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D4.2: Assessing how policies enable or constrain the resilience of farming systems in the European Union: Case study results

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1 Introduction

Farming systems are always exposed to variegated internal and external challenges, for example fluctuating prices, adverse weather events, crop pests, animal diseases or food scares. While some of these challenges occur as shocks with reversible and irreversible effects, others unfold over longer periods of time, creating continuous stress. In Europe, most farming systems are regional and specialised. The challenges differ across regions, subsectors, farm types, and farming systems. However, in recent years, European farming systems have generally experienced more pronounced and overlapping challenges: on the one hand, a build-up of shocks such as more frequent extreme weather events, increased price volatility on liberalised markets or unpredictable political interventions to trade policies. These are accompanied by significant long-term stresses, such as changing consumer preferences, climate change, rural outmigration or the lack of skilled labour. The accumulation of these overlapping environmental, economic, social and institutional challenges could render many farming systems in Europe vulnerable and threaten their functions, i.e. the production of food and fibre as well as the provision of public goods (e.g. landscape amenities, rural development and habitat diversity). If farming systems are not resilient to the challenges, their functions are likely to deteriorate, and in extreme cases entire farming systems could collapse (Meuwissen et al., 2018). Vulnerable farming systems are a major threat to food security, rural development and the development of the bioeconomy.

The public and private goods potentially affected by their deterioration or collapse make the resilience of farming systems the object of public policy. However, there is little systematic knowledge about the effect of public policies on farming systems from a resilience perspective. The SURE-Farm Project has therefore developed a Resilience Assessment Tool (ResAT) to evaluate how public policies enable or constrain the resilience of farming systems (Termeer et al., 2018). It builds on insights from resilience theory to investigate the ability of farming systems to cope with risks, shocks and uncertainties (Ge et al., 2016) and to avoid deterioration and collapse (Carpenter and Brock, 2008).

Resilience can be generally defined as the ability of complex social-ecological systems to cope with changing environments (Bullock et al., 2017; Folke et al., 2010). Following Anderies et al. (2013), the SURE-Farm conceptual framework distinguishes between three types of resilience against external perturbations: robustness, adaptability and transformability (Meuwissen et al., 2018). *Robustness* is the capacity of a system to resist external perturbations and to maintain previous levels of functionality without major changes to its internal elements and processes (Urruty et al., 2016). *Adaptability* is the capacity of a system to adjust internal elements and processes in response to changing external circumstances and thereby to continue its

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development along the previous trajectory while maintaining all important functionalities (Folke et al., 2010). *Transformability* is the capacity of a system to develop or incorporate new elements and processes to a degree that changes its operational logic in order to maintain important functionalities when structural changes in the ecological, economic, or social environment make the existing system untenable or dysfunctional (Walker et al., 2004). As a strategy to defend system functionality, resilience differs fundamentally from insulation. Systems that are neither robust nor able to adapt or transform must be isolated from external shocks and stresses to prevent potential collapse. In the long run, however, insulation strategies suppress co-evolutionary processes that enable a system to develop adaptive capacities and are therefore likely to further reduce resilience.

In the past, farm policies were often aimed at insulating agricultural sectors from external shocks, in particular from price fluctuations, through a system of managed markets with guaranteed minimum prices, intervention buying and border protection. A complex and multi-layered configuration of European, national and subnational policies provided further support for farms and farmers through, e.g., various forms of state aid, state support to social security, public investments in infrastructure and land amelioration, or sector-specific regulations.

After the liberalisation of agricultural markets since the 1990s and in the wake of climate change, water scarcity, biodiversity loss and other ecological stressors, the resilience of farms and farm systems has become more of a concern in agricultural policy-making. In response, the EU's Common Agricultural Policy (CAP) is currently in a process of recalibration. When presenting the European Commission's legislative proposals for the CAP after 2020, Agricultural Commissioner Phil Hogan highlighted as one of "the Commission's commitments [...] to ensure a more resilient agricultural sector in Europe" (European Commission, 2018).[13] The upcoming reforms for a post-2020 CAP can therefore also be understood as a decision whether and how much to invest in resilience-supporting policies and as a choice between the three resilience strategies – robustness, adaptive capacity and transformative capacity – or a mix of them.

Against this background, it is important to understand whether and how the current configuration of EU and national policies supports or constrains the capacity of regional farming systems to cope with the range of novel challenges. Understanding the CAP's effects on the resilience of regional farming systems requires an analysis of the interactions between the CAP

[13] The Commission further explains: " [...] although it remains at heart a policy designed to support European farmers and ensure Europe's food security, today's CAP does much more than just that. Europe needs a resilient, sustainable and competitive agricultural sector to ensure production of high-quality, safe and affordable food for its citizens and a strong socio-economic fabric in rural areas." European Commission, (2018). Modernising and Simplifying the Common Agricultural Policy: Tageted, flexible, effective, Brussels.

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and various other policies, which occur not only within the sector, but also across sectors and jurisdictional levels (Daugbjerg and Swinbank, 2012).

The Resilience Assessment Tool (Termeer et al., 2018) builds on broad academic literature that has identified characteristics of resilience-enhancing policies (Brink et al., 2013; Carpenter et al., 2015; Daedlow et al., 2013; Folke et al., 2010; Gupta et al., 2010; Olsson and Folke, 2007; Pahl-Wostl, 2009). However, it adds a distinction between policy characteristics that enhance either robustness, adaptability or transformability. Therefore, it allows to address the question posed by work package 4 of the SURE-Farm Project: *To what extent do current policies at the EU and member state level, and in particular the CAP, enable or constrain the resilience of European farming systems along the dimensions of robustness, adaptability and transformability?*

This report presents the findings from an application of the Resilience Assessment Tool (ResAT) in eleven case studies across Europe. The aim of the task is to understand how policies affect the resilience of farming systems. Hence, the level of analysis is the farming system, not the country or member state. Consequently, the analysis does not assess the resilience effects of policy at the national level, but policy effects on regional farming systems. The next section provides a brief summary of the tool and explains the methodological steps. This is followed by a presentation of the results: We first present general findings. This is followed by a discussion of four distinct clusters of cases and an analysis of overarching patterns across the cases. A discussion of the policy implications as well as reflections on the limitations of the research conclude the report. The details of the case studies are contained in two separate appendix documents. Appendix 1 contains the arguments supporting the resilience scores in each case, appendix 2 contains the relevant texts from policy documents on which the scores were based.

Overall, this report presents the first attempt to systematically assess the ability of policies to support the resilience of farming systems and thereby to identify policy strengths and weaknesses, and to provide entry points for policy improvements, from a resilience perspective. Importantly, the aim is not to assess the resilience of policies themselves, but the extent to which these policies influence the resilience of European farming systems. The comparative case study approach is explorative in nature but aims to enable broader lessons and deliberations.

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2 The Resilience Assessment Tool (ResAT): Framework and methodology

2.1 Framework: Resilience-enhancing policies

The Resilience Assessment Tool has been developed to assess how policies enhance or constrain the resilience of farming systems along the three dimensions of robustness, adaptability and transformability. The tool is applied at the level of policy outputs, i.e. direct results of decision-making processes which typically take the form of policy programmes, laws or regulations (Knill and Tosun, 2012). The tool is not applied at the level of policy outcomes, which are the effects generated by the policy outputs. The key elements of policy outputs are policy goals, i.e. the (stated) ends that a policy seeks to achieve, and policy instruments, for example rules, prohibitions, subsidies, and fines, but also networks, platforms, trainings or partnerships.

Contemporary policy constellations are multi-level, multi-goal and multi-instrument (Howlett et al., 2015), making means-ends relations in public policy often ambiguous and contested. It is for example possible that a policy enables one dimension of resilience (e.g. adaptability) while simultaneously constraining other resilience capabilities, e.g. robustness (Ashkenazy et al., 2017; Martin et al., 2016). Trade-offs can also be linked to different time frames (Béné et al., 2012). An important question is therefore whether policies create synergies or trade-offs between the different resilience capabilities and how a good balance can be achieved. Of course, trade-offs may also emerge between resilience and other important dimensions of public administration, such as effectiveness, efficiency and legitimacy (Duit, 2016; Hood, 1991). Policies must also balance flexibility and adaptability on the one hand and stability, predictability, and efficiency on the other (Weick and Sutcliffe, 2001; Wildavsky, 1988). Moreover, resilience is not a neutral concept and opponents to policies justified on its ground are likely to contest its meaning and related knowledge. More specifically, groups that are more or less interested in maintaining the status quo might emphasise different dimensions of resilience, with change-averse groups likely to champion robustness over adaptability or transformability. To address these complications, the ResAT includes both policy aims and policy instruments and embraces all three resilience orientations, i.e. robustness, adaptability and transformability.

The ResAT is based on the adaptive capacity wheel, a heuristic that has been developed to assess the capability of governance institutions and policies to enable society to adapt to climate change (Gupta et al., 2016; Gupta et al., 2010). The adaptive capacity wheel has been further developed by considering new insights on adaptive capacity, by including the three

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resilience dimensions of robustness, adaptability and transformability, and by adjusting the tool to the specific resilience challenges to European farming systems (Termeer et al., 2018).

Based on a broad literature review, we have identified four key characteristics of resilience-enhancing policies for each of the three types of resilience.

Robustness-enhancing policies are the most conservative ones. They aim to support the ability of farming systems to maintain all of their current functions at the desired level of output without major changes to the system despite perturbations, shocks and stress (Anderies and Janssen, 2013; Chaffin et al., 2014; Urruty et al., 2016). They are characterised by

- a *short-term focus* on recovery and continuation of the status quo with marginal adjustments, typically within months to a year;
- a priority on *protecting the status quo*, typically with quick and familiar adjustments to existing practices, thereby encouraging the preservation of current system characteristics;
- the provision of *buffer resources*, e.g. through public compensation funds, drought aid, mobilization of additional labour force or water reservoirs, that cushion farming systems from adverse effects of shocks and stresses or enhance their ability to recover quickly; redundancy is a specific form of buffer that makes backup systems available which can provide the same functionality if the primary system fails;
- support for or provision of *other modes of risk management* that help the farming system to bounce back to an acceptable state quickly after a shock and thus prevent further crisis escalation, for example through insurance schemes, risk monitoring and evaluation, and information how to avoid and minimize risks.

Adaptability-enhancing policies focus on increasing the capacity to identify and adapt to constantly changing conditions (Hurlbert and Diaz, 2013; Karpouzoglou et al., 2016), to learn from disturbances (Boin and van Eeten, 2013) and to implement changes to avoid or withstand future shocks and stresses (Duit, 2016). Adaptability-enhancing policies are characterized by (Anderies and Janssen, 2013; Brown, 2014; Folke et al., 2010; Karpouzoglou et al., 2016; Olsson et al., 2006; Priest et al., 2016; Rijke et al., 2013)

- *a middle- to long-term focus* of 1 to 5 years that takes into account that even swift adjustments to existing structures, policies and cultures need time to unfold;
- *flexibility* that allows and encourages actors to respond in flexible ways to changing circumstances, by avoiding overly strict and means-oriented regulations and procedural prescriptions;

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- *enabling variety and tailor-made responses* between and within farming systems, e.g. through broad stakeholder involvement, the incorporation of multiple sectors and connections across jurisdictional boundaries, through context-sensitive policy design and by overcoming silo mentality (Brown, 2014; Duit, 2016; Pahl-Wostl, 2007; Rijke et al., 2013; Verweij and Thompson, 2006);
- *enabling social learning*, i.e. the adjustment of practices to novel circumstances without a full paradigm change, typically through social processes that include improvisation, trial and error, reflection and exploration of new ideas, learning across institutional boundaries and removal of mechanisms that inhibit social learning (Dewulf et al., 2005; Pahl-Wostl, 2007; Pelling and High, 2005).

Transformability-enhancing policies focus on the ability of farming systems to incorporate or develop new elements and processes to a degree that their operational logic is changed, typically when ecological, economic, or social pressures threaten to make it untenable or dysfunctional (Walker et al., 2004). Transformability-enhancing policies are characterized by

1. *a long-term focus* that accepts that transformative change requires a decade or more but needs immediate and serious efforts to implement small but in-depth changes (Termeer et al., 2017);
2. *the dismantling of incentives that support the status quo,* with a view to address path dependencies, structural power, vested interests and the "reproduction of core regime elements" (Geels, 2014), and by recognising or creating windows of opportunity to disrupt prevalent but problematic patterns of behaviour (Rijke et al., 2013) and by encouraging and incentivising transformative practices of target groups;.
3. *support for in-depth learning* that enables higher-order reflexivity, i.e. actors challenging dominant mind-sets and fundamentally adjusting them to changing circumstances, and third-order learning, i.e. peoples' capacity to reflect on the schemata underlying a system of which they are part (Argyris and Schön, 1978; Bartunek and Moch, 1987; Brunner and Schönberger, 2005; Folke et al., 2005; Huntjens et al., 2012; Pahl-Wostl, 2007);
4. *enhancing and accelerating niche innovations*, experimentation, self-organisation and early wins (Geels, 2014; Termeer et al., 2017), for example by enabling self-governance of collectives (Ostrom, 2005), by tolerating the emergence of ''shadow networks'' outside direct government control (Olsson et al., 2006), and by connecting actors and encouraging them to experiment through facilitated access to resources and support (Gunderson, 1999; Olsson et al., 2006; Rijke et al., 2013).

