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Between aspirations and reality: Making farming, food systems and rural areas more resilient, sustainable and equitable



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ABSTRACT

This paper explores the connections between farm modernisation, rural development and the resilience of agricultural and rural systems. The paper starts by ascertaining why agricultural and food systems need to change systemically. Evidence from case studies in fourteen countries is used to explore the possibilities for, and drivers and limitations of systemic change in four thematic areas: the resilience of farms and rural areas; prosperity and well-being; knowledge and innovation, and; the governance of agriculture and rural areas. In each area, we identify a major mismatch between visions and strategies on the one hand, and market developments, policy measures and outcomes on the other. The first theme is of growing concern as there has been an observable decrease in the social-ecological resilience of farms and of rural communities in recent decades. The second theme emerges as important as the concentration of production in some regions or some farms is directly linked to the marginalisation of others. The third theme illustrates that local farmer-driven innovations can teach us much, especially since farmers focus on efficiently using the resources available to them, including their location-specific experiential knowledge. Through the final theme we show that informal networks can balance different interests and approaches, which is essential for integrated rural development strategies and projects. Our findings in these four thematic areas have implications for the strategic frameworks and policy of the EU (and beyond) and future research agendas. We explicitly draw these out. The 14 case studies show that practitioners, grassroots initiatives and pilot programmes are already generating a wealth of experiences and knowledge that could be fruitfully used to inform higher-level policy development. The paper concludes that systemic change requires more critical reflection of conventional wisdom and approaches, and openness to ideas and practices that are outside the mainstream.

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1. Introduction

The last decades have seen profound structural changes in European agriculture, food systems and rural areas. In large parts of Europe, agricultural production has become highly specialised and capital-intensive, and food processing and retailing have grown exponentially in scale (EEA, 2010; European Commission, 2011a, b). These changes have contributed to an abundant supply of cheap food for European consumers, and have supported the development of non-agricultural sectors by releasing labour resources and creating a steady demand for machinery, production inputs and services.

However, these structural changes also mean that contemporary food production is now largely decoupled from natural processes and much more dependent on industrially produced inputs and fossil fuels. The negative social and environmental outcomes of these developments have been widely analysed and documented (IAASTD, 2009; EEA, 2010, 2013; OECD, 2012). The risks associated with intensive farming systems, including their path-dependency and limited buffering capacities, are increasingly becoming apparent. Examples include the collapse of cereal production due to drought in regions accustomed to low but relatively stable rainfall levels; the nutrient surpluses and the related eutrophication of ecosystems and groundwater bodies in regions with a high concentration of intensive indoor livestock production; and the current economic problems in capital-intensive dairy farming (EEA, 2010, 2013; European Commission, 2011b).

The intensification of production and the growth of output in some specific areas means that other areas, generally with less favourable production conditions and/or more distant from markets, are being marginalised (Knickel, 1990; Knickel et al., 2013). The concentration of agricultural production and the increasing polarisation of agricultural structures has led to significant problems in both, intensive farming areas and less favoured areas (European Commission, 2010a, 2011b). There is a large risk that the very substantial public and private sector investments currently going into building a 'knowledge-based bio-economy' will further aggravate these problems, as this will reinforce the agricultural sector's focus on producing cheap raw materials (EU SCAR, 2015).

From the point of view of a more balanced development of rural areas, it seems of utmost importance to steer structural changes in directions that foster a more sustainable development overall, and that contribute to addressing the social, environmental and economic imbalances and challenges referred to earlier. Hence, the transformation and the adaptive capacity of the agricultural sector and of rural economies have become key questions (European Commission, 2015; Knickel et al., 2013; Horlings and Marsden, 2014; Peter and Knickel, 2016; IPES-Food, 2016).

The objective of this paper is to investigate how farms, communities and rural regions perceive and respond to the systemic challenges they are facing. Through 14 case studies, we investigate the strategies deployed by farmers and other rural actors in their efforts to maintain their quality of life and ensure continuity, not least through adapting and transforming in response to new challenges, opportunities and broader societal changes. We will explore the gaps between current policy and practice and the changes that are both needed and desirable.

2. The relevant scientific literature and policy discourses

What does the literature tell us about the gaps between existing practice and the needed changes, and in what direction are the strategic policy frameworks moving? In this section we will briefly review both of these issues before framing the research questions addressed in this paper.

2.1. Resilience

The introduction of this paper discusses the diminishing social-ecological resilience of farms and of rural communities. But, why is this a problem, and why have the research and policy communities come to regard resilience as so important? Detailed accounts of the enormous structural changes that have occurred in the European and global agricultural and food sectors in recent decades and the changes that are needed in order to meet the joint challenges of feeding the world and to significantly lower agriculture's environmental impact have been put forward by the European Commission (2010a, 2010b, 2011a, 2011b, 2015, 2016), the European Environment Agency (EEA, 2010, 2013, 2015), The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) (2009), Cooper et al. (2010), the Forum for the Future of Agriculture (FFA, 2016), Potočnik (2015) and others. The importance currently attached to resilience by the research and policy communities is very clearly a result of the declining social-ecological resilience of farms and of rural communities.

Resilience is generally understood as the capacity of social, economic and environmental systems to cope with change, both foreseeable trends and unexpected events or disturbances, by responding and reorganising themselves in ways that maintain their essential functions and their identity (Berkes and Folke, 1998; Walker et al., 2004; Folke et al., 2010). In the early 1970s Holling (1973) highlighted the importance of resilience, defining it as the ability "to manage or cope with change". Milestad and Hadatsch (2003) and, most recently, Askenazy et al. (2017) argue that it is critically important to analyse and understand the interrelationships between farm, local/community and regional levels. Darnhofer et al. (2014a; 2014b) highlight the importance of diversity in strengthening resilience and, more recently (2016) have drawn attention to farmers' agency, the wider social forces that play influential roles, and the importance of a range of capacities: the capacity to conserve existing functions and structures (persistence), the capacity to deal with uncertainty through reorganisation and learning (adaptability), and the capacity to create a wholly new trajectory that involves a change in the very nature of the system (transformation). Herman (2015) adopted a socio-cultural approach in her exploration of the development of social resilience within agriculture and cautions that "the particular relationship between farmers and the land, and the positive sense of connection and custodianship, can cement conservative socio-economic and environmental values, thereby constraining innovation". Lamine (2015) emphasises the possible reconstructions between agricultural, food and environmental issues from a territorial agrifood systems perspective. In doing so, she goes beyond the prevailing sustainable development paradigm, which focuses on the interactions between agriculture and the environment. She emphasises the importance of relocalisation and transition pathways and the diversity of actors and institutions involved in agrifood systems. Focussing on the related research, Wilson (2010) argues the need for agricultural economists and social scientists working on multifunctionality to work together more closely.

Resilience has also become increasingly important as a reference point in policy discourse. One can argue, however, that the term is often used as a buzzword with little clarity about its meaning. OECD (2012) emphasises in its 'Environmental Outlook to 2050: The Consequences of Inaction' that "continuing with business-as-usual will have adverse and costly impacts on human well-being, security and economic growth", and that fundamental changes are needed. The 'Europe 2020' strategy seeks to promote a "more resource efficient, greener and more competitive economy". We should also look to the Common Agricultural Policy (CAP), which is the primary EU instrument for encouraging sustainable resource

management and the delivery of public goods related to the environment and climate change and the EU's largest area of expenditure (Cooper et al., 2010; Swinnen, 2015; Hart, 2015). Article 3 of the 2014–2020 Rural Development Regulation (RDR) of the CAP refers to the “development of an EU agricultural sector that is more territorially and environmentally balanced, climate-friendly, resilient, competitive and innovative”. Priority 5 refers to the need for a “shift towards a low carbon and climate resilient economy”. Yet, against these objectives, European agriculture is also expected to maintain and increase production, reduce its negative environmental impacts, increase its resource-use efficiency and to make positive contributions towards climate stability, biodiversity, landscape quality and resilience to weather extremes.

Based on the above, in this paper we will look more closely at the causes for the low and diminishing level of resilience of farms and rural areas, and some promising developments that counter this trend (Section 4.1). We use a set of case studies to explore the level of resilience of farming and rural communities in very different contexts. We then go to explore the mechanisms and strategies that aim to strengthen the resilience of farms and rural communities, and the implications of their deployment at different spatial and temporal scales. Related in-depth analyses are presented by both Askenazy et al. (2017) and De Roest et al. (2017) in this special issue.

