 - In other cases, the impetus has been to **set up a more remunerative and preferably premium market for products of a certain quality where this is currently missing** – e.g. for sheep and wood products in SI-1 or for grass fed beef in EE-2. In the Estonian example this has involved bringing the various actors involved in the supply chain together.
- The identification of **more efficient means of managing environmental risks/challenges** (e.g. of declining water quality) is a motivation for some of the initiatives, particularly those where there is a private interest involved (although not exclusively). This is the case in FR-2 (Volvic) as well as UK-1, NL-2, NL-3, NL-4 and UK--2 in terms of approaches to influence policy.
- In other cases, it is a **love of nature/culture and a commitment to the environment** and the protection of habitats that provides the impetus for action (CZ-2, CZ-3, AT-2) or the desire to raise awareness of the environmental benefits and cultural aspects of particular systems, such as traditionally managed apple orchards in DE-2 or the management of semi-natural grassland habitats in EE-2 or that profitable arable farming can go hand in hand with ESBO provision in UK-2.

- Finally, for some private companies, part of the broader economic rationale for engaging in or promoting the initiative is the desire to **maintain product quality, brand reputation and image** (FR-2 – Danone/Volvic), NL2 (Bavaria Brewery), NL-1 (CONO) – see below regarding the factors influencing the engagement of the private sector.

3.2 Conditions for the successful establishment and development of initiatives

“What key actions, information and other developments helped to create these conditions?” is the key question addressed in this section. These conditions for success include both a range of human capital characteristics (knowledge, confidence to act, skills in communication or innovation) and also social capital characteristics (exhibited in different kinds of community, new linkages being made or by the strengthening of trust and capacity among a group). Beyond this, wider drivers and linkages have played a role including contextual changes, threats or opportunities, the emergence of special political conditions, prior reasons for the formation of a stakeholder group etc.

A common theme emerging in many cases is the importance, early on in the development of a new approach, project or initiative, of information-sharing, promoting exchange of knowledge and opinions between different stakeholders whose actions are directly relevant to achieving ESBOs. Sometimes the process of gathering and sharing information is deliberately pursued by the project initiator(s) – for instance in the Danone case in France; while in other cases it can be almost by accident or incidental. Often it is only once that information-sharing takes place that different individuals or groups realise that there is a potential common interest that they could work on, together. This is the case, for instance, in Hope Farm in the UK-2 (arable and AES farm-scale). Here, the gradual involvement of the farm manager in the neighbouring farms’ informal networks (assisted by the action-oriented work of the Pegasus team) has raised his awareness and thus also enabled the RSPB to recognise that there could be common interests in working together to enhance ESBO provision and economic performance simultaneously in this locality.

The critical role played by actively shared information and communication, and the consequent relevance of trust as a factor enabling this, is highlighted in many case studies. In those where there are lower levels of trust among various key actors – for example between farmers and landowners and government-sponsored environmental agencies and environmental NGOs (e.g. in the Czech Republic, Slovenia, UK) – it can be important for actors to take sufficient time and be less explicit/agenda-driven or more conciliatory and willing to listen to alternative views, as they establish the key relationships that can begin to facilitate change. Often distrust arises from differences in perceptions when certain things are overlooked or ‘taken for granted’ by one party, whereas another party sees exactly those things as very important to recognise and understand.

In these kinds of situation, the techniques of conflict resolution may form part of the early stages of a new initiative – simply creating ‘neutral’ situations that allow conflicting parties time to come together and hear each other’s views, before any judgements are made about what should happen and why. In the most difficult situations, it may not even be possible to incentivise actors to come together for these kinds of exchange as they may lack confidence in their ability to communicate in large meetings, or they may simply distrust all others present and their motives. Thus, we find

examples where initiatives must work by careful and painstaking ‘piecing together’ of a collective understanding through multiple one-to-one meetings in a variety of less formal settings (e.g. UK-3), or where gatherings are hosted first for entirely social and community purposes, rather than with a specific ESBO objective in mind (e.g. PT-2).

3.3 Barriers to success encountered during development and how have they been tackled?

Many cases present an interesting narrative of obstacles identified, overcome or not, and the reasons why. There are many parallels with small business development, where frequently the challenges change as the initiative grows and develops. As a general pattern, we could say that at the start, the barriers are often failures in effective communication and information provision and exchange, as well as a lack of trust or simply a lack of awareness of situations, threats, trends and potentials.

As the initiative develops, physical and institutional constraints may become key – e.g. ‘we know what we want to do, now we need to find the resources to make it happen’. This is the case, for instance, in UK-4 (Care Farms), where the national network has developed to a point where it sees the need for a step-change in resourcing in order to sustain and expand the considerable potential within the movement – in this case, reaching out in a more co-ordinated way to the health sector. A related barrier in these situations can be specific technical or commercial knowledge or expertise: e.g. knowing how to set up a company or understanding how best to develop an effective promotional message or brand; or being able to speak persuasively to those in positions of relative power and influence, such as commercial organisations or government officials, to unlock access to new resources.

We can see this in respect of a number of case studies – e.g. the Slovenian mountain wood-products initiative, where technical skills from the forest processing sector were drawn into project development by the Pegasus team; and by Danone’s apparently new-found interest in working with agricultural extension officers to seek to identify better ways to ensure water quality through appropriate farming practices. Often, there is a kind of dynamic interplay between knowledge, information sharing, trust and technical or business skills development and acquisition. One may feed off, and then feed back into, the other factor – as new gaps are identified, new people or institutions are drawn into the initiative and their knowledge and information further highlights new opportunities, knowledge gaps or resource needs to be addressed. This is illustrated very well in the case of the tomato processing chain in northern Italy, where we see a cumulative development of ever-more sophisticated and influential ways of working and raising standards of ESBO provision, over a long period of time.

Once maturity is reached, barriers may still arise, and policy change or alterations in funding can be important. In some cases, these could arise from too much complacency once the long-sought-after goals that drove the initial process appear to have been reached, when in fact, changing external circumstances or certain characteristics of partners (e.g. increasing age, reduced capabilities) mean that these cannot be taken for granted. The German orchards case (DE-2) is an example. For other cases, it is perhaps more the ‘price of success’ which may be a barrier to further progress, including ‘actor burnout’ among key individuals – always a risk when an initiative depends heavily upon one

charismatic individual (e.g. the CZ-3; AT-1) – or institutional growth and external funders requiring the development of more complex monitoring and reporting obligations, which may then stifle or at least, reduce, continuing innovation (the ‘dead hand’ of bureaucracy, e.g. in at least one Netherlands case and perhaps France).

In some cases, it appeared necessary to take steps to renew the initiative by changing key roles or bringing new people in, or to decide to disengage from certain formal undertakings, in order to enable more radical or free thinking about future directions. Indeed, the Pegasus study teams have been aware in some of these case studies that this is perceived as a useful role that external researchers can play – providing fresh eyes through which to evaluate an initiative, identifying its strengths and weaknesses and generating new ideas for positive future development (this was clearly the case with SL-4, UK-2 and UK-3, DE-2 and others).

3.4 Synergies and tensions between ESBOs and farming and forestry activities.

Many CS show potential for further development in this respect – greater synergies might be achievable. Indeed, identifying them and suggesting how they could be taken forward was one common theme of the case study reports. The action-oriented research approach has enabled teams to engage directly in the agendas of the cases that they have studied, aiming to help them to consider and plan to realise more of that latent potential.

