

Anna Agata Martikainen

THE INFLUENCE OF THE COMMON AGRICULTURAL POLICY ON THE RESILIENCE OF FARMING SYSTEMS IN POLAND



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*For Adam and Aurelia,
who fill my life with meaning and light;
and for Antti,
who stood by me through every chapter.*

Anna Agata Martikainen

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List of abbreviations

- BPS – Basic Payment Scheme
- CAP – Common Agricultural Policy
- EAFRD – European Agricultural Fund for Rural Development
- EAGF – European Agricultural Guarantee Fund
- EC – European Commission
- EU – European Union
- FADN – Farm Accountancy Data Network
- FAO – Food and Agriculture Organization of the United Nations
- GUS – Statistics Poland (*Główny Urząd Statystyczny*)
- IERiGŻ–PIB – Institute of Agricultural and Food Economics – National Research Institute (*Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej – Państwowy Instytut Badawczy*)
- KRUS – The Agricultural Social Insurance Fund (*Kasa Rolniczego Ubezpieczenia Społecznego*)
- KZGPOiW – National Union of Fruit and Vegetable Producer Groups (*Krajowy Związek Grup Producentów Owoców i Warzyw*)
- LAG – Local Action Group
- LODR – Lublin Agricultural Advisory Centre (*Lubelski Ośrodek Doradztwa Rolniczego*)
- NGO – non-governmental organisation
- PLN – Polish Zloty
- RDP – Regional Development Programme
- ResAT – Resilience Assessment Tool
- ROP – Regional Operation Programme
- SAPS – Single Area Payment Scheme
- SME – small and medium-sized enterprises
- SSP – Shared Socioeconomic Pathways

Introduction

The research problem and scope of analysis

European farming systems face a broad range of risks and challenges: economic, environmental, social, and institutional. The relative relevance of these aspects appears to have evolved recently, and environmental concerns are becoming more significant. However, market, policy, and technological development may all be equally important (Mandryk et al., 2012). These risks are in the form of sudden shocks, or long-term stressors, which continuously change the context of their operations and increase the level of the vulnerability of these systems. To cope with those risks, an in-depth insight into the mechanisms of resilience is necessary (Perrin et al., 2020). Resilience thinking may contribute to a better understanding of the interconnections and challenges of establishing sustainable food production, diversified agro-ecosystems, and vibrant rural regions (Darnhofer et al., 2010). Resilience theory originates in ecology and systems theory, but has recently been used in economics, political science, and management theories (Ge et al., 2016). It provides an interdisciplinary framework to investigate the ability of complex social-ecological systems to cope with changing environments (Bullock et al., 2017). Several resilience frameworks have been developed and applied to farming systems. However, a review by Quinlan and colleagues (2016) shows that indicators in a metric to assess resilience are mostly limited in their focus and scale, and do not distinguish between different capacities of resilience, such as robustness, adaptability, and transformability (Cabell & Oelofse, 2012). Due to incomprehensive metrics, existing resilience frameworks do not sufficiently capture the interplay of the multiple processes and actors apparent in farming systems. The proposed study focuses on capturing policy solutions and processes affecting resilience, using the metrics developed in a new Resilience Assessment Tool (ResAT).

The definition of resilience in the presented study is based on the framework developed by Meuwissen and colleagues (2019). Resilience is defined as the ability to retain system functions in the face of increasingly complex and accumulating economic, social, environmental, and institutional shocks and stressors through robustness, adaptability, and transformability. *Robustness* is the farming system's ability to withstand stresses and (un)expected shocks (Urruty et al., 2016). *Adaptability* is defined as the capacity to modify the composition of inputs, production, marketing, and risk management in response to shocks and stressors without affecting the structure and feedback mechanisms of the farming system (Folke et al., 2010).

Transformability is the ability to substantially transform the internal structure and feedback mechanisms of the farming system in response to major shocks or long-term stresses that make business as usual untenable (Walker et al., 2004).

Risk management and the resilience of agriculture are among the most important issues in the ongoing discussion on the shape of the CAP after 2020 (EC, 2020b), and a reform of this policy requires in-depth reflection on its impact on the resilience of farming systems (Ge et al., 2016; Andries et al., 2013). The current reforms of the CAP include decisions on whether and how much to invest in resilience, and what mix of the three resilience capacities (robustness, adaptability, transformability) to choose (EC, 2020a).

An additional reason to adopt the proposed research topic now is that the current process of the preparation of the new CAP after 2020 creates an extraordinary research circumstance for observing the changes being created in the shape of EU agricultural policy, creating new solutions to challenges as well as changes in the structure of policy organisation and value system. It also makes it possible to examine the evaluation of these changes in the eyes of stakeholders.

The scientific problem to be solved by the research is to assess the influence of the European Union policies on the resilience of Polish farming systems. EU agriculture was supported for a long time by the complex set of policies, especially the CAP (Martikainen, 2019). Previously, agricultural policies had aimed at isolating the system from the external shocks, such as price instability. However, in the 1990s, a process of liberalising agricultural markets started, which exposed farming systems to price fluctuations. These concerns have been strengthened by climate and environmental stressors. Although disturbances and pressures have a broad impact on food systems, improving resilience entails assisting regional farms and farming systems in managing and responding to various disruptions while sustaining vital functions such as agricultural production, providing jobs, and generating revenue, as well as the preservation of rural regions, ecosystem services, and biodiversity (Meuwissen et al., 2019). These issues require addressing and answering the question of whether the current and planned designs of the CAP and other policies support or constrain the resilience of farm systems. While some farming systems, such as dairy, receive relatively more support than others from the CAP funds, little is known of how beneficial the CAP is for the less supported systems, e.g. fruit and vegetable farming.

The innovative aspect of the proposed research primarily concerns the research methods and the framework used to describe the resilience-enhancing policies. Previous research on resilience had focused mostly on the farm level – the strategies of farmers to anticipate shocks and challenges and their responses to them. The Resilience Assessment Tool (ResAT) is a new tool for testing resilience at the level of farming systems. It assesses how the policy goals and instruments encourage, enable, tolerate, or constrain the resilience of the farming systems, taking into consideration three different capacities of resilience: robustness, adaptability, and transformability. The ResAT tool had not been used previously to study the Common Agricultural Policy in Poland.

The value added of the research is the application of the concept of three types of policies supporting resilience to assess support for the resilience of Polish farming systems, the use of a new tool for analysing and evaluating agricultural policy (ResAT) in Poland, and the evaluation of the implementation of the Common Agricultural Policy in Poland from the point of view of the resilience of farming systems, exemplified by the case study of the fruit and vegetable farming system. Stakeholder input has been especially important for EU agricultural policy since 2020, as member states will have more flexibility in implementing the CAP to better fit national and regional needs (European Parliament, 2018). Last but not least, the study also provides a ready-to-use template for applying the approach to analyses of other farming systems.

In accordance with the resilience theory, the research makes it possible to verify the usefulness of the proposed dynamic concept of resilience for the assessment of the present and future design of public policies. The proposed research is a contribution to the ongoing discourse related to the future of the CAP and its influence on the resilience of farming systems, by analysing this influence in the context of its capacities of robustness, adaptability, or transformability as well as their 12 main characteristics.

Taking the above into account, the main scientific goal of the research is to assess the impact of the CAP on the resilience of Polish farming systems in terms of robustness, adaptability, and transformability, based on the fruit and vegetable farming system as an example.

The scientific questions and hypotheses

The above-mentioned main goal may be broken down into five specific research questions that will serve as a guideline for this study:

Question 1: What are the main challenges for the farming system?

Question 2: How do the actors within the farming system cope with these challenges?

Question 3: How does the focus on resilience capacities differ between policy goals, policy instruments, and the implementation of the CAP 2014–2020?

Question 4: What are the strengths and weaknesses of the CAP 2014–2020 in Poland in terms of robustness, adaptability, and transformability?

Question 5: What policy mix would be the most desirable by stakeholders in different future scenarios for EU farming?

Summarised answers to these questions are included in Chapter 5 – Conclusions and future areas of research.

To formulate research hypotheses, literature review and a recognition of the state of scientific knowledge in the field of the resilience of farming systems in Poland have been conducted. The resilience theory emphasises changes and uncertainty, and stresses the role of the capacity of the system to adapt and transform as an important aspect in reducing vulnerability (Scott, 2013; Darnhofer, 2014; Ge et al.,

2016). Policy can enhance the resilience of farms in three different capabilities – robustness, adaptability, and transformability (Meuwissen et al., 2019). However, the observation of the CAP development shows that more CAP measures and budget allocation were devoted to reactive rather than proactive courses of action. Farms and their robustness were a major focus of resilience measures, but other solutions and possibilities were overlooked (Meuwissen et al., 2020). For example, research suggests that enhancing social capital and learning among farmers can improve adaptability and transformability, contributing to overall resilience, and policies should focus more on fostering these elements (Slijper et al., 2022). The transfer structure analysis for Poland suggests a shift in the ratio between funds obtained by Poland under the CAP Pillar I and Pillar II. While this ratio stood at 50:50 in the early years of Polish membership in the EU, it changed to 60:40 with the predominance of Pillar I (direct payments) for the period 2014–2020. This is the consequence of a decision made by Poland as part of the flexibility given to member states in terms of transferring funds between the pillars. Poland was among a small group of five new member states that decided to move funds from Pillar II (funds allocated for rural development) to Pillar I (Nurzyńska, 2018). There was a sharp decline in funds for the development of rural areas (Pillar II of the CAP) between 2007–2013 and 2014–2020, which was due to a transfer of 25% from Pillar II to Pillar I (Czyżewski & Stępień, 2014). Poland was the only country that decided to shift the maximum allowed amount of 25% of the value of funds allocated to rural development to Pillar I (direct support system). The vast majority of countries transferred funds from Pillar I to Pillar II (Nurzyńska, 2018). Such division of funds limits resources for important investments related to the modernisation of agriculture and the competitiveness of farms. Compensation and decoupled measures were significantly more supported than investments. Coping with problems, and the continuation of farming even in unfavourable conditions, was more strongly supported than adapting for new forms of farming or transforming farming into other activities, such as tourism. In the years 2004–2020, only about 0.9% of funds of RDPs were allocated to knowledge transfer and innovation (Beba et al., 2017). More support was directed in Poland towards advocating the “equality” rather than the “efficiency” of the CAP measures (see Zawalińska, 2019).

At the same time, pressure of the European Union on pro-environmental activities in agriculture requires adaptability, such as transition towards lower-input farming practices (EC, 2019). Some studies suggest that organic practices in fruit and vegetable farming have the potential to provide high quality crops in quantities comparable to resource-intensive practices (see Kopczyńska et al., 2020). However, the transitions to organic farming requires additional resources and the role of subsidies is the most important in the transition period, when it is not yet possible to obtain additional incomes from selling organic products (Jasiński et al., 2013).

The adaptability of the fruit and vegetable farming system is also necessary to increase the competitive position of Polish fruit and vegetables on foreign markets. In Poland, the production of apples is of the greatest importance in the harvest of fruit,

making around 80% of the harvest (see GUS, 2020a). However, yields of Polish apple orchards are low in comparison with the most productive countries. According to Kraciński and Wicki (2020), in the years 2015–2017, it was on average 19 t/ha, compared to the average harvest of 40–50 t/ha in countries like New Zealand, Italy, or Chile. At the same time, the harvest of Polish apples increased by 55% between 2005–2008 and 2015–2017 as a result of improved technology and greater intensification of production, which is a sign of progress in adaptability.

The literature studies and the recognition of the state of scientific knowledge in the field of the resilience of farming systems in Poland made it possible to formulate the two following research hypotheses:

Hypothesis 1: The CAP supports resilience more intensively by ensuring robustness rather than adaptability and transformability in the Polish farming systems.

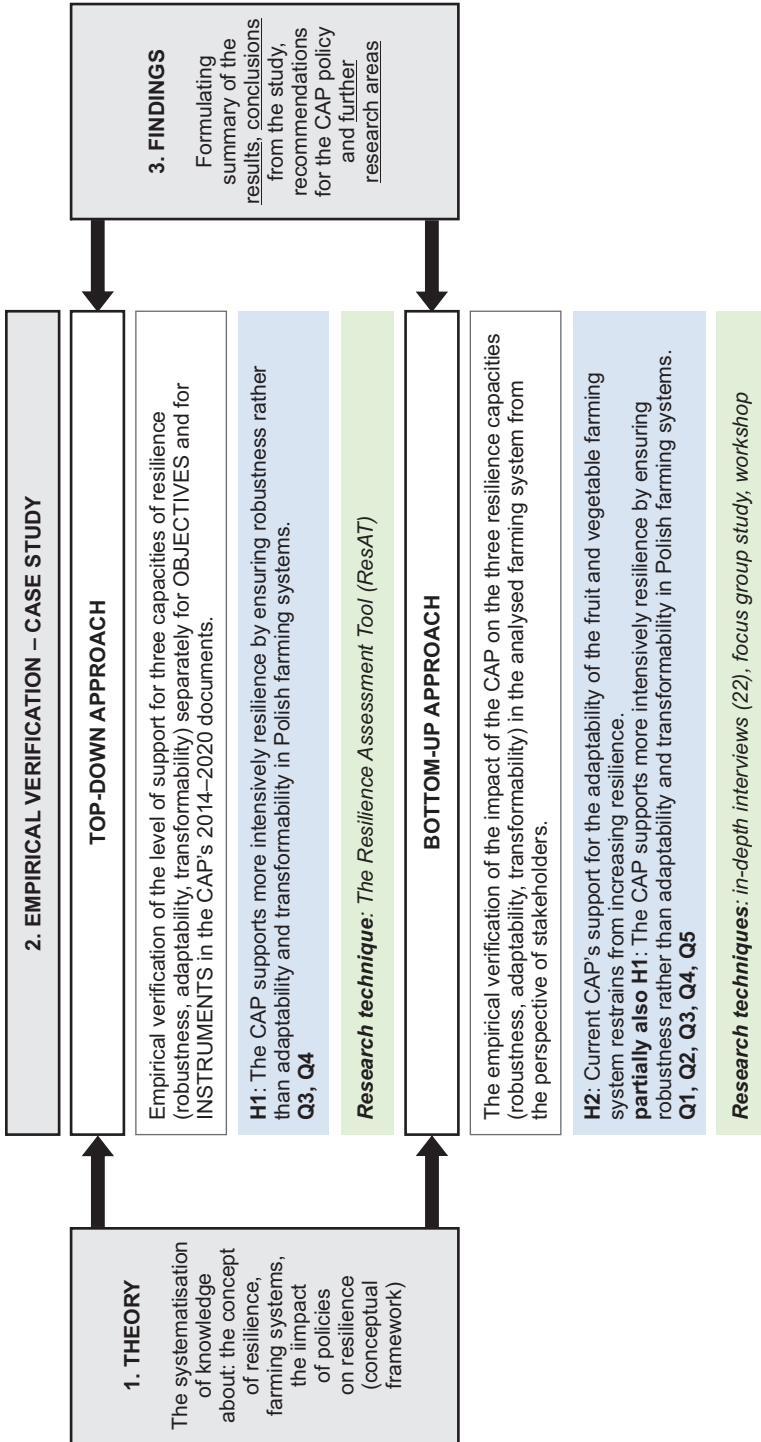
Hypothesis 2: Current CAP support for the adaptability of the fruit and vegetable farming system restricts it from increasing resilience.

In order to empirically verify hypothesis 1, it is necessary to compare the CAP support for three resilience capacities: robustness, adaptability, and transformability. This hypothesis was tested using the problem-based approach and research technique called *Resilience Assessment Tool* (ResAT), developed by Termeer and colleagues (2018). The method of the study is presented in Chapter 3.1., and the results in Chapter 4.1. A summarised verification of hypothesis 1 is included in the Conclusions chapter.

In order to empirically verify hypothesis 2, it is necessary to assess whether the CAP framework (2014–2020), support for adaptability, restricts stakeholders from increasing the system's resilience in the scope of adaptability. This hypothesis was tested using a problem-based case-study method. As the hypothesis refers to the system and its stakeholders, the bottom-up approach was applied to explore their experiences (Sabatier, 1986). Triangulation was used to assure the validity of the research and comprehensively understand the phenomena (Flick, 2018; Konecki, 2000). The data was collected via interviews and a stakeholder focus group. The study method is presented in Chapter 3.2. and the results in Chapter 4.2. A summarised verification of hypothesis 2 is included in the Conclusions chapter.

The research method

The chosen research method was mainly the problem-based case study. The research was designed to examine policies at three levels: goals, instruments, and implementation. The phenomenon was examined using both top-down and bottom-up approaches (Sabatier, 1986). In the top-down approach, Resilience Assessment Tool (ResAT) was used to assess whether the proposed policy goals and instruments for the current programming period of the CAP encourage, enable, tolerate, or constrain the resilience strategies and resources of farming systems. In the bottom-up approach, the aim was to explore policy influences as experienced by actors (farmers, policymakers, and other stakeholders) in the web of multi-level and multi-sectoral



Note: Q stands for the research question.

Figure 1. The structure of the research process

Source: Own elaboration.

policies. This allowed an observation of the outcomes of the policy implemented. It also made it possible to assess how the needs of the system are met by the current policy implementation and to what extent the proposed changes in the policy address these needs. The research was realised in the structure indicated in Figure 1.

The book structure

The book is divided into five major chapters. The first one focuses on resilience, its definitions, economic importance, and its significance for farming systems. It also demonstrates three resilience capacities: robustness, adaptability, and transformability.

The second chapter discusses policies relating to farming systems. It refers to the evolution and advance of the CAP approach to resilience. The chapter presents the key characteristics of resilience-oriented policies.

The third chapter, which describes the research process, is a transition from theoretical to empirical chapters. It describes research techniques that are performed in both the top-down and the bottom-up approach. The Resilience Assessment Tool, the procedure for conducting in-depth interviews, and a stakeholder workshop are all thoroughly described. This chapter also presents the case study and the features of the farming system examined in the research.

The findings of the empirical research are described in Chapter 4. It is divided into two sections. The first one presents top-down research findings, focusing on the linkage of goals and instruments to the robustness, adaptability, and transformability of the farming system and its 12 characteristics. It also includes the results of stakeholder proofing and concludes with a summary of findings.

The bottom-up analysis results are reported in the second section of Chapter 4. The findings from in-depth interviews are described as first. The key themes covered by interviews include: the main challenges for the farming system, strategies used by actors to deal with them, resources, and networks used in doing so, as well as the influence of the CAP and other related policies (such as environmental or social policy) on the farming system and its actors. The results of stakeholder proofing from bottom-up analysis are also reported, followed by the identification of policy strengths and shortcomings in terms of resilience. The chapter concludes with a summary of the workshop's findings on policy recommendations for the CAP's future. It contains policy proposals for three potential future scenarios: *status quo*, protectionist, and liberal.

The fifth chapter summarises the study and presents the most relevant findings. It contains a summary of the results, answers to all research questions, the verification of hypothesis, and recommendations for further study on this subject. At the end of the book there is a bibliography and annexes, including two code books for interviews.

1. The theory of resilience and farming systems

The term “resilience” derives from Latin word “*resilire*” or “*resilio*”, which means “to bounce” (Alexander, 2013). The resilience theory is a broad, varied, and loosely organised collection of concepts originating in ecology and systems theory, which were later adapted in other fields, including economics, political science, and management theories (Carpenter & Brock, 2008; Kinzig, 2012; Ge et al., 2016).

Resilience can refer to environmental or economic systems, organisations, individuals, or infrastructure. Anderies, Walker, and Kinzig (2006) called it a “collection of ideas”. Since the late 1980s, the concept has been increasingly evident in the study of human-environmental relations (Janssen et al., 2006). Resilience is described in many ways (Brand & Jax, 2007; Barrett & Constan, 2014) and can take many different types and forms (Anderson, 2015). This can be beneficial to promoting cross-disciplinary and science-practice collaboration, but the conceptual clarity as well as the practical implications of the concept of resilience are put at risk. Brand and Jax (2007) argue that in providing balance to the usage of resilience as a phenomenon with unclear delimitation, a clearly specified descriptive framework of resilience is essential. A transparent descriptive framework serves as the foundation for operationalising and applying resilience. This chapter is, therefore, an exploration of the current understanding of resilience, especially in the context of farming systems, which leads to the formulation of a framework for the empirical analysis.

1.1. Resilience – definitions and concepts

According to Holling (1973, p. 14), who conceptualised resilience in ecology, it “is a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variable”. Such a definition refers to the ecological meaning and focuses on relations within the system. Definitions of the concept can focus on the objectives: “Resilience can be broadly defined as the dynamic capacity to continue to achieve goals despite disturbances and shocks” (Tendall et al., 2015). Walker and colleagues (2004, p. 1) define resilience, focusing on functions: “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks”. Such a definition emphasises structures and processes of the ecosystem. In the same article, a division of resilience into three capacities was introduced, including resilience, adaptability, and transformability. Folke and colleagues (2010) built their resilience thinking framework upon this

approach, using the terms ‘persistence’, ‘adaptability’, and ‘transformability’ as three capacities of social-ecological systems. Later, Walker, and Salt (2012) defined resilience more broadly as “a framework for understanding the persistence, adaptation, and transformation of socio-ecological systems”. According to Bahadur, Ibrahim, and Tanner (2013), high diversity, effective governance and institutions, the capacity to function with change and uncertainty, community engagement and the incorporation of local expertise, preparation and planning for disruptions, high socioeconomic equity, robust social values and systems, accepting non-equilibrium dynamics, continuous and effective learning, and the adoption of cross-scalar perspective are ten key characteristics of resilience. In this approach, it is also evident that resilience cannot be narrowed down to robustness, as the capacities presented involve aspects characteristic of adaptability and transformability.