2.2. Balanced and inclusive development

We face a situation where the intensification of production and growth in some regions marginalises others. Works such as ‘Prosperity without Growth: Economics for a Finite Planet’ by Tim Jackson (2009) and ‘The Measurement of Economic Performance and Social Progress Revisited’ by Joseph Stiglitz et al. (2009) can help explain this tendency. Knickel (1990, 1997) and Knickel et al. (2013) have been revisiting this problem for almost twentyfive years and argue that the concentration of production and wealth in some regions, and on some farms, runs counter to the goal of a more balanced overall development as it is directly linked with the marginalisation of other regions and farms. Knickel (1990, 1997), IAASTD (2009) and others also relate the concentration of production with environmental degradation, and the problems of work-related pressure, stress and indebtedness. The constant search to reduce production costs in order to remain competitive exerts ongoing pressure on food quality, environmental standards and work conditions. Work by Van der Ploeg since the early 1990s (see for example Van der Ploeg, 1994) focusses on farmer's orientations and motivations, and on different farming styles. He stresses that some farmers adopt strategies that are intended to simultaneously improve the farmer's and the community's prosperity and benefit the farmer's quality of life. Wilson (2010) has proposed a conceptual framework, based on the economic, social and environmental resilience and vulnerability of rural areas as a way of understand different trajectories that rural communities are following. He refers to “the ‘productivist trough’ with its characteristically low community resilience” and the need to “help rural diversification pathways away from agricultural over-dependence”. In consideration of the gravity of these questions, we find surprisingly little empirically grounded social science analyses on the direct connections between concentration and marginalisation that specifically focusses on the agricultural sector and the food system.

On the policy side, reference must be made to the European Commission's strategy document ‘Europe 2020: a European strategy for smart, sustainable and inclusive growth’ (European Commission, 2010b) that refers to the need “to offer a sense of direction to our societies”, to “inclusive growth”, the “fostering [of] a high-employment economy” delivering “economic, social and

territorial cohesion and solidarity”, and “respecting the environment and cultural diversity”. Two of the main overall objectives are to foster social cohesion and prosperity and to promote well-being among all European citizens. Priority 6 of the RDR also refers to “promoting social inclusion [and] poverty reduction in [...] the economic development of rural areas” (Art. 5 (6), Art. 20) (European Parliament/Council (2013).

In this paper we examine the increasing imbalances in the prosperity and well-being of rural areas, their causes and potential remedies (Section 4.2). We investigate how agricultural change affects rural prosperity and whether there is an observable shift from a focus on the costs of production, productivity and cost-efficiency (i.e. input–output relations) to ‘effectiveness’ (i.e. adequacy in meeting social or environmental goals, such as enhancing the quality of life). This leads us to explore the circumstances under which agriculture and agricultural change contribute to rural prosperity and well-being and those when it does not. In so doing we draw on the in-depth analysis by Rivera et al. (2017) contained in this special issue.

2.3. Knowledge and learning

Knowledge and learning is the first of two thematic areas that are instrumental in bringing about (or inhibiting) changes and transformation. This theme has been intensively researched, particularly in recent years, and plays an increasingly important role in EU-level policy development.

Several recent studies highlight that the current agricultural knowledge and innovation system, particularly national level agricultural institutions, including higher education, is deeply attached to the model of technologically-driven agricultural industrialisation – and that this is a major factor driving agricultural developments over recent decades (EU SCAR, 2009, 2012, 2015; IAASTD, 2009). Borne (2010) argues that transdisciplinary research on alternative modernisation trajectories and on pathways that enhance resilience receives insufficient funding. Pretty (1997), and Röling and Jiggins (1998), note that this is particularly the case in countries with resource-intensive agriculture and in regions where production is extremely concentrated and/or specialised. In this context, Darnhofer et al. (2016) point to the important role of experimentation: “Experiments that farmers engage in – individually or collectively – are designed to probe the future, to test new potential combinations, to assess whether a new activity or production method is promising for now or sometime in the future.” Darnhofer et al. (2016) advocate a relational perspective that highlights the importance of open-ended learning and taking advantage of unexpected outcomes.

The second SCAR Foresight report (EU SCAR, 2009) described the state of the “remaining publicly funded” knowledge and innovation institutions in Europe as “unable to absorb and internalise the fundamental structural and systemic shifts that have occurred [...] and is [...] locked into old paradigms based on linear approaches and conventional assumptions.” The third SCAR Foresight report (EU SCAR, 2012) stresses the necessity of making Europe's agricultural knowledge systems “more responsive in providing integrated answers that combine ecological and social concerns with economic aspects.” The Strategic Approach to EU Agricultural Research and Innovation (COM, 2016), and the analyses put forward by the Standing Committee on Agricultural Research (SCAR) (2009, 2012, and 2015) provide sound analyses, as well as future-oriented strategies for resilient agricultural and food systems, and sustainable rural development.

New insights into innovation processes and co-learning have led to considerable changes in EU level frameworks. One very important milestone in this respect has been the Strategic Working

Group's AKIS-3 report (EU SCAR, 2015) that introduced the interactive innovation model, emphasised the role of ICT and e-science in agriculture, and heralded the role of the public sector as a "coordinating agent in an increasingly pluralistic AKIS". Article 14 of the RDR refers to a range of actions to promote the transfer of knowledge and information, and Article 15 to advisory, farm management and farm relief services. However, the reference to "farm modernisation, competitiveness building, sectoral integration, innovation and market orientation, as well as the promotion of entrepreneurship" says a lot about current priorities.

The 'Europe 2020' strategy identifies knowledge and innovation as the drivers of future growth and development (European Commission, 2010b). The European Commission's communication 'The CAP towards 2020' strategy reflects this priority: emphasising that innovation is "indispensable to preparing EU agriculture for the future" (European Commission, 2010a). It also states that "measures to help unlock the potential of rural areas should pay particular attention to innovative ideas for business and local governance". The RDR speaks of the "networking of national networks, organisations and administrations involved in the various stages of programme implementation" and how this has proven to "play a very important role in improving the quality of rural development programmes by increasing the involvement of stakeholders" (RDR, par. 40). Article 53 of the RDR established the European Innovation Partnership 'Agricultural Productivity and Sustainability' (EIP-AGRI),¹ a new instrument to support more interactive innovation processes. One key aim of EIP-AGRI is to bring together a diverse range of actors, and close the gap between agricultural research and its practical application.

Following on from this, in this paper we will look more closely at the undervalued role of informal knowledge in driving systemic change, and the causes for this (section 4.4). We address the role of social learning and of different knowledge bases in shaping the changes and the outcomes observed in our different case studies and, specifically, the role of farmers' and rural actors' experiential knowledge. We also explore how collaboration between regional authorities, farmers, research and extension can be the basis of positive developments. Our analysis here draws on the paper by Sümene et al. (2017), also in this special issue.

2.4. Governance systems and arrangements

The last vital area reviewed concerns governance systems, arrangements and processes. As with knowledge and learning, governance plays a key role in bringing about (or inhibiting) change and transformation, has been intensively researched in recent years and plays an increasingly important role in EU-level policy development. The horizontal dimension of European governance has been extensively dealt with in the literature on new modes of governance and on the role of civil society (see for example Steurer, 2013). Bozzini (2011) argues that insufficient attention has been paid to the role of regions as a social space for governance interactions (rather than just one level within a multi-level context). Tilzey and Potter (2008) argue that many European rural areas are increasingly shifting from productive areas to consumptive ones, that are expected to deliver social or recreational functions which, in turn, requires new management arrangements. Baldock (2014) draws attention to the "structural heterogeneity in EU farming plus the intrinsic jointness of the production of market goods (food) and non-market services [that] create a certain unavoidable complexity." He concludes that "highly targeted policies have their place and will

be needed. ... that these issues demand collaborative thinking across organisations, public and private, ..." [and that] "quite different actions may be needed in the prime agricultural producing areas relative to the more economically marginal but environmentally sensitive areas, especially those associated with high nature value farming." The growing importance of grassroots initiatives and informal networks is widely recognised as is their ability to form the basis of targeted and collaborative actions.