However there are also many cases where the research team was aware of the fragility or contingency of the synergistic relationships in place between farmers’ or foresters’ practices and ESBO provision. For instance in the Estonian beef case (EE-2), it is clear that some of the farmers needed to be persuaded of the economic added-value of the marketing approach being developed (raising public profile, building a dedicated customer base), as opposed to the simpler alternative of simply selling their beef cattle for live export when prices are relatively high. If one link in the chain is broken (e.g. they produce organically but then fail to get a differentiated premium price), the stability of the system could be threatened.

In the Volvic water management case (FR-2), discussion between farmers and Volvic has highlighted a tension between the continuation of the established low-impact livestock farming and the uncertainties associated with the economic support needed to underpin it. While Volvic seems focused upon the risk of damage through intensification and thus works to promote management practices which are better informed and more precise, farmers themselves identify the main risk to continuing ESBO provision as being their own financial survival. Currently this depends upon significant, but not necessarily secure, CAP support payments where it is being considered by the partnership how the commercial beneficiary of the system might be encouraged to take on some part in this relationship in future. The question then becomes – if the alternative scenario is not intensification but farm collapse and land abandonment, does Volvic still see this as equally undesirable in respect of its public image and the quality of the product? Different tensions can be seen with the issue of outdoor grazing of dairy cattle in the Netherlands. The initiative is strongly supported by public opinion, but the science behind the apparent animal welfare benefits disputed.

3.5 Threats and uncertainties holding back achievements

The list of these challenges includes market fluctuations, policy changes, developments in consumer and citizen preferences and demand which are all beyond the immediate influence of the players. This can raise major questions such as is the market opportunity really based upon a more permanent shift in societal norms or just a temporary fashion? Does the policy system, or the corporate player, really want to commit to this relationship, and is it sustainable in the longer-term? Internal threats within projects include ageing and increasingly less active land managers, the adverse influence of economies of scale in management practices and supply chains, the loss of local autonomy as initiatives grow and more people become involved. Suspicion and bad feeling among key actors, leading to insufficient communication/trust to maintain progress is an issue in some cases. In others it is a loss of key people who have been pivotal in getting the process moving. Many of these challenges and setbacks can't be avoided, but they can be recognised as risks, and planned for as contingencies, at least to some degree.

4 Internal and external factors influencing the interplay between the commercial / private, public and voluntary aspects of the initiatives

In this chapter we assess the factors, both internal and external to the case study initiatives that have influenced the dynamic interactions between private initiatives/ market drivers, public policies and voluntary initiatives and consider how these have influenced ESBO provision from farming or forestry. A number of questions were identified against which the case studies were reviewed.

4.1 Influences on the engagement of the private sector

First, it is important to define what we mean by the private sector (here we do not include the non-profit, 'voluntary', sector). There is a distinction to be made between active private sector players who are shaping or actively engaged in the design and development of the collective action and those who, while they are participants, are more passively involved. The second group are perhaps better classified as beneficiaries of the collective action. The focus in this section on the first group.

There are varying degrees of involvement by private actors in the initiatives studied. These include cases where commercial operators/actors who actively drive the initiative; collaborative approaches where commercial operators co-develop the initiative with stakeholders and private individuals (including farmers/foresters); and situations where the commercial operators or individuals engage in the initiative at a later stage, once it is up and running, i.e. when the potential economic opportunities become more evident. These second stage actors are often approached to participate by those in the initiative and the stakeholders involved.

The case studies identified a range of **commercial operators/actors driving the initiatives**. These included:

- a) Individuals and groups of farmers cooperating at the production level – e.g. bergamot producers;
- b) Retailers and supply chain actors, operating individually as well as cooperating along the supply chain. These types of actor include those that are part of the supply chain linked with the agricultural product being produced or part of a supply chain linked to an ESBO (e.g. clean water) that is associated with the agricultural production system. Examples include the Bavaria brewery, the Heineken brewery (original impetus for the Skylark initiative), Danone in the case of the Volvic case study; producer groups (e.g. tomato inter-branch in IT1 – which also includes downstream players); processors (e.g. dairy processors in NL-1); and retailers.
- c) Consultancies, for example the organisation involved in developing the standards for the organic mountain haymilk and value chain organisation in AT-1.

In all these examples, a clear economic/ business case for protecting or producing ESBOs is generally the starting point for action – the private company identifies action as an efficient or an effective means of achieving the outcomes required. There are different types of economic/ business cases, the bottom line for which is generally enhanced profitability for the company. There is some overlap between these commercial goals but they include:

- To improve public image and brand reputation;

- To obtain a price premium and/or to maintain the appeal or credibility of a specific product with consumers, e.g. the dairy company CONO in NL-1; or to meet consumers' evolving demands. Some supply chain operators engage because it provides them with a market niche, for example by adding value to products, e.g. cheese in NL-1; milk in the AT-1 haymilk example, etc.;
- To sustain the license to operate or to meet obligatory product standards (in light of legislative requirements), e.g. Danone in FR and the breweries in the NL;
- To enable wider access to markets, e.g. the interbranch organisation in the IT-1 tomato case study; or to find new market outlets, e.g. the organic producers' union in IT-2 bergamot case study;
- To reduce costs, e.g. Bavaria brewery was previously compensating farmers to limit their water use to address water scarcity issues, and wanted to avoid the costs of building a sewage facility to comply with local legislative requirements; Danone in the FR Volvic case study is another example, with the company seeking to avoid water treatment and its costs.

There are several examples in the case studies where **commercial operators co-developed the initiative** with local stakeholders and private individuals (including farmers/ foresters) via collaborative approaches. Typically there was a perceived opportunity to develop added economic value from the farming and other activities taking place in the area, such as using the landscape and environmental value of the area to promote niche products and/or tourism (e.g. Pays de Langres PDO in FR-1, the Garfagnana case study in Italy). In other case studies, shared motivations were the driver for engagement. For example, in the WILD project (UK-1), the private water company works with local advisers and agencies to deliver ESBOs only some of which directly benefit them. In the Bavaria brewery case in the Netherlands (NL-2), the interest of the brewery is to avoid the costs of installing a new sewage system, whereas farmers are keen to mitigate the effects of droughts by using recycled water from the brewery. In the haymilk case study in Austria (AT-1), a retailer cooperates with a consultancy, a food processor and farmers to exclusively distribute organic dairy products from a specific area.

In the situations where the **commercial operators/individuals recognise the potential economic opportunities available at a later stage**, once the initiative is running, the opportunities have generally already been created by the public sector/other players. Commercial players arrive later, and in the PEGASUS case studies, they have often been sought out by those involved in the initiative. This can be seen in cases where territorial initiatives have been developed to promote the identity of an area, often driven by public sector stakeholders and NGOs in the first instance. Examples include the Slovenian nature conservation initiative, which is an attempt to drive local tourism (SI-4) and the wet meadows restoration project in the Czech Republic (CZ-2).

In most of the cases examined, the participation of private land managers, e.g. farmers and/or foresters was central to the initiative. For foresters, there is often an issue of property rights to be overcome, e.g. where forest land cannot be purchased (e.g. CZ-3) or where property rights constrain "the owners' right to manage and derive benefits from their own property" (SI-2). Understanding farmer motivations is not straightforward, with the case studies showing contrasting levels of

farmers' participation. The factors influencing farmers' participation can be grouped as follows (they are not mutually exclusive):

- Economic motives: these include generation of sufficient profit or revenue for example via increases in the price of products, obtaining compensation for accepting opportunity costs or payments for services supplied either through policies or the market;
- The ease of supplying/ implementing what is required – the level of bureaucracy involved may be a critical issue;
- Technological motives: obtaining access to new technologies or advisory services that have the potential to improve farm performance;
- Non-economic (intrinsic) motivations: these include belief or scepticism about the goals of the initiative and levels of trust of those running it, which can vary considerably (there are several examples of where lack of trust hinders engagement – e.g. CZ, SI cases), social aspects (NL-2), cultural/educational aspects, e.g. DE-2 and peer pressure from neighbouring farms.