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Table 1 provides an overview of the different types of resilience-enhancing policies.

Table 1: Typology of resilience-enhancing policies: Key characteristics and anchor examples

Type of resilience	Key characteristics	Anchor examples of how this characteristic may be enabled by policy goals	Anchor examples of how this characteristic may be enabled by policy instruments
Robustness	1. Short term focus	No long-term visons; months to years discourse	Payment and programming cycles of one year or less
	2. Protecting the status quo	Prioritization of existing farming and production systems; agricultural exceptionalism discourses; focus on agricultural interests	Subsidies for existing production systems
	3. Buffer resources	Importance of buffer resources such as finances, fresh water, labour, seeds etc.	State aid regulations that discourage innovation; financial compensation (emergency schemes)
	4. Other modes of risk management	Focus on short-term fluctuations rather than systemic risks	Accessibility of data to individuals; state-funded or subsidized private risk management; procedures to trigger market crisis intervention
Adaptability	1. Middle-long term	1-5 years discourse	Programming cycles of 1-5 years
	2. Flexibility	Emphasis on flexibility; discourse focuses on desired outcomes rather than means	Global directives; dynamic regulatory norms; monitoring focuses on goals instead of means
	3. Variety and tailor-made responses	Multiple problem definitions; importance of diversity between and within farming systems is acknowledged.	Availability of a wide range of different policy instruments to tackle a problem; room for decentralised decisions; local autonomy

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Type of resilience	Key characteristics	Anchor examples of how this characteristic may be enabled by policy goals	Anchor examples of how this characteristic may be enabled by policy instruments
	4. Social learning	Encouragement of learning; attention to the ideas of different actors and sectors	Communities of practice; broad networks; learning loops embedded in policy
Transformability	1. Long term	5 and more years addressed in discourse; long-term future-oriented frames	Long-term backward planning and strategies
	2. Dismantling incentives that support the status quo	Recognition of perverse incentives and unproductive path dependencies; aims to unblock lock-ins	Abolishment of instruments that support developments which hinder transformations; significant reallocation of resources
	3. In-depth learning	Challenging of dominant frames; paradigmatic change; radical new frames; broad involvement of stakeholders	Broad consultations; organised and consequential policy dialogues; learning communities; invitation of novel or unusual actors
	4. Enhancing and accelerating niche innovations	Attention for niche innovations; support to accelerate innovation	Legal room for experiments; resources for experimenting; right to self-organize; subsidies for niche innovations

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2.2 The Resilience Assessment Tool

The Resilience Assessment Tool (see Figure 1) evaluates the capability of a policy constellation to enhance the resilience of farming systems, differentiated along the three dimensions of robustness, adaptability and transformability. For this purpose, it uses the twelve key characteristics explained in the previous section. The policy constellation is assessed through a systematic and transparent analysis of relevant policy documents. The analysis needs to identify policy elements (specific goals or instruments) that have an impact on the resilience capability of a farming system. Pertinent policy elements are linked to the indicators they are likely to affect. The effect of each relevant policy element is scored, using a Likert scale (table 2). Based on these detailed scores, the overall policy constellation receives a summary score for each indicator, which is then translated into a colour code that is entered into the ResAT wheel (see Table 2). The coloured ResAT wheel (Figure 1), which contains the twelve indicators of a resilience-enhancing policy, summarises the analysis along with a narrative evaluation of the strengths and weaknesses of the policy constellation.

Table 2: ResAT Likert scores and related colours in the ResAT wheel

Question: To what extent do the policy's goals and instruments enable or constrain the characteristic?		
Answers: enabling	**Answers: constraining**	**Score (+ colour)**
Not clear		**0** (White)
Not enabling	Very constraining	**1** (Red)
Slightly enabling	Constraining	**2** (Orange)
Fairly enabling	Fairly constraining	**3** (Yellow)
Enabling	Slightly constraining	**4** (Light green)
Very enabling	Not constraining	**5** (Dark green)

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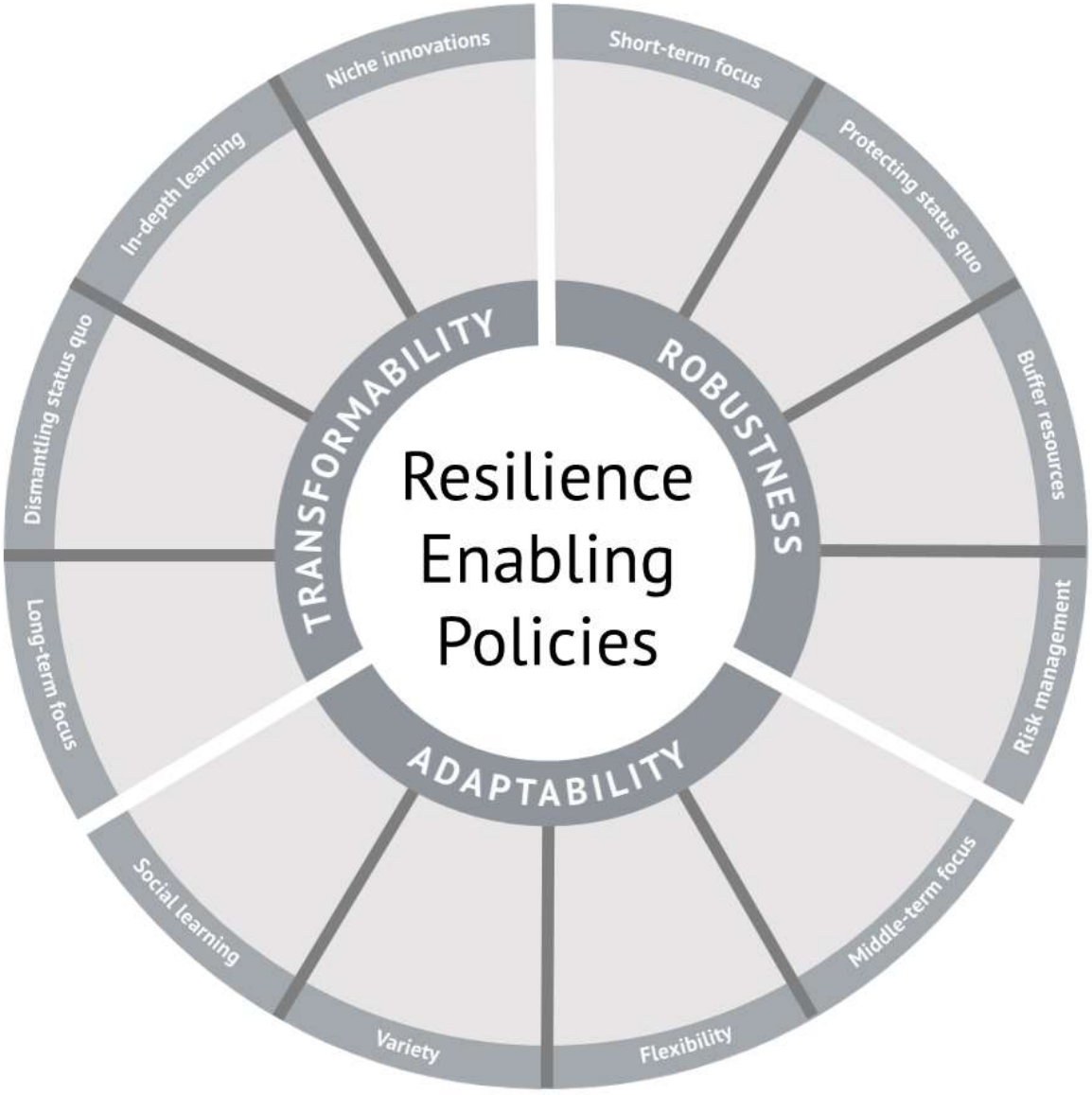
Figure 1: The ResAT wheel



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2.3 Summary of the protocol for the ResAT application

The application of the ResAT had to take into account that the resilience types and associated characteristics

- are not independent from each other and must therefore be presented as a resilience profile, as presented by the ResAT wheel;
- are context-dependent and must therefore be assessed with regard to a specific farming system and its particular challenges;
- might be addressed to different degrees at the level of policy goals and policy instruments;
- cannot be assessed 'objectively' and is subject to expert judgement and sound interpretation, which makes a transparent and systematic approach imperative.

To address these considerations, the application of the ResAT to the case studies followed a protocol with the following seven steps:

- Step 1. Identification of the main challenges to the specific farming system by the researcher; these were summarized in a brief outline.
- Step 2. Data collection: The analysis was based on three type of policy documents: (i) CAP policy documents; (ii) national CAP implementation plan(s); (iii) possible national agricultural policy programs. The case study datasets were sent to the work package coordinator to ensure completeness and comparability across cases.
- Step 3. Data analysis: The case study researchers identified relevant text items in the selected policy documents and linked them to the indicators of resilience-enabling policy. The analysis was organised either by coding selected text with a qualitative text analysis software or by copying of relevant text into a data extraction table.
- Step 4. Interpreting and scoring the data: Based on the coded or extracted text, several researchers determined overall scores on a 5-point Likert scale for the policy constellation in the case study at the level of goals and instruments. Different scores were discussed and the arguments recorded. The document analysis was registered in a formal background document.
- Step 5. Overall analysis of strengths and weaknesses: Based on the scores, the case study researchers developed a narrative account of the overall strengths and weaknesses of the policy constellation in their case and drew conclusions on the implications for the ability of the policy mix to enhance the resilience of the specific farming system in the case.

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- Step 6. Presenting and communicating the data: Based on the scores, the case study partners entered the corresponding colours into the ResAT wheel. The choice of colours was explained in the case study report.
- Step 7. Stakeholder check: Case study partners organised a focus group or conducted a set of interviews with 4-5 key stakeholders to validate and enrich the outcomes.

A detailed description of the procedure can be found in Termeer et al. (2018)

The protocol for the case studies was developed by the work package coordination team from Wageningen University (and Humboldt University at Berlin) and discussed with all case study partners during a meeting of the SURE-Farm consortium in April 2018 in Madrid. Experiences and questions during the application of the ResAT were discussed among all case study partners during Skype meetings. The case study partners received feedback on their draft report from the work package coordinators during the summer. Preliminary conclusions were discussed with the case study partners during the SURE-Farm consortium meeting in Halle, Germany, in September 2018 and during a workshop with stakeholders in Brussels in October 2018. The final versions of the case studies were sent to the work package leaders between late September and mid-November. On this basis, this report was written in November 2018.

Importantly, the documents analysed are not necessarily representative for the entire nation. For example, Rural Development Programs can differ at sub-national level. Since the aim of the task was to understand how policies affect the resilience of farming system, the level of analysis was the farming system, not the country or member state. The policy documents to be included in the analysis were selected with a view to identify those policies that are most relevant to the farming system in the case study. For example, in Italy, where the case study focuses on hazelnut farming in Lazio, we selected and analyzed those policy documents that contain policies that are relevant to this specific farming system. Hence, we did not consider policies that are relevant only to other regions or other types of farming, such as durum wheat production in Sicily or vineyards in Veneto or even vineyards, arable farmers or olive producers in Lazio. As our results indicate, the outcome of the resilience assessment can indeed differ across countries, across sub-regions within a country and across types of farming systems.

The documents that were included in the analysis are listed in appendix 3. The effect of individual documents on the overall score can be derived from appendix 2, which contains the texts and document sources on which the scores were based. Information on the stakeholder check in the case studies is provided in appendix 4.

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3 Results

This section provides an overview of the findings. More detailed results from the case studies are contained in the appendices.

3.1 General findings

The ResAT was applied in eleven case studies across the European Union by local case study partners. Following the overall design of the SURE-Farm project, the anchor of each case study is a regional farming system. A farming system is characterised by its functions (marketable and non-marketable, public goods), actors (farmers and other actors with mutual influence) and locality. The cases were selected to include variety along five dimensions: (i) challenges (economic, social, environmental, institutional); (ii) agro-ecological zoning; (iii) type (sector, intensity, farm size, organisational form); (iv) produce (high-value products, commodities); and (v) affected public goods (landscape, water quality, biodiversity).

The degree and type of resilience necessary for a farming system depends on the challenges it faces, which therefore form the point of reference to assess whether the policy constellation enables or constrains the resilience of the farming system.

Overall, the farming systems in the case studies represent a broad range of resilience challenges.

- Demographic challenges include depopulation and outmigration, an ageing farm population, lack of skilled labour, changing consumer preferences, and a gender imbalance in the farming sector.
- Economic challenges include market access, price volatility, the position of farmers in their value chains, insufficient insurance arrangements, unsatisfactory financial and management skills, very high land prices, capital scarcity, food safety issues, public health issues and animal welfare.
- Environmental challenges include climate change, soil fertility, nitrate management, biodiversity loss (in particular pollinator loss), diseases, wildlife damage (e.g. the return of large predators), but also the impact of environmental regulations and the lack of environmental skills.
- Institutional and political challenges include often fragmented governance structures, land ownership issues, geo-political instability, trade conflicts, the decreasing acceptance of conventional farming, the uncertain future of pesticides, regulatory costs and political distortions on land markets.