According to Zawalińska and colleagues (2022), there is a difference between “revealed resilience”, which is determined *ex-post*, and “potential resilience”. The latter is explored in the approach proposed by Meuwissen and colleagues (2019). The second one derives from the definitions presented above and distinguishes between three resilience capacities: robustness, adaptability, and transformability.

The word ‘robustness’ is derived from the Latin word *robustus*, which means “strong” (Urruty et al., 2016). Robustness is a capacity to withstand long-term pressures (such as climate change) and sudden shocks (such as adverse weather events or sudden price volatility) (Meuwissen et al., 2019). It makes it possible to maintain previous levels of functionality without major changes (Urruty et al., 2016). Robustness depends on the availability of buffer resources and effective risk management, such as diversification or insurance (Feindt et al., 2020).

While robustness focuses on preserving or restoring a previous state of order, adaptability refers to the capacity to adapt and grow stronger from disruptions (Boin & van Eeten, 2013). “Adaptation is a process of deliberate change in anticipation of or in reaction to external stimuli and stress” (Nelson et al., 2007). According to Walker and colleagues (2004), adaptability is the capacity of actors in the system to manage resilience. Folke and colleagues (2010, p. 1) define it as the “capacity to adjust responses to changing external drivers and internal processes and thereby allow for development along the current trajectory”. Stone and Rahimifard (2018) stress that resilience must concern the ability to not only maintain core function but also adapt to changing conditions. Adapting to both slow and substantial changes should include fostering the development of new institutions that are mindful of the ecosystems they are responsible for (Tompkins & Adger, 2004). Individuals’ willingness to adapt to evolving conditions and change their actions is critical for building and maintaining socio-ecological resilience. Research suggests that people must know how to learn flexibly in order to be adaptive through different practices (Fazey et al., 2007).

Walker and colleagues (2004) define transformability as the capacity to construct an essentially new system when ecological, economic, or social factors make the current system untenable. Folke and colleagues (2010, p. 1) characterise it as “the capacity to cross thresholds into new development trajectories”. When the adaptive capacity

is not sufficiently developed to keep the system from shifting into another state as a consequence of pressure and surprises from the outside world, transformation occurs (Davidson, 2010).

The distinction between three resilience capacities is helpful in assessing the scope of potential resilience strategies and enabling the investigation of trade-offs and synergies between them (Meuwissen et al., 2019). Walker and colleagues (2004) state that resilience capacities are rather imprecise terms, although they do not advise creating too narrow definitions, as they need to fit different purposes.

Resilience in relation to systems has been examined in different fields of study, although the most common was reference to social-ecological systems. Literature shows a pronounced adoption of resilience thinking in managing ecosystems and social-ecological systems, focusing on multiple ecosystem functions and services (Walker et al., 2004; Folke, 2006; Olsson et al., 2006; Anderies et al., 2013; Rist et al., 2014). In comparison to most other applications of resilience thinking, the “resilience thinking” paradigm within the social-ecological systems (SES) approach in natural resources management and environmental governance studies draws on a more elaborate definition of resilience and a wider range of methodological tools (Duit, 2016). However, the relevance and implications of resilience thinking are still underappreciated (Ge et al., 2016).

Resilience has its origins in ecology and systems theory, but it is also a relevant concept for economics. The terms “ecology” and “economics” derive from the same Greek root, *oikos*, which means “household” or “estate”, with “ecology” concerned with the study of the complex aggregate, and “economics” with its management. This shared etymological root suggests that the two disciplines are deeply connected (Barrett, 2008). Arrow and colleagues (1995) explain the importance of resilience for economics: as all economic activity is based on environmental resources, which are finite, the current use of those resources influences the capacity for generating material production in the future. Relations between humans and the environment are dynamic and complex. They depend on technology, preferences, the structure of production and consumption, etc. Although the consequences of human innovation are impossible to predict, ecosystem resilience is a useful index of environmental sustainability (Common, 1995). Resilience can be seen as “ecosystem dynamics where there are multiple (locally) stable equilibria” (Arrow et al., 1995, p. 2). In this approach, resilience is an amount of disruption that can be sustained until a system based on one locally stable equilibrium flips to another (Holling, 1973). The resilience of ecosystems in which economic activities are carried out determines their sustainability.

Resilience became relevant for researchers working on economic sustainability (Farber, 1995; Perrings, 2006). Economic studies have taken account of social structures such as markets, policies, and labour supply, as well as how these influence production practices and, as a result, the environmental effects of agriculture (Darnhofer et al., 2016). The interplay of the dynamics inside and between these structural elements is considered to be the basis of resilience. Despite the different forms

of resilience in various systems, it is possible to indicate and find signs of impending danger for the resilience of an ecosystem. However, it is difficult to identify clear signals of change early enough to facilitate an efficient approach, or even to establish a scientific consensus on a timeframe that enables effective intervention (Levin et al., 1998). Considering the non-linear complex dynamics of interconnected social-ecological systems, adaptively managing resilience is the appropriate approach for dealing with exogenous shocks and unanticipated events (Allen et al., 2011).

Within the resilience paradigm, there is a distinct emphasis on policy relevance, and the resilience approach is related to various policy models and management programmes (Duit, 2016). One of these is adaptive management, which is an approach making it possible to test policy development and management during interventions on different scales and observe how the system responds. Adaptive management is adaptive, because it recognises changes in the natural resources being managed as well as the need for responding by altering behaviour and conforming when circumstances change. It accepts ambiguity and unpredictability. As a result, policies must be continually updated and flexible in order to respond to unforeseen circumstances. As experience makes it possible to learn and adapt, trial and error is the default model for the management learning process (Gunderson et al., 2002). Hence, policy development should also be approached as a topic of scientific experimental design (Walters, 2007). It makes it possible to understand the system better, provide social or economic products, and pinpoint possible options (Arrow et al., 1995). According to Hasselman (2017, p. 41), adaptive management can be defined as: “a systematic process for improving policy and its implementation. It seeks to address at least one type of uncertainty with varying emphasis on experimentation to discover new knowledge; deliberative processes to engage multiple perspectives in decision-making; and monitoring of outcomes and changes with responsive adjustment”.

Resilience became a concept important for economic research on relationships between risk and poverty (Alwang et al., 2001; Barrett & Constanas, 2014). The interest of economists is focused on understanding why certain individuals, communities, and even whole nations remain in poverty as others have rapidly improved living standards, i.e. how social systems change from a low- to a high-level equilibrium (Barrett, 2008). Economists studying poverty traps employ similar frameworks that rely on the mathematics of dynamic systems (Barrett et al., 2011).

Elinor Ostrom, a winner of a Nobel Memorial Prize in Economic Sciences, whose works on institutions of collective governance is significant for contemporary debates on resilience, credited another winner of a Nobel Memorial Prize in Economic Sciences – Herbert Simon – for important theoretical influence by recognising that complex systems are partially decomposable in their structure (Ostrom, 2007). The focus on institutions, such as Ostrom’s research on common property regimes, made it possible to examine change in different socio-ecological systems as outcomes of particular institutional arrangements.

Herbert Simon stated that “a global rationality of the ‘economic man’ should be revised to a concept of a rational behaviour that is compatible with the access

to information and the computational capacities that are actually possessed by organisms, including man, in the kinds of environments in which such organisms exist” (Simon, 1955, p. 99). According to Simon, the concept of an “economic man” puts too high demands on the decision-maker, who is assumed to be able to attach definite range of payoffs to each possible outcome, which requires specifying the exact nature of outcomes that are certain, or at least have a defined probability, without the possibility of consequences which may not be anticipated. Also, payoffs need to be completely ordered, as one has to be always better, as good as, or worse than the other. There is no evidence that actual human-choice situations meet these criteria. Simon’s works formed the ground for the theory of behaviour of human individuals and groups of individuals making choices in an organisational context. Due to the complexity of organisational choices, interventions require monitoring and reflection, which allow humans to adapt their interventions to effects and results that were not predicted. The limited condition of human choice described by Simon was more closely related to the psychological theories of perception, cognition, and behaviour, observed in experimental research (see Simon, 1956). Decisions taken in the absence of total knowledge are not irrational but have rationality within contextual limitations. They are pragmatic and shaped by habits and institutions that provide reasonable expectations for the possible outcomes. Works of Simon influenced many scientists who wanted to understand how individuals respond to changes in a complex environment, and laid a groundwork for many concepts and techniques which are currently associated with resilience. His influence is clear in many theoretical foundations for contemporary debates on resilience and environmental governance (see Holling, 2001 for the influence of Simon on understanding complexity, self-organisation, and the adaptive cycle by ecologists).

Questions of economic resilience were also raised by different rates of recovery of regional economies from the 2007–2008 economic crisis (see Capello et al., 2015; Dube & Polese, 2016; Bristow & Healy, 2018).

Lockwood (2010) names resilience as one of the principles of good governance. The concept of resilience is progressively being used to guide development programmes designed to improve rural households’ and communities’ ability to cope, adapt, and transform in the presence of a variety of disturbances and pressures (Pelletier et al., 2016).

Empirical research on perceived resilience is still limited, with most studies focusing on a single resilience capacity, challenge, or function (Spiegel et al., 2021). Ashkenazy and colleagues (2017) collected empirical evidence on strategies possibly increasing resilience of the farm, but at the same time possibly undermining the resilience in the region in which they operate. They also noticed that enhancing short-term resilience might weaken it in the long term, due to diminished adaptability.

There are two types of resilience assessments described in the literature: resilience assessments based on pre-defined indicators and resilience assessments based on perceived resilience. The pre-defined-indicators approach relies on the assessment of important socioeconomic and ecological variables that are often specified by

academics rather than the stakeholders in the farming system (see Cabell & Oelofse, 2012; FAO, 2016). *A priori* knowledge of which features of an environment make individuals in it more resilient to shocks and stressors is difficult for experts when choosing resilience capacity measures. While these assessments of resilience may include data gathered locally, they frequently rely on statistical relations at an aggregated level. Moreover, indicator-based resilience evaluations are also context-specific. Comparing and synthesising resilience assessments across farming systems is challenging because of this (Clare et al., 2017). Another issue is identifying criteria and metrics for quantifying resilience, as it is difficult to define and incorporate all important features and indicators that impact resilience, ranging from economic and geophysical to sociocultural and political variables (Cutter et al., 2008).

Resilience assessments relying on stakeholder perception have recently gained popularity (Clare et al., 2017). Perceived resilience is based on the stakeholder's cognitive and affective assessment of his or her ability to foresee, buffer, adapt, and transform the farming system in the face of a short-term shock or long-term pressures. It provides information on a variety of socioeconomic, psychological, and institutional variables as well as their effects, but resilience assessments based on perceptions should not be viewed as a substitution for evaluations based on indicators, but, rather, as supplementary to them (Jones & Tanner, 2017). When the same questionnaires are relevant in multiple contexts and resilience is viewed in a similar way, perceived resilience evaluations allow comparisons between farming systems (Jones & d'Errico, 2019). However, the assumption of uniform understanding of resilience should be treated with caution in cross-cultural comparisons, as resilience has been demonstrated to be a culturally- and contextually-sensitive concept (Ungar, 2008).

Evidence is lacking on which measures are the most effective in increasing the resilience of the agricultural sector as a whole (McCarthy et al., 2017).

1.2. Farming systems

Comprehensive research is needed to understand how resilient farms are to shocks. The systematic approach, which allows for a more thorough examination of the relationships between the many elements of the food economy, can be considered advantageous (see Soliwoda, 2019).

A farming system is a bio-based production system with the main aim of food production. According to Ge and colleagues (2016, p. 17), bio-based production systems are, "social-ecological systems that combine social organization, human technology, biological processes and ecological systems and their services for the production of food, fiber or biomass."

Systems theory is frequently used to explore the linkages and interactions between individual parts that underpin the existence or lack of resilience in response to both exogenous and endogenous disturbances. Commonly, the focus is on the restoration or relocation to one or many equilibria, as well as on internal and external variables

that either enhance or endanger systems, contributing to or diminishing their resilience (Pike et al., 2010).

The approach presented to farming systems differs significantly from the *crop production systems*, also called *farming systems* in the literature, which is the term used mainly in agronomy and agricultural engineering. In agricultural economics, the terms *production systems* or *economic system* are more frequently used (Zimny, 2007). This refers to the way of developing farmland in terms of plant and animal production and processing, which is valued according to economic and ecological criteria. The criterion for distinguishing systems is the degree of dependence of agriculture on industrial means of production and the possibility of achieving the goals of sustainable development by this sector of the economy (Kuś & Stalenga, 2006). In this approach, systems such as conventional, integrated, or ecological are identified (Jończyk et al., 2007). Such systems are not socio-ecological constructs, as the focus lies on methods of production, their productivity, and agroecological impact, which distinguishes them from the approach adopted in the study.

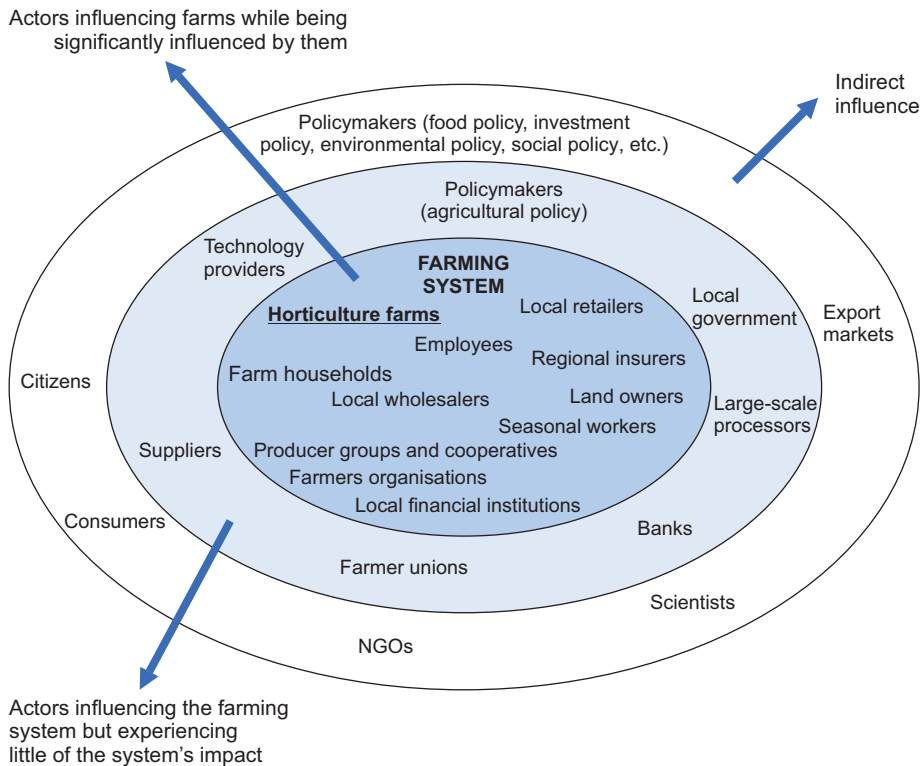


Figure 2. Selection criteria to identify actors within the system boundary of a farming system, including exemplary actors of the Polish fruit and vegetable farming system in the Lubelskie region

Source: Own elaboration, based on Meuwissen et al., 2019.

In this approach, a farming system is a system hierarchy level above the farm (Giller, 2013), where characteristics emerge as a result of formal and informal interactions and interconnections among farms, technical feasibility, stakeholders along the value chain, public in rural and urban areas, consumers, policymakers, and the environment (Ge et al., 2016). The primary product or products of interest and the regional context serve as the foundation for characterising a farming system. Farms that provide the system's primary goods are its foundation. As a result, not every farm in the region is part of the same farming system. Depending on patterns of impact, non-farmer stakeholders (people and organisations) are categorised into context actors and actors of the farming system. While context actors either unilaterally impact farms or are unilaterally influenced by them, farms and other actors within the farming system influence each other (see Figure 2). The operations of farming systems can have a variety of impacts, since they operate in open agro-ecological systems and are connected to different social networks and economic processes. The farming system is thus characterised by these external impacts and public goods (Meuwissen et al., 2019).

Farms, like other actors in the farming system, are not homogeneous, and conflicts between their interests and identities are expected. As a result, while the farming system is the framework's focal scale, other nested levels of the system, such as farm households and supply-chain actors, should also be included (Meuwissen et al., 2019).

1.3. Resilience in farming systems

Resilience thinking offers a framework to emphasise dynamics and interdependencies across time, space, and domains. It is founded on the concept that social-ecological systems are complex and that future changes are unpredictable, placing an emphasis on adaptive management strategies (Darnhofer, 2010). The primary assumption of SES resilience theory is that society and nature can both be modelled as complex systems with various stability domains or equilibrium points. Each of these systems has a number of potential equilibrium configurations, and systems may change from one stability domain to another as a result of gradually increasing internal pressures, quickly occurring and unforeseen external disruptions, or both. While a regime shift's timing is highly unpredictable, it is at these times that the whole SES runs the danger of turning into a different, less desired but equally stable stability domain. Despite the fact that change is inevitable given the cyclical structure of all systems, preventing "regime shifts" into unfavourable stability domains is a crucial management objective from the resilience viewpoint (Duit, 2016).

As farming systems are socio-ecological systems, it is important to take into consideration both social and ecological aspects. Simply applying the ecological concept of resilience to social systems implies that there are no significant variations in actions and structure between socially-constructed institutions and ecological systems. In the social sciences, this is sharply disputed. However, several disciplines, including human geography (Zimmerer, 1994), human ecology (Folke et al., 2002),

and ecological economics (Levin et al., 1998), have pointed to the similarities between ecosystem resilience and social resilience. Since social resilience has economic, spatial, and social dimensions, observing and assessing it requires interdisciplinary knowledge and analysis at multiple levels (Adger, 2000).

Farming systems have seen significant changes in recent decades: farms are no longer considered as facing a stable environment, allowing them to focus on optimising production methods. It is visible especially in the environmental context, as extreme weather-related events are becoming more frequent (see Figure 3). Rather, farms are envisioned as dynamic and adaptable in order to respond to a constantly changing environment. In farming-systems research, the adaptive approach concentrates on guaranteeing enough room for manoeuvre, discovering transition capabilities and increasing degrees of freedom. The theory of resilience aids in comprehending how to make effective use of unanticipated change (Milestad et al., 2012).

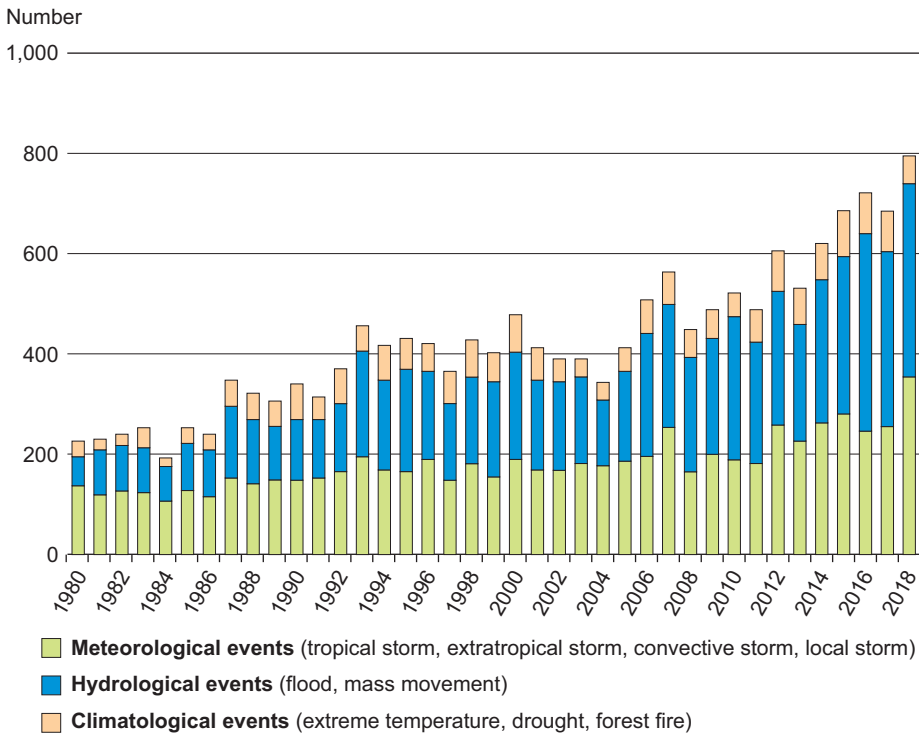


Figure 3. World weather-related natural catastrophes by peril, 1980–2018

Source: Munich Re, 2019.

In the scientific literature, the increase of interest in the resilience of farming systems dates to last twenty years (see Figure 4). In 2002, only six publications in the Web of Science referred to both these terms, while in 2021 there were 414 such publications.