In his analysis of policy frameworks, Dower (2014) refers to "a step-change in the relationship between governments and local actors, between elective and participatory democracy" and the "need to enhance the existing, and develop new, mechanisms for linking top-down government and bottom-up initiatives". The LEADER programme (Links between Actions for the Development of the Rural Economy), launched by the European Commission in 1991, was established to support rural development projects initiated at the local level, and to encourage experiments and try out new approaches, in order to revitalise rural areas and create jobs. The LEADER Initiative is a prime example of mobilising local actors and action, introducing new ideas and methods, and of sharing these experiences and related expertise². In this paper, we argue that informal governance arrangements and multi-actor platforms play a significant role in harmonising agricultural and rural development.

Based on the above, in this paper we will look specifically at the inadequate recognition of, or support for, informal governance arrangements and the causes for this (Section 4.4). Here we address a number of issues starting with the strengths and weaknesses of the different governance structures identified in the case studies. This leads us to explore the role of multi-stakeholder partnerships and less formal, cooperative approaches. These explorations draw on the in-depth analysis presented by Koopmans et al. (2017) in this special issue.

Many analyses fail to pay adequate attention to the gap between the often visionary high-level strategies, and the limited progress made in actually achieving more sustainable and resilient farms, food systems and rural areas. In this paper, we intend to explicitly address this gap through the specific research questions, referred to above, that relate to each of the four themes. Before doing so we will briefly outline the empirical material that forms the basis of this article and the underlying research approach.

3. Empirical foundations and research approach

The empirical basis of this paper are fourteen rather diverse case studies that have been carried out in 2014/15 as part of the RETHINK project 'Rethinking the links between farm modernization, rural development and resilience in a world of increasing demands and finite resources'. The relatively large consortium of multidisciplinary teams from fourteen partner countries allowed the project to consider a wide spectrum of situations and to approach the same research questions from very different angles.

The key criteria used to select the case studies were:

- The relevance and richness of available information: the case study could help us to answer the key research questions.
- Maturity: the cases were sufficiently developed and advanced to provide meaningful insights.
- Learning: these insights can, at least partly, be expressed in more general terms.

¹ European Innovation Partnership 'Agricultural Productivity and Sustainability', COM (2012) 79 final.

² See for example <http://www.elard.eu/> and http://enrd.ec.europa.eu/leader-clld_en.

- **Feasibility:** The case study could be comprehensively analysed from the available data and the national resources available for further data collection and analysis.

A common conceptual and analytical framework (Darnhofer et al., 2014a, 2014b) allowed us to draw out general conclusions while also highlighting the influence of contextual factors. The analytical questions were posed first at the case study level, and later – through comparative analysis – at the international level. Through the questions, each case study was to explore the connections between farm modernisation, rural development and the resilience of agricultural and rural systems.

The fourteen case studies provided empirical data about how practitioners are reshaping their working practices and interrelations with markets and society at large in order to achieve a way of farming that works better for them. Each case study highlighted particular strategies and potential synergies between farm modernisation and the prosperity and resilience of rural communities. Related to this, we wanted to identify and better understand the conflicting goals and potential synergies facing rural areas, while explicitly recognising the complexity of the challenges and the diversity of different rural localities. Table 1 provides a brief profile of the fourteen case studies.

In the case studies, a systems perspective was used to explore interdependencies and to understand the interrelated dynamics of change (Darnhofer et al., 2014a, 2014b). A flexible approach to data collection was adopted, as different kinds of knowledge and data are available in different forms in different countries. Multiple sources of evidence were used in order to ensure the internal validity of the case studies (e.g. pooling the existing literature and data, combining complementary methods and including inputs from all relevant stakeholders). Generally, the teams drew on primary and secondary analyses and expert discussions. In all areas where teams used common methods (interviews, workshops, surveys), the methodologies were further coordinated. A thorough documentation of procedures ensured the reliability and replicability of the case study analyses.

In order to work in a genuinely transdisciplinary fashion and maximise stakeholder dialogue, decision-makers in the public and private sectors, and other stakeholders, were involved in the project from the very start. Stakeholders were involved through interviews, group discussions and/or workshops. A certain flexibility was built into the case studies in order to enable each country team to relate to nationally significant research questions and discourses. This allowed the teams to engage more effectively with the national stakeholder groups and decision-makers in the private and public sectors.

4. Analysis: four areas of divergence in agricultural and rural development

In this section we synthesise the key findings from the 14 case studies around each of the four themes identified above. We relate these findings to existing strategic frameworks and the systemic changes required. We address each of the four thematic areas in three steps: first, we provide a brief synopsis of the thematic area, then a summary of the key evidence from the case studies, and finally an initial exploration of potential implications of our findings.

4.1. The resilience of farms and rural areas

4.1.1. Resilience means learning, adaptation and realignment

The in-depth analysis carried out by Askenazy et al. (2017; in this special issue) applies this concept to agriculture, food systems

and rural areas. Their analysis shows that the interpretation and operationalisation of the concept of resilience depends on the system boundary to which it is applied and that it can, and must, be applied at many levels, from an individual farm, a farm family, a food chain, a rural community or a region as well as the global level (see Table 2). In their comparative analysis, Askenazy et al. (2017) identify multiple individual and collective strategies being deployed by farmers and rural residents “to try to ensure their resilience”.

Farmers and rural regions do not follow the, often narrow, scope of conventional economic thinking, but often apply a wide range of strategies that have multiple aims. For example, farmers in the Baltic States responded to the 2008 economic crisis by finding new markets to sell their agricultural produce. Such a strategy can enhance farmers’ and even regional autonomy, and overcome previous limitations and economic boundaries. A focus on new markets and different consumer groups can also lead to improvements in product and process quality, as shown in the case of organic farming in Austria. It can also induce the adoption of more progressive standards, as was the case with environmental standards in Israel. Farmers carefully weigh the trade-offs. For example, investing in technology to increase efficiency can increase farm revenue, but can also create debt. This debt may become hard to service if markets and economic circumstances change, and often puts a heavy emotional burden on farm families. The current dairy farm crisis provides a striking illustration of this point. What is largely neglected in many analyses is that learning, adaptation and realignment are critically important in maintaining livelihoods.

4.1.2. Discussion of the key findings from the case studies

Table 2 provides some concrete observations from the fourteen case studies. The examples show that resilience resides at a number of different levels: the individual farm, the community and the region. The meaning of resilience changes when used for different levels and dimensions. Regional resilience, for example, can be seen as the capacity to maintain living conditions and livelihoods at a regional level. In this paper, we emphasise rural resilience, and the relations between these three levels.

The case studies indicate also that social-ecological resilience goes beyond, and is complementary to, the notion of sustainability. The resilience concept accentuates the potential of, and need for, social-ecological systems to adapt. Resilience underlines dynamics, learning and a re-balancing while sustainability puts more emphasis on the simultaneous achieving of social, environmental and economic goals. That sustainable development is sometimes also referred to as durable development, is another indication that the two concepts can be seen as complementary.

Already these first few examples illustrate a variety of strategies which reflect the diversity of contexts and divergent goals: the strategies being adopted are much more differentiated than the standard ‘scale enlargement – specialisation – rationalisation’ model. The examples also illustrate a complex balancing of adaptation and maintenance. The diverse motives driving these strategies ranged from improving competitiveness in global markets (in the Irish and Israeli case studies), maintaining autonomy (in the Latvian, Lithuanian and Austrian case studies) and paying more attention to quality of life and the provision of public goods and ecosystem services (the Belgian, Danish, and Swedish case studies). The active positioning of farming in the newly evolving bio-economy was the predominant feature in the German case study, and an increased engagement in higher value product chains and organic markets were the strategies adopted in the Austrian, French, Spanish and Italian case studies.

Askenazy et al. (2017) found that redesigning supply chains is one frequently chosen strategy for enhancing resilience. Alternative

Table 1
Overview of the 14 case studies ³.