4.2 Links between public / private / other stakeholder interactions, the supply of ESBOs and market demand

It is quite difficult to distinguish a clear relationship between the nature of the interaction connecting different types of actors, the supply of ESBOs and the market demand for these. There are several reasons for this, including the variability of the relationships that we have seen in the Case Studies and the literature. Furthermore, apart from rural vitality and recreation, the desire to deliver ESBOs, and particularly environmentally beneficial outcomes, is rarely the primary driver of the activities undertaken. However, they are often an indirect driver. For example, a collective initiative may deliver an increased level of protection of water resources or improved water quality, but the primary driver for the farmers involved might be to comply with regulation in order to maintain a license to operate, avoid costs, etc. Similarly, the maintenance of landscape character may be an outcome in other initiatives, while the primary driver motivating action by farmers and others is to enhance the economic viability of the local area.

The supply of environmental ESBOs generally should increase as a result of the actions taken in the initiatives and the objectives adopted. However, in some of the most effective cases the association with the ESBO is used as a means to increase economic opportunity for participants, although this is not often well quantified (see section 2.1.2). In most cases, the environmental and social benefits are complementary and can result from actions that have economic goals at their heart (e.g. increased farmer incomes, increased benefits to local economies), although these are often assumed rather than demonstrated and more work is required in this area. In one case, however, the social and environmental aspects have been found to conflict. In the intensive olive production (PT-3) case study, a dam was built to enable the intensification of olive production, which has revitalised the area in terms of income for rural communities and farmers at least temporarily, but the effects of the more intensive production are damaging rather than beneficial environmentally.

The establishment of distinctive local product labels and identities is perhaps one of the best and most visible means to nurture (place-based) ESBOs while, at the same time, making use of the

benefits through market development. Several initiatives in the case studies create links and generally increase benefits both from the land use management that they are based upon as well as the 'place' from which they originate. There is clear evidence that the diffusion/consolidation of ESBOs at local level can be strongly linked to the successful production and marketing of specific local products and brands, particularly those linked to environmentally sustainable production. When local commercial operators, including various sorts of producer associations, succeed in harnessing/developing market opportunities (at local, national or European level), there can be a direct positive impact on the diffusion/consolidation, or strengthening of supply of ESBOs at the local level.

The new markets can arise as the result of various factors: innovative products, better capacity to explore demand and/or to promote a new product amongst consumers, more direct relationship with international buyers, etc. This is evident in those cases where producers and processors within the supply chain have put in place collective initiatives to valorise the ESBO related specificities of agri-food products through the use of market channels (IT-1 and IT-2).

4.3 Institutional and governance arrangements influencing private/public/voluntary interaction

One of the issues we sought to investigate was the way in which specific institutional and governance arrangements may influence the interactions between private, public and voluntary actors – by either supporting or undermining them. The case studies uncovered a range of different arrangements in place and specific examples showed the issues that can arise, often unintentionally, when governance settings are not well suited or sufficiently flexible to the needs of a local, collective initiative. The case studies also demonstrate some of the ways in which governance arrangements can be improved to support more effective collective action.

The examples collected suggest that where there is greater experience with the challenges faced in a particular locality, or where the types of activities promoted are fairly straightforward (e.g. the development of the haymilk organic farming label in AT-1), then the existing governance and institutional settings are more likely to be appropriate for an initiative to emerge or develop. Conversely, more novel initiatives and less local governance experience and capacity can create conditions that are less favourable to progress.

In terms of the issues, in some cases, sectoral rigidities and conflicts between objectives or policies have inhibited action – for example where agricultural or forest interests/strategies/plans diverge from those put in place for the environment (e.g. raised in AT-2). However, in AT-2 which focuses on the Lungau Biosphere Reserve, pressure and commitment for joined-up activities is increasing, although there remains a challenge to translate the strategy documents into practical actions on the ground. This raises an important question about how to cope with locally conflicting views.

Secondly, while the multi-level governance arrangements that are in place in most case study areas, especially in relation to CAP funded rural development measures, are often the principal source of public sector funding for the initiatives we have studied and frequently essential for them to function, they are not always supportive of collective approaches. In several cases they have enabled

intermediary actors, such as institutions or facilitators, to drive forward initiatives. These intermediaries can include National Parks and local authorities for example (e.g. the Valdaso agri-environment territorial agreement – IT-3). However, in this case, some important competences have not been devolved to the territorial level because of the fear of creating higher transaction costs and constraining the flexibility of the initiative. In other cases there has been some tension between the conventional models that authorities are accustomed to and the flexibility required for more innovative and/or collective approaches.

Where initiatives have sought solutions involving the whole **supply chain**, the key message that emerges is that potential benefits that can be achieved if the objectives are appropriate and the supply chain is able to operate in a joined-up way (e.g. DE-2, AT-1, IT-1 and IT-2). Focussing on several links in the chain has advantages over a focus on individual farms separately from the supply chain. In short supply chains, all parts of the value chain can be linked relatively easily and this can be effective but the market potential may be limited. However, for longer supply chains, the way information is transmitted through the chain usually is less transparent and the distance between the producer and consumer is greater. Improved awareness of the different aspects of the supply chain by the various actors involved would be helpful in some cases. Creating opportunities for the various actors along a supply chain to come together to discuss issues and work together is an important way of achieving this.

In EE-2, a small ‘value chain’ was created for marketing grass-fed beef from sites of importance for nature conservation, involving suppliers, processing and distribution organisations which have together created a board to oversee the development of the label. In the Italian tomato example, it is the inter-branch organisation that sets the institutional context for introducing sustainable practices within the supply chain as it is the place where the different actors in the chain come together to make decisions. It is important to point out that actions designed collectively, for example within a supply chain cooperative, can enable a long-term positive impact on the sustainability of initiatives, simply because they imply changes in the organisation of producers/processors which would not otherwise be possible (IT-1, IT-2). In this case, governance enhancements of the agri-food chain and the delivery of environmental and social benefits go hand in hand and the former are the required precursors to the latter.

Where labels or certification schemes are developed with ESBO objectives, the importance of transparent documentation, appropriate management prescriptions and effective controls is highlighted (e.g. DE-2, FR-1, NL-4, EE-2, AT-1, etc.). The type of management which producers have to adopt to permit access to the market / use of the label / obtain a higher price for their product (e.g. milk) needs to be clearly specified in the rules, whether they are rigid or more flexible. Transparent communication is important to allow trust to be developed between the producers and the consumers (AT-1, NL-1).

Some cases focused on bilateral agreements between a private company and land managers, primarily farmers along a supply chain (NL-1, AT-1). Both of the case studies using this type of arrangement relate to dairy products (milk and cheese) where consumer awareness and willingness to pay a premium for special products seems relatively great, at least in some parts of Europe.