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The analysis shows that many goals and instruments in the CAP – as well as other agricultural policy instruments – address resilience capacities of farming systems. Despite minor differences across case studies, the CAP instruments were generally linked to different resilience dimensions.

A first group of instruments was mostly found to be robustness-enhancing:

- Direct area-based payments and greening payments are disbursed annually and their conditionalities usually do not require much change to established practices. They tend to enable farmers to continue with their current business model even if profitability is low.
- Market safety net instruments respond to short-term price fluctuations and enable farmers to maintain their business rather than adapting to lower or fluctuating prices.
- Crisis reserves are buffer resources devoted to help farmers and farming systems to retain their business in the face of market crises or natural disasters.
- Geographical indications, which are technically not part of the CAP, enable some farming systems to establish a high-value market niche and to continue traditional production practices that would otherwise be less competitive.
- Support for insurance schemes helps farmers and farming systems to make arrangements for support in case of disaster.
- The coordination of production can help farmers to respond to short-term fluctuations in the marketplace.

A second group of instruments were mostly found to support the adaptability of farming systems:

- Agro-environmental programs help farmers to adopt more environmentally-friendly practices and to cope with environmental regulations or environment-driven limitations of land use, e.g. in Natura 2000 areas.
- Investment support is widely conditional on the adoption of more sustainable farming practices, improved animal welfare etc. These policies therefore enhance the capacity of farms and farming systems to adapt to changing circumstances.
- The LEADER and LEADER plus programmes encourage social learning by providing support for cooperation between farmers and other types of actors in rural areas and along rural value chains.
- Various provisions in the CAP provide enhanced flexibility to member states to adopt policies that are tailored to the needs of specific regions and farming systems. These include in particular modulation, i.e. the option for member states to shift financial

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resources between the first and second pillar, various options for the implementation of the area-based direct payments, and the flexibility in designing rural development programs within the confines of the ELER directive.

- In some cases, the young farmers' premium, an optional element of the area-based direct payments, was seen as enabling adaptability by encouraging the next generation to enter farming; other case study partners, however, found that the young farmers' premium basically worked as an additional buffer resource for the receiving farm operations.

Identifying transformability-enhancing policies was more difficult. Many case studies found that transformability was often implied in goal formulations, which, however, tended to be rather generic and were often not matched by specific instruments. Four types of instruments were mostly found to support transformability:

- Support for organic farming because a change to this would imply a fundamental change to the operational logic of a farm or farming system; a shift to organic farming typically implies a fundamental paradigm change in the underlying assumptions about the interaction of agricultural production and the ecological processes in a farming system.
- Support for new rural value chains was found to buttress niche innovations that could contribute to transformational change.
- The European Innovation Partnerships "Agricultural Productivity and Sustainability" (EIP-AGRI) provide means to connect a broad range of actors and to develop niche innovations. In some cases EIPs were judged to potentially encourage deep learning.
- The dismantling of incentives to maintain the status quo was found in several cases as the effect of either the reduction of previous support, of new regulatory requirements, or of specific choices in the design of the area-based direct payments of rural development programmes. In these cases, changes to the overall policy constellation made an established business model unviable and therefore forced the farming system into transformation. This, however, was not necessarily accompanied by policies that would enhance the capability of the affected farms or the entire farming system to transform to novel practices and business models.

3.2 Clusters of cases

Overall, we found four different clusters of cases.

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3.2.1 Cluster 1: Robustness-oriented policy

The first cluster consists of six cases and thereby represents the dominant pattern: a focus on enhancing the robustness of a current farming system, with less and sometimes little emphasis on adaptability and transformability. In some cases, the strong focus on robustness is likely to incentivize status quo-oriented behaviour and thereby to constrain the other two resilience dimensions.

The first case in this group is the **dairy farming system in Flanders, Belgium** (see

Figure 2; Lievens & Mathijs 2018). After the abolishment of dairy quota in 2015, the system faces significant challenges from lower and fluctuating milk prices. This is compounded by fluctuating input prices, high land prices, competitiveness issues, and tightening regulations around Nitrate management. The adaptability of the sector is structurally limited by high investment costs and high levels of debt, a robustness-oriented vocational training system and the specificity of skills and equipment. The policy constellation is dominated by the high direct payments, which serve as buffer resources and enable the farming system to continue in the current operational logic (whereby for leased land a major share of the direct payments is passed on from the farmer to the land owner), and the market safety net, which provides a price floor for the main product, although the short-term relief might depress prices in the medium term. Significant financial aids for farm investments and for weather-related insurance schemes also support the dominant high output-oriented business model. However, investment support, a certain degree of flexibility in the RDP, tailor-made voluntary schemes to reduce production and opportunities for social learning through LEADER programs and EIP-Agri projects enhance the adaptability of the farming system, albeit to a lesser degree than the support geared towards robustness. At the same time, environmental and food safety regulations restrict farmer's flexibility, e.g. their options to move more into processing. A long-term focus is well articulated at the level of policy goals but not matched by concrete instruments. The policies betray little ambition to dismantle incentives for maintaining the status quo or to promote in-depth learning. However, some support is available for niche innovations, in particular for organic farming and rural-urban cooperation.

The second case in this cluster is the **crop farming system in the North-East region of Bulgaria** (see Figure 3; Valchovska & Peneva 2018). This farming system with dominantly large-scale operations faces challenges from the depopulation of rural areas, changing consumer preferences, lack of organized markets and market infrastructure, inadequate risk perceptions by farmers, lack of financial and management skills among farmers, extreme weather

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conditions and climate change, the implementation of nitrate regulations, fragmented national and regional governance structures, ongoing problems with the post-socialist land ownership regime and international political instability, in particular the Russian embargo. The policy constellation strongly enhances the robustness of the farming system by supporting the status quo through area-based direct payments and providing additional buffer resources in case of natural disasters. Support for risk management is an established goal but the instruments available have little practical impact. Adaptability is enhanced through policies aiming at, inter alia, innovation development, agri-environmental measures, producer groups and socio-economic development. However, some of these elements are not readily available to crop farmers and social learning is not a goal. The case study finds little support for transformability, with no ambition to dismantle incentives that maintain the status quo, no consideration of in-depth learning and little support for niche innovations.

The third case is the **cattle breeding sector in Bocage Bourbonnais in the Massif Central in France** (see

Figure 4; Léger 2018). The farming system is located in a remote area and is challenged by more frequent extreme climatic events, in particular droughts, an ageing farm population, pressure from downstream actors, in particular large retailers, fragility of niche strategies, and a trend away from grassland-based animal production to cereal crop production. Enhancing the robustness of this farming system is therefore at the centre of the policy which aims to maintain the status quo through direct payments, support for insurance schemes and various RDP measures. In contrast, support for adaptability and transformability is limited, apart from the LEADER programme. The policy measures are assessed as rather inflexible and not susceptible to tailored solutions. The niches that receive support (e.g., agrotourism) are more geared towards adaptation than towards novel innovations. In-depth learning is barely addressed in the policies.

The fourth case in this cluster is the **arable farming system in the Altmark region in Eastern Germany** (see Figure 5; Daskiewicz & Balmann 2018). The system is challenged by poor soil quality, outmigration and an ageing population, a decreasing agricultural workforce, slow generational renewal, decreasing societal acceptance of large conventional farms, a risk of cost-intensive regulations and the capping of direct payments, rising land prices, a risk of lower rainfall due to climate change and a weak capital base. The policy constellation enhances the robustness of the farming system by providing buffer resources through direct payments, payments for less-favoured areas and the crisis reserve, but with little dedicated support for other risk management tools. The RDP are designed to enhance adaptability, e.g. through programs for the protection of agricultural resources and access to innovations, but are not

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well funded. The strong decoupling of first-pillar payments provides much flexibility and the RDP programs in Saxony-Anhalt explicitly addresses issues of diversity, including farm-level diversification, support of new entrees in a special young farmers program (since 2017), strengthening of the value chain, and engagement in the EIP. Social learning is encouraged through LEADER, which is however not well funded. Transformability is not well supported with little long-term considerations, no ambition to dismantle the considerable incentives to maintain the status quo and limited space for in-depth learning; however, there is significant support for niche innovations through EIPs, programs for organic production and regional marketing, and networks between publicly funded research institutions and the sector also enhance transformability.

The fifth case in this cluster are private **fruit and vegetable farms in the Polish regions of Mazovia and Podlasie** (see Figure 6; Ciechomska & Zawalińska 2018). This farming system is challenged by the loss of a major export market after the Russia embargo, major price fluctuations, increasing environmental risks with more frequent extreme weather events and pests, as well as quickly changing consumer preferences and limited uptake of crop insurance. The policy constellation in this case enhances the farming system's robustness through, inter alia, direct payments, protection for geographical indications, subsidies for market development, a crisis fund for income stabilization, less-favoured area payments, investments in infrastructure projects to improve water availability, or action plans to reduce risks from chemical plant protection. The robustness-orientation is complemented with adaptability-oriented policies under the RDP, which are, however, less well funded. There is support for, inter alia, more sustainable farming practices and for social learning, e.g. through innovation networks, but less than for cooperation and self-governance within the sector. Transformability-enhancing policies are mostly absent. Long-term development is addressed is policy goals, but in rather unspecific terms. There is little support for in-depth learning or niche innovations and no strategy to reduce incentives to maintain the status quo. Overall, the policies enhance mainly robustness and to a lesser degree adaptability, but lack a strategy to support transformability.

The sixth case in this cluster is the arable crop system in the **Veenkoloniën – Oldambt in the Netherlands** (see Figure 7; Buitenhuis 2018). This farming system faces challenges from relative economic backwardness (in the Dutch context), an ageing farm population, reduction of direct payments through the convergence mechanisms introduced in the 2013/14 CAP reform, climate change and extreme weather conditions as well as plant diseases and vulnerable soils. The policy constellation in this case strongly enhances the robustness of the farming system, in particular through the direct payments which provide buffer resources to stabilize incomes and which thereby support the status quo. This is complemented by support for risk management. Adaptability is fairly enabled through various RDP programs, although the adaptability

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orientation is stronger at the level of the goals than the level of the instruments. However, support for transformability is weak. Long-term goals are rather generic, the phasing-out of status-quo incentives is occasionally discussed but not implemented and in-depth learning is barely mentioned in the policies. However, various programs provide support for selected niche innovations, e.g. new fertilization systems, monitoring techniques and early disease detection systems.

The final case in this cluster are small and medium-sized mixed farms in North-Eastern Romania (see Figure 8; Voicilas & Luca 2018). This farming system is located in a very poor region and faces challenges from fluctuating incomes, extreme weather events (drought, floods), competition from large companies, market access restrictions and demographic changes. Further challenges for small mixed farms emerge from political programs to accelerate structural change in the farm sector while the farm population is ageing, younger people are migrating to urban areas and producer organisation remains weak. The policy constellation is enhancing the robustness of the farming system to a limited extent. Direct payments provide essential working capital with additional payments for smaller holdings, complemented by inter alia free water supply. Support for risk management appears to have limited effect. Various measures to enhance adaptability are available but access is obviously difficult for small farms. The case also unveils various attempts to enhance transformability. However, the main aim appears to be structural consolidation and the training opportunities remain within traditional frameworks. The overall effect on the resilience of small farms appears to be limited and the agricultural policy has competing aims: support for small famers as part of rural social policy versus structural transformation towards larger, more competitive holdings. Subsidies for small farms are probably not sufficient to induce business development. Support for the transition from peasant farming to more specialist business models and commercialisation is seen as desirable, and market access remains an issue. Overall, this leads to a relatively ambivalent assessment of the resilience-enhancing effects of the policies in this case.