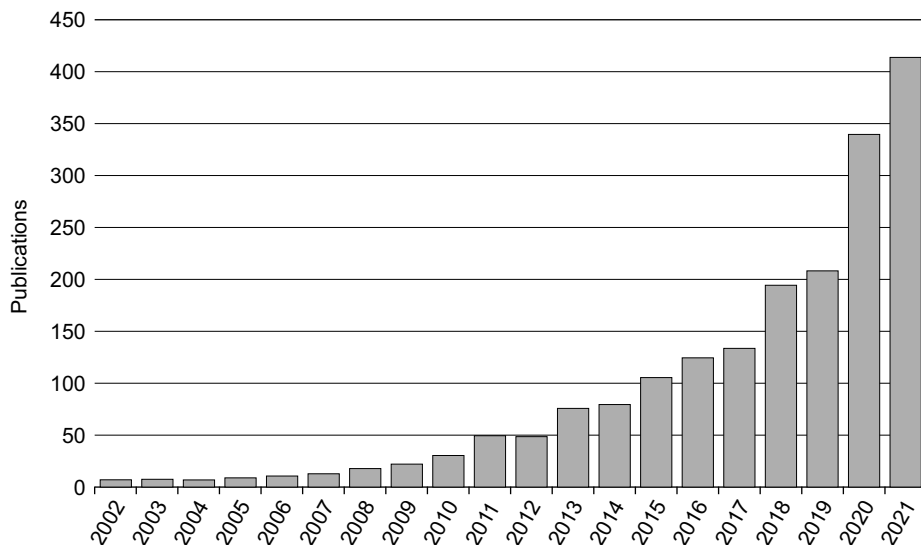


Figure 4. The number of publications referring to terms “resilience AND farming systems” in the years 2002–2021

Source: Web of Science.

The dynamics and evolution of complex social-ecological systems are addressed by resilience thinking, which focuses on three capacities of socio-ecological systems: robustness, adaptability, and transformability (see Folke et al., 2010). The concept of resilience was adopted within the systems-ecology theory in the 1970s, hence it was from the start developed in relation to systems (Walker & Cooper, 2011). Resilience is a property of the system (Adger & Hobdod, 2014). It has become more common as a general approach to comprehending social-ecological systems, as there is a clear connection between social and ecological resilience, especially for social groups or communities that rely on ecological and environmental resources for a living (Adger, 2000).

Farming resilience is contextual, plural, and placed (Herman et al., 2018). As local systems become more connected due to global economic, social, and environmental changes, they may face also changes in their internal structures and the external disturbances they may face. Resilient systems can learn, organise themselves, and evolve with change (Anderies et al., 2013). Farming systems face production and vulnerability changes, such as the results of global warming and price volatility (Vermeulen et al., 2012; Adger & Hobdod, 2014; Anandhi et al., 2016; Tripathi et al., 2016). Resilience thinking in research on farming systems can reduce their vulnerability and increase production (Ge et al., 2016). The current agenda thus needs to address the issues related to resilience in farming systems more explicitly. To apply resilience thinking to farming systems, it is needed to establish interdisciplinary collaboration. Turning resilience theory into practice and practical tools is facilitated by the community of practice.

Bayliss-Smith (1991) described a good example of farming system vulnerability in the Highlands of Papua New Guinea. The vulnerability of its residents to a poor-quality and sometimes disrupted food supply as well as the vulnerability of soil and vegetation resources to degradation were both linked to an overreliance on the sweet potato as a staple crop. This historically recent condition has undermined the resilience and increased the vulnerability of land systems and production systems, affecting women and children living in dry grasslands to the greatest extent. Interventions such as increased agricultural diversity, population mobility, and the availability of additional incomes have all helped to minimise sweet potato overreliance in recent decades. However, the research also described new vulnerabilities arising in the new equilibrium.

Anderies, Walker, and Kinzig (2006) attempted to summarise some of the key takeaways from 15 case studies involving the implementation of resilience-based concepts. It is clear that the resilience framework has a long way to go before it becomes a theory. Nevertheless, it can be a very useful and appropriate framework for studying and managing socio-ecological systems. It will not replace specific theories in ecology, economics, or other social sciences, but it can help incorporate these (partial) theories in a way that leads to a deeper understanding of the complex evolution of interconnected socio-ecological systems operating at various levels, in addition to providing new aspects of its own.

A resilient social-ecological system may use a crisis to transform into a more desirable state (Folke et al., 2005). Through testing alternative system configurations and designing strategies for choosing among potential futures, key leaders and shadow networks can prepare a system for transformation. Key leaders can spot and utilise windows of opportunity as well as navigate the transition to adaptive governance. The ability to span governance scales, orchestrate networks, establish and communicate understanding, and reconcile various problem domains are all leadership functions. Effective transformations depend on epistemic and shadow networks to provide novel ideas and ways of managing socio-ecological systems (Olsson et al., 2006).

There are some difficulties in the systems approach to resilience. The first challenge is related to delimiting and identifying the system to be examined. Maximising the system model can lead to a limitation of explanatory value, for example in the case of a global food-governance system. Reducing the scope of the model, on the other hand, leads to a reduction of social complexity. As a result, it appears that resilience thinking can be successfully used within a limited range of medium and small SESs, where the primary system components can be comprehensively mapped, animated, and modified by policy interventions (Duit, 2016).

2. Policies regarding the resilience of agriculture and farming systems

Human institutions affect the resilience of the environment. Current global problems, such as climate change, influence farming systems at a large scale, hence responses to them need to involve both local and global influencers. The promising strategies for addressing the global problems include dialogue among stakeholders, civil servants and scientists, as well as the unity of institutional types and designs facilitating experiments, learning, and changes (Dietz et al., 2003).

An approach to the governance and management of farming systems that attempts to control the main variables of the systems, with the aim of providing efficiency, reliability, and favourable levels of the system's desirable goods and services, increases the vulnerability of the system to such unexpected changes (Olsson et al., 2006), as farming practices are modified due to the policy requirements (Huttunen & Peltomaa, 2016).

Environmental economists argue that economic policies should not necessarily aim to maximise efficiency or productivity in the traditional sense. The concept of maximisation *per se* is not incorrect. The concern is that important variables such as resilience and environmental costs are, in fact, frequently overlooked (Ehrlich, 2008). The increasing number of failures among previous practices, as well as the vulnerability of socio-ecological systems has led to a demand for more adaptive governance regimes capable of dealing with instability and transition (Dietz et al., 2003). Adaptive governance emphasises adaptability (Karpouzoglou et al., 2016). This form of governance regime, capable of matching the intrinsic complexity of socio-ecological systems while also dealing with instability and transition, requires significant changes in how humans engage with and manage these systems (Wondelleck & Yaffee, 2000). Key individuals provide management, transparency, vision, and purpose, as well as assist in the transformation of management organisations into learning environments (Folke et al., 2005). Adaptive governance systems frequently self-organise as social networks, with teams and actor groups drawing on diverse knowledge systems and experiences to develop a shared understanding and policies (Berkes et al., 2000). This can lead to co-production, a process of transforming inputs from various stakeholders into goods and services (Ostrom, 1996). The rise of "bridging organisations" appears to be lowering the costs of collaboration and conflict resolution (Hahn et al., 2006). Enabling legislation and governmental policies can encourage self-organisation while framing creativity for adaptive common management efforts (Folke et al., 2005).

Policies are rules that translate information about the system into action, which feeds back into the system (Anderies et al., 2013). Uncoordinated actions by actors at different levels are unlikely to scale up in a desired and predictable way. Understanding cross-scale implications of different policies for the whole system is thus necessary. Decisions need to be structured at multiple levels of an organisation and scales to achieve development trajectories that can meet sustainability performance criteria (Anderies et al., 2013). However, the dynamic nature of links between governance levels is not well-understood in examining adaptation, and the policy of scale-building is often ignored (Adger et al., 2005).

Previous policy designs that have become institutionalised most often constrain new policy development (Howlett & Rayner, 2007). It is, therefore, important to explore the context in which the policy mix is developing and how it is evolving.

2.1. The evolution of the Common Agricultural Policy and its approach to resilience

The CAP is an old and the most expanded policy of the European Union in terms of the instruments, defining their legal regulations (Kawecka-Wyrzykowska, 2016). Its legal basis lies in the provisions contained in Articles 32 to 38 of the Treaty of Rome of 1957 (Krzyżanowski, 2015), although it was formally inaugurated in 1962 with the launch of the common organisation of agricultural markets (Drygas & Nurzyńska, 2018). The main goal of the CAP at the time of its introduction was to achieve self-sufficiency in food production. This required large investments in European agriculture and caused an increase in food prices (Gorlach, 2004). The CAP has played a crucial role in the process of integration since its introduction, and decision-makers have recognised its distinct characteristics (Parlińska & Wielechowski, 2016). Prior to 1990, agricultural policy attempted to protect the agricultural sector from outside shocks, especially price fluctuations, by using a system of managed markets with guaranteed minimum prices (Daugbjerg & Swinbank, 2012). However, after market liberalisation in the 1990s, agricultural resilience started to take prominence in public debates. Climate change, water scarcity, biodiversity loss, and other ecological stressors were also crucial for these concerns (Termeer et al., 2018). The transfer from price support to income support (OECD, 2011) as well as expanding the scope of intervention from agriculture to multifunctional rural development with the consideration of rules of sustainable development (Dwyer et al., 2007) has been a major change in the CAP since 2013.

In crisis situations, the EU tended to choose the support of robustness. An example is the robust €1bn Food Facility rapid response mechanism that the Commission launched shortly after the 2007/2008 crisis. However, a certain level of flexibility allowing for adaptive measures could also be observed (Candel et al., 2016).

A collection of regulations issued on 20 December 2013 sanctioned the CAP principles for the 2014–2020 period (European Parliament, 2013a, 2013b, 2013c, 2013d, 2013e). The greening of agricultural measures (Erjavec & Erjavec, 2015),

a definite separation of direct payments from production efficiency (European Commission, 2017b), the convergence of the amount of direct support in EU countries (Czyżewski & Stępień, 2015), the reduction of support for the biggest beneficiaries, as well as an increase in direct financial support for young farmers and particular production activities (European Parliament, 2013c) were all changes related to the first pillar. The core characteristics of the second pillar, to be implemented via national rural development programmes that consider EU common priorities, were not changed by the CAP reform (Parlińska & Wielechowski, 2016).

Through the efficient protection of the internal market for agricultural goods, the EU agricultural policy has contributed to generally stable conditions for the operation of EU agricultural production. The CAP was continuously adjusted to both internal and external forces by adapting the instruments used and the scope of protection during the course of its existence (Majewski & Malak-Rawlikowska, 2018).

The direct financial support mechanism of the CAP, aimed at being the key instrument for fostering convergence in the development of farming systems and rural sustainability among EU member states, has been criticised for failing to achieve its goals. One important problem of the direct payments scheme raised in the literature is allocating more resources to the older members' already developed farming systems and less to the developing ones, enhancing the disparity between member states (Volkov et al., 2019). There is a risk that the CAP and its national implementations, which concentrate primarily on supporting robustness through income-support measures, now limit the capacity of some farming systems to adapt or transform. It is thus advocated that careful consideration should be given to how to rebalance support for various resilience capacities within the CAP (Buitenhuis et al., 2020b).

Case studies on various policies found a decrease in coherence when shifting from goals to instruments and then to implementation practices (Nilsson et al., 2012). Conflicts resulting from instrument design and guidelines, or different priorities set at the EU and national level, can constrain the effective implementation of resilience-enhancing solutions.

Enhanced policy coherence is one way to strengthen the match of policies to the circumstances of local stakeholders (Nilsson et al., 2012), as coherent policies provide consistent incentives for stakeholders to act in a particular way, while incoherent policies send conflicting signals about the desired behaviour (May et al., 2006). Credibility, understood as a degree to which the policy mix is credible and trustworthy, both generally and in terms of its elements and processes, may also be used to describe the significance of policy configurations (Rogge & Reichardt, 2016).

The concept of resilience is quickly becoming more prevalent in policy documents from all tiers of government and from a wide range of political settings (Duit, 2016). The European Commission stresses the importance of enhancing the resilience of agriculture and food systems (EC, 2018b, 2018c, 2020d, 2021c), farms (EC, 2018a, 2018b), as well as rural areas (EC, 2021a, 2021b, 2021e), especially in the context

of climate change (EC, 2020d), the depletion of natural resources and biodiversity decline (EC, 2021c), yet including social, environmental, and economic elements (EC, 2021d). According to the European Commission (2020d), “the new CAP has to be fit for purpose in its ambition to put the agricultural sector on a track of greater sustainability and resilience.”

The European Green Deal concept, which was presented in 2019, could be viewed as the largest and most radical step in the development of the EU policy. It calls for a new institutional framework for the EU’s operation, enhanced research and implementation, and broad social mobilisation. The EU’s whole economy and way of life are covered by the European Green Deal. Additionally, Europe has made a substantial and innovative contribution to addressing the most pressing global issues (Wilkin, 2022). The majority of the components are directly or indirectly related to agriculture, although the agriculture industry will be most affected by two strategies: 1) “from farm to fork”, or developing an equitable, environmentally responsible, and healthy food system; and 2) preserving and restoring ecosystems and biodiversity (Baer-Nawrocka & Poczta, 2022). According to the European Commission (2020d), the new, reformed CAP “should incentivise, empower and support European farmers, helping them to contribute more decisively to tackling climate change, protecting the environment and moving to more sustainable and resilient food systems”.

The European Commission’s new ideas put several additional requirements on Member States. They are, nevertheless, coupled with major obstacles as a result of both the necessity to create national strategies and the duties to implement policy instruments and assess policy implementation impacts (Wąs et al., 2018). The Polish agriculture is not prepared for the full implementation of the European Green Deal, as the productivity of farms in Poland is among the lowest in the EU. It is the result of agrarian fragmentation, which was not significantly changed by the CAP (Czyżewski et al., 2010), as well as lower soil quality than in Western Europe and a shorter growing season. It will be far more challenging to deploy precision farming techniques than in Western European countries because of the fragmented agrarian system and the farms’ comparatively low levels of technical equipment and financial resources (Czerniak, 2021). Taking into account the current state of agriculture in Poland and the restrictive assumptions of the European Green Deal, it will undoubtedly be necessary to increase support for agriculture, both financial (from the state budget and EU funds) and substantive (as part of advisory services). It will assist in reducing the negative consequences of the planned measures’ implementation for the EU economy, which will directly and indirectly impact the agricultural sector. However, in the Financial Perspective 2021–2027, support through financial transfers obtained under the CAP (I and II Pillars) is reduced in real terms; this primarily affects the second pillar of the CAP (Rural Development Programme), which is composed of structural funds intended for modernisation, social, and environmental purposes. The biggest cuts are related to investment purposes (Baer-Nawrocka & Poczta, 2022).

The anticipated starting date for the planned CAP reform was postponed to 1 January 2023 as a result of the ongoing negotiations between the European Parliament and the Council of the European Union (European Parliament, 2020).

2.2. The main characteristics of resilience policies

The CAP is necessary in order to enhance the resilience of farming systems in Europe based on three capacities: robustness, adaptability, and transformability. However, these capacities cannot be strengthened at the same time by one approach (Ashkenazy et al., 2017). Therefore, the policy needs to enable balance between them in the policy mix, which allows for tailoring instruments to regional and sectoral needs. Trade-offs between resilience and other important public administration dimensions, such as frugality or rectitude, may emerge (Hood, 1991), which needs to be taken into account.

Resilience is a politically sensitive subject. From the political standpoint, resilience is frequently a win-lose game with many uncertainties. The actors involved have significant incentives to take advantage of these uncertainties and hinder resilience-based strategies (de Bruijn et al., 2015).

According to Anderies and colleagues (2013), robustness as well as the ability to adapt and transform are key elements of policy design framework, as they help dealing with uncertainty and disturbances in social-ecological systems, continuously adapting to the uncertainties and disturbances of the changing environment, and transforming towards new socio-ecological systems configurations when the existing system becomes untenable.

Policies that enable robustness assist the farming system in supporting its current functions and the desired levels of output; at the same time, they avoid major changes in response to shocks and stresses (Meuwissen et al., 2019). They help systems to recover from shocks or become more resistant to unfavourable changes (Chaffin et al., 2014).

According to Anderies and colleagues (2013), the concept of robustness provides grounds for a systematic analytical framework for short-term and medium-term policy design, usually addressing short-term challenges within months or years. *Ad hoc* policies or instruments that shift burden to different time scales are accepted, if not promoted (Termeer et al., 2018).

Such policies are characterised mostly by incremental actions and focus on proximate issues (Wise et al., 2014). They promote the maintenance of certain qualities in the face of uncertainty in the environment (Anderies et al., 2013). While government compensation for losses or subsidies for present production techniques may improve robustness, it may also reduce adaptability and transformability, since the recipients learn to count on subsidised payments and government assistance. As a result, it may tend to favour the *status quo* and diminish farmers' incentive to seek new methods to diversify their operations (Ashkenazy et al., 2017).

According to Folke and colleagues (2010), policies focusing on robustness buffer for preserving what the system has and regaining what it had. Depending on the unique resilience issues, these buffer resources may include, for example, public compensation funding, the mobilisation of an additional labour force, water reserves, or food supplies (Termeer et al., 2018).

Other risk management measures are put in place and supported in order to return to an acceptable level of normality early in the crisis process and, therefore, avoid future escalation (Boin & van Eeten, 2013). If risk management is successful, it leads to resilience: the ability to avoid and recover from the negative consequences of risky events. *Ex-ante* risk management includes:

- risk-prevention or risk-reduction actions to reduce the likelihood of risky events (e.g. emission reductions);
- risk exposure and sensitivity reduction - actions to reduce exposure to specific risks (e.g. diversification);
- risk compensation or risk mitigation - *ex-ante* actions to compensate for risk-related losses (e.g. formal insurance).

Ex-post risk management includes risk-coping - actions taken to compensate for losses after a risky event has occurred. This is frequently an *ad hoc* risk-management strategy with minimal upfront costs but potentially serious consequences (Heltberg et al., 2009).

Taking the above into account, the main characteristics of robustness-oriented policies are a short-term perspective, protecting the *status quo*, providing buffer resources, and other risk-management measures.

By altering the boundaries of safe operating spaces, suppressing information necessary for adaptive management, cancelling signals of deteriorating resilience, and reducing pressures that would promote stress tolerance, managing to reduce short-term variance leads to ecological fragility. The management of variance and the management of resilience are thus closely and inextricably linked. Decision-makers can identify opportunities and challenges as they arise while maintaining the ability to deal with them by allowing for variation, learning, and flexibility when keeping an eye on change (Carpenter et al., 2015). It is, therefore, necessary to consider longer time frame, taking at least several years into consideration.

The lack of the flexibility of stakeholders in the system hinders adaptability (Gunderson, 1999). The ability to ease institutional constraints may be crucial in many contexts to reduce the vulnerability of farm households and improve system resilience (McCarthy et al., 2017). Experimental actions of farmers can increase the resilience of farms and the farming systems (Kummer et al., 2012), although the policy needs to enable experimentation by providing favourable and flexible conditions in order to utilise this potential (Kangogo et al., 2020), and all too frequently laws are inflexible (Garmestani et al., 2013). As a way of coping effectively with growing uncertainty, flexibility should be included in governance systems (Karpouzoglou et al., 2016). Greater flexibility for adaptive management must be carried out with caution to ensure that it is used in a legitimate and responsive

manner to the system (Cosens, 2013; Ebbesson & Hey, 2013). Achieving the proper balance between structured and reflexive parts of the legal framework in order to promote adaptive capacity needs careful focus (Clavis et al., 2014).

The lack of information-sharing between policy domains and levels aggravates barriers to tailor-made responses, as they cannot be delivered without multi-level and multi-sectoral cooperation (Rijke et al., 2013). The participatory approach seems to support variety and tailor-made responses, resulting in effective policy outcomes, such as the narrowing of the policy relevance gap and enhanced adaptability (Park et al., 2012).

The capacity to adapt and to manage resilience requires learning and the ability to make sense of things, especially in areas of collaborative learning, using a combination of various sources of information and knowledge. Both social processes and actors, e.g. knowledge brokers, are needed to combine information and knowledge from multiple sources and a range of scales through experimental approaches such as adaptive management (Walker et al., 2006). Social learning is an important characteristic of adaptive governance (Karpouzoglou et al., 2016), takes place in a specific context, and is primarily concerned with practice (Cundill et al., 2011). In such learning processes, informal networks are thought to be vital (Pahl-Wostl, 2009). Social networks can act as channels for knowledge accumulation and transmission, and hence can play a crucial role in the dissemination of social innovations and sustainable change, thereby boosting the overall resilience of human-ecological systems (Moore & Westley, 2011). Sharing and developing know-how collaboratively aids the optimisation of local farming and food supply systems (Lutz et al., 2017). Measures and policies that strengthen interactions between individuals, communities, and the stakeholders, such as knowledge exchange forums or innovation transfers, may contribute to social learning and the strengthening of social networks, which contribute to resilience through assisting in risk management and smooth consumption, fostering the implementation of innovative farming technologies, assisting smallholder farmers in accessing markets, increasing access to external financing and expertise, facilitating collaborative relationships among stakeholders, exchanging information between members, transferring additional knowledge, exploring new economic opportunities, or mitigating risk (Bernier & Meinzen-Dick, 2014). Research shows that arable farmers benefit more when they work collectively, and their business potential grows (Sobczak et al., 2013). Cumming and colleagues (2012) stress the importance of support for social learning by engaging actors at various levels, from local to global. Decentralised (collaborative) leadership and policymaking are frequently associated with formalised learning alliances that serve as “safe spaces” for informal cooperation and trust development (Rijke et al., 2013).