Case study	Summary of the case studies and key issues raised
Organic farming and resilience (Austria)	The case study focused on Salzburg, where 49% of the agricultural area is certified organic. Farmers couple a selective use of technology with traditional knowledge, in order to meet societal and consumer demands. They focus on economies of scope, niche markets and new business models (Darnhofer and Strauss, 2015).
New forms of governance in landscape development (Belgium)	The case study focused on a landscape fund in the canal zone of Ghent. This alternative financing strategy for landscape development involves new forms of cooperation between different rural actors, farmers, the municipality and local residents. (Koopmans et al., 2015).
Landscape strategy and agriculture (Denmark)	The case study focuses on the rural landscape as the spatial framework for agricultural and rural development. It explores how collaborative strategies can contribute to the design of agricultural landscapes that are more attractive and enhance ecological landscape services and social cohesion (Pears et al., 2015).
Transitions towards ecological production (France)	The case study focuses on the greening of the agri-food system in the Drôme Valley ('Biovallée'). The systemic analysis covers the role of the different actors in the agri-food system, the social learning processes and the forms of territorial governance (Lamine et al., 2015).
Opportunities for creating an eco-economy (Germany)	The case study focuses on the role that rural areas and agriculture can play in the transition towards a low-carbon, resource-efficient economy. It examined cross-sectoral management, new territorial-level arrangements, new forms of governance and the valorisation of different kinds of knowledge (Peter et al., 2015).
Farmers adopting a new nutrient management technology (Ireland)	The case study focuses on livestock farmers participating in the Irish Agricultural Catchments Programme. It analyses the role of innovation in the sustainable intensification of grass-based production and, more specifically, the adoption of a new nutrient management technology (Buckley and Shortle, 2015).
Rural innovation as a response to global fluctuation (Israel)	The Arava region is currently undergoing a major crisis that is pushing stakeholders to consider new directions for agricultural and rural innovation. The case study explores how a once highly successful farming community has had to reassess the resources available to it and find new ways forward (Hurwitz et al., 2015).
Extensive pig production systems (Italy)	The case study analyses an outdoor pig farming system in Tuscany, which is based on a local pig breed, the <i>Cinta Senese</i> . The newly established, high value-added, food chain combines traditional artisanal methods with contemporary management and modern technologies and marketing (De Roest and Ferrari, 2015).
Small farms' development strategies (Latvia)	The case study focuses on Tukums, a centre of fruit growing. It examines how modernisation influences the resilience of farming systems and the prosperity of farmers and the region. Organisational innovations and diverse practices of market, territorial, social and political involvement are identified (Sumane et al., 2015).
Resilient farming systems and market differentiation (Lithuania)	The case study focuses on how farmers, local inhabitants and consumers strive to maintain local added-value in the food sector, especially through farmers' markets. It explores the issues that key actors associate with farm modernisation, as well as the bottlenecks related to diversification (Atkociuniene et al., 2015).
Innovation and social learning in vegetable production (Spain)	The case study analyses the evolution of the Camposeven cooperative in the region of Murcia. The cooperative stresses the use of sustainable horticultural techniques, trust-based ways of working, transparency, prioritising quality over quantity and using a diverse range of marketing channels (De los Ríos et al., 2015).
Peri-urban agricultural transformations (Sweden)	The case study explores development trends in landscapes between 1990 and 2020, in a peri-urban area around Gothenburg. Focus is on the influence of incentives and regulations on changes in land use, the sustainability of the landscape and the ecosystem services produced (Olsson et al., 2015).
Suburban food production systems in Bern (Switzerland)	The case study examines local agricultural initiatives in the agglomeration of Bern. Focus is on the growing number of initiatives aimed at strengthening the sustainability of agricultural and food systems, and specifically the economic and social links between farmers and local residents in food markets (Bourdin et al., 2015).
Resilience and competitiveness of small ruminant farms (Turkey)	The case study focuses on the Isparta province, famous for fruit and oil rose cultivation, as well as its sheep and goats. The analysis identifies the role that farmer organisations (cooperatives, breeders' unions, etc.) and innovations play in the competitiveness and resilience of local farming systems (Giray et al., 2015).

supply chains decrease dependency on retailers, retain more value added along the chain as a whole, which is a more evenly shared along the chain, and foster cooperation between chain partners. Such adjustments are far easier today, as information technology and the internet allow farmers to engage directly with consumers. In Switzerland, there are many examples of this strategy, which increase transparency and build consumer trust in local brands and produce (Bourdin et al., 2015). The case study in Switzerland also reveals that resilience at the regional level can be enhanced by establishing new forms of cooperation with large players. The organic milk industry strengthened its ties with national retailers, enabling retailers to have a buffer against shocks within their conventional chains.

In a number of case studies, farmers adopted several strategies simultaneously to ensure their resilience, but implemented them at different paces and adapted them towards a range of economic, environmental and/or social objectives. The case studies in Turkey, Lithuania and, to a lesser extent, Latvia show that one way of strengthening farm resilience is to limit borrowing and choose a modest technological upgrade, to give priority to local as opposed

to extra-regional or export markets, and strive to maintain autonomy. Other goals include reducing risk (Latvia), being less dependent on energy-intensive technology or simply increasing added-value by applying artisanal methods, as in the Italian case. The differences in trajectories and goals reflect differences in preferences, structures, resource endowments and societal demands. The diversity of farm household strategies is related to a farm's degree of integration with agricultural and non-agricultural markets, the relevance of different sources of income for the farm household, the degree of specialisation and the (combination of) marketing strategies used (confirming earlier findings from Van der Ploeg, 1994; and Knickel et al., 2011).

At the regional level, some case-study regions were dominated by family farms whose main concerns were with making environmental improvements and improving their economic viability and quality of life (Austria, France, and Italy). In other regions, farms predominantly focused on 'old-style' modernisation, i.e. specialisation and scale increase, leading to ever-more investments in machinery and increased automation (Ireland, Latvia, and Lithuania). Yet, in most case study areas regional resilience, that is the capacity to maintain living conditions and livelihoods at the regional level, might well be strengthened by a dynamic mix of different farm types and strategies.

³ Detailed information on all 14 case studies, including the complete case study reports, is available on the RETHINK project website: <http://www.rethink-net.eu/case-studies.html>.

Table 2

Applications of the concept of resilience to agriculture, food systems and rural areas and some key findings.

Level	Illustrative examples from the case studies
Farm	Farmers find it hard to restructure or grow their farms fast enough to cope with the reduction and volatility of producer prices. It is almost impossible to do this whilst using more environmentally sustainable practices (Germany, Ireland, and Sweden). Ensuring that a farm business remains adaptable and avoids over-specialisation and path-dependency and unwarranted indebtedness (Israel). Focussing on economies of scope in farm development and niche markets. Revalorising multifunctional agriculture (Austria, Belgium, and Denmark).
Farm family	Coupling the selective use of technology with traditional knowledge in order to meet societal and consumer demands (Austria). Social learning processes contribute to transitions and more resilient farming systems (France, Spain). Maintaining farming as an attractive occupation for the next generation (Turkey). Smallholders adopt development strategies that emphasise autonomy and depend more on social networks (Latvia, Lithuania, and Turkey).
Food chain	Keeping all partners in a food chain economically viable is essential to maintaining the food chain as a whole (France, Israel, and Switzerland). Good governance and ways of working together, trust and transparency can strengthen food chains and enhance the viability of each business involved (Spain). Global changes can necessitate new directions for agricultural and rural innovation in order to maintain livelihoods (Israel). Combining traditional artisanal methods with contemporary management and marketing can reconnect farm production with gastronomy, and stabilise traditional high nature value farming systems (Italy).
Watershed	Maintaining the integrity of water bodies through better farming practices, and through continuous learning and improvement (Ireland). New governance structures and multiactor cooperation can help to integrate different interests and increase socio-ecological resilience at regional level (Belgium, Denmark, and Sweden).
Rural community	Creating synergies between the development of farming, rural businesses and communities. Identifying new business models that allow farmers to link up with other rural stakeholders (Austria, Denmark, France, Germany, Israel, Latvia, and Spain). Strengthening ties with nearby cities is another strategy for achieving greater resilience (Belgium, Germany, Sweden, and Switzerland).

4.1.3. Strengthening rural resilience

The challenges, indeed crises, described in the introductory sections, imply that strengthening the resilience of agriculture, food systems and rural areas needs to become more important as a policy goal. The references provided in Section 2 suggest that resilience has actually entered policy development, maybe not yet in a meaningful way, and sometimes just appearing as a change in the use of terminology, but it is still present. The discussion of the case study findings in the previous section shows that farm and regional-level adaptations and transformations, and thus resilience, can be encouraged or constrained by many factors. These include the capacity of individual farmers and farm managers, their interactions with other stakeholders and the access they have to (multiple sources of) agricultural knowledge and support. Other influencing factors include access to resources such as land, labour and capital, and, most importantly, the farmer's and rural actor's ability to reconfigure these through creative thinking and (joint) problem solving, interactive innovation, and adopting new practices. Policies and market mechanisms shape many of these factors, sometimes in advantageous ways, and other times in unfavourable ways. Generally, policy makers do not assess these effects systematically nor do they properly take into account the effects of market mechanisms and power relations.