In other cases, broader collaborative arrangements have been put in place. They involve heterogeneous stakeholders (FR-2, NL-2, NL-4) and some take the form of public-private partnerships. Collaborative governance is organized around the management of a circumscribed resource system, e.g. an aquifer and its watershed. In some cases, collaborative arrangements emerge through the integration of a specific value chain (NL-4, IT-1). Convergence of interests relating to the provision of ESBOs seems to be a key driver for the development of these types of arrangements. The reduction of transaction costs is also pointed at as another enabling factor.

It is also evident that the food/retail sector is often not much involved in the land management aspects of rural development policies, so ESBO provision is often divorced from the market, something that many of the initiatives investigated in PEGASUS have tried to overcome. Having said that, there is increased interest from parts of the food/retail sector in demonstrating their sustainability credentials, and in some of the cases studies (e.g. CONO in NL, the Skylark initiative, etc.), this is what has led them to get involved and engaged in the land management practices of their suppliers. Other governance issues identified include:

- The difficulty for small farmers of meeting the requirements imposed by conventional retail chains. In EE-1, renting special/dedicated space for these farmers and processors in supermarkets was identified as a creative way around this problem.
- Governance and property right issues particularly associated with forests. For example, such issues have hindered action to promote natural succession in forests in the Liberec region of the Czech Republic (CZ-3)
- How to motivate farmers to pursue market opportunities, especially when they are part time?

4.4 Policy interactions with the initiatives

There are many different types of policy being implemented or otherwise in play in the case studies. The main categories include:

- Regulation – both EU and national (e.g. protection of water quality, forest, spatial planning), e.g. AT-3, CZ-3, DE-1, IT-1, PT-3, NL-4, PT-2, UK-1;
- Payments to farmers and foresters related to land management, agri-environmental commitments and production (via the CAP Pillar 1 and 2 and Member States' implementation of these) present in almost all case studies;
- Funding to facilitate community action and cooperation, the setting up of producer groups, etc. via the CAP Pillars 1 and 2, e.g. UK-1 and NL2 (Skylark);
- Funding to support advice, awareness raising and to support marketing and promotion via CAP Pillar 2, e.g. EE-2;
- Investment support for capital costs via the EU Structural Funds or the CAP, e.g. CZ-2, CZ-3, EE-3;
- Funding for research and innovation via Operational Groups, LIFE projects, as well as regional/national funding, e.g. IT-1, SI-4;

- Funding for broader rural development related initiatives (infrastructure, cultural and social capital, job diversification, etc.) for the vitality of rural areas (through Structural Funds and LEADER approaches) e.g. EE-1, AT-2, FR-1, IT-2, IT-4, SI-3, SI-4 ;
- Other national or local funding sources, e.g. small conservation grants, e.g. DE-2, EE-1, EE-2, UK-3, UK-2.
- Land use planning in rural areas, including on the circumference of Frankfurt.

The role that policy plays in relation to the action situation in the case studies is very varied. Generally speaking, it appears that the public-private relationship is synergistic, relatively strong and that public policies work as an enabler and in some cases as drivers of a private actor-led initiative. Regulation is often highlighted as a driver for action, whereas funding instruments are generally used to provide incentives to farmers/foresters to join an initiative. Funding instruments may also enable the initiative to take place e.g. use of the Leader approach or the cooperative measure for agriculture within the RDPs to enable collective action, use of multiple CAP Pillar 2 measures in combination at the regional level to fund a variety of actions from quality labels to agro-tourism. In other cases they provide support for the underpinning activities on which the initiative relies e.g. organic farming for the haymilk label in AT-1 or the marketing of products in Estonian supermarkets in EE-1.

Another approach is to fund broader initiatives aimed at strengthening the vitality of rural areas e.g. via the EU Structural Funds and LEADER with the intention of creating not only the conditions for local development, but also in some cases for producing environmental benefits, usually indirectly. For example such spending programmes may aim to maintain agriculture and forestry as active forms of land management which otherwise would have been abandoned, e.g. as in IT-2 and IT-4. Examples with respect to each of the policy types are set out below.

Legislation / regulation plays an important role in setting product related standards and safeguards and in and in regulating certain private activities, such as potentially polluting activities and the generation of waste (regulations on water use, effluent management, etc.). Levels of compliance with certain environmental rules in rural areas vary considerably and in some cases initiatives are designed to increase compliance, often by means of some form of incentive. Environmental rules and the need to comply with them can be the trigger for the engagement of private companies (see also Chapter 3), for example:

- **Waste water rules, manure management, and the requirements under the WFD** have all driven action in the following case studies: vIT-1, NL-2, UK-1 and also others.
- **Protected areas:** the designation of areas where particular rules are applicable to protect the environment, for example Natura 2000, biosphere reserves, Areas of Outstanding Natural Beauty in the UK (AONBs), etc., influence land use dynamics while providing an important territorial focus for action. Case studies affected by protected area legislation include: AT-2, CZ-1, FR-3, IT-3, PT-3, SI-3, SI-4, and UK-3.
- **National/regional forest legislation:** Efforts to enhance the public benefits associated with forests, including recreation and nature conservation, have led to the introduction of regulations and management rules in many countries. National forest policies of various kinds are referred to in all of our cases where forestry has some relevance, such as in Austria, where

the Forest Act of 1975 provides, in general, public access to all forest areas, irrespective of ownership. Other relevant case studies include AT-3, EE-3, FR-1, FR-3, SI-2; SI-2.

- **Spatial planning:** this is relevant in several cases For example spatial planning legislation in PT-2 contributes to the maintenance of small farm structures; in the Green Belt case (DE-1), it ensures maintenance of green corridors around the city of Frankfurt.

Many of the initiatives rely on **CAP and related Member State funding** as a key form of support for the various land management activities which have an association with ESBOs. This includes Pillar 1 funding to maintain some level of farm income -this can be especially important in maintaining the HNV farming systems and farming found particularly in mountainous areas, although it is not targeted to these areas specifically or to ESBO provision, except in the case of the Greening component.

Pillar 2 funding is present in most of the agricultural and some forestry case studies. The agri-environment-climate and organic farming measures are the most frequently mentioned. In addition, other CAP Pillar 2 measures are highlighted as important within certain case studies. These include:

- Advice provision, for farmers in particular;
- The RDP cooperation measure – seen as having huge potential, although not fully utilised in the initiatives examined (e.g. Slovenia cases);
- Support for the establishment of producer groups (EE-2);
- Payments for food quality schemes (EE-2) and promotion and marketing of products (the fact that micro-enterprises found it difficult to receive support for marketing and promotion of products in the 2007-13 Estonian RDP was an issue identified in EE1);
- The Leader approach – identified in numerous cases as the means to initiate action at the local level (e.g. EE-1, AT-2, IT-2, IT-4);
- Payments for Areas of Natural Constraints (AT-1, AT-2, AT-3);
- Aid for non-productive investments (e.g. UK-1).

In Italy, the Common Market Organisation of the fruit and vegetable regime was an important policy lever that forced actors to create the interbranch organisation (IT-1).

In some cases, the development of policy over time has been central to the shaping or evolution of an initiative. For example the design of the package of agri-environment and climate measures in Italy and its recent evolution has enabled the creation of the Valdaso AE agreement centred on peach production in the Marche Region of Italy (IT3).

EU Structural Funds also play a role. For example, they are the source of support for capital costs in CZ-2 (creation of ponds/lakes), CZ-3 (related to forests), in EE-3 (the State Forest Management Centre) for infrastructure investments and for raising the environmental awareness of the general public. In IT-2 they are the source of aid provided for infrastructure, cultural identity, village renewal and tourism facilities.