Taking the above into account, the main characteristics of adaptability-oriented policies are medium-term perspectives, flexibility, variety, and tailor-made responses and social learning.

The third capacity of resilience is transformability, which also can be supported by policies. A resilient social-ecological system may use a crisis to transform into a more desirable state (Folke et al., 2005). The motivations of actors to transform can be used to leverage disturbance attributes (Daedlow et al., 2013). Transformations are necessary for shifting towards development pathways, which can satisfy performance measures defining the sustainability of decision-making frameworks. If transformations are necessary, many farming systems' capacity to transform must be actively strengthened through an enabling environment (Meuwissen et al., 2021). Deliberate transformation demands resilience thinking, first in evaluating the relative benefits of the present vs potential, possibly more beneficial stability domains, and then in building the resilience of the new development trajectory (Folke et al., 2010). The resilience field is now looking at themes previously handled by transition management researchers, such as technology change, transformation, governance, and social factors (Olsson et al., 2014).

It is usually relevant in the long term – decades (Rotmans et al., 2001) to centuries (Ostrom, 2005). However, the final stage of transformation may happen very rapidly, within years or months, and even come as a surprise. The time frame depends on the system (Anderies et al., 2013). Agriculture's transition to sustainability requires the development of a suitable long-term strategy, particularly one that establishes a framework for continuous programmes and policy interventions (Zegar, 2021), as, if agricultural policy is not rooted in a developmental vision for agriculture and the economy as a whole, it will become unstable, inefficient, and ineffective (Wilkin, 1995).

Reforms of governance are necessary to establish adaptive and resilient management of the system (Rijke et al., 2013). Chaffin and colleagues (2016) emphasise the relevance of governance as an undermining driver in pathologically stable or robust systems that are socially or environmentally degrading. Destabilising policies involve the changes in norms, agents, and technology infrastructure (Kivimaa & Kern, 2016). Cundill and colleagues (2011) also stress the importance of stimulating questioning and the dismantling of frameworks of reference.

Because the existing equilibrium is characterised by stability and inertia, a transition needs a fundamental shift in assumptions as well as the adoption of new practices and standards (Rotmans et al., 2001). Cumming and colleagues (2012) point to the role of policy and public institutions in assisting in the translation and dissemination of new knowledge and practices, therefore establishing an ongoing feedback loop between research and implementation, and possibly transforming societal attitudes and motives, enabling in-depth learning. According to Cundill and colleagues (2011), raising awareness about alternative perspectives on a problem and reflecting on learning are two of the five key activities necessary to define the goal to be addressed in an adaptive-management context and to determine the objectives that are desirable and feasible for the participants.

Innovation is essential for dealing with crises and instability, as well as for transforming the future (Gunderson et al., 2002, Folke et al., 2010). Transformation is most

enabled by institutions which grant more room for experimenting and innovation (Termeer et al., 2019). The role of policy is to provide “safety nets” to communities ready to engage in potentially risky innovation (Cumming et al., 2012). Policy discourse has increasingly emphasised the significance of innovation in aiding quick recovery from economic shocks, while evolutionary thought has underlined the particular relevance of innovation capacity (Bristow & Healy, 2018). There should be opportunity for creative ideas in agricultural policy to foster innovations (Knickel et al., 2009). Niche innovations utilise local knowledge, which can be holistic and conceptualised, whereas scientific knowledge is more abstract. However, it is often conservative or adaptive, rather than encouraging rapid technological change. It is crucial to understand when local knowledge can feed niche innovation, and when its promotion can be dysfunctional (Blaikie et al., 1997). Niche innovations generate internal momentum (by learning processes, price/performance improvements, and support from influential organisations), shifts in the ecosystem place pressure on the regime, and regime instability offers opportunities for niche innovation diffusion. The synchronisation of these processes allows the penetration of “green” technologies in major markets where they face many challenges from the present regime (economic, technical, political, cultural, infrastructural) (Geels, 2014). Rotmans, Kemp, and van Asselt (2001) stress the importance of the local and regional government in permitting radical experiments, for which there is no wider political mandate.

Taking the above into account, the main characteristics of transformability-oriented policies include a long-term perspective, dismantling the *status quo*, in-depth learning, and enhancing niche innovations.

3. Research methods and data for resilience analysis

The chosen research method was the problem-based case study. The case-study method is often used in situations where the research problem involves many variables with complex mutual relations and the researcher has a very limited control over the object analysed. In particular, a case study is preferred over other research methods, among other situations when it is necessary to explain the cause-and-effect relationships that are too complex for questionnaire research and impossible to analyse by experiment, with a detailed description of the context. It is also preferred to analyse the actions taken and the results of a programme or policy from the point of view of their effectiveness and efficiency (Patton & Appelbaum, 2003). The CAP is a compound and multi-dimensional policy, which dynamically changes in relation with policy and agricultural business trends. The case-study method is, therefore, considered the most suitable to examine the influence of the CAP on the resilience of farming systems.

The phenomenon was examined by using both a top-down and bottom-up approach (Sabatier, 1986). The Resilience Assessment Tool (ResAT) was used in the top-down approach to examine whether the proposed policy objectives and instruments for the next programming period of the CAP promote, enable, tolerate, or limits farming-system resilience practices and resources. The analysis considered goals and instruments separately, because previous research had shown a significant misalignment between visions and goals on the one hand, and policy instruments and outcomes on the other (Knickel et al., 2018).

In the bottom-up approach, the aim was to explore policy influences as experienced by actors (farmers, policymakers, and other stakeholders) in the web of multi-level and multi-sectoral policies (Yanow, 1996). For rural and agricultural development plans and initiatives, it is essential to not only assure that resilience measures are well-integrated and clearly stated, but also recognise that they are placed in a specific context, perspective, value system, and needs that will also vary through time and space (Ashkenazy et al., 2017). The actor perspective is useful for identifying relevant policies and their consequences (Huttunen et al., 2014), as it allows observation of the outcomes of the implemented policy, which might differ from the intentions stated in the policy outputs. It also allows the assessment of how the needs of the system are met by the current policy implementation and the extent to which the proposed changes in the policy address these needs. It is also important to better understand farmers' views in order to design training and

advisory programmes to enhance agricultural resilience to a range of disruptions (Perrin et al., 2020).

The proposed research procedure allows for generalisations, but of analytical, not statistical nature. This makes it possible to discover the relationships and features of the phenomenon as well as the mechanisms of its course and impact. In this case, the nonprobability consecutive sampling selection of the research material and respondents can be considered a suitable way of proceeding. The knowledge acquired in this way also has a proven theoretical value.

Techniques and tools

According to the chosen convention of the study, the triangulation of research techniques was used, mostly including qualitative research techniques:

An analysis of strategic documents using the Resilience Assessment Tool (ResAT) – a modification of the Adaptive Capacity Wheel (Gupta et al., 2010). The method includes the following steps: the identification of the main challenges of the fruit and vegetable farming system in Poland based on the literature review, the selection of documents and the preparation of the database, analysis, interpretation of the results, and graphic presentation of the results.

Focus groups and a hybrid forum: the results achieved in the research were discussed multiple times with representatives of various stakeholders in the farming system in the participatory approach, i.e. in the form of a focus groups and a hybrid forum. The concept of “hybrid forum”, as presented by Callon and colleagues (2009), is a democratic and dynamic way to think and act together, which is quite different from the traditional focus group. In the latter, the groups aim at having a common discussion to have better knowledge on one given theme, while in a hybrid forum, the actors not only express their ideas but also discover, learn, and construct them together. The participants had a chance to discuss the results and add their point of view on the feasibility of the application of the results worked out in the research.

Interviews: the influence of policy configurations on the experienced resilience of farming systems was studied through two rounds of in-depth interviews with relevant stakeholders, chosen by the nonprobability consecutive sampling (40 in total). The interviews were complemented by document analysis. The data collection and analysis included the following steps: desk research, identifying and contacting the respondents, conducting interviews, analysing the results, and synthesising the findings.

The research was conducted in ten steps, indicated in Figure 5.



Figure 5. The sequence of research tasks

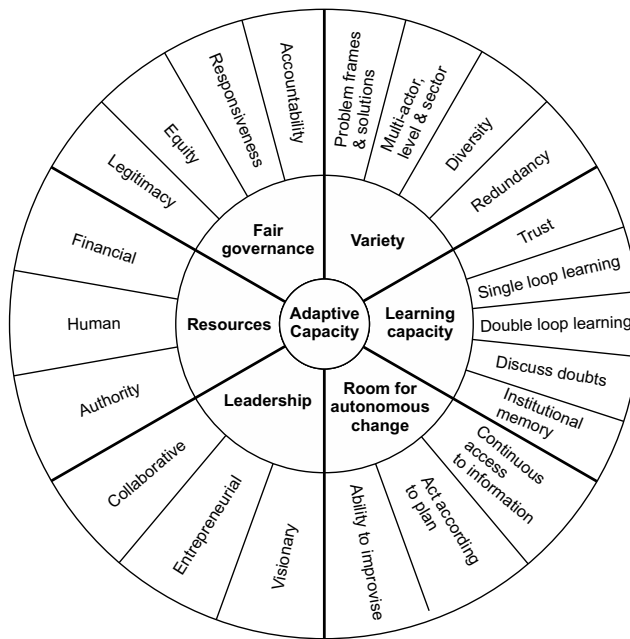
Source: Own elaboration.

3.1. Methods and data in the top-down analysis

The aim of the top-down analysis was to examine policies at the levels of goals and instruments. In this approach, the Resilience Assessment Tool (ResAT) was used to assess whether the policy goals and instruments of the CAP encourage, enable, permit, or constrain the resilience strategies and resources of farming systems.

3.1.1. *The Resilience Assessment Tool*

The Resilience Assessment Tool (ResAT) assesses if policy goals and instruments enable or constrain farmers’ resilience strategies and resources. Division into goals and instruments is important to examine the policy coherence at these levels (Nilsson et al., 2012). The tool focuses on policy outputs, while the bottom-up approach examines policy outcomes, which are the effects generated by the outputs. Policy goals and instruments are the primary components of policy outputs. Goals describe what the policy intends to achieve in a broad or specific sense. Instruments are the means to those ends. Rules, restrictions, subsidies, and fines are examples of instruments, but so are networks, training activities, and partnerships. Because of their social form, policy instruments have their own normativity that is independent of the goals. They imply choices, such as a desired balance of bureaucracy and control versus free information (Lascoumes & Le Gales, 2007).



Effect of institution on adaptive capacity	Score	Aggregated scores for dimensions and adaptive capacity as a whole
Positive effect	-2	1.01 to 2.00
Slightly positive effect	1	1.01 to 1.00
Neutral or no effect	0	0
Slightly negative effect	-1	-0.01 to -1.00
Negative effect	-2	-1.01 to -2.00

Figure 6. The Adaptive Capacity Wheel and the scoring scheme

Source: Gupta et al., 2010.

The tool is used in presented research to analyse and evaluate the implementation of the CAP and relevant national policies in terms of addressing and supporting the resilience of farming systems. The ResAT, developed by Termeer and colleagues (2018), is based on the Adaptive Capacity Wheel (Gupta et al., 2010) (see Figure 6), at the same time following the resilience framework of Meuwissen and colleagues (2019).

The Adaptive Capacity Wheel was developed to assess how inherent characteristics of institutions can stimulate the capacity of society to adapt to climate change at both local and national level. Six dimensions to be assessed were selected after the literature review: variety, learning capacity, room for autonomous change, leadership, the availability of resources, and fair governance. 22 criteria for these dimensions were selected. The method makes it possible to focus on whether and how institutions need to be redesigned to respond more adequately to climate change challenges. It proved to be a useful qualitative tool to provide a comprehensive idea of relevant dimensions and to represent the results (van der Brink et al., 2014). The traffic light colours proved to be more communicative than neutral colour versions. It is important to note that the values added to different criteria are not additive, because equal weighting of criteria can be misleading, as some dimensions or criteria can be the “weakest links”, and ensuring high values in those dimensions or criteria might be a necessary prerequisite for adaptation (Tol & Yohe, 2007).

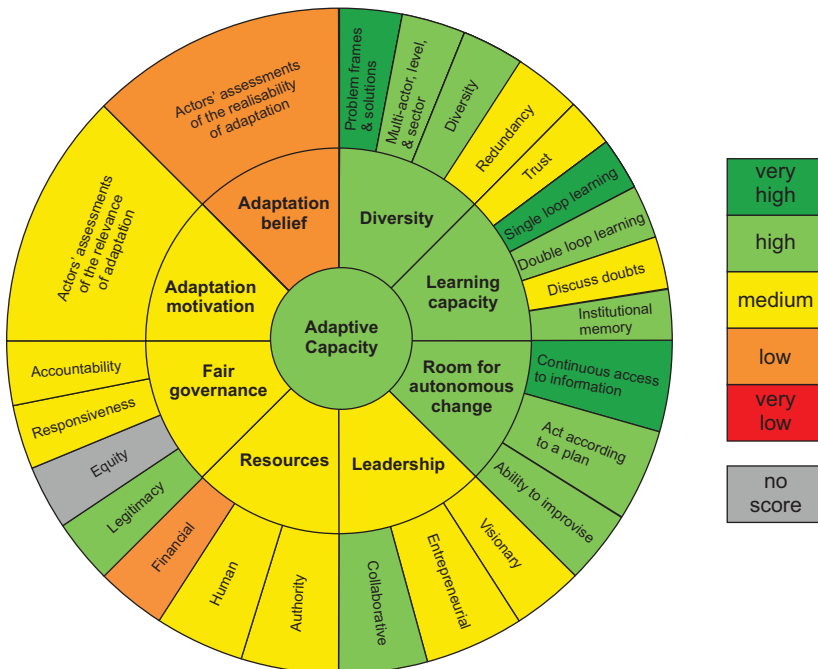


Figure 7. Example of the Adaptive Capacity Wheel for water management in north-western Germany

Source: Grothmann et al., 2013.

Other research using the Adaptive Capacity Wheel (Grothmann et al., 2013) confirmed that the most relevant results were found in a qualitative analysis of dimensions and criteria. The visualisation of results provides only a general overview of strengths and weaknesses but does not present various aspects of the assessment and possible interventions to overcome weaknesses identified. In this research, the Adaptive Capacity Wheel was adapted by adding two dimensions (adaptation motivation and adaptation belief) and changing the scoring (see Figure 7).

The Resilience Assessment Tool (ResAT) (Termeer et al., 2018) is a modification of the Adaptive Capacity Wheel in three aspects. Firstly, new insights from the literature published after 2013 were included. Secondly, the tool was differentiated in order to address three resilience capacities of robustness, adaptability, and transformability, whereas the Adaptive Capacity Wheel focuses mostly on adaptability. Thirdly, the tool was adjusted to specific resilience challenges of European farming systems in order to be able to analyse the extent to which policies enable their resilience. The Resilience Assessment Tool covers three resilience capacities (robustness, adaptability, and transformability) and their twelve characteristics (see Figure 8).



Figure 8. The Resilience Assessment Tool demonstrating resilience capacities (robustness, adaptability, and transformability) and their characteristics

Source: Buitenhuis et al., 2020a.

The analysis is conducted at the level of two key policy elements, namely goals and instruments. It is a qualitative assessment of whether particular elements enable or constrict particular resilience capacities.

The documents selected for the analysis on the programming period 2014–2020 contained 20 documents, including EU regulations on the CAP, national programming documents on the CAP, and other documents related to it (e.g. publications of the European Commission or the Ministry of Agriculture and Rural Development).

3.1.2. Stakeholder proofing

A focus group was organised in order to validate and enrich the outcomes and increase the reliability of the qualitative data analysis. The stakeholders were selected based on their type (from policymakers through farmers' organisations' representatives, to academics and experts) as well as merits related to the fruit and vegetable farming system and/or the CAP. Fifteen stakeholders were selected and approached to take part in the focus group via e-mail invitation. There were seven participants: two representatives of the Ministry of Agriculture and Rural Development, one representative of a fruit farmers' organisation, three academic fruit and vegetable farming experts, and one academic CAP expert.

The meeting took place in the library of the Institute of Rural and Agricultural Development, Polish Academy of Sciences. It started with an explanation of the goal of the meeting and the timetable. Then, key concepts for the meeting were presented: the main challenges for the fruit and vegetable farming system in Poland (the participants had a chance to comment on the material presented), the definition of resilience used in the study, and types of policies targeting different capacities of resilience – robustness, adaptability, and transformability. Subsequently, the research method was explained, and results of the study were presented. To focus the discussion on the results obtained, it was divided into six blocks: three of them were related to goals of the CAP and their relation to resilience capacities (robustness, adaptability, and transformability), and another three to the instruments of the CAP in the context of those three capacities. The meeting ended with a comparison of goals and instruments as well as final comments from the participants.

3.2. Methods and data in the bottom-up analysis

From the perspective of regional farming systems, the impact of the policy structure on the resilience of European farming systems cannot be explained without examining the interactions between the CAP and other sectoral policies at different judicial levels. It is also essential to understand the temporal and contextual dimensions of the sphere in which these policies are being implemented (Howlett, 2019). While the majority of economists believe that understanding empirical analysis methods is important, it should be noted that qualitative research methods are seldom used in economic literature. The increasing formalisation of applied research models

has resulted in a decline in economics' interpretative capabilities (Blok, 2017). While a policy may be intended to enhance the resilience of farming systems, its practical consequences may vary, depending on the features of farming systems, the local environment, and the perceptions of relevant stakeholders (Buitenhuis et al., 2021). Stakeholder engagement can help in assessing the effects of policies and possible governance reforms at the regional level, as well as identifying stakeholder perceptions of influences and their reactions to specific governance frameworks (Roberts et al., 2021), as understanding how adaptation to a complex and dynamic environment and policy demands is dealt with by stakeholders is essential for sustaining a viable and resilient agricultural industry, both economically and ecologically (Herman, 2015). This section presents a bottom-up assessment of the policy structure for a case-study of farming systems of family fruit and vegetable farms in the Lubelskie region. The main goal of the analysis was to conduct a bottom-up assessment of how the network of multi-level and multi-sectoral policies develops at the level of regional fruit and vegetable farming system and how it enables or limits resilience.

The assessment was based on the bottom-up approach to policy research (Sabatier, 1986), as the actor perspective is useful for identifying relevant policies and their consequences (Huttunen et al., 2014). The aim of the study was to gain a better understanding of the interactions between different policies through the experiences of various types of farmers, NGOs, and regional policymakers. In comparison to a top-down policy analysis, which begins with concrete policy outputs and assesses target achievement (i.e. the match between policy goals and outcomes) as well as possible side effects, a bottom-up policy analysis begins with actors who are influenced by a variety of policies. This includes removing the distinction between policy goals and instruments. Through the realistic experiences of stakeholders in and around a farming system (e.g. farm owners and their family members, advisors, suppliers, etc.), the bottom-up research enabled an examination of interrelations across policies as well as their impact on resilience.

The main approach to the analysis was generally inductive, which means that no predefined conceptual approach was used, as the main aim of this analysis was to investigate how stakeholders inside and around the farming system perceive the impact of policy arrangements on the resilience of the system and how they experience the coherence of policy measures in relation to their practices and goals (Huttunen, 2015). Multiple implemented policies mix and have interlinkages, resulting in complementarities or contradictions that influence policy impacts, which are referred to as policy configurations. Determining which policies are applicable to the farming system examined is an empirical question. Private governance structures such as a value-chain organisation may be addressed when reasonable, if they influence how policies impact a farming system's resilience, but they are not the primary focus of the study.

The study focuses on how policy frameworks affect the robustness, adaptability, and transformability of the farming system, following the conceptualisation by Meuwissen and colleagues (2019). The case of non-resilience is included, which refers

to a farming system that experiences a decline in its basic public and private functions. Resilience, as a potential, cannot be directly observed, therefore in the presented study it is examined in retrospective, focusing on responses of the farming system to changes and challenges in recent years (after 2004 – Polish accession to the European Union), as viewed by relevant stakeholders.

The objective of the research was to investigate policy impacts as perceived by stakeholders within and around a farming system, rather than to determine causal interactions between policies and resilience (Huttunen, 2015; Yanow, 1996). The focus of the research was not exclusive to farmers, but included all stakeholders who have a direct impact on farmers' behaviour, such as advisors, family members, organisations of farmers, tenants, suppliers, etc. As a result, the study was of exploratory character, focusing on actors' perspectives and observations within a particular social and economic setting.

In four cases, the impact of policy configurations on the resilience of a farming system was investigated. These cases were analysed using 20 in-depth interviews with key actors, as well as document analysis. The sequence of tasks in this research is shown in Figure 9.