Support from government can play a key role in both regional and farm-based efforts to strengthen resilience. This support can take many forms, e.g. support for collective initiatives, co-learning and co-innovation processes or for local capacity building. While it is preferable that governmental support adopts an integrated approach to promoting regional and community level resilience, several case studies revealed that support is usually offered on a farm-by-farm basis, without a clear regional vision and strategy. One consequence of this farm-level focus is that any distributional effects that may arise from say, supporting larger farms, tend to be overlooked. At the same time support for agricultural investment is often not accessible to small farms or for strategies that are not 'mainstream' (Dwyer et al., 2012; Davidova et al., 2013).

Support is also rarely available for open-ended projects that are surrounded by uncertainties, for innovative ideas that cannot be expressed in a conventional business plan, for social innovations that do not involve investments in buildings or machinery, or for farms that want to avoid going into debt. Similarly, the direct payments that do exist – e.g. for organic farming – are rarely justified for their systemic effects, such as higher value-added, employment generation, or a higher level of resilience. It is in all

of these areas where the mismatch between visions and strategies on the one hand and market developments, policy instruments and outcomes on the other becomes visible.

If the necessary systemic changes in agriculture are to occur, the subsidies that prop up unsustainable practices, such as practices that are intensive in their use of fossil fuels, ought to be phased out. Yet here we face the fundamental problem that many societal and environmental costs associated with agriculture are externalised and that ecosystem services are considered to be 'free', thus providing an economic advantage to unsustainable practices. To create a level playing field, finite resources, such as soil, water and biodiversity must have a realistic price, and the social and environmental costs and benefits have to be accounted for.

4.2. The prosperity and well-being of rural areas

4.2.1. Less concentration means more social cohesion

In this section we discuss the linkages between farming, rural prosperity and well-being in our fourteen case studies. We relate this discussion to the important question of social, economic and territorial cohesion. In the discussion, we focus on the basic idea that less concentration of (agricultural) production and wealth will, almost inevitably, enhance social cohesion.

Based on their comparative analysis of the fourteen case studies, Rivera et al. (2017; in this Special issue) argue that in the past, rural prosperity mainly stemmed from the economic benefits that originated from the modernisation of agriculture. However, they challenge the common assumption that agricultural rationalisation, scale enlargement, specialisation and mechanisation contribute to rural prosperity and a better quality of life. They argue that there are several reasons why this simple logic no longer holds true. At the farm level, increasing capital intensity is often associated with debt and (path) dependency, placing farm incomes under economic pressure. From a societal perspective these structural changes have not contributed to the prosperity of rural communities (at least in aggregate).

4.2.2. Discussion of the key findings from the case studies

Table 3 presents some examples from the case studies that illustrate the divergence in socio-economic goals and the tensions between an individual business perspective and social goals. An in-depth analysis of the question of prosperity and well-being based on the in-depth case studies in seven countries (Spain, Italy, Lithuania, Latvia, Israel, Germany and Denmark) is presented

Table 3
Examples of the linkages between farming, rural prosperity and well-being.

Issue	Illustrative examples from the case studies
The importance of the common good	Farmers appreciate the feeling of working on a 'common project' where everyone participates and felt this makes them more effective, innovative and motivated (Austria, Belgium, Denmark, France, Germany, Italy, and Spain). Farmers see social inclusion not just as an intangible benefit, but also as a <i>modus operandi</i> (Germany).
The benefits of community life and well-being	Rural areas are less and less primarily places of production (Belgium, Denmark). Farmers appreciate environmental integrity not just for the benefits it provides, but also take pride in the ecosystem and landscapes that they maintain (Austria, Denmark, Latvia, and Lithuania). Agricultural change and community well-being can be very closely connected and the two go hand-in-hand (Germany, Israel, and Turkey).
The multidimensional aspects of prosperity at an individual level	Stakeholders seek to balance their economic interests with human, social and environmental well-being (all case studies). Non-economic aspects such as autonomy, social recognition, and social and environmental well-being all played a very significant role for farm households when they were asked to define well-being (Austria, Latvia, Lithuania, Spain, and Turkey).

by Rivera et al. (2017).

These few examples from the case studies are indicative of a shift in orientations and motivations. They show that some strategies that farmers adopt are meant to have a beneficial effect on both the farmer's and the community's prosperity, and improve farmers' quality of life (a finding that is in line with work by Van der Ploeg in the early 1990s, see e.g. Van der Ploeg (1994). Rivera et al. (2017) found that some of these strategies, and particularly those that are less mainstream, are an expression of new ways of thinking about rural prosperity and well-being. Throughout all the case studies we observe a shift from a focus on the costs of production, productivity and cost-efficiency to effectiveness in meeting social or environmental goals, such as enhancing the quality of life. Trade-offs are common. Small farms and particularly farms in less favourable areas are more likely to seek to better integrate the economic and social aspects of their activities than large farms. One way in which they do this is by engaging in local trading systems that strengthen community bonds (Van der Ploeg et al., 2002; Bryden et al., 2011; Knickel et al., 2013).

On an aggregate level, the sum of businesses maximising their individual benefits does not guarantee the well-being or prosperity of rural communities. On the contrary, the concentration of production in some regions and on some farms is highly divisive and runs counter to the goal of fostering social cohesion.

Rivera et al. (2017) conclude that rural areas are more than a place of production. They follow the line taken by Woods (2005), Bryden et al. (2011) and others, and stress that the countryside is (also) a place of consumption. Indications of this from our case studies include an increased emphasis on environmental conservation and residential decentralisation (Austria, Belgium, Denmark and Sweden), new urban-rural partnerships (Switzerland), and the provision of other non-food services and amenities in the countryside (Germany). These findings are in line with a vision of prosperity in which human beings flourish, seek social cohesion and improve their levels of well-being, while reducing their material impact on the environment (Jackson, 2009; Stiglitz et al., 2009).

4.2.3. Fostering well-being and a more balanced development

Considering these shortcomings in conventional trajectories, it is hard to understand why conventional agricultural support systems (i.e. Chambers of Agriculture, policies, market interventions, etc.) undervalue and largely ignore alternative and multifunctional approaches. This tendency was observed in all fourteen case studies.

As with the resilience theme, we can observe a mismatch between visions and strategies about prosperity and well-being on the one hand and market developments, policy instruments and outcomes on the other. The existence of, sometimes huge, differences in access to resources, including support mechanisms, is

another factor that is very detrimental and particularly worsens the situation of the most deprived rural groups, increasing inequality within and between regions. The current one-sided emphasis on economic performance, competition, competitiveness and growth is counterproductive as it further disadvantages the most marginalised. On another level, and this appears very clearly from all of our case studies, the rural actors themselves are guided by more than economic considerations: Personal well-being, maintaining vibrant rural areas, fostering a sense of community, exchanging knowledge, and caring for the environment are key factors that stakeholders identified as contributing to the prosperity of rural areas.

Our case studies indicate that the stimulation and active promotion of partnerships and cooperation through support schemes can contribute to prosperous rural areas, often more so than competition (Darnhofer and Strauss, 2015; De Roest and Ferrari, 2015). The German Regional Action and Bio-energy Regions pilot schemes and many LEADER activities vividly illustrate this point (Peter et al., 2015). Co-learning and innovation play a major role in the required changes.

4.3. Knowledge and innovation

4.3.1. New understandings of knowledge and innovation

The current agricultural knowledge and innovation system, particularly national level agricultural institutions, including higher education, is deeply attached to the model of technologically-driven agricultural industrialisation. There are four related challenges in preparing European agriculture and rural areas for the future: first, to make agricultural knowledge systems more responsive to contemporary challenges; second, to perceive knowledge and innovation as drivers of development; third, to move beyond old paradigms based on linear approaches and conventional assumptions, and; fourth, to integrate ecological and social concerns with economic aspects.

Šumane et al. (2017) emphasise that the transition towards more sustainable agriculture will require a new knowledge base, with new content and forms of knowledge, and new processes of learning. More specifically, they point to the importance of farmers' informal knowledge and learning practices in constructing alternative pathways towards sustainable agriculture and in strengthening agricultural resilience. In the next sub-section we examine the key lessons that we learned from the case studies on the importance of different kinds and sources of knowledge, and forms of learning, and their integration, in adapting modern agriculture.