Other purely national, rather than EU related, policies also play an important role. This is particularly the case in relation to forests (see with respect to legislation above); the role of local and regional planning and development policy is highlighted in a number of cases.

Small-scale community grants and payments, whether or not ultimately backed by EU funds, can play an important role, particularly where these can provide support for small-scale and less conventional activities that might otherwise not be eligible for funding (e.g. orchard example – DE-2). In Estonia, national support for market development and promotion in the organic supply chain was important for both EE-1 and EE-2 cases.

The case studies also underline the diverse impacts on ESBO provision of applying individual policies and policy packages in different contexts. The same measure can either enhance or disable ESBO provision. Examples of this distinction can be observed in the same area. A programme of research to capture the diversity of impact and the reasons for it, differentiated by land management types and/or by issue would be worthwhile. Sometimes certain CAP payments are seen as part of the problem instead of (or as well as) part of the solution (e.g. FR-1 – direct payments intended to support farm incomes effectively encourage the expansion of cropped areas with knock on effects on landscape character and the restructuring of parcels into larger units – although of course the cessation of payments would not necessarily prevent such changes from occurring in future).

However, it is clear from the case studies that policy measures alone are not sufficient to incentivise the most appropriate action in most of the cases examined. The role of an individual or group of individuals, creative ideas and a willingness to find ways to achieve the goals identified are critical. Policy interventions, particularly in the form of support from the CAP, often seem to be an important ingredient in the mix of measures required, especially where they complement other factors that help to achieve the objectives of the initiative. Different forms of CAP payments often provide the background support necessary to incentivise the broad continuation of the land management activity and related social structures, central to the initiative.

4.5 Relationship between public appreciation, public awareness and the expression of public preferences for ESBOs, and commercial-public dynamics expressed in the initiatives

In some areas, the public appreciation of certain ESBOs is high and it is this appreciation that is one of several drivers of the initiative, reflected in the market opportunities that emerge as a consequence (e.g. AT-1, AT-2, CZ-2, CZ-3, EE-1, NL-1). The emergence of public support programmes for certain types of management practices in certain areas also can be seen as an expression of (sometimes growing) public appreciation (AT-1, AT-2, AT-3, IT-2, NL-1, EE-1, EE-2 etc.). It is those ESBOs that are most visible to the public or affect quality of life (including specific food availability) that are most often mentioned in relation to public appreciation. Particularly important is landscape character, sometimes articulated in relation to cultural heritage and rural vitality. Sometimes this is expressed in terms of geographic location – i.e. mountain areas, sometimes in terms of what the public like to see in the countryside (e.g. outdoor grazed animals). In other cases it is the mode of production (e.g. organic), with the implicit assumption that these types of management are linked to environmental benefits, even if this is not systematically the case in practice. Those ESBOs that are less immediately apparent, such as the qualities of soils, water, and climate are far less often mentioned in the case studies or apparently appreciated.

Public appreciation is also an important factor determining success in achieving enhanced provision of ESBOs in a number of cases, for example where the focus is adding value to production through the creation of a label or a brand for a product. In these cases, consumer appreciation and willingness to pay for the product and the values it purports to embody (such as the links to ecological or other benefits) is critical to the success of the initiative (e.g. DE-2 – apple juice, AT-1 – organic mountain haymilk, EE-1 – local artisan and farm food, EE-2 – grass-fed beef)

The case studies highlight the importance of taking a long-term perspective with respect to achieving the goals of the initiatives and strategies in question. Typically the shape, significance and impact of local action emerges *over time*. To get it underway and then maintain it, usually requires a process of *trust building* that involves the cooperation of different actors, eventually leading to more buy-in for the actions identified. To achieve a successful outcome it is therefore important to communicate the benefits arising from the public/private/voluntary interaction to a wider audience as well as to the participants. Often it is helpful to use positive examples of good practice that illustrate clearly the benefits for the actors involved and show the relevance for societal needs and the environment. Demonstrating the “*history*” of the current situation, for example in designing labels and even explaining their precursors can be one approach to explain to actors how things have changed over time and provide the starting point on which to base reflections for future development.

5 Matching the PEGASUS concept of ESBOs with the SES framework

A central focus of the PEGASUS project is initiatives or other forms of collective action that foster the provision of ESBOs. A key challenge in the project has been to create a common understanding of the ESBO concept and terminology, not only among researchers coming from different scientific fields, but also for stakeholders on the ground, as it has been elaborated in chapter 0. This challenge goes hand in hand with the fact that there are often no suitable indicators nor data available that provide quantitative evidence for the levels of ESBO provision, let alone to characterise the functional linkages between land use and management and levels of ESBO provision, or how the provision of one ESBO might benefit or reduce the provision of another. There are clear distinctions to be made between environmental and social benefits, the provision of which is **directly** linked to land management practices (e.g. water quality #2, soil functionality #9 or species and habitats #11), and those “secondary” ESBOs that depend on the provision of another ESBO such as outdoor recreation (#15), educational activities (#16), health and social inclusion (#17).

It would be helpful to use more of a common language or terminology for the communication of the ESBO concept to different types of stakeholders. The ESBO term is certainly not familiar or in wide use at present. It can be argued that there is potential to create a much more common understanding of a “new” term of this kind primarily through more frequent usage (e.g. as has occurred with biodiversity, or climate change). However the path to familiarity needs time and attention and a potentially wider audience than seems probable for the ESBO concept. As there is already an ongoing discourse on ecosystem services, as well as on public goods, it may be preferable to choose a terminology that is accessible to different stakeholder groups. Thus, “Environmentally and Socially Beneficial Outcomes” (ESBOs) could be replaced in future work by “**environmental and social benefits/services** (of agriculture and forestry)” as an explicit although rather unwieldy term.

5.1 SES framework application

The application of the Social-Ecological System (SES) framework in the project aimed to be a means of understanding the complexity of the system factors determining the provision of ESBOs, with a focus on the interrelation between the presence of a ‘collective’ action and the land management practices adopted. From a SES framework perspective, the initiatives studied in the PEGASUS case studies identified the following variables: *actors, governance systems, action situations/interactions*, and, in some cases, the *resource units*.

The objectives of the initiatives relate to the provision of ESBOs through agriculture and forestry through fostering particular types of land use or land management, which can be considered to fall within the variable *action situations*. Exogenous and endogenous factors drive the collective action and these have an influence on the factors affecting land use and management intensity more directly, including public awareness and appreciation. Such factors are covered in the SES framework terminology by the following variables: *social, economic and political setting, related ecosystems, governance, and macro factors*. ESBOs are defined by, and target levels determined through societal and political actors, and are covered under different variables, notably: *Resource Units, Resource*

System or Outcomes (action situations). Figure 8 illustrates the extent of congruence of the SES and more specifically PEGASUS concepts.