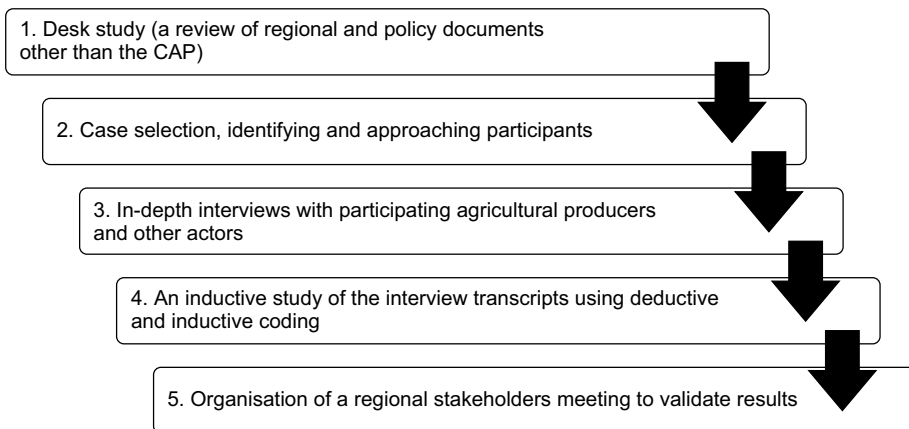


Figure 9. The sequence of tasks in the bottom-up analysis

Source: Own elaboration.

The farming system cases were all located in the Lubelskie region, although the administrative region is not considered as delimiting for the farming system. The choice of cases from one administrative unit ensured homogeneity in policy mix affecting the cases, as different regional programmes may have various outcomes and effects.

3.2.1. Desk research

Supplementary documents were used to get acquainted with the main farming system-specific challenges (e.g. Nosecka, 2014; Stolarska, 2014; Klepacka &

Florkowski, 2016; Czyżewski et al., 2018; Wąs & Kobus, 2018) and the local policy context (see Chapter 3.3.). Documentation on regional development programmes, environmental and manure legislation, energy policies, taxation, and social policy structures applicable to the case study were all included in the policy background analysis. Desk research entailed looking at current statistical information, such as that from past surveys, publications, or databases. This made it easier to understand and contextualise experiences of stakeholders, as well as to pose additional questions.

3.2.2. Case selection, identifying and approaching participants

Four regional farming-system cases were to be selected, which represented robustness, adaptability, transformability, or decline. The aim was to ensure variety in terms of the stability and change of activities and functions, not to place cases into theoretical sub-categories, since farming-system cases demonstrate different resilience-capacity characteristics.

The selection of the research sample was made after consultations with the employees of the Lublin Agricultural Advisory Centre (*Lubelski Ośrodek Doradztwa Rolniczego* – LODR) and the National Union of Fruit and Vegetable Producer Groups (*Krajowy Związek Grup Producentów Owoców i Warzyw* – KZGPOiW). In the first phase, specialists from both organisations selected farms that met the conditions of robustness, adaptability, transformability, or decline – three for each case. The address data of these farms were transferred to the organiser of the consultations, who was responsible for conducting the interviews. Potential respondents were initially contacted by phone (they had previously been informed by LODR or KZGPOiW advisors about the possibility of choosing their farms for research). During telephone conversation, potential respondents were provided with information about the purpose of the study and asked for an opportunity to meet.

Out of the twelve potential respondents identified, only seven farmers expressed the will for an initial face-to-face meeting on proposed dates. Others indicated their refusal by the lack of time or reluctance to give interviews, which would have to be recorded. After the visits and the discussions held with these seven farmers, farms that met the conditions of robustness, adaptability, transformability, or declining to the highest extent were selected. Then the interviews were conducted.

The robustness case was carried out at a farm with both fruit (22 ha) and vegetable (10 ha) production, which contained of 22 ha of own land and 10 ha of rented land. The adaptability case was based on a farm of 5.39 ha, focused on vegetable and cereal production, with plans for starting fruit production (plum orchard). It was a family farm, characterised by a low class of land. The owners adapted to the market demands by reducing the amount of fertilisers, etc., but they did not plan to start organic farming due to the cost of certification. The transformability case was observed in a farm of 25 ha, focused on arable crops, co-owned by the father and the son. The wife of the farmer worked outside agriculture. The farmers changed the farming practices into organic. The owners also rented rooms for tourists.

Farming accounts for about half of the income, and agrotourism for another half. The decline case was exemplified by a farm of 24 ha, focused on fruit and cereal production, although only 14.5 ha were cultivated by the owner and the remaining part was rented to another farmer. Because the owner was 72 years old and had no successor, he had recently started downscaling production and no longer invested in the farm. The farm's owner also owns a shop.

3.2.3. *Conducting interviews*

Interviews were the most important part of the bottom-up analysis. During interviews with selected farmers, the guidelines from the protocol for bottom-up policy analysis (Candel et al., 2019) were used. All interviews were transcribed.

To select other respondents, chain-referral sampling was used (Thompson, 2012). Apart from the recording, notes were kept during interviews with farmers, mainly regarding people influencing the decisions made in the farms surveyed. Most often they were family members (spouses, children), advisors, other farmers, suppliers of means of production, buyers, representatives of local authorities, etc. Based on interviews and notes, lists of seven to ten people were selected in each case, who, according to the respondents, had a big impact on decisions undertaken in the farms or had a very good understanding of the problems of the functioning of agricultural farms and the fruit and vegetable farming system in Poland. The farmers surveyed provided contact details to those people and informed them about possible contact by the researchers.

During the initial contact, around half of the potential respondents did not agree to participate in the interview. For example, bankers justified this by professional confidentiality. The representatives of fruit and vegetable purchasers were also reluctant to give interviews, which they justified with the lack of time or the fact that such research was not useful to them. The children of farmers from two farms also did not agree to an interview. Their justification was that they were not interested in agriculture and they planned to engage in other occupations than farming. In the case of sixteen respondents, who were suggested by farmers and agreed to take part in the interview, the approach to interview was individualised and depended on their role in the system.

The semi-structured interview approach was used, because the aim was not to direct respondents into specific responses (e.g. specific policies), but, rather, to engage in their perception of policy effects. Nevertheless, issues discussed were related to the background and assessment of the condition and development prospects of the fruit and vegetable system, drivers of behaviour and relations between different stakeholders, ways of obtaining information and learning within the system, the most important risks and challenges to which the system is exposed, ways of dealing with these risks and challenges by actors in the system, the assessment of the case-study farms relevant to the respondent (the respondents did not always refer to a given farm, but characterised problems of the whole group of similar farms),

resilience, the policies affecting the farming system, access to knowledge, capital, social networks, markets, insurance, and other resources. The interviews began with an explanation of the study background, data use, and details regarding the promise of personal privacy in data analysis and reporting.

In total, there were twenty interviews. Of the respondents, nine were farmers, including two involved in organic farming, four were advisors, two were sons of farmers, two were public administration officials, one was a tenant, one was a representative of the Local Action Group (LAG), and one was an input supplier.

3.2.4. Coding and analysis

The coding took place using the ATLAS.ti qualitative data-analysis software, which is a popular software for analysing data from interviews, focus groups, documents, field observations, and open-ended survey questions (Woods et al., 2016). The coding was conducted in two rounds – the first one focused on challenges of the system and ways of coping with them, the policies affecting the respondents, as well as the resources and networks they used to learn about them. The approach to develop codes for this round was a combination of a theory- and data-driven approach (DeCuir-Grunby et al., 2011). An initial set of codes was supplemented by the case-specific codes which proved to be relevant during the interviews (see Annex 2).

The second round of coding focused on the policies' influence on the resilience of the farming system and was developed using the deductive approach. It made it possible to indicate whether these policies enabled or constricted robustness, adaptability, and transformability. The coding process was like coding in a top-down document analysis, using the Resilience Assessment Tool. It included coding on the ordinal 0–5 scale indicating the level of enabling resilience capacities and their characteristics. During this round of coding, the resilience capacities concerned and whether the policy had an enabling or restricting impact based on the experiences shared by the participants during the interviews were assessed. Furthermore, this round made it possible to code inconsistencies experienced within and between policies as well as perceived inconsistencies between policy objectives, instruments, and implementation.

3.2.5. The organisation of stakeholder check

The stakeholder check (proofing) was organised in the library of the Institute of Rural and Agricultural Development, Polish Academy of Sciences. Twenty stakeholders were invited, including three representatives of the Ministry of Agriculture and Rural Development, three representatives of the Agency for Restructuring and Modernisation of Agriculture, two members of the Institute of Agricultural and Food Economics – National Research Institute, three members of fruit and vegetable farming organisations, three farmers, three academic CAP experts, and three

academic experts in fruit and vegetable farming. Eight people attended the meeting, including two representatives of the Ministry of Agriculture and Rural Development, a farmer, one representative of the Institute of Agricultural and Food Economics – National Research Institute, two experts in fruit and vegetable farming, and two CAP experts.

3.2.6. *Workshop on the CAP recommendations*

The meeting took place in Warsaw, Poland, at the Institute of Rural and Agricultural Development, Polish Academy of Sciences. Eleven stakeholders participated in the meeting, and their types were as follows: two policymakers, two advisors, two farmers, one representative of a farm organisation, one representative of regional self-government, and three scientists/policy researchers. In more detail, they represented the following institutions: the Ministry of Agriculture and Rural Development, the Agency for Restructuring and Modernisation of Agriculture, the Mazowiecki Agricultural Advisory Centre with its headquarters in Warsaw, the Department of Agriculture and Rural Development of the Marshal's Office of the Mazowieckie Voivodeship, the Institute of Agricultural and Food Economics – National Research Institute, the Polish Chamber of Regional and Local Product, the Agricultural Advisory Centre in Brwinów, the Faculty of Economic Sciences at the Warsaw University of Life Sciences, the Faculty of Economic Sciences at the University of Warsaw. The participants were provided with accompanying materials (in Polish), which aimed to help them in discussion: four pages with the main concepts and definitions, including scenarios, and three pages with ResAT wheels to fill in during the workshop.

The workshop started with an introductory presentation of the goals of the meeting. Then the participants presented themselves. After that, the concepts of resilience and the farming system were introduced. The three capacities of resilience and the characteristics of policies supporting them were described. The results of interviews with stakeholders were briefly presented. At the end of the introduction, the participants had an opportunity to ask questions in order to ensure understanding.

After the introduction, the workshop was carried on in two rounds. The first one was aimed at creating generic policy recommendations on enhancing the three resilience capacities: robustness, adaptability, and transformability. This round was based on a structured discussion, answering the questions of what policies or associated actions were needed to enhance each capacity and how this could be achieved. The first round ended with the participants filling in the Resilience Assessment Tool wheel for the Polish fruit and vegetable farming system in a future *status quo* scenario on a scale of 1 to 5.

In the second round, the focus was on who and at what level (EU, national or regional) should introduce the measure, what precisely needs to be done, how such measures can enhance particular resilience capacities, and how they can be

implemented. The suggestions were collected on a whiteboard and divided per resilience capacity and governance level and time frame: short-term – up to one year, mid-term (one to five years), and long-term (> five years). At the end of the round, the participants voted on which actions they considered the most important.

Table 1. An overview of the farming-system description for the five EU-Agri-SSP scenarios

	SSP 1 Sustainability	SSP 2 Middle of the road	SSP 3 Regional rivalry	SSP 4 Inequality	SSP 5 Fossil-fuelled development
Demand for meat	–	+/-	+	Elites: +; Rest: –	+
International trade	+/-	+/-	–	+/-	+ with regional specialisation in production
Land productivity growth	+ Rapid diffusion of best practices	+/-	–	Large-scale industrial farming: + Small-scale farming: –	+ Highly managed, resource- intensive
Feed import	–	+/-	–	+	+/-
Meat production	–	+/-	+	+/-	+
Feed production	+/-	+/-	+	+/-	+/-
Agricultural prices	Relatively +	+/-	+	Relatively –	–
Price volatility	+/-	+/-	– in EU	+	+
Land availability	–	+/-	–	+	+
Labour availability	+/-	+/-	–	+	+
Food industry structure	Mixed	Mixed	SMEs	Multinationals	Multinationals
Vertical cooperation	+	+/-	–	Mixed	–
Food waste	–	+/-	+	+	+
Consumption trends	Healthy, natural, and sustainable	Mix	Origin	Slenderness	Diversity

Note: The meaning of the signs is as follows: “–” low level, “+” high level, “+/-” moderate level.

Source: Based on Mathijs et al., 2018.

In the third round of the workshop, the stakeholders assessed the desired mix of policies under two different scenarios for EU farming. The scenarios were based

on the Shared Socioeconomic Pathways (SSP), developed by O'Neil and colleagues (2014), as these scenarios have been used and quantified in several projects (Bauer et al., 2017; Popp et al., 2017; Rijahi et al., 2017). SSPs are defined based on two critical uncertainties – socioeconomic challenges for adaptation and socioeconomic challenges for mitigation. Mathijs and colleagues (2018) adjusted the available SSP narratives, which were developed for a global economy, to narratives significant for EU farming systems, using extensive literature review on food consumer trends, complementing the narratives with insight from EU scenario exercises (see Mora, 2016; Mylona et al., 2016; Vervoort et al., 2016) and using system thinking to increase the coherence of scenarios. They were used in this research as baselines for future scenarios so that the stakeholders could more easily imagine a later development under which the farming system might operate in the future. It was important to use precise future pathways, because they were relatively formal and based on possible developments, which nevertheless differ depending on the assumptions. Of the five scenarios (see Table 1), two were chosen for the workshop which differed the most from each other in terms of policy – the most protectionist scenario (SSP 3) and the most liberal scenario (SSP 5). Hence, the stakeholders had to imagine two different backgrounds in which the policies might operate in the future, having information about the key economic variables describing this future (see Table 1).

The third round of the workshop ended with the participants filling in the ResAT wheels for both scenarios. After that, a brief summing up of the meeting took place.

3.3. The case study of a Polish fruit and vegetable farming system in the Lubelskie region

Fruit and vegetable production is one of Poland's most significant agricultural production sectors. Even though it only covers 635,000 ha, or 4.4% of arable land in good condition (GUS, 2020b), fruit and vegetable production accounted for more than 40% of overall crop cultivation in 2019 (EC, 2020c). Poland is currently the leading producer of apples, cherries, raspberries, and currants in the European Union, as well as a major producer of gooseberries (Wójcik & Traczyk, 2020). Poland receives 2.04 billion EUR from the export of fruit and fruit preserves, while the export value of fresh vegetables and their preserves is 971 million EUR (IERiGŻ-PIB, 2020).

The Lubelskie Voivodeship, located in eastern Poland, is considered a peripheral region both geographically and socioeconomically. This status is a result of historical conditions, post-war border localisation, and socioeconomic processes (Flaga & Wesołowska, 2018). The region faces significant demographic issues, including depopulation, ageing population, and the migration of young and active individuals to other regions or abroad. These factors contribute to social polarisation and hinder economic revival (Miszczuk & Wesołowska, 2012). Lubelskie has a lower level of socioeconomic development compared to other Polish regions (Smolińska-Bryza et al., 2025). This is reflected in disparities in education, entrepreneurship, housing, and public finances (Wesołowska & Jakubowski, 2018). Lubelskie is home to diverse

ecosystems, including water bodies, peatlands, meadows, forests, and moors. The region's natural features and traditional farming landscapes are significant for tourism, especially food tourism, which helps preserve local heritage and provides financial resources for inhabitants (Skowronek et al., 2020).

Agriculture is a dominant sector in the Lubelskie Voivodeship, with traditional farming landscapes and food tourism playing crucial roles in the region's economy. The region is known for its tradition-based food products (Skowronek et al., 2019). Lubelskie is part of the Nadwiślański Region, which is the second-largest fruit-producing area in Poland, though it is less significant compared to the Grójec region near Warsaw. The region is known for cultivating apples, pears, plums, sour cherries, sweet cherries, strawberries, raspberries, currants, and gooseberries (Kulikowski, 2007). Fruit and vegetable production has intensified in recent years, leading to increased exports and specialisation in high-demand fruits such as apples and raspberries (Pawlak & Smutka, 2022). The region also engages in vegetable cultivation, such as onions, carrots, cabbage, cucumbers, tomatoes, and sugar beets, including field vegetables and those grown under cover. The concentration of vegetable cultivation is more intensive in the suburban areas of large cities as well as close to processing plants (Kulikowski, 2007). The level of the integration of fruit and vegetable producers is relatively low, affecting the absorption of funds for operational programmes (Bieniek-Majka, 2022).

In the Lubelskie region, 99.78% of arable land belongs to individual family farms (GUS, 2022). The fruit and vegetable farming system consists mainly of small and medium-sized farms, and is one of the farming systems benefiting the least from the CAP in Poland, despite the political agreement at the EU level to reduce subsidies to major farm operators in favour of small farmers, and it continues in the CAP post-2020 (Drygas & Nurzyńska, 2018). The Lubelskie region's fruit and vegetable farming system was chosen for the case study, because it has historically received lesser CAP funding. As a result, it was not as policy biased as many other farming systems. The farming system examined needed to deal with challenges to a large extent using its own capacities and resources; stakeholders within the farming system thus understand their needs while coping with risks and capturing opportunities, and can deliver input in measures that would assist in this process other than direct subsidies. This is seen as a valuable point of view that has been comparatively less impacted by agricultural policy in the past.

The fruit and vegetable farming system is exposed to numerous risks. Vulnerability to economic risks is related to declining prices due to the Russian embargo, variations in prices, and lack of labour for seasonal and labour-intensive work. In 2014, the Russian Federation has embargoed the Polish agricultural sector. As a result, the import of (among others) Polish fruits and vegetables was suspended. This particularly affected the market for some products, e.g. apples, whose export level was highly dependent on the Russian market (Nosecka, 2014). The embargo also resulted in lowering the volume of the Polish export of fruits and vegetables to countries of the Commonwealth of Independent States (Klepacka & Florkowski, 2016). It

also affected the price of fruits and vegetables. Other factors, such as the Single European Market or price changes on the world market, also influence fruit and vegetable prices in Poland. They are also subject to seasonal supply fluctuations, mostly due to the fruits' sensitivity to unfavourable agro-meteorological conditions, which contribute to crop failure (Bieniek-Majka, 2017). In the years 2008–2016, price volatility for fruits amounted to 22.3% and in the case of vegetables, it was 13.1% (Czyżewski et al., 2018). Another factor is the fragmentation of production, which leads to the weak position of particular growers in the food-supply chain and low influence on the prices, which are still largely dictated by the fruit processing industry and other large purchasers (Kierczyńska, 2019), as poor agricultural business organisation in Poland is one of the most serious issues affecting the farming industry (Chlebicka, 2011).

Vulnerability to environmental risks is related to increasing incidents of extreme weather such as hail, frost, and drought, as well as to hydrological instability, the infestation of trees by pests, and fungal diseases. For example, floods in 2010 and May frosts in 2011 caused rapid price increases of fruit and vegetables (Czyżewski et al., 2018).

Vulnerability to social risk relates to changes in the preferences of consumers (see Jäder & Wawrzyniak, 2015; Olewnicki et al., 2016; Olewnicki et al., 2018). Fruits represent a negligible part in the pattern of consumption, and with low incomes, the spending on them can be limited. However, despite the fact that the EU policy measures taken to promote healthy food are not effective (International Panel of Experts on Sustainable Food Systems, 2019), the fruit and vegetable sector in Poland was defined by its high consumption growth dynamics in the years 2005–2018 (Szajner et al., 2019). During the pandemic, the long-observed interest in a healthy diet, which was primarily demonstrated by a rise in demand for fruits and vegetables, increased (Baer-Nawrocka & Poczta, 2022). Another key factor forming the volume of the fruits consumed is their prices, which influence the periodical changes in demand for particular species. These changes are partly attributed to variations in domestic production highly dependent on atmospheric conditions (Stolarska, 2014). Another factor influencing the resilience of the system is that, especially the FADN region of Mazovia and Podlasie (Lubelskie is a part of this FADN region), has the lowest crop insurance uptake in the country (Wąs & Kobus, 2018).

4. Research results

The research results cover both the top-down and the bottom-up approach to the analysis. In the top-down approach, the results of the Resilience Assessment Tool (ResAT) are presented, focusing on the goals and instruments of the CAP in the perspective of 2014–2020 and its potential influence on different resilience capacities: robustness, adaptability, and transformability. The results of the top-down approach are used to verify Hypothesis 1: “The CAP supports resilience by ensuring robustness rather than adaptability and transformability in Polish farming systems more intensively.” The results are also used to answer Question 3: “How does the focus on resilience capacities differ between policy goals, policy instruments, and the implementation of the CAP in 2014–2020?”

The bottom-up approach focused on the level of implementation as well as the experience of stakeholders and their perspective on the resilience of fruit and vegetable farming system and the perceived influence of policies on its resilience. The results of the bottom-up approach are used to verify Hypothesis 1: “The CAP supports resilience by ensuring robustness rather than adaptability and transformability in Polish farming systems more intensively” (an additional stakeholder check added to the results of the top-down research) and Hypothesis 2: “Current CAP support for the adaptability of the fruit and vegetable farming system restricts it from increasing resilience.” The results are also used to answer Question 1: “What are the main challenges for the farming system?”, Question 2: “How do the actors within the farming system cope with these challenges?”, Question 3: “How does the focus on resilience capacities differ between policy goals, policy instruments, and the implementation of the CAP 2014–2020?”, Question 4: “What are the strengths and weaknesses of the CAP 2014–2020 in Poland in terms of robustness, adaptability, and transformability?”, as well as Question 5: “What policy mix would be the most desirable by stakeholders in different future scenarios for EU farming?”