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Figure 2: ResAT wheels for case study on dairy farming in Flanders, Belgium. Source: Lievens & Mathijs (2018)

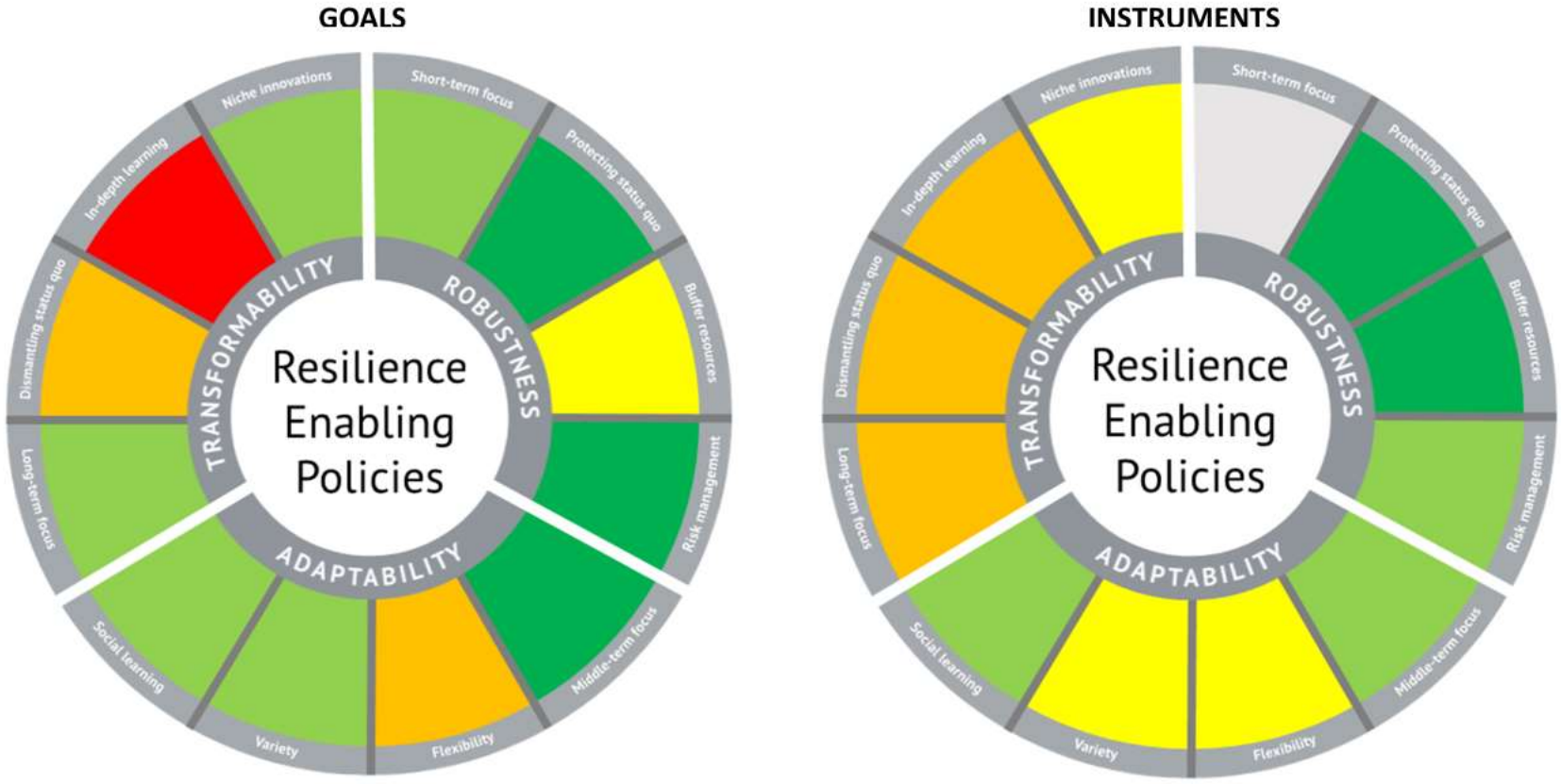

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Figure 3: ResAT wheels for case study on crop farming system in Bulgaria. Source: Valchovska & Peneva (2018)

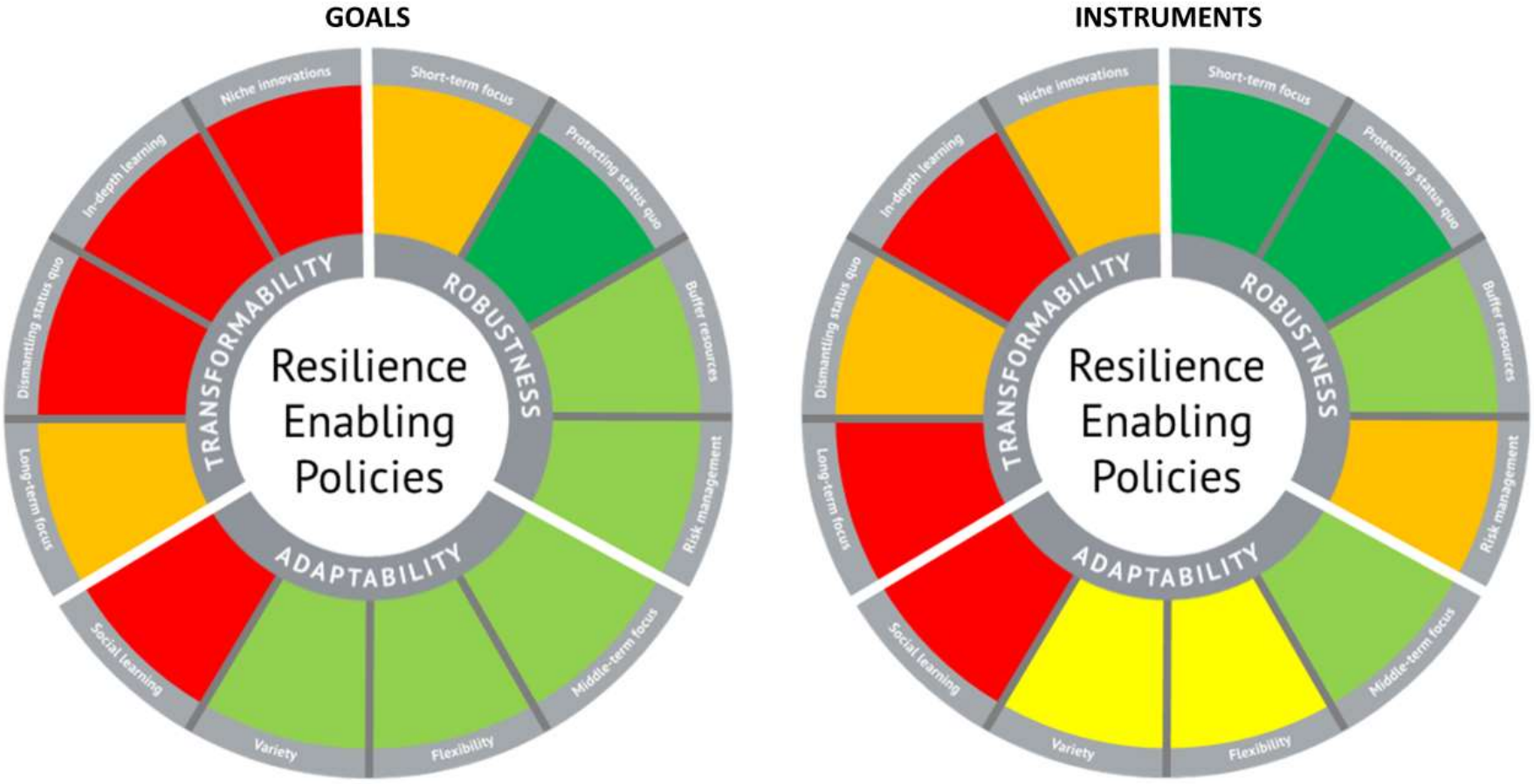

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Figure 4: ResAT wheel for case study on cattle breeding sector in Bocage Bourbonnais in the Massif Central in France. Source: Léger (2018)

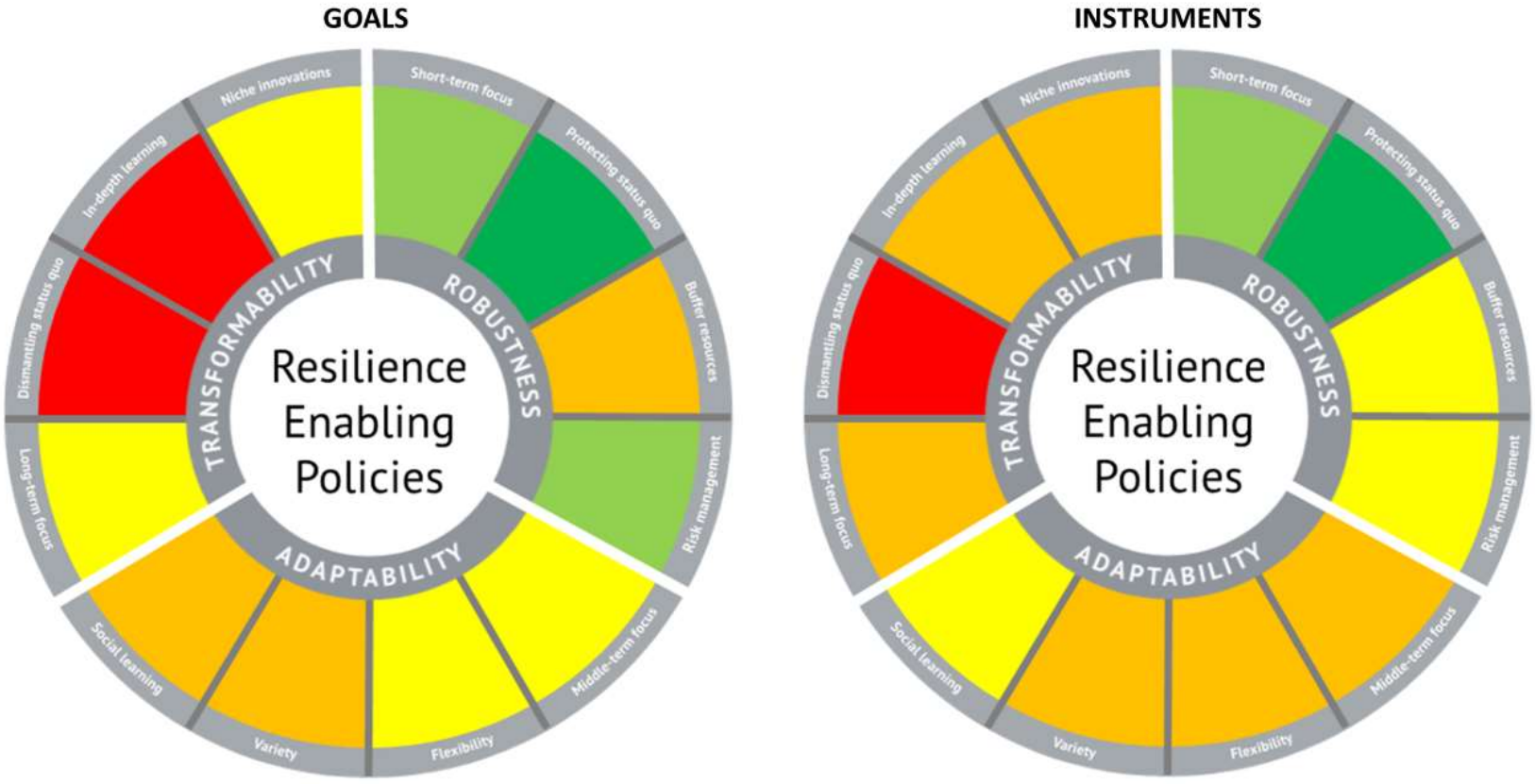

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Figure 5: ResAT wheels for case study on arable farming system in Saxony-Anhalt, Germany. Source: Daskiewicz & Balmann (2018)

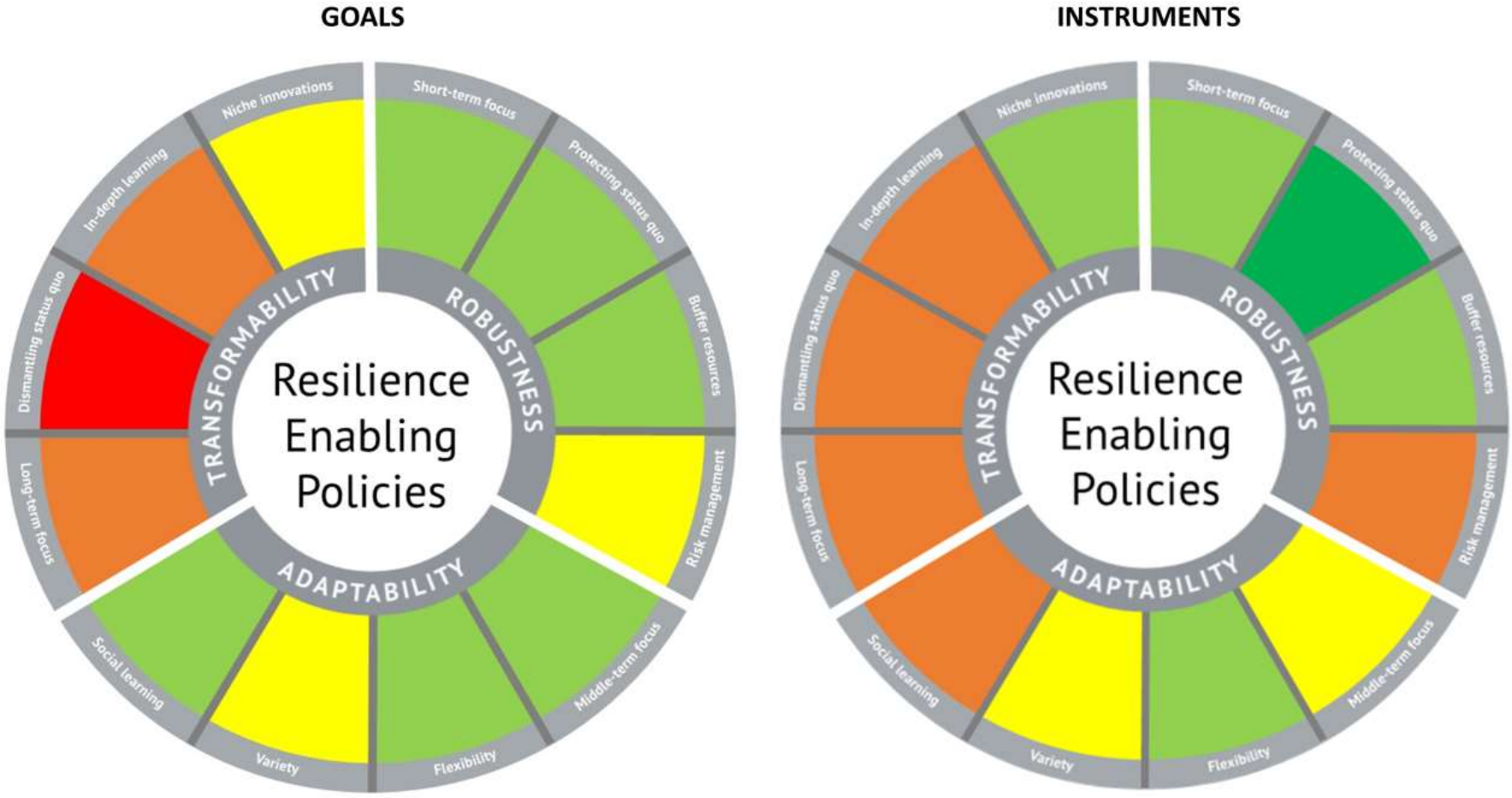

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Figure 6: ResAT wheels for case study on private fruit and vegetable farms in Poland. Source: Ciechomska & Zawalińska (2018)