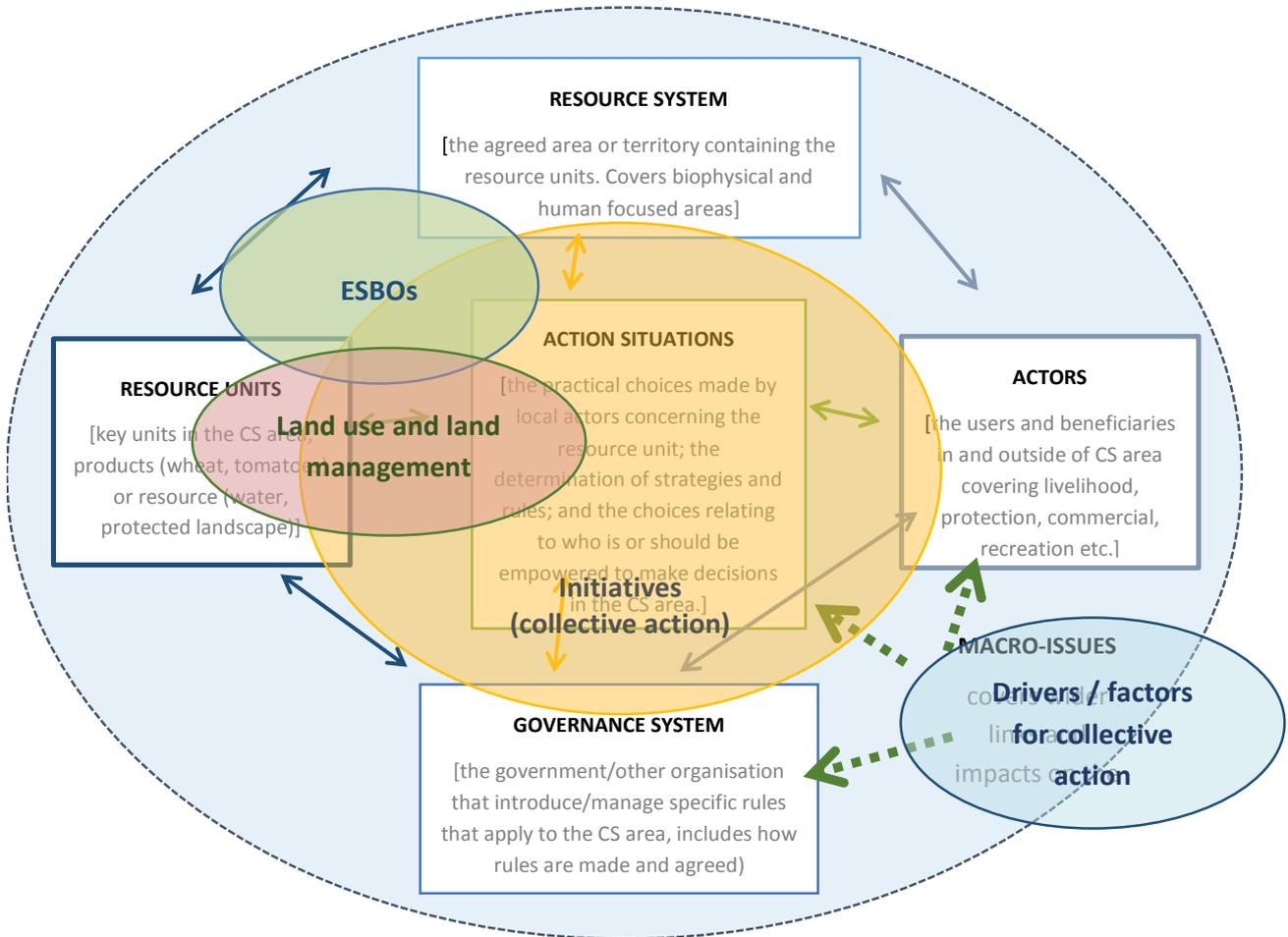


Figure 8 Main components of the SES framework and overlay of key PEGASUS concept terms (adapted from Ostrom and Cox 2010; McGinnis and Ostrom 2014)

Overall, the use of the SES framework in the case studies' methodology was appreciated for its ability to guide attention to all relevant aspects of the system, rather than confining it to single aspects or relations. However, the interpretation of the conceptual framework shown in Figure 8 sometimes created some difficulties and blurred the delineation of the SES framework in relation to the ESBO concept applied in PEGASUS.

Nonetheless, researchers found the SES framework was helpful to raise awareness of the systemic nature of an issue (CZ-2).

The application of the SES framework in the context of the PEGASUS project [...] is a useful framework to analyse the links between ecological systems and links to societal, political and economic dimensions.” (AT-3)

Different approaches were applied to delineate the system boundaries. The framework has proven to work well for the analysis of territorial and geographically well-defined case studies. Difficulties arose particularly where the focus of the initiative was on a minor aspect of land use/management

in an area, or where actions and outcomes were scattered over a large territory or focussed on value chains, as in several of the PEGASUS case studies (DE-3, EE-1, EE-2 and EE-3, UK-4, IT-4). This is illustrated in quotes from three of the cases.

To allow a better understanding of the operational level mechanisms that led to Valdaso success, the SES boundaries have been defined as those defined by the administrative requirements of the AEA (Agri-Environmental Agreement). With this choice it was possible to analyse more in depth the different SES components and the synergies that led to ESBOs production, but we could not fully explore the broader system and the multi-level governance that the system involved. (IT-3)

For not place-based initiatives, the ecological part of the SES would need to be redefined to be able to consider how the social system is influenced by the ecological system and vice versa. (NL-4)

However, the range of considerations linked to care farming was far broader than the SES model could capture. It was also felt that the distinction between CFUK as a national network and the case study focus on individual local farms was challenging in terms of developing a unified SES picture.

In addition, certain ESBOs are relevant within the particular SES, while others extend to other SES and/or ecosystems, which means that the boundaries of the SES are not finite when using it in our context (DE-2).

The list of **first-tier and second-tier variables** used to describe the SES for each of the case studies was generally regarded as a helpful tool to identify all relevant elements of the system. Particularly the social dimensions (such as the characteristics of actors, level of trust, a sense of history) would have been easily overlooked without the SES approach (CZ-2). However, there was criticism particularly regarding the fact that the approach “divides the system artificially into arbitrary parts (e.g. resource system and resource units should not be divided as they are one complex)” (EE-2).

A second difficulty in relation to the definition of the system was the categorisation of the ESBOs. The varied approaches taken by the case study teams has been highlighted above, i.e. that the ESBOs have been categorised variously (?) as resource units (RU), outcomes (O) of the Action Situation or even as the Resource System (RS). There were suggestions “to display [ESBOs] as an arrow going from resource units to actors. There also needs to be an arrow from the action situation to the ESBOs, because many ESBOs require labour before they can be enjoyed (Jones et al. 2016)” (NL-4).

It was also raised that “the methodology lacks guidance on performing and discussing the trade-offs occurring from the ESBO provision” (PT-3). The multi-faceted nature of the social-ecological system could result in mere qualitative descriptions (NL-4) and “despite attempting to be as precise as possible without undue reductionism, [the approach] still leaves a lot of room for researcher error, as much as it is left to expert judgement” (SI-1).

Most case study researchers found the SES diagram useful. The issue of turning points and tipping points being critical to the systemic thinking, a positive point of the SES method is that they can be described and outlined in the resource system section. In particular, knowledge about such tipping

points and the awareness of their implications is critical. Again the supporting literature signals that while the framework shows the situation at a given point in time, the situations and processes within the systems are iterative and dynamic.

5.2 Challenges of applying the SES framework to case studies on ESBOs

There were five main challenges identified in PEGASUS about the use of the SES framework as a method for the case studies, as follows:

- a) the lack of a dynamic aspect to the framework, as it represents the situation at a given point in time;
- b) the substantial adjustments to the approach required for those case studies that did not consist of a clear geographical area;
- c) it has been difficult to communicate the SES framework and terminology to stakeholders;
- d) the scale of certain CS was such that the SES framework struggled with the complex situations involved;
- e) there were some areas where there was not a good correspondence between the ESBOs approach adopted in PEGASUS and the SES framework, as noted above.