4.3.2. Discussion of the key findings from the case studies

The fourteen case studies confirm that technological innovation cannot readily be separated from organisational or social changes at the farm, food-chain or community level. The case studies also show that social and organisational innovations play a particularly

Table 4
New and wider understandings of knowledge and innovation.

Issue	Illustrative examples from the case studies
Wider understanding	When innovation takes into account social and environmental considerations it can advance economic development, social welfare and resilience and improve natural resource management (Austria, Germany, Israel, Latvia, Lithuania, and Spain). Existing agricultural knowledge institutions and networks do not pay equal attention to all knowledge needs but tend to focus on technical aspects (Austria, Switzerland, and Turkey).
Capacity building	Systemic shifts, such as the transition to energy farming, require that farmers receive training in new business skills, often also in the development of value chains (France, Germany). Mutual trust, transparency and good communications between different actors play an important role in the creation, adoption and scaling-up of innovations (France, Germany, Ireland, Israel, Italy, and Spain).
Farmers' knowledge	Farmers' experiential and location-specific knowledge plays a major role in the daily management of the farm as well as when creating novel solutions or adapting their practices (Austria, France, Germany, Ireland, and Israel). Local and informal knowledge is often more attuned to the values, needs and resources of farmers and rural communities (Austria, France, Germany, and Latvia).
Knowledge exchange	Multi-actor platforms set up to share different forms of knowledge enable joint learning through reflection, encourage people to question practices and promote new, innovative ideas. Their particular potential is due to their embeddedness in tangible social, economic and environmental contexts, which have specific dynamics, diversity, opportunities, uncertainties and risks. These platforms strengthen social learning (Austria, Denmark, France, Germany, Italy, Latvia, and Spain).

vital role in renewal at farm level and in rural economies (Table 4). An in-depth analysis on the role of knowledge and innovation in the fourteen case studies is presented by Šūmane et al. (2017).

Šūmane et al. (2017) emphasise that access to *appropriate* knowledge for innovation played an important role in all case studies. New pathways require a mix of new technical, organisational, marketing, management and other knowledge, as well as social skills (Hurwitz et al., 2015). However, the existing agricultural knowledge institutions and networks do not pay equal attention to all knowledge needs: they are good at providing technical knowledge, but they have little competence in helping farmers to engage in social innovations or to establish and manage innovative supply chains (Bourdin et al., 2015; Darnhofer and Strauss, 2015). Šūmane et al. (2017) also show that farmers rely heavily on their own experiential knowledge and place a high value on exchanging experiences with other farmers. This informal knowledge, interactions, exchanges and learning form a foundation for developing practices that make best use of local natural and social resources and possibilities and enhancing livelihoods in the long-term.

Integrating this context-sensitive knowledge with formal scientific knowledge will be a critically important tool for fostering systemic change. Knowledge exchange is essential in order to better address common and complex challenges, to meet economic, environmental and social needs, to develop innovative solutions and to foster collaboration between different stakeholders. Trust is a key element in stimulating knowledge partnerships (Pears et al., 2015; Rivera et al., 2017) but the importance of trust is often overlooked by public sector decision-makers. To build trust takes time and it is hard to plan it.

4.3.3. Opening up the agricultural knowledge and innovation system

The findings obtained from our case studies are fully in line with the European Commission's (2016) most recent research strategy discussion paper which states that: *“dealing with complexity requires the harnessing of all available knowledge sources, including tacit knowledge at (the) farm and business level and requires the involvement of all relevant actors (farmers, foresters, cooperative and industry, advisors and knowledge brokers, etc.) in a process of knowledge co-creation and appropriation. This is what we refer to as the interactive innovation model”*.

In this case the mismatch between visions and strategies on the one hand, and market developments, policy instruments and outcomes on the other is primarily expressed in the lack of sufficient recognition of the value of farmers' practice-based experiential knowledge. Policy frameworks such as the EIP-AGRI, which was introduced in 2013, might gradually change this and strengthen the

role of farmers as co-creators of knowledge, but more attention needs to be paid to developing stronger mechanisms in this regard.

The EIP-AGRI supports the combination of different types of knowledge and co-learning and fosters adaptive management. Because it meets the demands identified earlier, it does represent a major improvement to the transfer-of-knowledge approach. Yet, the importance and potential of informal knowledge and of adaptive management is not yet sufficiently recognised, particularly in national agricultural knowledge and innovation systems. When implementing the EIP-AGRI at the national-level insufficient attention is paid to the types of knowledge and innovation that are required to foster a more balanced overall development, to making agricultural and food systems more sustainable, or to increasing the resilience of rural communities.

The inadequate inter-linkages between knowledge, innovation and rural development lead us to conclude that policies and support frameworks are insufficiently supportive of longer-term adaptive management frameworks. Such longer-term frameworks require facilitation, network management and continuity. In some areas prolonged funding might be necessary to ensure the continuation and viability of newly established governance processes and structures. Initiatives such as the new EIP-AGRI can make an important contribution to disseminating the lessons learnt from pilot programmes and to fostering their wider application. A wider network of pilot schemes that experiment with, and achieve, far-reaching systemic change could be a way of disseminating such experiences. The funding of pilot schemes could require that they cross social, economic and environmental boundaries, are carried by multi-actor partnerships, recognise the importance and potential of informal knowledge and are based on a convincing long-term vision and management strategy. From a policy development perspective it is very important to evaluate the systemic changes that such schemes induce and to learn from this.

The similarities between the EIP-AGRI and the LEADER policy frameworks in supporting agricultural and rural innovation lead us to believe there is a strong possibility for building connections between the two and for them to exchange their experiences and lessons learnt. Both approaches show how important it is to give consideration to factors that lead different actors to become engaged in strategy development and implementation, and use this knowledge to promote practice-driven, practitioner-led innovation (Knickel, 2015; Šūmane et al., 2017). Governance arrangements play a major role in facilitating this.

4.4. Governance arrangements

4.4.1. Multi-level governance, formal and informal structures
Koopmans et al. (2017; in this special issue) argue that informal

Table 5
Multi-level governance, formal and informal arrangements.

Issue	Illustrative examples from the case studies
Relationships between rural areas and agriculture	Innovative entrepreneurial activities amongst those who are committed to the region can help to create a new, more dynamic regional identity (Austria, Germany, Italy, Latvia and Spain). New approaches to connect strategic planning with rural development instruments and socio-economic mechanisms have the potential to align rural landscape management with leisure and production functions and re-connect urban, peri-urban and rural areas (Belgium, Denmark, and Sweden). A better integration of different funding mechanisms can help to harmonise agricultural and broader rural development goals (Belgium).
Enabling collective action and multi-stakeholder partnerships	Network building and participatory decision-making matter significantly in reorienting developments and in creating new joint 'projects' (Belgium, Denmark, and Germany). Culture and tradition can be a major factor in this (Austria, Italy, and Latvia). Where farmers are less involved in civil society and cooperative initiatives less renewal was observed. In such regions one of the first steps that needs to be taken is to invest in activating stakeholders and promoting community engagement (Turkey, Lithuania).
The role of less formal, cooperative approaches	Informal networks can play a major role in balancing different interests and in strengthening long-term perspectives (Belgium, Denmark, and Germany). Transparent communication and open governance structures with meaningful stakeholder involvement are very important (all case studies). Government agencies can effectively participate in formal and informal networks without necessarily being in a leading position (Belgium, Denmark, and Germany). Implementing agencies tend to pay insufficient attention to experimenting with, and learning, how to enable more integrated, cross-sectoral, bottom-up strategies and projects (all EU case studies).

networks can play an important role in balancing different interests and in strengthening long-term perspectives. Multi-actor cooperation helps, and is sometimes even needed in order to, move away from purely economic and purely sectoral approaches. Strategies are more likely to succeed through a concerted effort, co-ordinated by formal and/or informal networks. The same authors also go one step further, emphasising that well-managed processes of multi-actor involvement can capture the diverse – and sometimes conflicting – interests around rural development, allowing participants to identify and align themselves behind common long-term goals. Well-managed multi-actor processes can also help in resolving conflicts and conflicting goals, particularly when different motivations and interests are made explicit.