4.1. The results of the analysis of the CAP documents at two levels: goals and instruments

The European Commission stresses the importance of enhancing the resilience of agriculture and food systems (EC, 2018b, 2018c, 2020d, 2021c), farms (EC, 2018a, 2018b) as well as rural areas (EC, 2021a, 2021b, 2021e) especially in the context of climate change, the depletion of natural resources, and biodiversity decline (EC, 2021c), yet including social, environmental, and economic elements (EC, 2021d). A detailed

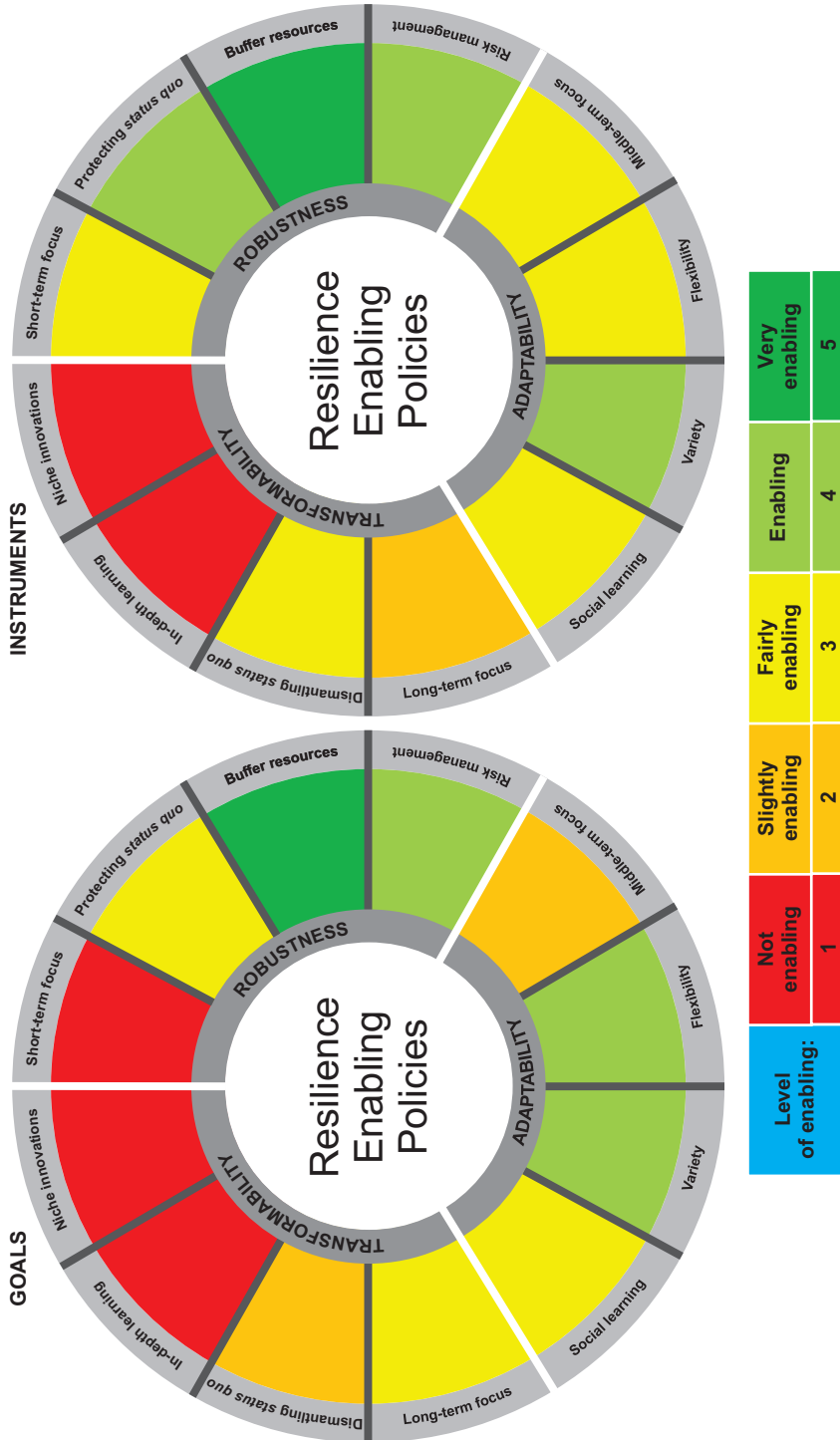


Figure 10. The ResAT Wheels depicting the level of support for different characteristics of resilience capacities

Source: Own study.

analysis of twenty documents on the programming period 2014–2020, including European Union regulations on the CAP, national programming documents on the CAP, and other documents related to it (e.g. publications of the European Commission as well as the Ministry of Agriculture and Rural Development), made it possible to assess the level of support for different capacities of resilience and their characteristics by the goals and instruments of the CAP (see Figure 10).

4.1.1. Goals and instruments enabling robustness

The CAP goals usually relate to time scope longer than one year, so they do not enable a short-term focus (score 1, see Figure 10). The only short-term goal expressed in the documents analysed is the intention of mitigating risks related to the uncertainty of agricultural commodity markets and environmental risks, over which farmers have no control (EC, 2017b, p. 3).

The protection of *status quo* is fairly enabled by the CAP goals (score 3, see Figure 10). Some goals aim at maintaining the current levels of production and ensuring that farmers continue working on the land and have a degree of stability in revenues (European Parliament, 2013c). Other goals ensure that rural communities remain in good economic condition (EC, 2013a, p. 3). There are also goals aimed at strengthening the position of farmers in the food chain, for example by encouraging the formation of producers' organisations or taking actions for strengthening the brand of Polish food products abroad (EC, 2017a, p. 12). The Polish Ministry of Agriculture and Rural Development declares its determination to keep the model of agriculture based on family farms by ensuring special protection and support for them (Ministry of Agriculture and Rural Development, 2018, p. 2). Another area of protecting the *status quo* is support for keeping the share of domestic plant varieties. On the other hand, linking direct payments to certain products is only optional for countries and limited by the EU, and more goals in the documents analysed are aimed at improving farming than maintaining the *status quo*.

The CAP goals are very enabling for the development of buffer resources (score 5, see Figure 10). According to the European Commission, farmers should be rewarded for the services delivered for the public by stable income support, independent of market fluctuations, and it should be ensured that they can make a decent living at the same time as invest in farms (EC, 2013b, p. 5). Additionally, young people can get funds for starting a farm (EC, 2017a, p. 8). The Polish Ministry of Agriculture and Rural Development reckons that fruit and vegetable production requires support in the form of production subsidies (Jurgiel, 2016). In Poland, a project for improving the stability and continuity of agricultural production in the periodic water shortage or excess was launched. This is based on support for construction, reconstruction, and proper use of drainage devices for improving production conditions, increasing water retention, and achieving environmental effects (Ministry of Agriculture and Rural Development, 2018, p. 31). Buffer resources are also considered a means of providing a stable, varied, and safe food supply for citizens (EC, 2017b, p. 1).

Other modes of managing risks are enabled by the CAP goals (score 4, see Figure 10). “The production of fruit and vegetables is unpredictable, and the products are perishable. Even limited surpluses can significantly disturb the market. Therefore, measures for crisis management should be established and those measures should continue to be integrated into operational programmes” (European Parliament, 2013d, p. 4). The current CAP maintains two pillars but has increased the link between them to better integrate policy support and enhance the safety-net measures to deal with potential threats and disturbances (EC, 2013b, p. 1). Mutual funds and insurance schemes allow farmers to respond better to market instabilities and the volatility of prices. The Polish Ministry of Agriculture and Rural Development has a goal of stabilising the main agricultural markets in order to ensure food safety in the country. It aims to increase the intake of insurances of farm facilities and yields. The Single Common Market Organisation aims to improve the competitiveness of EU agriculture on world markets and provide safety net for farmers against external uncertainties. It coexists with direct payments and risk-management provisions under rural development programmes (EC, 2013a, p. 5). In Poland, there is a national programme for reducing the risk related to the usage of plant protection products, which aims to promote non-chemical plant protection methods and the reduction of pesticide use (Ministry of Agriculture and Rural Development, 2018, p. 23). A phytosanitary law and rules for fighting and preventing the spread of dangerous organisms aim to prevent losses in crops, and other regulations, for example related to soil liming, prevent the chemical degradation of soils. Support for beekeeping also aims to reduce risks which can affect fruit and vegetable production.

The short-term focus of the CAP instruments is fairly enabled (score 3, see Figure 10) and related to direct payments, for which farmers can apply every year and which are limited each year by the annual allocation (EC, 2017b, p. 4). Other instruments are usually targeted for a period of over a year.

Instruments of the CAP enable the protection of the *status quo* (score 4, see Figure 10). Over three thousand products are under the protection of the EU by registration as “geographical indications” (EC, 2017a, p. 9). In Poland, a programme to support domestic plant varieties was launched (Ministry of Agriculture and Rural Development, 2018, p. 11). Limited payments linked, for example, to specific products or sectors are an option for member states (EC, 2013b, p. 7). The fruit and vegetable market was one of nine indicated in the Polish programme for the main agricultural markets development for the years 2016–2020, which, for example, enabled special provisions for the cultivation of tomatoes or strawberries (Ministry of Agriculture and Rural Development, 2018, p. 18). There are aid amounts for farming in mountain areas and other areas facing natural and other specific constraints (i.e. Less-Favoured Area, LFA). There are also payments attributed to the first hectares of the farms which provide more targeted support for small and medium-sized farms. Ten member states (including Poland) used an opportunity to introduce redistributive payment (EC, 2017b, p. 7). Market measures and income support are funded fully from the EU budget, even though rural development programmes have

to be co-financed by member states. However, the CAP is turning into promoting sustainable farming by linking 30% of national envelopes to provisions for sustainable practices, which is an incentive for farmers to modify their practices (EC, 2013a, p. 1). A policy not supporting the *status quo* is a development policy helping developing countries to sell agricultural goods on preferential terms.

Policy instruments are very enabling for the development of buffer resources (score 5, see Figure 10). Direct payments are the major source of support offered by the CAP (72% of the budget), serving nearly seven million farms in the EU and representing an important share of their agricultural income (EC, 2017b, p. 1). Up to 70% of Direct Payments in member states are dedicated to the Basic Payment Scheme, together with Young Farmer top-ups, Less Favoured Area top-ups (up to 5% of national envelope), Redistributive Payment for small farms, and “coupled” payments (EC, 2013a, p. 1). The payments are limited to those who are engaged actively in agricultural activities. Young farmers entering the agricultural sector can get an additional Pillar I payment, possibly complemented by start-up aid under Pillar II. A new crisis reserve of 400 million EUR per year in 2011 prices was also introduced to secure financial resources needed in the case of a crisis (EC, 2013b, p. 6). In Poland, a fund for the stabilisation of fruit and vegetable producers’ incomes is being developed (EC, 2017b, p. 1). There is one major change in buffer resources policy, which is introducing instruments for the provision of public goods, such as food safety, climate and the environment, the protection of water resources, animal welfare, and the condition of farmland. However, in real terms CAP funding decreased compared to the previous period (EC, 2017a, p. 7).

The policy instruments enable other modes of managing risks (score 4, see Figure 10). While grants and loans play a major role in helping farmers, instruments such as financial guarantee schemes or insurances are also available within the European Agricultural Guarantee Fund (EAGF) (EC, 2017a, p. 12) and the European Agricultural Fund for Rural Development (EAFRD) (European Parliament, 2013a, p. 1). The Crisis Reserve, amounting to 400 million EUR in 2011 prices, enables the European Commission to take emergency measures in response to market disturbances or a drop in prices. The modernised crop and weather insurance available in Pillar II is extended by an income stabilisation option, making it possible to pay out up to 70% of losses in income drops by 30% (EC, 2013a, p. 7). In Poland, the action plan for diminishing the risk related to plant protection products and a programme of financing soil liming are being implemented (Ministry of Agriculture and Rural Development, 2018, p. 28). The Polish Ministry of Agriculture and Rural Development is also preparing Polish producers for changes by information and advisory activities (mainly by a state-owned non-profit agricultural consultancy).

4.1.2. Goals and instruments enabling adaptability

The CAP goals slightly enable a medium- to long-term focus (score 2, see Figure 10) due to the fact that goals usually relate to the long term. Few of them, such as measures for encouraging potential new entrants to take up farming, have a medium-term focus (EC, 2017b, p. 9).

The CAP goals enable flexibility (score 4, see Figure 10). Member states or regions can design their own multi-annual programmes in response to the needs of their rural areas on the basis of the menu of measures available at the EU level (EC, 2013a, p. 6). The new rules of the second pillar are more flexible than in the previous programming period. The goal of such changes is to leave the member countries more freedom to fit their agricultural policy to regional needs.

Variety and tailor-made responses are enabled by the CAP goals (score 4, see Figure 10). The CAP not only is about feeding the population, but it also contributes to other key objectives of the European Union, such as boosting jobs and growth in the agricultural sector, increasing sustainability, and targeting climate change (EC, 2017b, p. 12). The incentives for sustainable and environmentally-friendly farming diminish the environmental risks (EC, 2017a, p. 4). The environmental goals seek to adjust farm activities by variations in response to the knowledge of environmental degradation, while the system can continue on the same trajectory with its important functions, such as producing food. The member states can design thematic sub-programmes in order to pay special attention to issues such as young farmers, small farms, mountain areas, women in rural areas, climate change, biodiversity, or short supply chains (EC, 2013a, p. 6). In the first pillar, the diversity of agriculture, agronomic production potential, socioeconomic needs and environmental issues, such as climate change, are acknowledged (EC, 2013b, p. 5). The CAP documents express the goals related to improving the environmental sustainability of agriculture as well as challenges related to climate change mitigation and adaptation, including developing resilience to various disasters, such as floods, droughts, or fires. Other goals include increasing the competitiveness of Polish agriculture and balanced territorial development (EC, 2014b, p. 2). The projects funded by the rural development programmes can have goals related to on-farm investments and modernisation, young farmers, agri-environmental issues, conversion to organic farms, agritourism, and village renewal or Internet provision. The prioritised activities can thus be of economic, environmental, as well as territorial nature.

The policy goals fairly enable social learning (score 3, see Figure 10). As stated in the Cork 2.0 Declaration (European Union, 2016), a greater policy focus on social innovation, learning, education, advice, and vocational training is essential for developing the skills needed. The European Innovation Partnership for Agricultural Productivity & Sustainability is the key theme. Measures within this partnership include knowledge transfer and cooperation between agriculture and research to enhance technological transfer to farmers as well as with other stakeholders, such as agri-business, administrations, etc. (EC, 2013a, p. 7). There are goals of creating

a knowledge-based agriculture and strengthening advisory services. There is support for bottom-up forms of the integration of producers, such as producer groups, cooperatives, and other organisations, with one of the goals being sharing knowledge (EC, 2017a, p. 11). Cooperatives are believed to build social integrity in rural areas, but in Poland the agricultural chambers, with mandatory membership, are considered by the Ministry of Agriculture and Rural Development as the most important organisations for agricultural self-government in rural areas (Ministry of Agriculture and Rural Development, 2018, p. 40), and they do not focus on social learning. All in all, social learning is mostly an additional goal alongside other priorities.

The CAP instruments fairly enable medium- to long-term focus (score 3, see Figure 10), mostly within Pillar II. Rural development programmes generally extend over several years (EC, 2017b, p. 11). Additional payments for Young Farmers, compulsory for all member states, are available for a maximum of five years from the moment of taking over as the head of a farmholding. The scope of introducing the Greening payment also has a medium-term focus. In the first and the second year, the penalty for failing to respect these rules is not applied, in the third year it amounts to 20%, and in the fourth year the maximum penalty will reach 25% (EC, 2013a, p. 3).

The instruments enable flexibility fairly (score 3, see Figure 10). Member states have the possibility to transfer up to 15% of the national envelope between Pillar I and Pillar II (Tropea, 2016, p. 20), and in the case of twelve European countries (including Poland), 25% from Pillar II to Pillar I (European Parliament, 2013e, p. 17). However, the amount of EU funds dedicated to Pillar II was cut by 7.6%, while Pillar I was cut by 1.8% (EC, 2013b, p. 3). These funds do not need to be co-funded. Active farmers have access to compulsory schemes as well as voluntary ones, if established at the national level. The exact threshold varies between countries. Depending on the choices made by national authorities, the basic payment is between 12% and 68% of the national budget (EC, 2017b, p. 7). The basic payment is applied either as the Basic Payment Scheme (BPS) or as the Single Area Payment Scheme (SAPS). The member state may opt for differences in the value of entitlements. The allocation for direct payments dedicated to coupled support, young farmers, small farmers, etc. depend on the particular member state, so the shares of funding allocated to different schemes may vary significantly between the countries, depending on their issues of most concern and national farming conditions (Kantor Management Consultants, 2015, p. 5), but within regulatory and budgetary limits (like the maximum 8% for coupled support or the maximum of 2% for young farmers). Regional Development programmes have to be built based on at least four out of the six common EU priorities. 30% of the national allocation has to be dedicated to a greening payment (EC, 2017b, p. 8). The standards that farmers have to meet in order to obtain full support are set at the national level. Countries have a 5% margin of flexibility in setting a ratio of permanent grassland to agricultural land (EC, 2017b, p. 8). The already introduced environmentally beneficial practices can replace the basic requirements.

Variety and tailor-made responses are enabled by the CAP instruments (score 4, see Figure 10). The CAP consists of various measures (European Parliament, 2013c,

p. 2). National or regional development programmes are designed to address the specific needs and challenges of rural areas in those countries and regions (EC, 2017a, p. 7). Pillar II provides a more diverse approach than in the previous programming period by changing “axes” into six broad priorities and their focus areas. Within Pillar II, different instruments aim to help the agricultural sector to adapt to new trends and technologies and become more efficient, cost-effective, and adaptive to various challenges. Funding for advice and economic development is available for small farms and young farmers – the CAP start-up aid instruments also allow grants for non-agricultural start-ups and the development of small and micro businesses (EC, 2013a, p. 7), which can be a possibility for farmers whose agricultural business is not efficient. At least 30% of the budget has to be reserved for voluntary measures, which are beneficial for the environment and mitigate the negative results of climate change (EC, 2013b, p. 7). The instruments are varied and include agri-environmental climate measures, organic farming, Areas of Natural Constraint, Natura 2000 areas, forestry measures, and investments beneficial for the environment and climate.

Social learning is enabled by the CAP instruments fairly (score 3, see Figure 10). The possibility of acquiring a higher co-funding rate for measures supporting knowledge transfer and collaboration supports social learning: “The maximum EU co-funding rates will be up to 85% in less developed regions, the outermost regions and the smaller Aegean islands, 75% in transition regions, 63% in other transition regions and 53% in other regions for most payments, but can be higher for the measures supporting knowledge transfer, cooperation, the establishment of producer groups and organisations and young farmer installation grants, as well as for LEADER projects and for spending related to the environment and climate change under various measures” (EC, 2013a, p. 6). LEADER projects in this programme period put greater emphasis on awareness-raising. Policy instruments are accompanied by training and advisory measures (EC, 2013b, p. 7). In Poland, there is a network for agricultural and rural innovations. Scientific institutes and public agricultural advisory units cooperate with innovation action groups, agricultural businesses, and other relevant organisations to implement innovations. A programme for scientific research on the possibilities of developing insurance in agriculture was also launched, which aims at suggesting solutions for farmers and creating new instruments. Funds are also dedicated to the development of science serving ecological agriculture. Educational activities related to the use of renewable energy sources in the form of energy cooperatives in rural areas are under preparation. The project *Akademia Producenta i Eksportera* (the Academy for Producer and Exporter) is an instrument for distributing information and promotion materials related to foreign trade markets for agricultural products among local producers and exporters, as well as the institutional and organisational conditions for exporting Polish products (Ministry of Agriculture and Rural Development, 2018, p. 39). These activities will include seminars and workshops. Actions are more focused on training and information rather than on social learning, which is considered supplementary.

4.1.3. Goals and instruments enabling transformability

The focus on the long term is fairly enabled by the CAP goals (score 3, see Figure 10). The main long-term CAP objectives include safe and high-quality food production, sustainable management of natural resources, and balanced territorial development (EC, 2013b, p. 2). Member states have the responsibility to set out future strategies for agricultural sectors, which will ensure their efficiency, competitiveness, and sustainability in the long term. However, most of these goals are not specific. Only some goals are more specific, such as providing training for almost 4 million participants and 1.4 million advisory sessions with a focus on the economic and environmental performance of farms or providing improved Internet services and infrastructure to 18 million rural citizens by 2020 (EC, 2013b, p. 2). Too general goals may make it more difficult to really transform the farming systems. Additionally, some of these goals, such as safe and high-quality food production, or sustainable management of natural resources, can also be seen as assuring that the system can maintain the desired levels of output in the future, without transforming itself and therefore facilitating robustness by protecting the *status quo* instead of setting new goals for future development. This is why the specification of these goals would be necessary to assess if they are to focus on the long-term transformation in a higher than fair level.