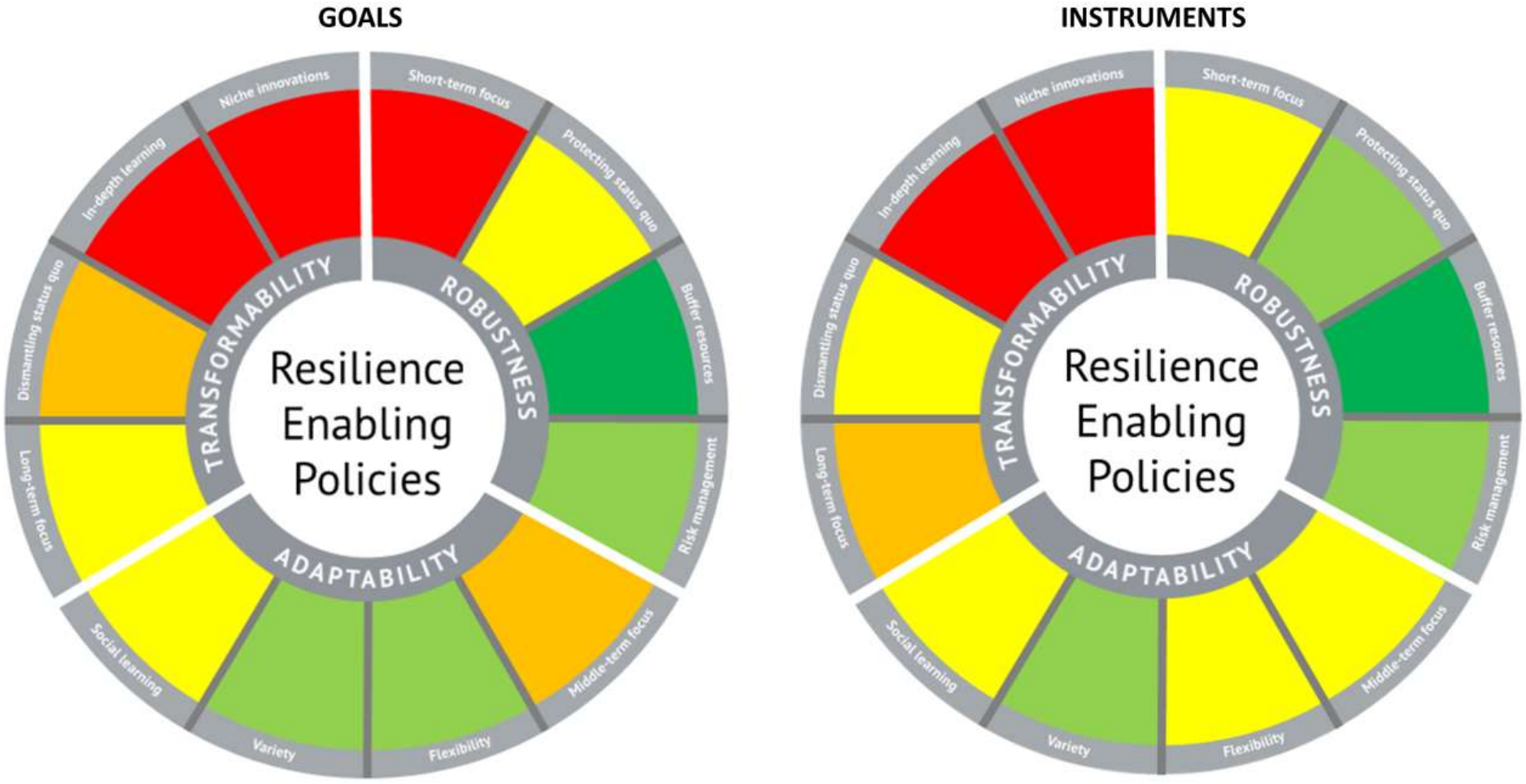

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Figure 7: ResAT wheels for case study on arable crop system in the Netherlands. Source: Buitenhuis (2018)

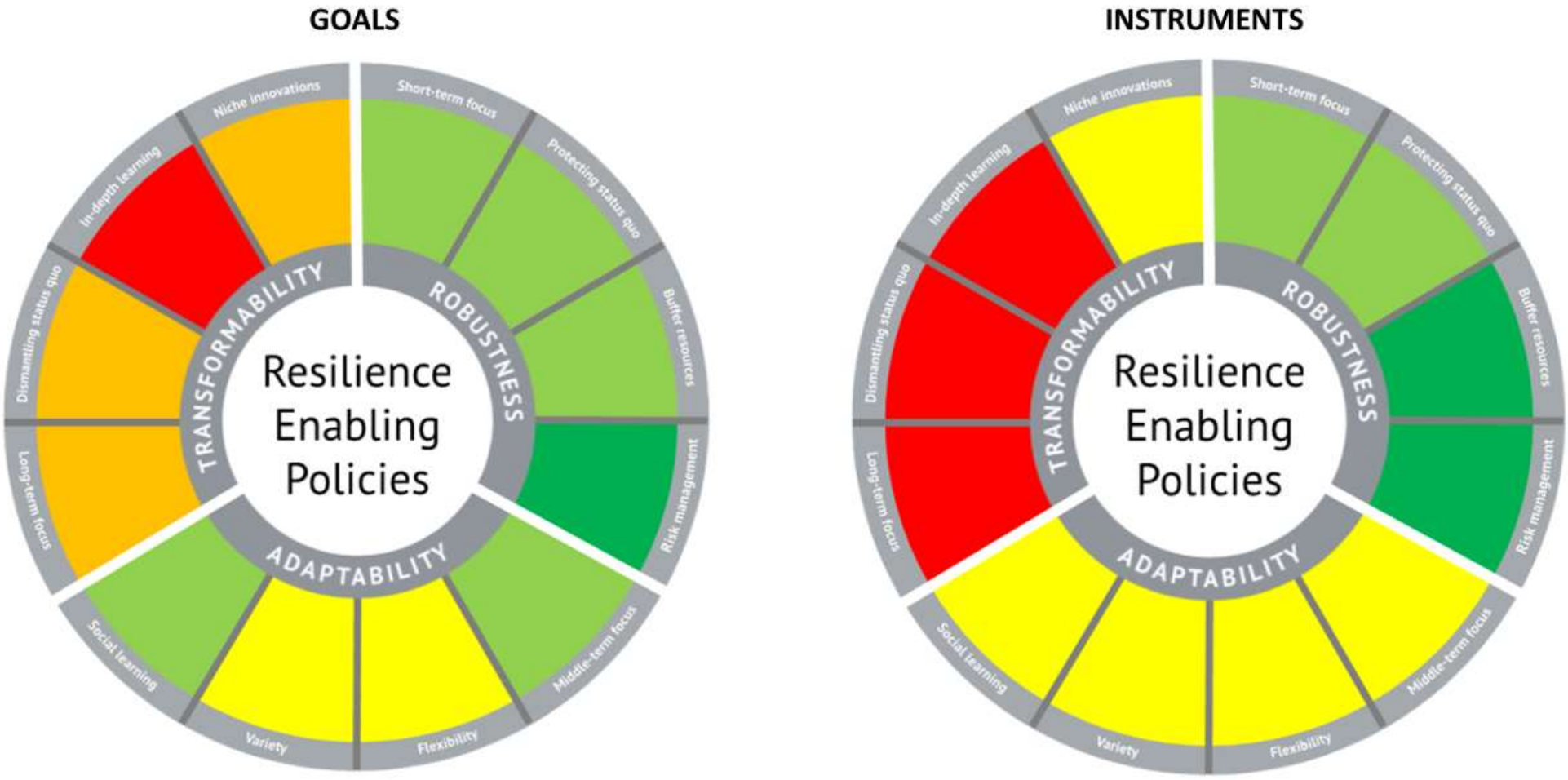

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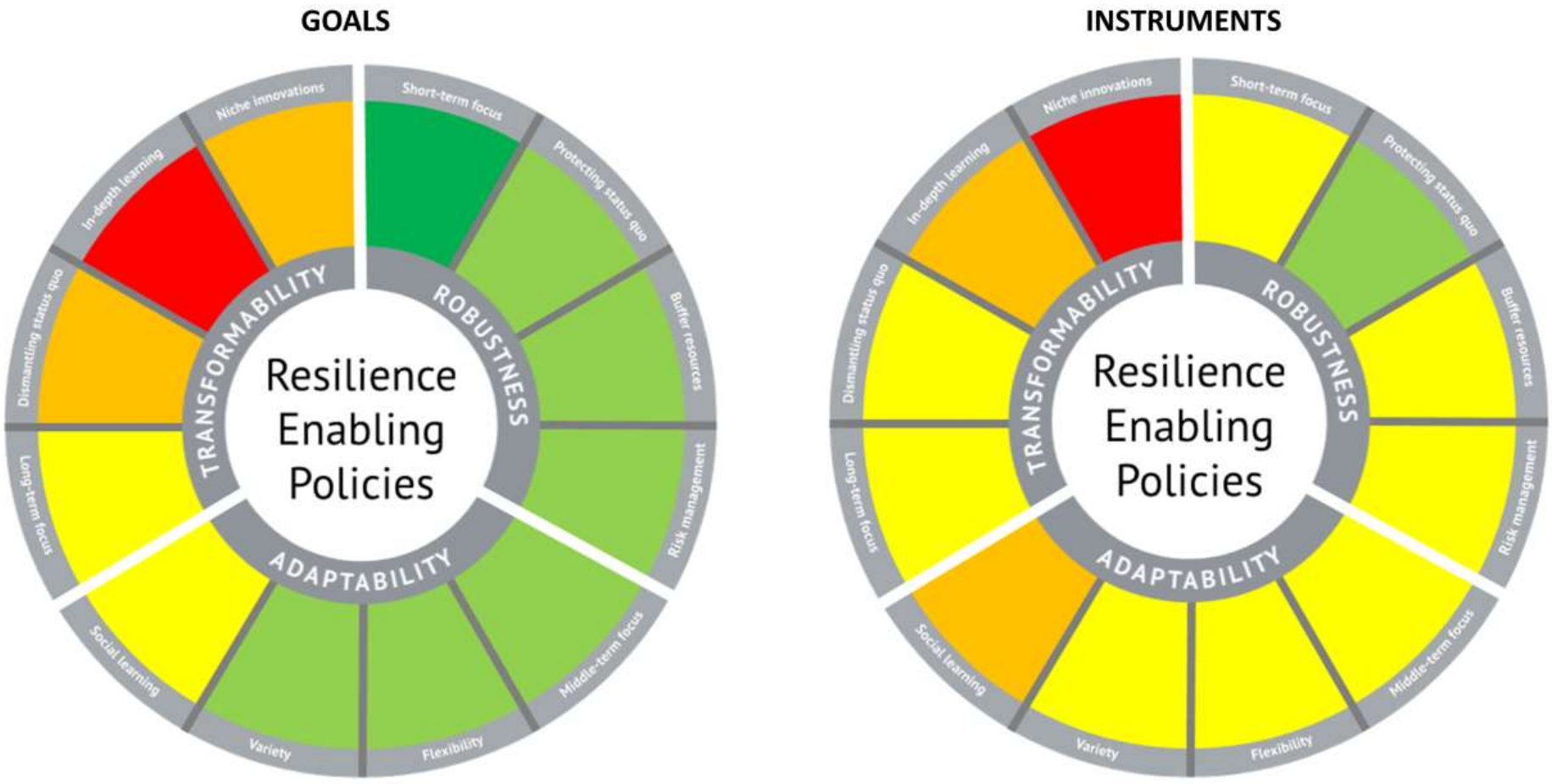
Figure 8: ResAT wheels for case study on small and medium-sized mixed farms in North-Eastern Romania. Source: Voicilas & Luca (2018)



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3.2.2 Cluster 2: Adaptability-enhancing policy

The first case in this cluster is the predominantly small-scale **hazelnut production system in central Italy** (see Figure 9; Sorrentino, Severini & Sidorini 2018). This farming system is challenged by an ageing producer population, price volatility in particular in response to political turbulences in Turkey (the dominant global producer of hazelnuts), increasing consumer reservations about fat-rich processed food, downstream market concentration, and increasing water stress as a result of climate change. For the resilience of this farming system, measures under the common market organization (CMO) and rural development policies (RDP) are far more important than direct payments. Producer organisations play also an important role. CMO and RDP provide support to compensate for natural and other constraints, while ambitious support for risk management has not yet been implemented. A combination of RDP and CMO measures enhance adaptability towards more sustainable practices, provide much flexibility and space for tailored solutions. Support for cooperation, however, is mostly limited to networks already involved in the supply chain. While the policy goals envision a more long-term transition, the support for long-term investments, generational renewals and EIPs is currently limited.