There clearly is the political will to further develop governance structures and processes in ways that accommodate different demands and foster the sustainability and resilience of food, agricultural and rural systems. At the same time, there is already much available relevant research and evaluation-based knowledge that can be drawn upon. In our case studies we explored whether this political will and knowledge about new governance arrangements were actually being deployed and, more specifically, how the relationships between rural areas and agriculture were expressed: functionally and spatially, and in terms of governance arrangements. In the following section we draw on the comparative analysis of governance arrangements in the case studies by [Koopmans et al. \(2017\)](#) to address these questions.

4.4.2. Discussion of the key findings from the case studies

The fourteen case studies ranged from very small farms and their associations, to farmer groups, producer cooperatives and producer–consumer associations, to bio-regions. Almost always we found that multi-actor cooperation was helping, or even needed in order to depart from purely economic and purely sectoral approaches. The case studies from Belgium, Denmark, France, Germany, Italy and Sweden show that multi-stakeholder cooperation can be very effective in reconnecting agricultural and rural goals ([Pears et al., 2015](#); [Koopmans et al., 2015](#); [Olsson et al., 2015](#)) ([Table 5](#)).

New forms of cooperation can strengthen rural resilience ([Koopmans et al., 2017](#)). Examples are producer organisations, which can lower costs and create new possibilities for a 'sharing economy', and rural residents who are coming together in efforts to protect key landscape elements and enhance their regions' natural capital. Other examples are the Danish case study, where a new multi-stakeholder group was established to improve a local stream

system and the surrounding landscape; and the Belgian case study, where farmers were encouraged to plant trees after joint discussions with non-farmers.

Strengthening ties with nearby cities is another strategy for achieving greater resilience through cooperation. While cities may be seen as competing with their peri-urban and rural surroundings, they are also important hubs of activity. Rural residents can find off-farm jobs in cities and sell their produce there, while urban residents may embark on visits to farms or seek recreation in the countryside, creating new revenue streams for farm families ([Olsson et al., 2015](#); [Pears et al., 2015](#)). Creating farmers' markets and designing activities that attract urban residents to rural areas plays an important role in farmers' strategies to strengthen rural resilience in Latvia and Lithuania.

The majority of case studies also show that more and more governments – both national and regional – are increasingly trying to assume the role of an 'enabling state' and to better integrate different programmes. Both these moves help to harmonise agricultural and broader rural development goals and are a way of being more responsive to the demands of rural actors to have more agency in rural development processes ([Koopmans et al., 2017](#)). A closely related finding that was particularly evident in the German and the Danish case studies, is that pilot schemes that encourage experimentation with completely new approaches are of particular value. Examples include new forms of partnership in value chains, new cross-sectoral rural development visions and strategies, and more localised interpretations of a knowledge-based bio-economy.

4.4.3. Strengthening informal networks and subsidiarity

European policy frameworks provide many opportunities for local actors to play a greater role in local-level policy implementation. The key question is whether national, regional and local-level decision-makers make full use of these opportunities. The case studies showed that it is in this area where the mismatch between visions and strategies on the one hand, and market developments, policy instruments and outcomes on the other is the most obvious. In general not enough attention is being paid to the important role that informal networks can play in balancing different interests and in strengthening long-term perspectives. The establishment and management of networks is a vital component of rural development programmes (RDPs) that requires more than initial or temporary funding. [Peter and Knickel \(2016\)](#), based on the German case study, suggest incorporating the management of networks, and their facilitation, in the concept of 'services of public interest' as an additional 'soft' factor.

New governance arrangements require new skills and competences (such as mediation, tolerating ‘failure’ and taking steps backwards) within public institutions and among citizens and civil society organisations (Rogge et al., 2013). This might at least partly explain why there is considerable reluctance to try out new approaches. Fostering cross-sectoral integration requires a considerable amount of facilitation and trust building. RDPs often do not contain relevant measures or adequate resourcing for this. Capacity building among local government and stakeholders is often not adequately coordinated with other kinds of support. In this context, Koopmans et al. (2017) refer to the collective environmental goals in the Danish case, and the joint achievement of socio-economic goals in the Spanish farm cooperative. In the literature, this is termed ‘civic agency’. In many of our cases, enhanced civic agency helped farmers to link up to broader strategic agendas, such as producing public goods.

Cairol et al. (2009) and Koopmans et al. (2017) stress that strategies with a territorial focus help to orchestrate the governance of agriculture and rural development. Participatory spatial development planning can play a major role in this. The contrasting experiences of the Belgian, Danish and German case studies highlight the need for additional research into the factors that stimulate and obstruct collaborative planning and action within rural and agricultural contexts. Overall, there is a pressing need to better integrate policy frameworks across levels and sectors.

In the following section, we explore the linkages between the four themes analysed above, how they relate to the required systemic changes, and draw out the potential policy implications.

Integration: going beyond traditional ways to achieve systemic change

One common thread that runs through all four thematic areas is the need to go beyond traditional approaches in order to achieve the required systemic changes. These traditional approaches are not sufficient to achieve these required systemic changes, and we need to look for more effective strategies and approaches. Part of this search needs to focus on policy frameworks. In this section, we discuss how the widespread call for systemic change can be triggered, and how transitions can be promoted. To this end we connect the findings from the four themes and discuss the implications of the research for policy in the EU and beyond.

Looking across the four thematic areas, we see two main strategies that will promote systemic changes and support a transition towards resilient agricultural and food systems and sustainable rural development. Both strategies can also be applied to the future development of policy frameworks:

- Building transformative capacity, supporting co-learning.
- Reorienting support for agriculture and rural development.

Building transformative capacity and supporting co-learning

Maintaining livelihoods has much to do with learning, adaptation and realignment. The importance of this in the case studies reminded us that social-ecological resilience goes beyond, and is complementary to, the notion of sustainability. Regions that have the capacity to define their own economic priorities and promote combinations of social, organisational and technological innovations that correspond with regional priorities and resources, will almost by definition, be more resilient. Overall, a considerable reorientation of the AKIS is required if we are to make the much-needed transition(s) and to benefit from the multiple new opportunities that this will bring.

The more recent EU-level strategic policy frameworks and instruments echo these new orientations. However, national and local authorities and, particularly those involved in the agricultural knowledge and innovation systems have not yet recognised the importance of resilience and sustainability.

The capacity of local government agencies and stakeholders to adapt and transform needs to be strengthened in order to support the emergence of diverse development pathways. However, for many decades education and advisory services have almost exclusively concentrated on transferring knowledge derived from research and ensuring compliance with regulations, instead of enhancing the capacity for experimentation and transformation at the local level. RDPs do not currently provide sufficient resources for training farmers in new business skills that are relevant to their regional and social context or for developing new business models and value chains that can co-evolve with local agriculture.

It is unfortunate that social innovation is mostly currently restricted to the LEADER programme. Darnhofer and Strauss (2015) argue that the programmers and funders of RDPs find it hard to accept that it is often not possible to predefine the outcomes of social innovations, as these only emerge through a process of modifying and refining ideas. At the same time, there is much to be learned from the multiple small initiatives that are already in place locally (Knickel, 2015; Knickel, 2016).

In consideration of the limits of natural resources and buffer capacities, more transdisciplinary research is clearly needed in order to explore modernisation trajectories that are more resource-efficient and pathways that enhance resilience. The principles that ought to guide this research have already been set out very clearly by the European Commission (2012) in its most recent discussion paper “A strategic approach to EU agricultural research and innovation”. The paper is a vital step forward demanding “integrated ecological approaches from farm to landscape level” as well as a “deeper understanding of ecological principles [that] is changing views on the functioning of primary production systems and will make it possible to use ecosystem services to benefit sustainable production. ... Synergies and trade-offs between the different environmental challenges and productivity and profitability aspects have to be considered in order to create win–win situations and design pathways to innovative and resilient ecological farming systems.”

The EIP-AGRI can in principle foster greater cooperation between the policy-making, research and farming communities. In view of the shortcomings in policy frameworks and implementation identified in this paper, there is a particular need to strengthen transdisciplinary research that can better inform public and private sector decision-making at all levels. A related conclusion is that research communities pay more attention to social components in their agendas. The particular factors include the quality of work conditions, the use of farmers’ knowledge and experience, ties with the local economy as well as community and environmental criteria. These changes will help support more gradual and more differentiated development pathways, particularly for the very large number of small farms, many of which are concentrated in Eastern Europe, reducing their exposure to external risks and allowing them to develop along trajectories that are more resilient. To accelerate the required systemic changes, it seems obvious that the European Agricultural Fund for Rural Development (EAFRD) should request Member States to allocate a minimum share of their agricultural funding to implementing the EIP-AGRI (as they are currently obliged to do for the LEADER programme).