The dismantling of incentives that support the *status quo* is only slightly enabled by the CAP goals (score 2, see Figure 10), because the key characteristics of the CAP remained untouched by the reform (EC, 2013b, p. 9). In the documents examined no expressed will to dismantle such incentives was found. The Ministry of Infrastructure and Development (2014, p. 60) declares the aim of the professional reorientation of farmers and their families towards taking up non-agricultural economic activity or employment outside agriculture. Such activities are planned to support actions resulting from the National Reform Programme, concerning systemic changes in agriculture (KRUS reform). However, in the opinion of the European Commission (2014a, p. 3), the Partnership Agreement with Poland “remains silent on the reform of the ineffective social security system for farmers (KRUS) and other related reforms aimed at introducing an agricultural accounting and tax regime for Polish agriculture. These reforms have been announced repeatedly in recent years, only to be postponed each time.”

In-depth learning is not enabled by the policy goals (score 1, see Figure 10). There are no goals expressed in documents examined that relate to in-depth learning. The goals related to learning do not concern changes in paradigms, radically new frames, or a broad involvement of stakeholders (except in research centres).

The enhancement and acceleration of niche innovations is not enabled by the CAP goals (score 1, see Figure 10). One of the goals for Pillar II is fostering knowledge transfer and innovation (Ministry of Agriculture and Rural Development, 2017, p. 12), but it is a broad statement, with no focus on niche innovations. More focus is on knowledge transfer, for example from scientific institutes or consultants

to farmers, which is more an investment in adaptability - social learning (EC, 2013b, p. 6).

Focus on the long term is only slightly enabled by the CAP instruments (score 2, see Figure 10). Relatively long-term instruments are related to national rural development programmes, which include actions undertaken in the seven-year period (EC, 2013b, p. 9). However, according to Ecorys and colleagues (2016, p. 9), member states did not document a joined up, coherent strategy on which to base their choices about the implementation of the CAP.

The CAP instruments fairly enable the dismantling of incentives that support the *status quo* (score 3, see Figure 10). The CAP expenditure for market management such as export refunds and intervention purchases is dropping, although it is important to notice that the main drop took place in the previous programming periods, from over 90% in 1992 to 5% in 2013, which gives a significant difference of 85 percentage points within 11 years (EC, 2013b, p. 4). However, the remaining fund for market management may be seen as still slightly constraining the other modes of risk-management instruments and supporting the *status quo* in the farming systems supported.

In-depth learning is not enabled by the policy instruments (score 1, see Figure 10). There are no instruments indicated in the documents examined that would be related to the implementation of in-depth learning.

The enhancement and acceleration of niche innovations is not enabled by any specific instruments of the CAP (score 1, see Figure 10). Although the Common Strategic Framework “Horizon 2020” was created, the aim of which was to promote research and development (European Parliament, 2015), the existing instruments do not leave room or resources for experimenting and niche innovations. The self-organisation instruments have mainly been created for other reasons than niche innovations.

4.1.4. Stakeholder proofing

The perspectives of stakeholders varied depending on the issue. They agreed with most of the arguments and the ResAT tool was considered useful, although some academic stakeholders expressed concerns about the scoring of data – that it is not clear how to score particular quotations, and it is not certain to what extent the quantitative aspect, related to the number of quotations, affects the final score. It was mentioned that the tool is more useful for the macro-level analysis due to its loose connection to particular systems. The stakeholders expressed interest in a bottom-up analysis and comparison of the results of both research approaches.

The stakeholders generally agreed to the arguments presented in the ResAT. They mostly shared their experience related to the implementation aspects of the CAP. They pointed out that the fruit and vegetable farming system is quite unique in Poland and in Europe. It receives relatively little support in direct payments compared to other farming systems due to the small average size of farms. This forces the system to adapt

to the market and increase its innovativeness. In the CAP, one of the problems with supporting the innovations is the lack of a precise definition of what can be considered an innovation. This causes serious problems in supporting innovations through the Rural Development Programme. The problem of the quality of the EU regulations was brought up several times by stakeholders, not only in the case of the innovations. In the case of fruit and vegetable farming, according to the stakeholders, the support for organisations, which is available in Pillar II, is also important. This can be a source of increasing adaptability and innovations, mostly in medium- and short-term (not big enough to support transformability, but, rather, adaptability). However, the cooperation and creation of cooperatives and producers' groups is very ineffective in Poland. According to EUROSTAT data from 2010, on average in EU countries, 43.9% of the total fruit and vegetable production was within groups and recognised producer organisations, while in Poland this figure was 11% (see Pilichowski, 2018).

It was also elaborated that there are differences between the situation of Polish fruit and Polish vegetable sectors – they are not homogeneous in terms of supply-demand instabilities and organisational structure. The fruit sector especially is very poorly organised, which makes it even more difficult for the sector to access the funds available in the CAP. It is hard to provide the necessary information flow so that small farmers know how they can use funds other than direct payments, which provide only several percent of general income from fruit and vegetable farms. The lack of information and education is often the reason for the low uptake of various instruments. The increasing complexity of the CAP requires more educational activity to avoid difficulties in its implementation. Otherwise, the regulations which might seem supportive may in reality have very little impact. For example, in the case of Poland, insurance is not a sufficiently utilised tool for risk mitigation offered by the CAP, especially due to the ineffectiveness of planning, but also due to the fact that the CAP is not effective in supporting education about insurance for Polish agriculture.

The stakeholders agreed that the buffer resources protecting the *status quo* and other measures helpful in risk management are the areas most supported. Opinions were divided regarding the influence of these characteristics on the robustness of farming systems. As for adaptability, some stakeholders suggested that it is not supported sufficiently, others claimed that risk management is the reason for the existence of the CAP and it is therefore strongly supported, especially related to climate-related risks. An interesting idea was that the fewer buffer resources are included in agricultural policy (as, for example, in the USA), the more necessary the other forms of risk management are.

The stakeholders agreed with most of the challenges listed for the system. The importance of the Russian embargo is mostly important for the fruit sector, which comes from the fact that 80% of the Polish fruit sector consists of apple cultivation, and Polish apples were mostly exported to the East (other fruits mostly to western countries). Of vegetables, only cabbages were exported to the East to a high extent and thus were affected by the embargo.

The stakeholders expressed the opinion that it is not surprising that transformability is not supported due to the fact that it is seen as risky. The main goal of the CAP is the preservation of social and production structures, and this idea is closer to robustness and adaptability rather than to transformation. However, the support of the social structure may play a dominant role, and the stabilisation of incomes does not necessarily mean the stabilisation of production, because it teaches farmers to adapt not to the market pressure and to increase competitiveness but to the CAP regulations and support.

Another important issue brought up by the stakeholders was the continuous growth in energy prices, which is affecting and will continue to affect the fruit and vegetable farming system even more strongly in upcoming years. Another interesting remark was that Ukraine is starting to introduce traditionally Polish varieties of apples, which may increase competition for this sector in the immediate future.

An important issue pointed out during the discussion is that of supply instability, which is an important economic threat, especially for fruit farming, due to the lack of stabilising tools, but was not included in the initial identification of the main farming-system-specific challenges. The issue was added to the description. Even a relatively small decrease in production results in large price increases, and *vice versa* – an increase in production leads to a rapid fall in prices. In 2018, the problem was so significant that according to one of the participants, 50–60% of chokeberries and around 20% of currants were not even picked in the fields, because the prices were so low that they could not cover the cost of the labour force. The vegetable market is more stable due to its higher level of organisation. However, the market for fresh vegetables is less stable than for processed ones, but still not as vulnerable to supply instability as the fruit sector. Many countries have introduced fixed limits of production, but these are not applied in Poland in the case of fruits due to the absence of a requirement for signing agreements between producers and processors protecting both producers from too low prices and processors from very high ones, which might endanger their business activity. It is a significant difficulty for this sector. Farmers use the diversification of production as a risk-management method.

Stakeholders also pointed out that in Poland, the EU Regional Operational Programmes (ROPs) and the CAP are not consistent. A mix of policies must be created to achieve better outcomes. An additional benefit of this might be a change in mentality. It would enforce the national policy for agriculture. The participants consider the lack of supplementing the CAP by other policies to be a big mistake. For example, education should be conducted at all stages of the value chain. Currently, no instruments connect farmers and consumers in Poland.

4.1.5. A summary of the results of the top-down analysis

The top-down approach made it possible to verify Hypothesis 1: “The CAP supports resilience more intensively by ensuring robustness rather than adaptability and transformability in Polish farming systems.” The results were also used to answer

Question 3: “How does the focus on resilience capacities differ between policy goals, policy instruments, and the implementation of the CAP 2014–2020?”

To summarise how the CAP aligns with resilience capacities in Polish farming systems, Table 2 presents a detailed assessment of the policy goals. This table categorises the extent to which the CAP goals enable robustness, adaptability, and transformability, offering key insights into the policy’s strengths and areas needing enhancement.

Table 2. A summary of the CAP’s goals support for resilience capacities

RESILIENCE CAPACITY	LEVEL OF ENABLING	KEY POINTS
ROBUSTNESS	Not enabling to very enabling	<ul style="list-style-type: none"> – Limited short-term focus on market and environmental risk mitigation. – Goals of maintaining production levels and stability in farmer revenues. – Focus on buffer resources through stable income support and production subsidies. – Intention to support risk management via mutual funds and insurance schemes.
ADAPTABILITY	Slightly enabling to enabling	<ul style="list-style-type: none"> – Few goals have middle-term focus, such as measures for encouraging potential new entrants to take up farming. – Enabling flexibility through multi-annual programme designs tailored to rural needs. – Encouraging diverse and tailor-made responses to regional challenges. – Focus on training and advisory services, with social learning as an additional goal.
TRANSFORMABILITY	Not enabling to fairly enabling	<ul style="list-style-type: none"> – Supporting long-term strategic planning for agricultural efficiency and sustainability. – Limited support for dismantling <i>status quo</i> incentives. – Goals related to learning do not concern changes in paradigms. – No focus on niche innovations, but on knowledge transfer instead.

Source: Own study.

Summarising the findings about the CAP’s policy instruments in fostering resilience, Table 3 shows key points of their support across the three resilience capacities: robustness, adaptability, and transformability. The results of the ResAT analysis show that at the level of instruments, the CAP supports robustness more intensively than adaptability. Transformability remains the least supported resilience capacity.

To verify Hypothesis 1: “The CAP supports resilience more intensively by ensuring robustness rather than adaptability and transformability in Polish farming systems”, and to answer Question 3: “How does the focus on resilience capacities differ between policy goals, policy instruments, and the implementation of the CAP

2014–2020?” it is necessary to compare the results obtained at the levels of goals and instruments.

Table 3. A summary of the CAP's Instruments Support for resilience capacities

RESILIENCE CAPACITY	LEVEL OF ENABLING	KEY POINTS
ROBUSTNESS	Fairly enabling to very enabling	<ul style="list-style-type: none"> – The short-term focus is fairly enabled by yearly direct payments. – Enabling maintenance of the <i>status quo</i> through market measures and redistributive payments. – Significant investment in buffer resources via direct payments (72% of budget). – Offering various risk management tools such as grants, loans, and insurance schemes.
ADAPTABILITY	Fairly enabling to enabling	<ul style="list-style-type: none"> – Support for medium- to long-term focus through seven-year rural development programmes. – Allowing some flexibility in fund allocation between Pillar I and Pillar II. – Encouraging diverse and tailored responses via a variety of measures and national programmes in Pillar II. – Facilitating social learning through training and information-focused instruments, though it is supplementary.
TRANSFORMABILITY	Not enabling to fairly enabling	<ul style="list-style-type: none"> – Limited long-term focus with actions of national rural development programmes within seven-year plans. – Significant reduction in market management expenditure, but minimal support for dismantling existing incentives. – No specific instruments for in-depth learning or promoting niche innovations. – Initiatives such as Horizon 2020 exist but lack targeted support for niche innovations.

Source: Own study.

The comparison of goals and instruments

Question 3: “How does the focus on resilience capacities differ between policy goals, policy instruments, and the implementation of the CAP 2014–2020?” required a detailed comparison of the characteristics of resilience capacities. In general, transformability is the least supported resilience capacity (see Table 4). Especially in-depth learning and niche innovations seem to be seriously neglected by the CAP (EC, 2013b). Robustness and adaptability are relatively balanced in the case of goals, but in the case of instruments, the dominance of robustness can be observed, as there is a shift towards a short-term focus and protecting the *status quo* in Polish agriculture. The short-term focus of the CAP instruments is fairly enabled and related

to direct payments, for which farmers can apply every year and which are limited by the annual allocation (EC, 2017b). Buffer resources in the case both of goals and instruments seem to be relatively strongly supported. Farmers are rewarded for their services by stable income support and direct payments are the major source of support offered by the CAP (72% of its budget) (EC, 2017b). Other modes of managing risks are also enabled by the CAP goals. Mutual funds and insurance schemes allow farmers to respond better to the market and price instabilities (EC, 2017a). The Polish Ministry of Agriculture and Rural Development (2018) aims to stabilise the main agricultural markets and increase the intake of farm facilities as well as yield insurance.

Table 4. A comparison of the degree of support in terms of robustness, adaptability, and transformability under the CAP objectives and instruments

	Robustness	Adaptability	Transformability
Goals	★★	★★	★
Instruments	★★★	★★	★

Note: The meaning of the indicators is as follows: “★” – low degree, “★★” – moderate degree, “★★★” – high degree

Source: Own study based on the analysis of documents.

Taking the above into account, Hypothesis 1: “The CAP supports resilience more intensively by ensuring robustness rather than adaptability and transformability in Polish farming systems” is resolved positively at the level of instruments.

Another noticeable feature of the wheels is that they show relatively similar scores for three different capacities of resilience: robustness, adaptability, and transformability. However, there are some differences between them. Robustness is more supported by the CAP instruments than by the goals, especially in the case of a short-term focus and protecting the *status quo*. Adaptability is similarly rated, although in the case of instruments, the medium-term focus has slightly greater importance, mostly within Pillar II (EC, 2013a), and flexibility to small extent, but loses its importance due to the regulatory and budgetary limits (such as a maximum 8% for coupled support or a maximum of 2% for young farmers) (EC, 2017b). The level of support for transformability does not change significantly; dismantling the *status quo* slightly increases the importance in terms of instruments compared to goals. National development programmes can be designed to address specific needs and challenges of their rural areas (EC, 2017a). The long-term focus loses the CAP support to some extent. While it is fairly enabled by the CAP goals due to the fact that the member states are responsible for setting out future strategies for the agricultural sectors (EC, 2017a), the general character of the guidelines leads to the situation where member states do not document a joined up, coherent strategy on which they base choices about the implementation of the CAP (Ecorys et al., 2016).

4.2. The results of the bottom-up analysis – stakeholders' views on the impact of the CAP on the resilience of farming systems

The results obtained in the bottom-up analysis covered challenges experienced by the farming system as well as ways of coping with these challenges and utilising opportunities as recognised by the stakeholders. The perceived role of policies on the resilience of the fruit and vegetable farming system was examined. Additionally, data on the scope of social networks and contacts to discuss policies as well as ways to access information and learn about policies and the availability of capital to manage challenges were collected.

4.2.1. The main challenges for the farming system

The results demonstrate that the fruit and vegetable farming system in Poland faces multiple challenges, which can hinder the resilience of the system. The main challenges indicated by the stakeholders are outlined in Figure 11.

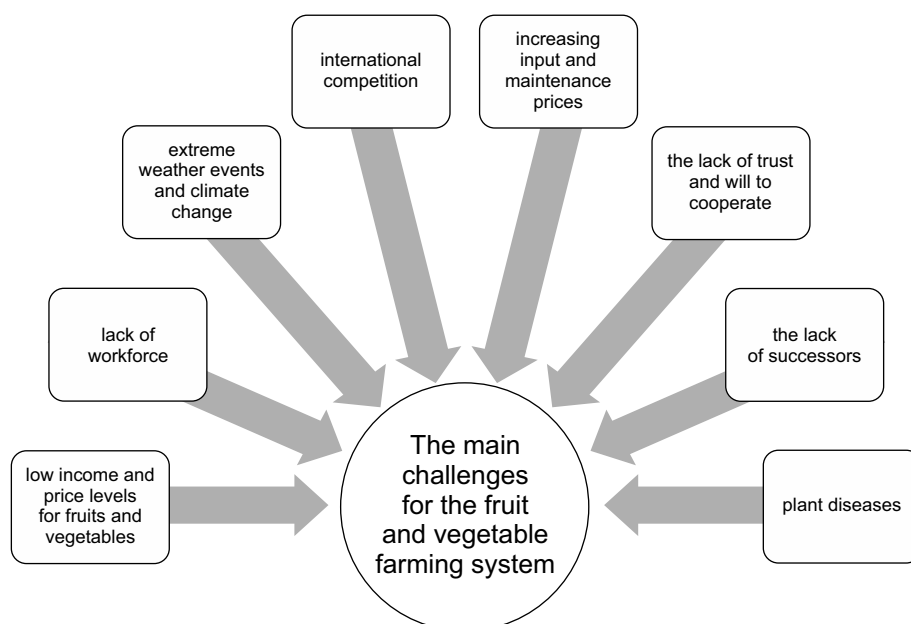


Figure 11. The main challenges for the fruit and vegetable farming system in the Lubelskie region according to the stakeholders

Source: Own study.

Three-quarters of the respondents considered income and fair prices to be a very important challenge – “*First and foremost – concerns about prices.*”¹ The respondents

¹ „przede wszystkim – obawy o ceny” (Interview 1, p. 4)

pointed out that the prices of their products were not rising – *“The price of vegetables has remained practically unchanged for 20 years.”*² The fluctuations of prices are also a challenge – *“So that this price jump would not be so drastic that profitability, even minimal, would be in every year, not the frenzy that once cauliflowers are 5 PLN each, and in the second year 0.80 PLN.”*³

Another very important challenge is the lack of workforce, which has been increasingly problematic in recent years – *“As far as employees are concerned, it is getting harder.”*⁴ The problem can be so serious that farmers cease growing particular crops – *“We ceased growing broccoli this year because of a lack of hands to work. This is a huge problem.”*⁵ The problem seems to be especially serious in the vegetable production – *“It seems to me that the labour market is the biggest challenge at this point in particularly vegetable segment.”*⁶ One of the reasons for this challenge, according to the respondents, is the emigration of Polish workforce abroad, where the salaries are higher – *“our people work hard in the West, but the money they receive there ... here is the clue.”*⁷ Another factor is the ageing of population – *“In agriculture, it is always said that the village is ageing, and it is true that when you drive around the village you see abandoned farms, you see a small number of people, you see few young people involved in production.”*⁸

Another major risk includes weather events and climate change. The main problem is drought – *“This is specifically about rainfall.”*⁹ *“Floods are not scary for us in our area, only drought.”*¹⁰ However, other weather events can also be problematic – *“There was frost last year. It froze a lot.”*¹¹ The related challenge is water supply – *“Now we have a large water shortage. Now winter this year has not been kind to us in terms of the amount of snow cover remaining and like no year, as I noticed, there is no water supply now. And this will definitely be a problem for the current season of 2019.”*¹²

² „cena warzyw praktycznie nie zmieniła się od 20 lat” (Interview 2, p. 2)

³ „żeby ten skok cen nie był taki drastyczny, żeby opłacalność, choćby minimalna, była w każdym roku, a nie szła, że raz kalafiory są po 5zł, a w drugim roku po 80 groszy.” (Interview 5, p. 2)

⁴ „Jeżeli chodzi o pracowników jest coraz ciężiej” (Interview 2, p. 2)

⁵ „Z brokoła żeśmy w tym roku zrezygnowali ze względu na brak rąk do pracy. To jest ogromny problem.” (Interview 3, p. 2)

⁶ „Wydaje mi się, że rynek pracy jest największym wyzwaniem w tym momencie w tym segmencie szczególnie warzywniczym.” (Interview 3, p. 3)

⁷ „nasi pracują na zachodzie ciężko, ale te pieniądze, które tam otrzymują... tu jest clue.” (Interview 5, p. 2)

⁸ „W rolnictwie ciągle się o tym mówi, że wieś się starzeje i to jest prawda, że jak się przejedzie po wsi to widzi się opuszczone gospodarstwa, widzi się niewielką ilość ludzi, mało się widzi ludzi młodych zaangażowanych w produkcję.” (Interview 9, p. 2)

⁹ „Tu chodzi konkretnie o opady.” (Interview 9, p. 3)

¹⁰ „Powódzie nam niestraszne na naszym terenie, jedynie susze.” (Interview 14, p. 9)

¹¹ „W ubiegłym roku były przymrozki. Wymroziło bardzo dużo.” (Interview 1, p. 3)

¹² „teraz mamy duży niedobór wód. Teraz zima w tym roku nie była łaskawa dla nas pod względem ilości zaleganej pokrywy śnieżnej i jak żadnego roku, jak zauważyłem, nie ma takiego zasobu wód w obecnym czasie. I to będzie na pewno bolączką na obecnym sezon 2019.” (Interview 18, p. 1)