The second case in this cluster is commercial **egg and broiler production in Sweden** (see Figure 10; Manevska-Tasevska 2018). Despite a prospering market, the farming system is under great pressure from stricter regulations and market demands with regard to animal welfare, animal health and food safety. This makes the continuation of the current system untenable. The policies provide only limited buffer resources through direct payments and support for veterinary services and disease prevention to maintain the status quo. At the same time, rural development programs provide ample support for more environmentally and climate friendly methods, investments in stables and vocational training, thereby enhancing the adaptability of the system. Policy goals aim at a more transformative change in the long run which is supported by policy instruments such as support for European Innovation Partnerships, organic farming, novel nitrogen management systems and niche innovations for the bioeconomy.

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Figure 9: ResAT wheels for case study on hazelnut production in Italy. Source: Sorrentino, Severini & Sidorini (2018)

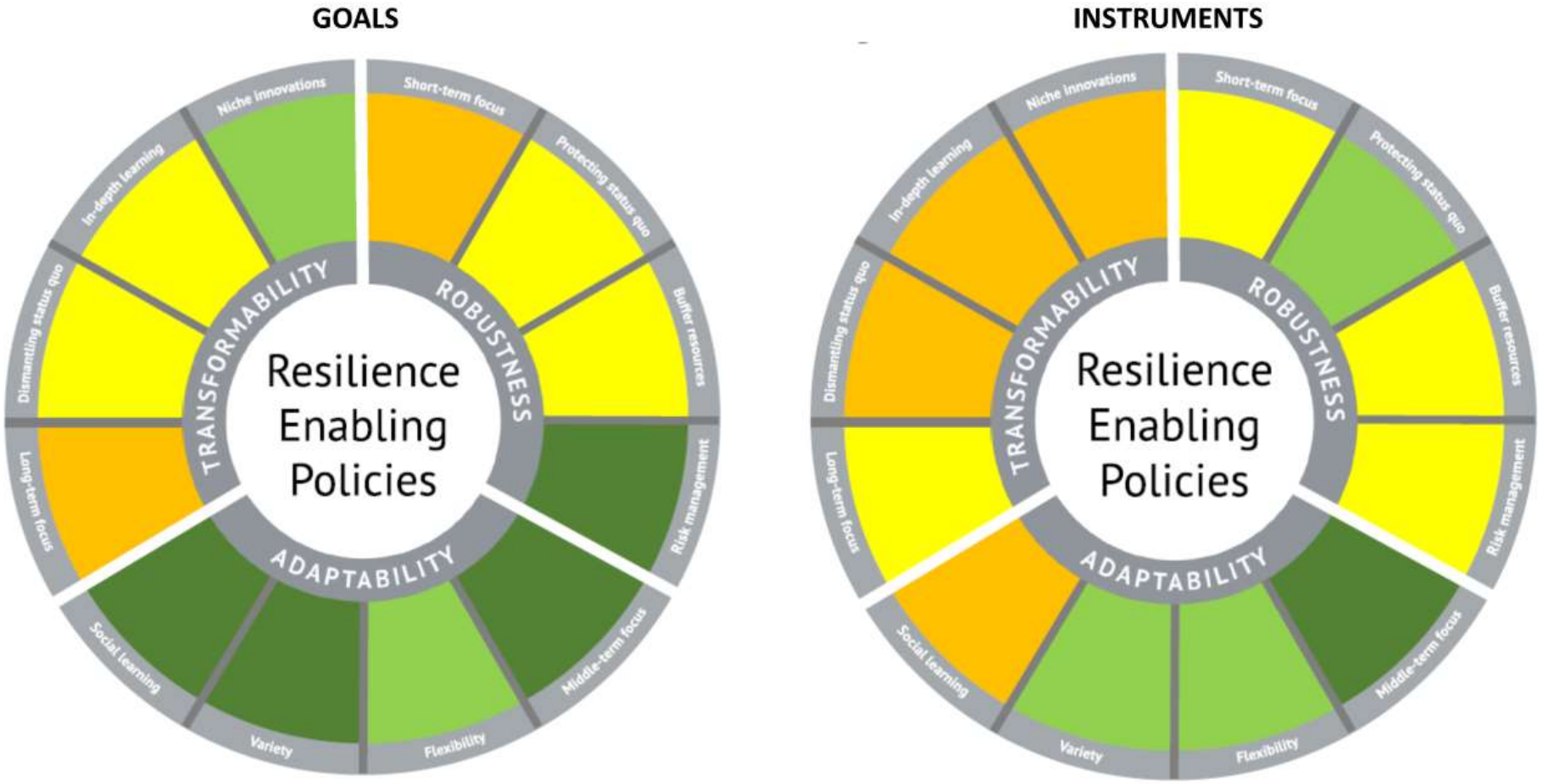

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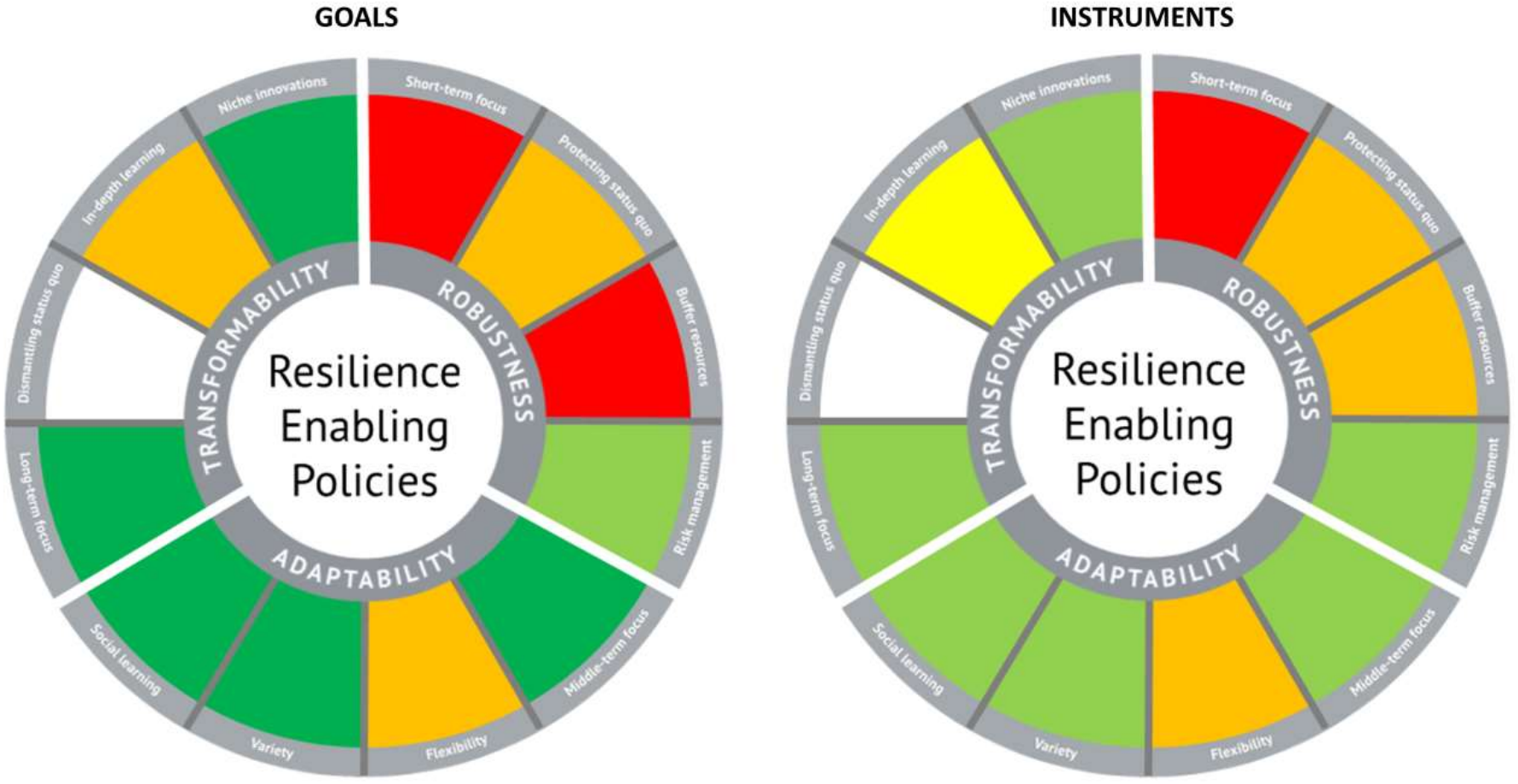
Figure 10: ResAT wheels for case study on commercial egg an broiler production in Sweden. Source: Manevska-Tasevska (2018)



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3.2.3 Cluster 3: Resilience-constraining policy

This cluster contains cases in which policy choices have removed incentives to maintain the status quo and therefore force the farming system under consideration into a transformation. However, the policies provide little support to enhance the ability of the system to transform successfully. Neither do they significantly support robustness or adaptability. Overall, the policies therefore constrain the resilience of the farming system, potentially or actually compromising the private and public goods involved.

After the initial assessment, three cases were grouped into this cluster, mostly due to very critical assessment of design choices and public agency performance. However, the revised scores after internal feedback and member check moved these cases into other clusters, leaving only one case in this category, which is an **extensive sheep grazing system** in the Huesca region **in Northeast Spain** (see Figure 11; Bardají, Soriano, & Bertolozzi 2018). The profitability of this system has been reduced by lower demand for meat, rising costs and higher land prices. Unattractive working conditions, rural outmigration and an ageing population leave few skilled people to care for the livestock. Droughts, climate change, predatory wildlife and animal diseases add to the pressure. In this context, the decoupling of direct payments that are based on historical entitlements removed an important incentive to maintain the extensive sheep grazing system. Robustness is slightly enhanced through disfavoured area payments, protected geographical indications and support for sanitary measures. The policy documents state adaptability as an important goal, but the instruments provide limited support for adaptability since the entry barriers to the sector are very high and the training and advisory systems were deemed a limited match with users' needs. The case study could identify little support for transformability apart from niche innovations with drones and virtual pastoralism.