The German case study exemplifies how new funding strategies and business models can effectively foster transformative capacity at both national and local levels (Peter et al., 2015). New decision-making platforms and information tools enable communities to make choices from a longer term perspective. The first experiences

with the EIP-AGRI indicate that European frameworks can encourage such initiatives on a larger scale. When well-implemented, such frameworks can foster mutual respect among farmers who are following alternative modernisation pathways and rural entrepreneurs, and enhance synergies and collaboration. Facilitators are important as catalysts in these processes.

5.2. Reorienting support for agriculture and rural development

EU policy is to contribute to the achievement of the UN's new 2030 Agenda for Sustainable Development with its 17 specific goals (UN, 2015; European Commission, 2016). Most of these goals have direct or indirect implications for agricultural, rural and food systems, which have to become more sustainable and resilient. How then can policy, and specifically the CAP, become more effective in promoting the required systemic changes?

The main entry points for making policy support more effective are: the Europe 2020 strategy,⁴ the Rural Development Regulation (RDR)⁵ of the CAP, the further development of the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI)⁶ and the strategic agenda and direction of the next reform of the CAP (2021–2027).

Rivera et al. (2017) provide an excellent entry point into the broad direction in which agricultural and rural development needs to move when they argue that effective policies are those that can “accommodate multiple visions, allowing space to experiment and to grow not only through one prescribed modernity, but also through a dynamic evolution”. More specifically they emphasise that economic efficiency can no longer be the dominant criteria in agricultural policy and that large industrialised farms “no longer represent an unquestioned ideal”.

Many of the case studies provide evidence of incremental changes in thinking and a gradual reorientation of farm management styles and business models. This shift is more pronounced in those countries where the industrialisation of agriculture has been going on for a long time (Austria, Denmark, France, Germany, Italy and Sweden). A considerable proportion of farms in these countries are highly specialised and capital input and energy-intensive, although more farmers are moving away from this model. It is important that decision makers pay more attention to the limited resilience of highly specialised and capital input and energy-intensive farms and to regions where agriculture is dominated by one or a few specialised sectors.

In countries, mainly the newer members of the EU, where the industrialisation of agriculture is less advanced and reliance on subsidies less pronounced, policy development, agricultural knowledge and innovation systems and agricultural investment require rapid realignment so that they are no longer pushing farms and agriculture in the direction of industrial farming. Supporting the resilience of these farm households means promoting diversity, cross-fertilisation, and cooperation. European and national policy frameworks that acknowledge the benefits of diverse farm structures and create a framework that enables different development pathways and farming styles can help foster more balanced, sustainable, and resilient development. Based on the analyses presented in this paper, it seems obvious to conclude that support mechanisms that recognise the particular and diverging needs of

different farm sizes and types, and that enable farmers to consider a range of approaches tend to be more efficient than the currently favoured ‘one-size-fits-all’ approach. Encouraging farmers to implement strategies that correspond to their specific strengths and that can flexibly be adapted to environmental economic or social changes also makes them more resilient.

Rivera et al. (2017) contend that decision-makers tend to underestimate the importance of policies that focus on serving people (particularly in marginalised regions and communities), on improving their quality of life, and on promoting resource-use efficiency in farming and rural businesses. The 14 case studies show that there is a whole range of strategies that can contribute to rural and farm-level prosperity. When farmers’ initiatives and strategies are integrated with those of other stakeholders this tends to increase the sustainability and resilience of agricultural and food systems and rural regions.

Askenazy et al. (2017) argue that when different actors in rural regions promote policies and strategies to enhance resilience, they do not necessarily account for the temporal and spatial scales at which these strategies’ effects manifest, which could lead to unexpected and even contradictory consequences for resilience. Moreover, indicators of the effectiveness of policy are not yet in line with contemporary demands (e.g. including economic, social and ecological perspectives when defining ‘value-added’). Our case studies very clearly confirm that well-being, environmental integrity, product quality, social cohesion, social recognition and maintaining a certain level of autonomy are as important as income as determinants of the quality of life for farmers and other stakeholders. Agricultural and rural development strategies must be based on visions and strategic perspectives that correspond with this reality. The ‘Regional Action’ and ‘Bioenergy Regions’ pilot schemes that form the basis of the German case study provide clear evidence of the value of open, participatory processes that lead to clearly formulated visions and strategic perspectives (Peter et al., 2015). Based on the analyses presented in this paper, it seems critically important that these processes become a formal requirement in rural development programming.

We have also established that decision-makers at the regional and local level do not pay sufficient attention to informal networks, trajectories that are less mainstream, experimentation or long-term perspectives. This can, at least partly, be explained by them lacking sufficient capacity to respond to emerging problems. Local governments and administrations must be in possession of the skills and abilities to carry out this new role. At the same time, it is necessary to carefully balance the devolution of responsibilities and strengthening of local ownership with higher level steering and coordination. In some places there is already an abundance of networks, organisations and initiatives, governments and it would be detrimental to establish new organisations or institutions on top of existing ones. In line with this, Koopmans et al. (2017) argue that it is generally more effective to connect existing structures and strengthen coordination between them than to create new ones.

6. Conclusions

We conclude this paper with two common concerns that emerge across our four thematic areas: resilience, prosperity and well-being, knowledge and learning, and governance. First, there is a glaring mismatch between the required systemic changes, and existing visions, on the one hand, and the outcomes, market developments and policy measures, on the other. Second, the potential of ‘thinking outside of the box’ and unconventional practices are widely disregarded, limiting our creativity in creating strategic frameworks and the choices we have.

Our case studies illustrate a complex balancing between

⁴ Communication from the Commission - Europe 2020 – A strategy for smart, sustainable and inclusive growth. COM 2010 (2020).

⁵ Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 and Council Regulation (EC) No 1698/2005.

⁶ European Innovation Partnership ‘Agricultural Productivity and Sustainability’. COM (2012) 79 final.

adaptation and maintenance, and identified a wide range of strategies that actors employ in order to maintain the livelihoods of their farms, farm families and rural communities. The concept of resilience accentuates the importance of dynamics, learning and re-balancing. The problem is that 'resilience' has entered the policy development lexicon but not yet in a meaningful way. The unquestioned ability of farmers and rural actors to reconfigure and adapt their use of resources, through creative thinking and (joint) problem solving, interactive innovation, and adopting new practices is affected by policies and market mechanisms. Yet we lack any systematic assessment of the effects of policies, regulations and subsidies in encouraging or thwarting such reconfigurations and adaptations designed to enhance resilience.

In all the case studies, we observed a shift in actors' focus on the costs of production, productivity and cost-efficiency to one on effectively meeting social or environmental goals, such as enhancing the quality of life. In some of the case studies the stimulation and active promotion of partnerships and cooperation were making a more significant contribution to rural prosperity than competition and individualism. More generally, our case studies show that social and organisational innovations play a particularly vital role in renewal at farm level and in rural economies. These new pathways require a mix of new technical, organisational, marketing, management and other forms of knowledge, as well as social skills. Integrating this context-sensitive knowledge with formal scientific knowledge, and fostering co-learning approaches, will be a critically important step in triggering systemic change. The political will to adopt approaches and processes that accommodate different demands and foster the sustainability and resilience of food, agricultural and rural systems can be very clearly recognised at higher EU level. The problem is that it often does not (yet) find its way into national, regional and local-level decision-making and implementation.

Overall our study, spanning 14 countries, 12 in the EU and two in adjacent countries, found a large array of existing and often successful, alternative development trajectories in farm modernisation, food systems and rural development. The case studies helped us to better understand and highlight particularly promising pathways. In line with the above, the distinctive contribution that this paper makes to the rural social science literature is that it accentuates research and policy approaches that extend beyond the conventional, traditional, ones. In order to achieve systemic change we need to more critically reflect on conventional wisdom and approaches and be open to ideas and practices that lay outside the well-worn paths of the mainstream. The main challenge however remains in us being able to overcome simplistic viewpoints about what 'modernisation' entails and to grasp the many opportunities that opening our eyes in this way will bring.

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