Some of the issues arising under these five main challenges and potential ways of addressing them are considered below.

- a) The dynamic aspect of the SES framework is implicit, but the key focus is not on change itself or the processes of development but on understanding the often complex system that is currently in place. There are several places within this frame where dynamic aspects can and should be articulated.
 - In outlining the resource system, it is important to cover both aspects of the health of the system and the resilience of individual ESBOs. Knowledge of tipping points and areas of the resource system that are benefitting from the current management can also be added here.
 - Where the legacy of the past impacts on current local practice and current legislation, as it often does, this can be covered both in action situations and the governance system.
 - If there is a strong historical past that casts a significant shadow over the current management, this is a macro-issue and should be noted here.
- b) The use of the SES framework for non-geographical case studies is clearly a challenging issue. Almost all of the examples in the literature use SES in the context of natural systems, whilst in PEGASUS the focus is on agriculture and forestry. This is a significant difference but the project is focussed to some extent on natural resource management so there are many points in common. However, there are significant social and economic aspects that may not fit so well with the territorially or geographically well-defined aspects of the usual SES models. Still, there are adjustments that can be made to ensure that the most is made of the SES framework in the less/non-geographical case studies. These might include:
 - Increasing the focus on the social and economic aspects of the system as it is this element of the system that will be providing the connections across the different actors. The

governance and action situations will have some collective resonance across the case study.

- Once the common themes are determined, the resource units and resource system will become clear and it might be that these are not the natural resources but more social ones.
- The local/global aspect of challenge b) above raises issues that are complex. The individual people/projects/businesses in the case studies will operate within a series of local contexts in those examples, where the geographical setting is large and disparate. In applying the SES approach in situations such as these, the focus should be on the elements are shared between the local contexts and bring them together within the same case study, rather than on the elements where they differ.

c) The communication with stakeholders is critical to both PEGASUS and the SES framework. To some extent all research tools need translating for use with particular local and national stakeholders. The level of detail to be considered is considerable, not least because these are complex situations and the approach is attempting to look at the whole rather than a small part of it. However, there are some elements that the approach taken by PEGASUS and the SES framework agree on:

- Using the action-orientated approach means that researchers meet the stakeholders where they are. In this sense researchers engage with stakeholders to understand their position, attitudes and behaviours in key areas that relate to the case study as a whole. This process is often of interest to the stakeholders themselves.
- Networks within the communities of stakeholders themselves are critical to the SES framework as they are the social equivalent of the ecosystem. It is likely that the network or networks have a strong impact on the decision-making process in terms of the actions and governance. If these networks are best described diagrammatically then so be it.

d) The need to explore and assess complex situations is part of the rationale for developing and adopting the SES framework; however, every tool has its limitations. This might be a case of scale, scope or a combination of both. The strength of the SES concept is that it promotes a systematic analysis and representation of the connections within the CS area. It does this by comprehensively addressing the interplay between social and ecological elements and associated systems and linking this to management practices and social mechanisms.

- The SES framework clearly does have its limits and there will be multiple SESs across wide geographical and non-geographical areas, depending on how a researcher wishes to frame these with initial research questions.
- Issues concerning the market, including the market mechanism currently used in a case, are best considered under the action situation area but they may also be impacted by the governance system or macro issues.
- However, the SES framework was developed to consider and understand the interactions between different geographical characteristics and associated actors. So the reason it seemed troublesome in some PEGASUS case studies may be partly because the application of the approach, in terms of the scale of the case, was too adventurous.

- e) The link between ESBOs and the SES framework needs clarification. Initially, there was an assumption in the first steps of the application of the SES method (“STEPS 1-2”) that the ESBOs would most comfortably equate with the resource units. However,
- While the assumption that ESBOs could be considered as resource units worked in some cases, the experience of the 34 CSs suggests that this was an oversimplification. ESBOs may have a root within the resource unit, but the interactions associated with them mean that they stray into the resource system as well. Furthermore, the values and experiences associated with ESBOs will also be related to the action situation. The SES diagram has been adjusted to include a box where the ESBOs can be listed and these can be linked to resource units and resource systems by a number.
 - The ESBOs are central to PEGASUS and to the mechanism for both data collection and analysis. The SES provides a framework within which the ESBOs can be assessed and analysed for the inter- and intra-relationships and connections with actors and areas of governance. The SES framework also provides a mechanism whereby the key ESBOs for the CS itself can be identified. This might be different from those ESBOs identified by the stakeholders involved in the initiative or project.

As a concept, the SES has been tested and adapted by the researchers in PEGASUS, as might be expected, given that the research team was highly multi-disciplinary. Researchers came from diverse academic backgrounds and have worked on different resource sectors in different geographic areas of the EU. However, the presence of a common framework has proved valuable and it will continue to inform our work, including the common vocabulary and the shared aim of understanding the various processes and outcomes and their impact on the provision of ESBOs in a particular CS and in agriculture and forestry more generally.

5.3 Action-orientation / transdisciplinary research

The level of action-orientation varied considerably between the 34 case studies, however not quite as initially foreseen, which was to be concentrated in the second of the two-staged research process. The project design was to start with the 34 more “broad and shallow” case studies (the first step) and to follow this with the in-depth work in 12 of these cases (the second step).

In all cases, the level of action-orientation was affected by the different mandates of engagement between the researchers and the stakeholders (which also depended on their earlier relationships with the initiatives, if any). The main phase of action-orientated research was initially foreseen for the second stage only, but in practice, in many cases some interactions with stakeholders took place in the first stage. Two examples illustrate how the co-design and action orientation helped to meet the needs of both the research and of the initiatives themselves:

The research was co-designed and fulfilled a need within the WILD project team for the development of social benefit indicators, which were drafted in the SROI-style workshops. The behaviour change aspects need more refinement, and this will be explored with the delivery partners and key stakeholder. (UK-1)

The action-based approach proved very fruitful, as it allowed us to set up the Mountain wood consortium, which is now building towards a very concrete project proposal. In case of the Traditional breeds, even though our analysis and messages to the community may be facing a lack of interest at the moment, they may still be built upon at a later time. (SL-3)

A key lesson from the application of such a participatory methodology is that the cultural context significantly determines the level to which action oriented research can be implemented:

In CEE countries, the trust between some groups of stakeholders could be so low, that it could be difficult even to bring them to the table to speak to each other and to motivate them to come to the meetings more than once. It is possible, but it could be difficult and could need much more time and experienced coordination than in countries with more mature social capital (most of the EU 15). In this case, sometime “start small” could be good concept, because people could be too quickly discouraged by seemingly no change for a long time (CZ wet meadows)

In the Dutch context, the interaction between researchers and farmers, the collaboration between farmers and authorities, and networking are standard practices. For this reason, an action-oriented approach may be easier to accomplish in the Netherlands than in many other parts of Europe. (NL skylark)

It has been highlighted that researchers getting involved in actions risk losing their position as “independent observers”. Accepting that there is a certain level of risk, some reflection on what this implies is required by all groups of actors. However, if researchers are applying principles of responsibility in the correct way, the action oriented approach has proven to provide some benefits:

- A danger of an action-oriented approach is the loyalty evolving from the social capital developed between the actors and the researchers. This may hinder objective observation and reporting. Combining involvement with distance is a major challenge of the researcher in an action-oriented approach. Another challenge is to balance confidentiality with research. More observations are made, and information gathered, than can be reported ethically.
- Our experience with this type of research has been that it is not sufficient to only address the physical and policy constraints that are pointed out by interlocutors. It is very important to consider motivation for change (both its strength and its nature) and willingness to engage in collective action on a certain matter.