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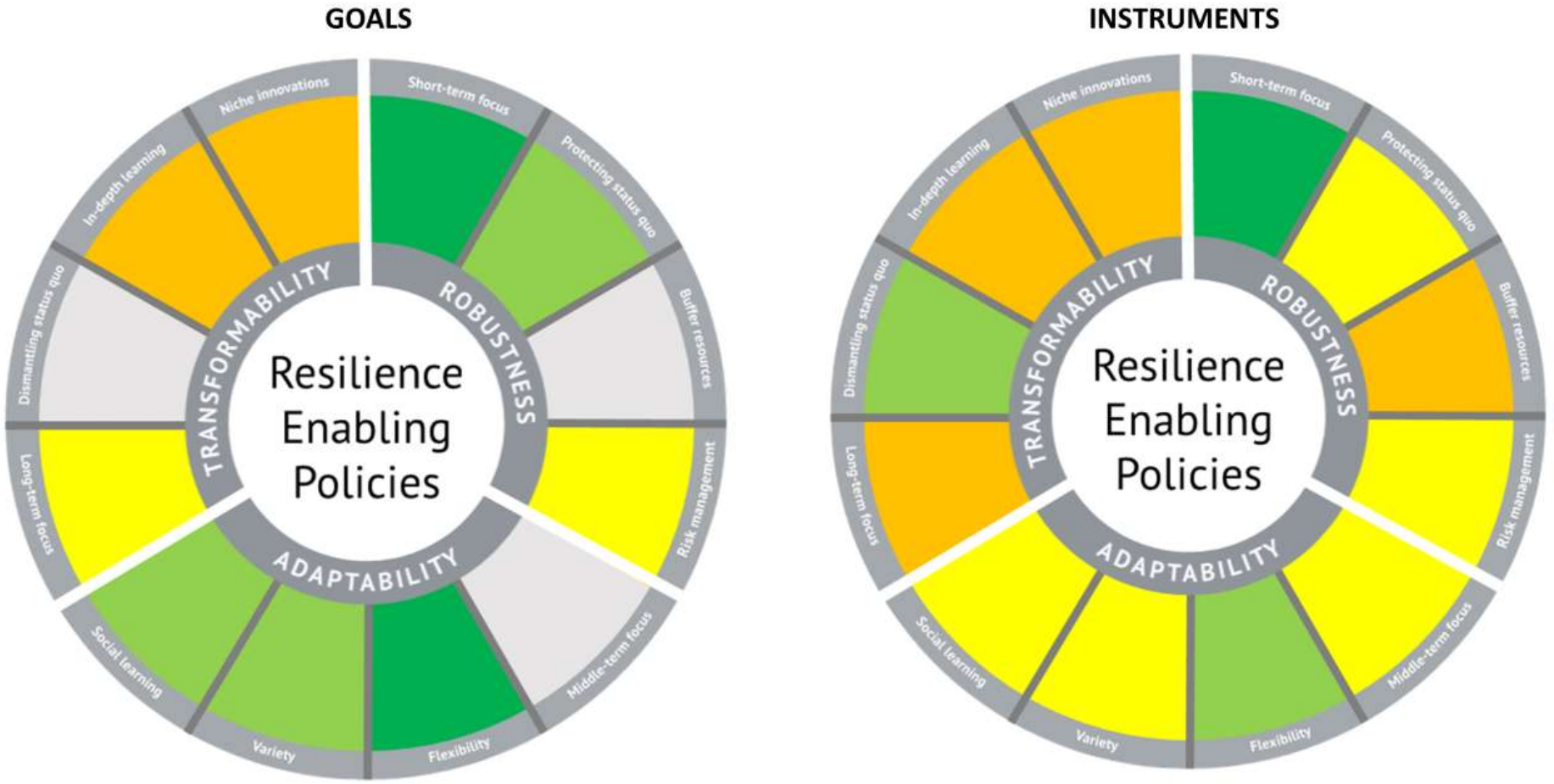
Figure 11: ResAT wheels for case study on extensive sheep grazing system in Northeast Spain (Huesca). Source: Bardají, Soriano, & Bertolozzi (2018)



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3.2.4 Transformability-oriented policy

By chance of historical incidence, the case study on the arable farming system in East Anglia, UK provides a contrasting case (see

Figure 12; Midmore 2018). In preparation for the British farm policy after Brexit, the UK government has announced a policy that promises to provide the same resources to the farm sector but with different patterns of incentives. The result is a policy that, if implemented, would focus on adaptability and transformability. The new policy framework is geared towards the provision of public goods and the enhancement of competitiveness through, inter alia, agro-environmental schemes, capital grants, skills and training programs, and emphasis on participatory and peer-to-peer learning. Long-term policy goals are clearly articulated and transformative ambitions are supported by planned measures to support in-depth learning, science-technology adoption processes, farmer access to innovation and innovations to support public goods. It will be interesting to follow the implementation of this ambitious, adaptability- and transformability-oriented policy.

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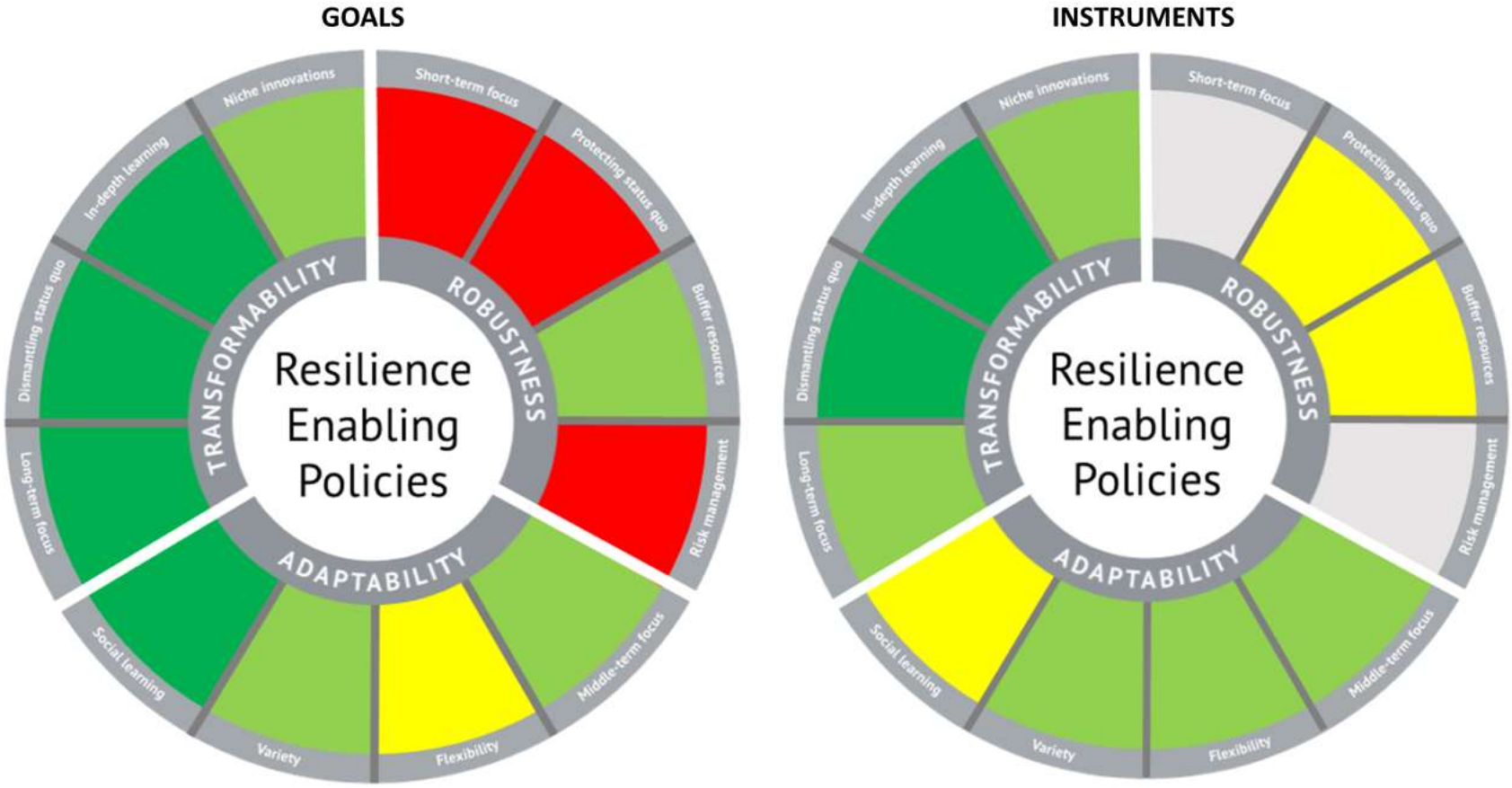
Figure 12: ResAT wheels for case study on arable crop system in East Anglia, UK. Source: Midmore (2018)



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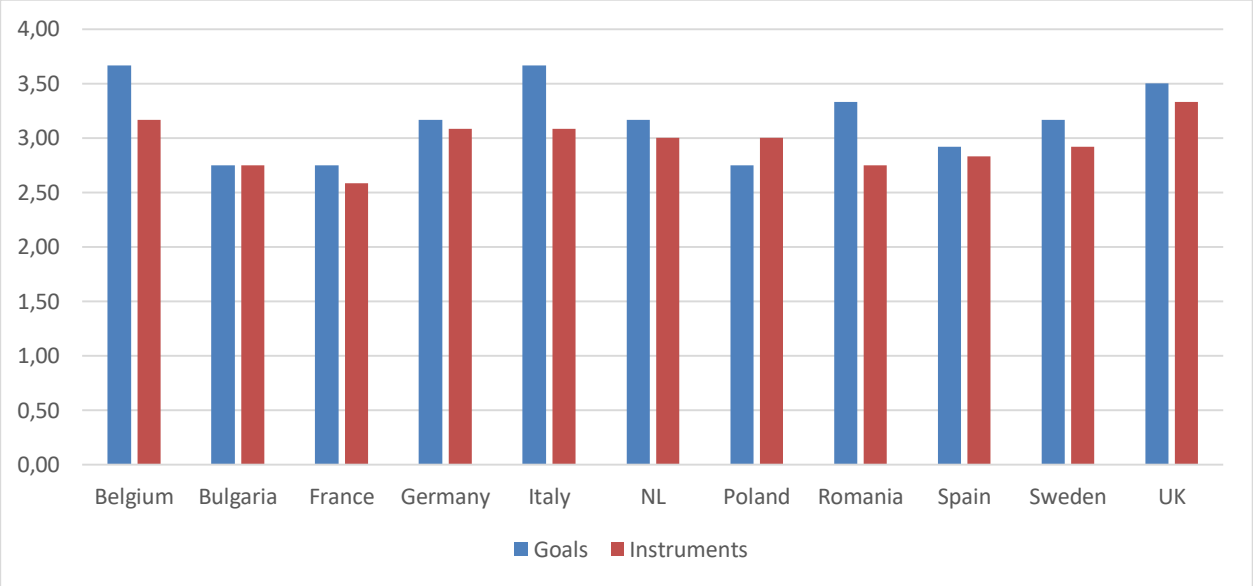
3.3 Overarching Patterns

Overall, several important patterns emerge from the case studies.

First, policy goals score better than policy instruments (see Figure 13). The average score for policy goals is 3.17, compared to only 2.95 for policy instruments. There are several possible explanations for this difference:

- Financial constraints might not allow ambitious goals to be fully implemented.
- Administrative constraints could create barriers to the implementation of flexible, tailored and creative policy designs.
- The symbolic dimension of policy-making: Even if policy-makers do not implement strong instruments to support change, a policy discourse about the need to adapt to novel challenges or to transform farming systems might send effective signals and reorient the thinking of relevant actors.
- The differences could also be due to a general time gap between the development of new, ambitious policy goals and the implementation of novel policy instruments.

Figure 13: Average ResAT scores for goals and instruments per case



Second, there are significant differences in the resilience-enabling capabilities between the case studies. The total average score per case ranges from 2.67 to 3.42, i.e. a 0.75 unit on the Likert scale. While these score differences should be treated with care because each assessment has been performed by a different case study team, they point to a very important result that is also supported by the more detailed explanations in the case studies: The CAP and its national

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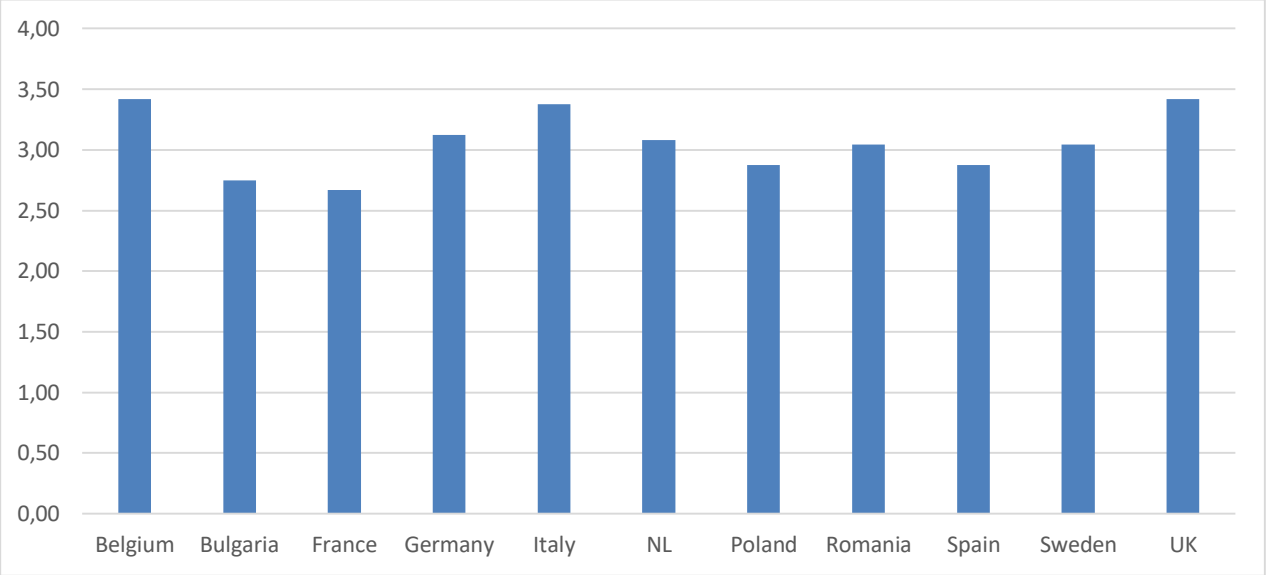
implementations enhance the resilience of Europe's farming systems to a varying degree. This suggests that we need to understand the underlying reasons of these differences in order to ensure that the resilience of all European farming systems and their ability to deliver agricultural products and public goods is adequately supported.

Figure 14: Total average ResAT score per case study



Third, while in some cases the scores were generally higher than in others, most cases reveal a rather mixed ability to enhance resilience, or more specifically: some resilience dimensions are more supported than others (see Figure 15 and Figure 16). The dominant pattern is that the policies enhance robustness more than adaptability, which in turn is more supported than transformability. However, the adaptability dimension scores highest at the level of both goals and instruments in three cases: hazelnut production in Italy, poultry production in Sweden and extensive livestock grazing in Spain. Within this group, the transformability scores for the Italian hazelnut production system and for the Spanish grazing system are significantly lower than the robustness scores; in contrast, for the Swedish poultry production case the transformability scores are higher than the robustness scores. The final, outlier case is the envisioned post-Brexit policy in East Anglia, where transformability scores are higher than adaptability scores, which are in turn higher than robustness scores at the level of both policy goals and policy instruments.

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Figure 15: Average ResAT scores per resilience category – goals

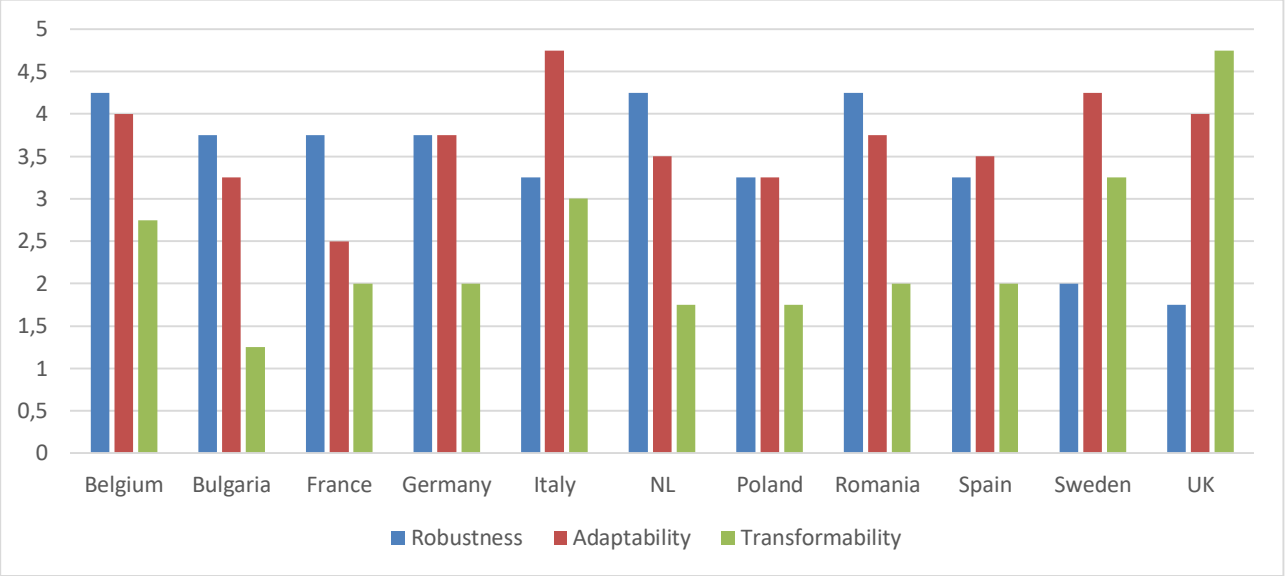
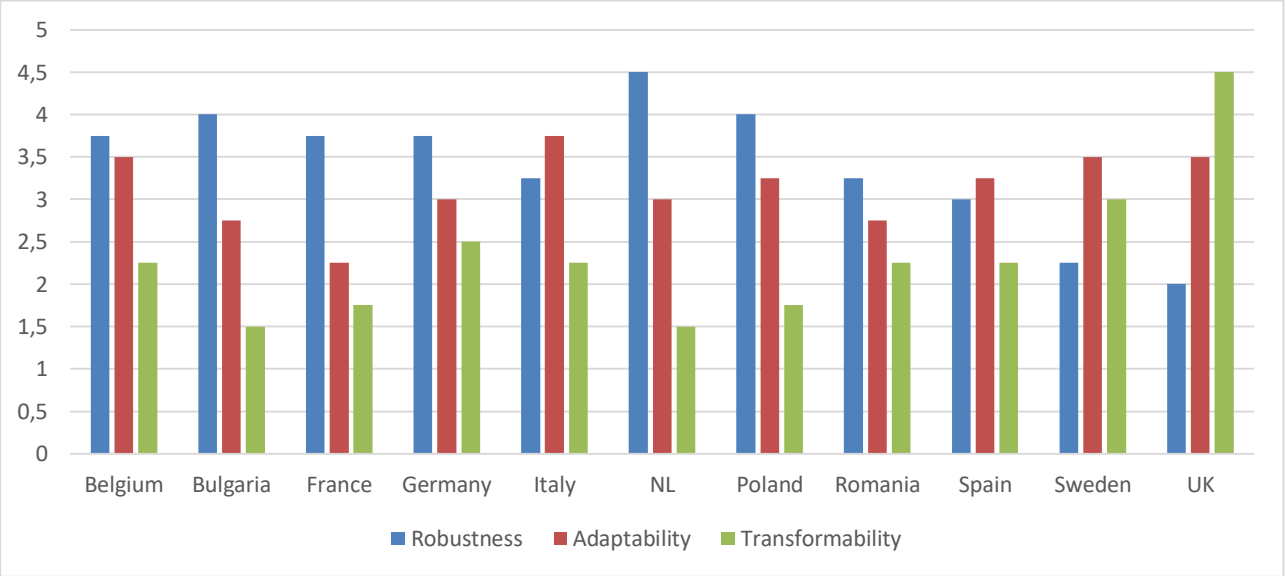


Figure 16: Average scores per resilience category – instruments



Fourth, the findings suggest that there is an instrumentation and implementation bias towards robustness and against adaptability (see Figure 17).

- On average, across all cases the average robustness score for instruments equals that for goals. In five cases, the average robustness score is higher for instruments than for goals, in three cases (Belgium, Romania, Spain) it is lower.

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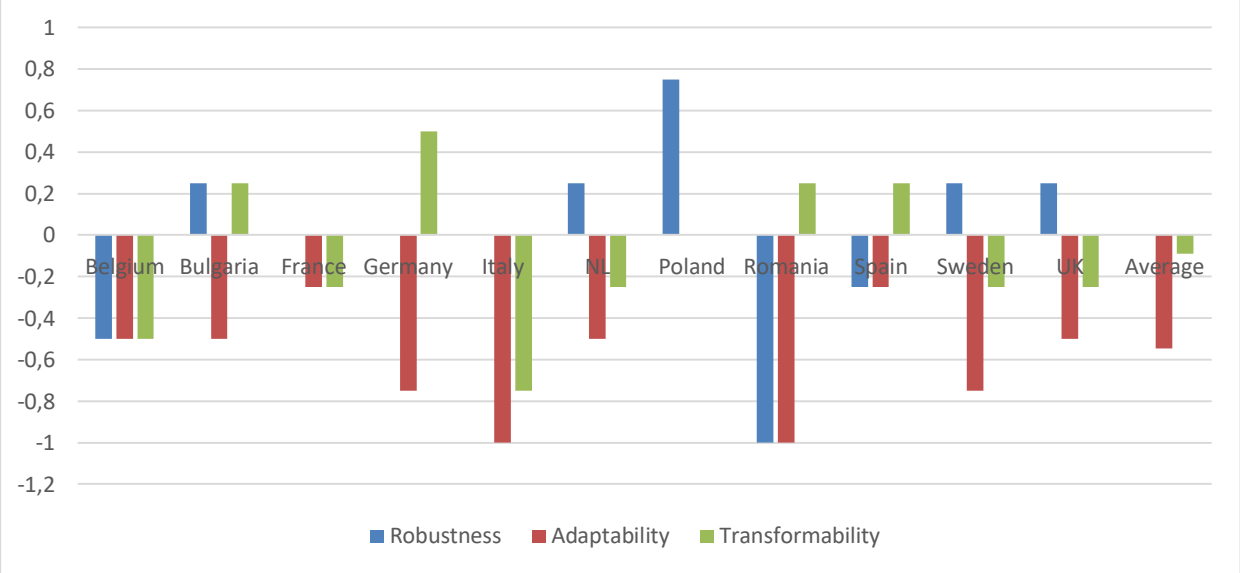
- In contrast, no case showed an average adaptability score that is higher for instruments than for goals, while it is lower in ten cases. On average, the robustness scores for instruments is 0.55 points lower than for goals. That means that the policy instruments are much less geared towards adaptability than the policy goals.
- The transformability scores are on average 0.09 points lower for instruments than for goals. The lower difference compared to the adaptability dimension partly reflects the already relatively low orientation towards transformability in the policy goals. In four cases (Bulgaria, Germany, Romania and Spain), the transformability scores were higher for instruments than for goals. In these cases, certain policy features created more transformative pressure or transformative opportunities for farming systems than what was declared as a policy goal. In six cases the transformability scores were lower for instruments than for goals.

Figure 17: Difference of the average ResAT scores for instruments vs. goals per case



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4 Discussion and conclusions

The application of the ResAT to eleven case studies has generated several important results.

First, the analysis demonstrates that resilience is definitely a meaningful category for analysing the CAP and farm-related policies more general. In all case studies, policy documents contained ample text that could meaningfully be linked to the twelve indicators for resilience-enabling policies. Furthermore, the three dimensions of resilience could be clearly distinguished in each case.

Second, the analysis reveals that the CAP and its national implementations do enhance the resilience of most farming systems in the case studies. However, there is a clear bias towards a robustness-cum-adaptability orientation. The main reason for this is that the bulk of resources go into payments that provide buffer resources for farms and enable the continuation of otherwise less profitable business models, thereby stabilising the status quo. Fewer resources are funnelled into measures that enhance adaptability; this occurs mostly through rural development programs and in some cases producer organisations. An open question is whether the relatively ample support for robustness creates disincentives for adaptation or transformation and therefore impedes these other resilience dimensions. However, for some farming systems the focus is more on adaptation or even transformation. These systems are exposed to strong pressures to change, sometimes from deliberate policies, such as environmental or animal welfare regulations, in other cases more as collateral effect of policy design choices.

Third, the support for transformability appears to be generally underdeveloped. Long-term goals are often rather generic, there is generally little support for in-depth learning and hesitation to dismantle incentives to maintain the status quo. This finding resonates with earlier analysis of the CAP as a path-dependent system that has created enormous incentives for beneficiaries to defend the current allocation of funds, which are mostly tied towards maintenance of the status quo and the robustness type of resilience.

Further reflections suggest a geographical pattern in the overall level of resilience scores. The overall average score for the three Eastern European cases was 0.24 lower than for the other eight cases. This raises the question whether policies in the Northern and Western parts of the EU are more aligned with the status quo while there is still more transformative pressure on farm structures in Eastern Europe. Further analysis, however, reveals that the three Eastern European cases score much higher on robustness and much lower on transformability compared to the other cases. A possible pattern emerging here is that the CAP and its national implementations in Eastern Europe are geared towards enhancing robustness under economic circumstances that create strong transformative pressures. The interplay between resilience orientations in the CAP

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and its national implementation and the specific national economic and policy context call for further analysis.

The application of the tool also revealed some differences in the understanding of the purpose of the instruments and the underlying assumptions and justifications. For example, some stakeholders rejected the proposition that direct payments serve as buffer resources. They rather perceived the direct payments as compensation for higher regulatory standards in the EU.

There is also a certain degree of ambiguity in the interpretation of some policy instruments. For example, most case study partners treated the young farmers' premium as another part of the direct payments and hence as a robustness-enhancing measure that supports the status quo by providing buffer resources. Others argued that support for young farmers might enhance adaptability or even transformability by incentivising newcomers into the sector. The latter interpretation, however, depends on whether this premium can indeed attract outsiders to the sector or at least support better training for insider successors. Further analysis could address to what degree these different interpretations reflect different circumstances in the case studies or different analytical assumptions.

Several of the case studies suggest that details in the national or regional implementation of the CAP can make a large difference in the resilience-enhancing effects. A striking example is the decoupling of the historical direct payments in the case of the extensive grazing system in Spain, which, according to the analysis, weakened the robustness of the traditional farming system compared to the previous coupled premiums.

Overall, the analysis presented here serves as an exploratory assessment of the resilience-enabling and resilience-constraining effects of the CAP and its implementation. Feedback by stakeholders on presentations of preliminary results indicate that resilience is seen as a useful integrative perspective for policy assessment. The distinction between the three resilience dimensions of robustness, adaptability and transformability can serve to clarify the policy choices implied in the further development of the CAP and its national implementations.

The ResAT analysis follows a top-down policy analysis, i.e. it starts with the policies as they are formulated. Building on the findings from the ResAT analysis, the next step in work package 4 of the SURE-Farm project are in-depth bottom-up case studies in several countries in order to deepen our understanding of the cumulative resilience effects of the complex contemporary policy frameworks from the perspective of the farming systems.

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5 References

5.1 List of case studies

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