This type of approach to research requires listening skills, and great sensitivity to how the actors might see and analyse the situation they are in. The SES framework in some cases has been an effective means to identify, together with the actors, the nature and pattern of relevant linkages, which might not have been so evident otherwise. It also enabled actors to recognise value in beneficial things that they might take for granted, pinpointing areas of tension or conflict as well as differences in understanding or motivations. In a number of cases the action-oriented research process itself supported actors in the initiatives in planning for greater robustness in the face of uncertainty in future (for example asking the ‘what if?’ questions), building inter-project awareness and networking, identifying skills and knowledge gaps and helping to find people to fill them and



even building a community across territories/regions/sectors. As such, the application of the approach resulted in offering a series of relationships which may well go beyond the lifetime and the resources of PEGASUS.

6 Some gaps and outstanding questions

Some ESBOs were more straightforward to grasp by stakeholders than others, e.g. when they were closely linked to environmental outcomes, specified in legislation or where they corresponded to commercial products. Others, however, have tended to be understood much more broadly e.g. biodiversity or landscape protection or, especially, rural vitality. Their definitions and delineations could be improved. In many cases they need to be translated into more concrete measures and outcomes without losing the primary reasons for valuing them. More concrete metrics would often assist both in understanding and in the measurement of outcomes which would be helpful to the deployment of incentives of different kinds and to policy development where there is a growing focus on results. There is more work to be done in this area.

We have noted that the interlinkages between landscape character (#14) and cultural heritage with rural vitality (#19) are especially important. We found that cultural practices and identity often act as binding elements between those two ESBOs and at the same time can blur the demarcation between them. To better delineate them, we suggest revising #14 to refer to the quality and number of the cultural heritage elements present in a landscape, and add one component to ‘rural vitality’ (#19) corresponding to the actual practices needed for the maintenance of cultural heritage in rural areas.

We also concluded from the coverage of ESBOs in the case studies that the perceptions of and the actions taken by stakeholders are impacted by their level of awareness and knowledge about the nature of ESBOs and threats to their provision. This suggests that more attention to engagement, education and training of farmers and other stakeholders would strengthen the effectiveness of policy implementation and many other initiatives in this field.

Attention to language in general and terminology in particular is important in establishing and building communication and communication is vital to the success of nearly every initiative in this field. Often it is helpful or necessary to adapt generic academic and policy terminology to local contexts. How is this best achieved? Is more training of facilitators and trainers an effective approach?

The **assessment of the provision of ESBOs at a European level** is substantially limited by two aspects. First, for many of the ESBOs described, there are no generally agreed indicators or proxies available, particularly for those related to the social dimension and for more complex outcomes with an environmental dimension (e.g. landscape character and cultural heritage). Second, where indicators exist, the aggregation of available data at a European level is often not possible, because of the variety in methods used and the granularity at which they are collected.

Although raw data and analysis about the provision of ESBOs generally is improving in the case studies, this is not always the case and it is often difficult to be certain at what level or whether the particular ESBOs mentioned are in fact the most significant amongst those being supplied in the locality by rural land managers. The need for consistent measurement and analysis on a European

scale requires a certain rigour and common framework, with limited flexibility. This needs to be accommodated inside the dynamism and adaptability of many local initiatives and the self determination that so often is highly valued in collective approaches. What are the best ways of achieving this?

The basic idea of interdependencies between the social and the ecological spheres appeals to many stakeholders (this is confirmed in other projects, see for instance Westerink et al 2017). However, **the current terminology deploys in discussing and applying these ideas - SES, ESBOs -- is not attractive to stakeholders** and can actually impede their understanding. In the scientific discourse, we propose to stick with social-ecological systems, public goods and ecosystem services as helpful terms, because they are broadly accepted and used in literature. When interacting with stakeholders, less technical, simpler phrases should be used, for instance there has been positive feedback on using the term 'landscape services' (although it does not capture the full range of ESBOs).

Further questions relating to the role of initiatives and their functioning; and their influence on land management and provision of ESBOs include:

- How to achieve sufficient commitment and private action to increase ESBO provision beyond current levels? Market opportunities, EU and more local regulations and CAP related incentives have been amongst the key drivers up to now. How far can we develop these? What is the role of more innovative approaches and how can these be stimulated?
- What are the triggers or limiting factors for scaling-up development? For example the striking role of facilitators/enablers/entrepreneurs/local leaders in so many initiatives seems to be an important condition for take-off and often continued success in many initiatives. What are the best means of increasing the supply of these critical actors? How far can niche markets be expanded without losing their attractiveness in the market and their linkages to local ESBO supply? How far are collective actions dependent on relatively tight and therefore probably mainly local networks or territories?
- What does success look like and how do we measure/understand it? Can we put in place more transparency and metrics that reflect the goals of participants and key stakeholders whilst also capturing the objectives of bodies representing the public interest, especially where they contribute funding?
- Does the current framework, for describing the actors involved and the network to be analysed, captures all the relevant actors? This is bound to vary between circumstances but in many cases may extend beyond the local and regional. There can be relevant actors at higher levels and in different countries as shown in several case studies, especially where there is a developed supply chain potentially bringing in a diversity of private actors. How can these be captured reliably but without undue work?
- Which external private actors win the trust of the land managers and how? Which are the most helpful frameworks for increasing the scale of mutually valuable networks involving private actors and land managers? How far can collective actions decrease the discrepancies in the relative market power of farmers and processors/retailers? What inhibits groups of farmers or foresters from organising to enter new markets themselves?

Some of these questions are picked up in subsequent deliverables being prepared under Task 5 of the PEGASUS project. For example a report on policy conclusions and recommendations is being prepared (Task 4 of the project). Other questions point to the need for further analysis and research.

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8 Annex

Table 7 Short titles of the 34 case studies, in-depth case studies highlighted in bold letters

CS code	Short reference
AT-1	AT haymilk label
AT-2	AT biosphere reserve
AT-3	AT mountain forestry
CZ-1	CZ biodiversity rich meadows
CZ-2	CZ wet meadows
CZ-3	CZ natural restoration of forest
DE-1	DE Green Belt
DE-2	DE traditional orchards association
DE-3	DE Regional Value shareholder corporation
EE-1	EE Talu-Toidab local food label
EE-2	EE Liivimaa Livaheis grass fed beef label
EE-3	EE State Forest Management Centre
FR-1	FR Pays de Langres
FR-2	FR Volvic water management
FR-3	FR Parc National de Cévennes
IT-1	IT tomatoes supply chain
IT-2	IT bergamot production
IT-3	IT IPM in fruit production in Valdaso
IT-4	IT niche products and tourism in Tuscany
NL-1	NL outdoor grazing scheme
NL-2	NL Farmer, beer and water
NL-3	NL landscape management with citizens
NL-4	NL arable farmer association
PT-1	PT montado silvo-pastoral system
PT-2	PT peri-urban mosaic
PT-3	PT intensive olive production
SI-1	SI mountain wood certification project
SI-2	SI urban forests
SI-3	SI agriculture as a growth strategy
SI-4	SI landscape park project
UK-1	UK integrated catchment management
UK-2	UK arable and AES farm-scale
UK-3	UK partnership for sustainable uplands
UK-4	UK care farms