Many respondents indicated challenges related to market and competition. One of the problems is low prices in years when there are a lot of products on the market – *“Lots of commodities and low prices should be expected.”*¹³ International competition is increasing the pressure on producers – *“There are many orchards in Ukraine, and they have their apples. And they are of course cheaper. We can slowly forget about this market. They are about to sell to us.”*¹⁴ It is also difficult for farmers to supply big supermarket chains – *“It doesn’t make sense to deliver to the market half free. They pay no one knows when. Once they pay back, once only if it sells. There is an uncertain situation, that’s why I’m withdrawing from it.”*¹⁵

Increasing input and maintenance prices brings other challenges – *“Costs increase every year. This is inevitable.”*¹⁶ The respondents indicate that the relation between costs and income is less and less profitable – *“Already skipping the machines themselves, which are expensive, needs a lot of investment. All fertilisers and means of protection, means of production – their prices are rising while prices of crops are falling.”*¹⁷ The cost of labour is also very high for many respondents – *“There are people for work, only the money they want to get is not the money we can pay.”*¹⁸ In addition, insurance costs are considered very high – *“Very high insurance costs for vegetable crops or even too high prices, barrier rates.”*¹⁹

The cooperation, both horizontal and vertical, is problematic due to the lack of trust and will to cooperate. The respondents suggest that it might be related to mentality – *“Maybe it results from the mentality that it’s better if your neighbour has it worse. God forbid if he has it better, then he is already an enemy. There is too little neighbourhood dialogue.”*²⁰ They also point to the lack of local leaders – *“We lack leaders to pull it. Each of us is an individual. Everyone would like to work on their own, everyone would like to work for themselves. We are socially very poorly developed.”*²¹

¹³ „Należy się spodziewać mnóstwa towaru i niskich cen.” (Interview 1, p. 4)

¹⁴ „na Ukrainie jest mnóstwo sadów i mają swoje jabłka. I mają oczywiście tańsze. O tym rynku możemy pomału zapominać. Oni zaraz zechcą nam sprzedawać.” (Interview 1, p. 4)

¹⁵ „Do marketu też za pół darmo bez sensu oddawać. Pieniądze też oddają nie wiadomo kiedy. Raz oddają, raz jak się sprzeda. Jest niepokojąca sytuacja, dlatego się z tego wycofuję.” (Interview 20, p. 3)

¹⁶ „koszty wzrastają co roku. To jest nieuchronne” (Interview 2, p. 2)

¹⁷ „Już pomijam same maszyny, które są drogie, dużo nakładów potrzebują. Wszystkie nawozy i środki ochrony, środki do produkcji to ich ceny rosną przy spadku cen płodów.” (Interview 9, p. 2)

¹⁸ „Ludzie są do pracy, tylko pieniążki jakie chcą uzyskać nie są pieniędzmi, które my jesteśmy w stanie zapłacić.” (Interview 11, p. 6)

¹⁹ „Bardzo wysokie koszty ubezpieczenia upraw warzywnych czy nawet zaporowe ceny, zaporowe stawki.” (Interview 11, p. 4)

²⁰ „Może to wynika z mentalności, że najlepiej jak sąsiadowi jest gorzej. A już nie daj Boże, jak jest lepiej, już jest wróg. Za mało jest wymiany międzysąsiedzkiej.” (Interview 9, p. 8)

²¹ „brakuje nam liderów, którzy by to pociągnęli. Każdy z nas jest indywidualnością. Każdy chciałby działać na własny rachunek, każdy by chciał pracować dla siebie. Bardzo słabo jesteśmy rozwinięci społecznie.” (Interview 19, p. 11)

Another challenge for some respondents is farm succession – *“There is no successor.”*²² The paradox that was indicated was that farmers who had invested in education for their children currently have problems with farm succession because of this – *“Let’s not kid ourselves that big farmers who thought about the future, educated and gave a good schooling to their children, gave a good background. These children went, studied, and graduated from good universities and good faculties. At this point, we have a paradox. Farmers have educated their children; they are well prepared for present times and have gone away. They see no future in agriculture. They went further, to the others.”*²³

The respondents also point to the challenge of plant diseases – *“The pressure of pests and plant diseases is also considerable.”*²⁴ Some farmers had had problems in the past obtaining plant-protection products, which put their crops at risk – *“Two years ago there was a lack of plant-protection products.”*²⁵

4.2.2. Resilience-enhancing strategies of the actors within the system

The results of the research suggest that according to the respondents, the farming system is partly capable of dealing with risks. On the one hand, some respondents point out that the farming system can cope with difficulties, and even develop – *“This sector is even developing recently in these areas.”*²⁶ On the other hand, some respondents are pessimistic about the chances of the system to deal with risks – *“I think, at least it seems to me that with the current fruit production market we have no chance.”*²⁷ There were also opinions suggesting that the system would change, because some farmers would manage to deal with risks, and others would not – *“I think it will change slowly and it will be like in the West. Larger farms will absorb the smaller ones. Small farms cannot do it. It will be like in the West, in one village there will be two, three farmers who will absorb these smaller farms.”*²⁸

According to the respondents, the farming system is partly capable of taking up opportunities. Some respondents indicated that it is easy to conduct production – *“It’s*

²² „Nie ma następcy” (Interview 8, p. 2)

²³ „Nie oszukujmy się, że duzi rolnicy, którzy myśleli o przyszłości wykształcili i dali dobrą szkołę swoim dzieciom, dali dobrą szkołę. Te dzieci poszły, studiowały, skończyły dobre uczelnie, dobre kierunki. W tym momencie mamy paradoks. Rolnicy wykształcili swoje dzieci, te są dobrze przygotowane do dzisiejszych czasów i poszły sobie. Nie widzą przyszłości w rolnictwie. Poszły dalej, do innych.” (Interview 19, p. 9)

²⁴ „Presja szkodników, chorób roślin też jest spora.” (Interview 2, p. 2)

²⁵ „Dwa lata temu wystąpił brak środków ochrony roślin.” (Interview 16, p. 5)

²⁶ „Ten sektor nawet ostatnio się rozwija na tych terenach.” (Interview 5, p. 1)

²⁷ „Ja sądzę, przynajmniej tak mi się wydaje, że przy obecnym rynku produkcji owoców nie mamy szans.” (Interview 19, p. 3)

²⁸ „Myślę, że powoli będzie się zmieniać i będzie jak na zachodzie. Większe gospodarstwa będą wchłaniać te mniejsze. Małe gospodarstwa nie dają rady. Będzie jak na Zachodzie, w jednej miejscowości będzie dwóch trzech gospodarzy, którzy wchłoną te mniejsze gospodarstwa.” (Interview 10, p. 5)

easy to survive and save money to invest in machinery and equipment that will facilitate undertaking some kind of production."²⁹ Others point to chances that have not been sufficiently taken; in their opinion – *"We certainly do not take advantage of the opportunities provided by organic farming."*³⁰ Risk aversion was stressed as an important factor, which makes it difficult for some farmers to take up opportunities – *"There is a group of people who are afraid of risk. This can be seen especially when investing in farm development. If there is a 60,000 bonus, then farmers would be more willing to apply, because it is a bonus, they get this money and spend and there is no problem. However, it is known that it is for a certain group of a certain economic size. If later the farmer is already a larger farmer and he qualifies for modernisation, for example, there are other rules, because you must first spend your money or use a loan and submit a payment application. The agency then refunds part of the costs. When it comes to specifics, some withdraw, because they are afraid of loans that they thought through, because it is different if they get money first and different if they have to spend and apply for a refund. Some give up at that moment, almost at the end, because they are determined first that they will invest, they will apply, and then they are afraid of it."*³¹

There are multiple ways for the respondents and the farming system to cope with the above risks and developments, as well as to take up opportunities. The main farms' strategies to support resilience, which were indicated by the stakeholders, are shown in Figure 12.

Many respondents indicated diversification, especially of non-agricultural practices, as an important strategy. Notably, processing and packaging was considered important – *"The most important is the processing of what we produce."*³² *"Only with this packaging we can exist."*³³ However, other means of diversification are also used – *"And an additional source of income is agritourism, renting rooms."*³⁴

²⁹ „łatwo jest przeżyć i zaoszczędzić środki na zainwestowanie w maszyny, w sprzęt, który ułatwi podjęcie jakiejś produkcji” (Interview 9, p. 1)

³⁰ „Nie wykorzystujemy na pewno szans, jakie niesie produkcja ekologiczna” (Interview 5, p. 7)

³¹ „Jest pewna grupa osób, która obawia się ryzyka. Można to zauważyć szczególnie przy inwestycjach w rozwój gospodarstwa. Jeżeli jest premia 60 tysięcy, to wtedy rolnicy chętniej by się o to ubiegali, bo to jest premia, oni dostają te pieniądze i wydają i jest bez problemu. Tylko wiadomo, że to jest dla pewnej grupy o określonej wielkości ekonomicznej. Jeżeli później rolnik jest już większym rolnikiem i on się kwalifikuje do modernizacji na przykład, są inne zasady, bo trzeba najpierw wydać swoje pieniądze albo posiłkować się kredytem i złożyć wniosek o płatność. Agencja wtedy refunduje część kosztów. Jak przychodzi do konkretów, to niektórzy się wycofują, że oni się boją kredytów, że oni przemyśleli, że jednak nie, bo co innego, jeżeli dostaną te pieniądze najpierw, a co innego, jeżeli mają swoje wydać i ubiegać się o refundację. Niektórzy w tym momencie rezygnują. Prawie przy finale, bo najpierw są zdecydowani, będą inwestować, będą się ubiegać, a później obawiają się tego.” (Interview 17, p. 5)

³² „najważniejsze jest przetwarzanie tego, co produkujemy” (Interview 12, p. 4)

³³ „Tylko z tego pakowania możemy egzystować.” (Interview 4, p. 4)

³⁴ „A dodatkowym źródłem dochodu jest gospodarstwo agroturystyczne, prowadzenie wynajmów pokoi.” (Interview 11, p. 3)

The diversification of agricultural practices is also used – “*We have it all, just like at the zoo, a little bit of everything.*”³⁵ It is common to combine fruit and vegetable production – “*There are two branches of production, fruit and vegetable growing.*”³⁶ One of the advantages of diversification is the possibility to harvest crops at different times, which diminishes the number of workers needed at one particular time – “*We harvest vegetables sooner and later orchard, the apples.*”³⁷ Farmers also combine fruit and vegetable farming with cereal cultivation – “*Garlic, pumpkin, potatoes, triticale.*”³⁸

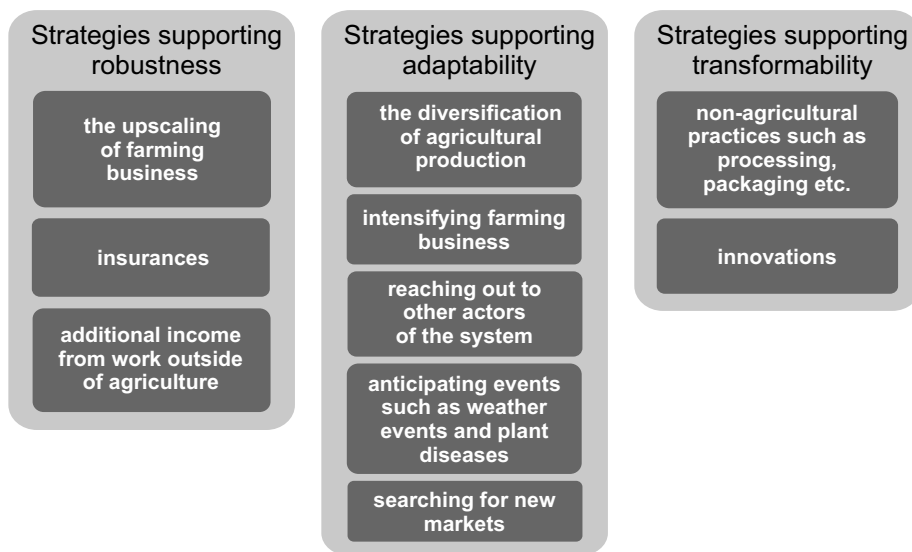


Figure 12. The main strategies supporting resilience taken by stakeholders within the fruit and vegetable farming system in the Lubelskie region according to the respondents

Source: Own study.

Another strategy is to intensify the farming business. This is used to cope with the lack of workforce – “*Farmers have greater access to the machinery park, to appropriate machines that replace manual work.*”³⁹ It also plays an important role in coping with drought – “*There must be irrigation.*”⁴⁰ Both conventional and organic farming uses intensification – “*Organic farming is also not old-fashioned agriculture, it is modern farming. People invest in tractors, equipment, and sprayers.*”⁴¹ The respondents also

³⁵ „To mamy tego wszystkiego, tak jak w zoo, wszystkiego po troszeczku.” (Interview 6, p. 15)

³⁶ „są dwie gałęzie produkcji, sadownicza i warzywnicza.” (Interview 1, p. 1)

³⁷ „warzywa zbieramy wcześniej a później sad, później jabłka.” (Interview 1, p. 6)

³⁸ „Czosnek, dynia, ziemniaki, pszenżyto.” (Interview 14, p. 1)

³⁹ „Rolnicy mają dostęp większy do parku maszynowego, do odpowiednich maszyn, które zastępują pracę fizyczną” (Interview 5, p. 2)

⁴⁰ „Musi być nawadnianie.” (Interview 7, p. 6)

⁴¹ „Rolnictwo ekologiczne też nie jest rolnictwem zaściankowym, tylko jest rolnictwem nowoczesnym. Ludzie inwestują w ciągniki, w sprzęt, w opryskiwacze.” (Interview 13, p. 7)

pointed to the importance of the facilities to store the products – *“They must have a storage room, they must have a warehouse.”*⁴²

Contacting farming-system actors is another way to cope with challenges – *“The future is in group actions.”*⁴³ Being part of a producer group helps farmers to sell their product – *“This is probably the most important element of the group, that this infrastructure allows a person with this good not to get lost in the field. Especially wanting to grow a commercial crop, which is large.”*⁴⁴ Cooperating with other farmers can be a way of dealing with a lack of workforce – *“They can borrow these people from each other.”*⁴⁵ Cooperation also allows sharing knowledge – *“A lot of farmers come all the time to get advice whether they could produce something there. Everyone is looking for something.”*⁴⁶ Cooperation with family members helps to ensure succession – *“In 2018, we gave our son part of the farm. We are working together at the moment.”*⁴⁷

Upscaling the farming business is a strategy used by many farmers. It can be related to buying or renting land – *“I would definitely like to enlarge the area I cultivate.”*⁴⁸ Or making other investments, in machines or facilities – *“We built the greenhouse ourselves.”*⁴⁹

The respondents see the importance of anticipating events, especially in relation to weather events and plant diseases – *“The farmer also predicts whether it will be frost, hail or drought; everyone is trying to save their plants in some way. They may not foresee everything, but they predict certain things. They introduce varieties that show resistance to diseases, pests and tolerance to weather conditions. Not everything can be predicted, but from what I see, it is so. They try to utilise various streams and rivers. There are not many of these streams or rivers, but where there is water close by they introduce varieties that can be quickly hydrated. Rather, there is this awareness of it.”*⁵⁰

⁴² „Muszą mieć przechowalnię, muszą mieć magazyn” (Interview 19, p. 12)

⁴³ „przyszłość jest w grupowych działaniach” (Interview 5, p. 2)

⁴⁴ „To jest chyba ten najważniejszy element grupy, że ta infrastruktura pozwala na to, że człowiek z tym towarem nie przepada na polu. Szczególnie chcąc robić uprawę towarową, czyli dużą.” (Interview 3, p. 10)

⁴⁵ „Pożyczają może sobie tych ludzi jedni drugim” (Interview 3, p. 5)

⁴⁶ „Cały czas bardzo dużo rolników przyjeżdża po porady, czy mogliby coś tam produkować. Każdy poszukuje czegoś.” (Interview 13, p. 4)

⁴⁷ „W roku 2018 przekazaliśmy synowi część gospodarstwa. W tej chwili pracujemy wspólnie.” (Interview 11, p. 2)

⁴⁸ „Chciałbym na pewno powiększyć swój areał, który uprawiam.” (Interview 14, p. 3)

⁴⁹ „szklarnię sami zbudowaliśmy” (Interview 7, p. 3)

⁵⁰ „Rolnik też przewiduje. Czy to może być przymrozek, czy grad, czy susza, każdy stara się w jakiś sposób swoje rośliny ratować. Może nie wszystko przewidzi, ale pewne rzeczy przewiduje. Wprowadzają odmiany, które wykazują odporność na choroby, na szkodniki czy tolerancję na warunki pogodowe. Nie wszystko się da przewidzieć, ale z tego co ja widzę to tak jest. Starają się zagospodarowywać różne strumyki, rzeczki. Tych strumyków, rzeczek to dużo nie ma, ale żeby też wprowadzać te odmiany, gdzie jest blisko woda, które można byłoby szybko nawodnić. Tutaj raczej jest ta świadomość tego.” (Interview 13, p. 6)

An important strategy is searching for new markets to sell the products. Some of them search for international markets – *“Cauliflowers and broccoli are sold very well abroad. We have good customers who pay well and good prices, much higher than in Poland.”*⁵¹ Others decide to sell retail – *“Only retail. We analyse the market, what the customer is interested in and whether it is possible to sell retail. With our quantities, only retail saves us; wholesale is the cost of preparing large quantities of goods, and we do not have such.”*⁵² There are also initiatives for creating a brand – *“We want to bring together many producers under one common brand, to promote it and to associate with one, not with many with products, make a product basket. Secondly, we want to make a local shelf with local products. Small but nevertheless the brand should also be visible to our inhabitants.”*⁵³

The respondents also indicated innovations as a strategy to cope with challenges – *“We, as a farm or a company, are very much in favour of this type of thing. We try to introduce as much innovation as possible. It is not an art to work hard, but you also have to do it smartly, which is what we can mechanise – we do it.”*⁵⁴

Many respondents indicate that additional income helps to deal with challenges – *“There are few who only do farming, because they won't survive. All our neighbours have additional jobs. They treat work in agriculture as an addition.”*⁵⁵ Some farmers travel abroad for work – *“Me too, there was a time when I went abroad to make some extra money. I went to Paris to make some extra money.”*⁵⁶

Taking out insurance is a strategy used by some farmers, although the prices are considered very high – *“I try. Cereals I insure, vegetables – I try. However, the rates are prohibitive. The maximum rate for vegetables is calculated at 170 thousand times 5%. 8,000 per hectare means very high rates.”*⁵⁷ So some farmers insure just part of their business – *“They use it. Only sometimes, it may be not necessarily in full,*

⁵¹ „Kalafiory, brokuly sprzedają się bardzo dobrze za granicą. Mamy dobrych odbiorów, którzy dobrze płacą i dobre ceny, dużo wyższe niż w Polsce.” (Interview 4, p. 3)

⁵² „Tylko detal. Analizujemy rynek, tym czym klient jest zainteresowany i to czy jest możliwość sprzedania w detalu. Przy naszych ilościach ratuje nas tylko detal, hurt to są koszty wyjazdu na giełdę i przygotowania dużych ilości towarów, a my takich nie mamy.” (Interview 6, p. 15)

⁵³ „chcemy skupić wielu producentów pod jedną wspólną marką, żeby ją promować i żeby kojarzyła się jedna, a nie z wieloma produktami, zrobić koszyk produktowy. Po drugie – chcemy zrobić półkę lokalną z produktami lokalnymi. Małą, ale jednak, żeby marka się opatrzyła też naszym mieszkańcom” (Interview 12, p. 8)

⁵⁴ „My jako gospodarstwo czy firma jesteśmy bardzo za tego typu rzeczami. Staramy się wprowadzać na ile to możliwe te innowacyjności. To nie sztuka się napracować, tylko też trzeba to robić z głową, czyli co można sobie maksymalnie zmechanizować to robimy.” (Interview 13, p. 10)

⁵⁵ „Mało jest takich co się tylko rolnictwem zajmują, bo się nie wyżyje. Wszyscy nasi sąsiedzi dodatkowo pracują. Pracę w rolnictwie traktują jako dodatek.” (Interview 6, p. 23)

⁵⁶ „Ja też, był taki czas, że na saksy jeździłem, żeby dorobić. Jeździłem do Paryża, żeby dorobić.” (Interview 6, p. 23)

⁵⁷ „Próbuję. Zboża tak, warzywa próbuję. Ale stawki są zaporowe. Stawka dla warzyw maksymalnie jest wyliczona na 170 tysięcy razy 5%. 8 tysięcy za hektar to bardzo wysokie stawki.” (Interview 11, p. 4)

comprehensively, only partially. But those crops on which farms' highest income is based, they insure it."⁵⁸ However, others do not take out any insurance, in some cases because of a negative experience in the past – *"We insured for 15 years, maybe more. We have not been insuring for some time. There was hail and we did not receive compensation."*⁵⁹

4.2.3. The influence of policies

The policy that the respondents most often indicated as influencing the farming system was investment in physical assets within Pillar II – *"People have better equipment. If it wasn't for this funding, they wouldn't have bought it for cash, they wouldn't be able to afford it."*⁶⁰ Some respondents have already used these funds multiple times – *"Within the modernisation, we used two; even now we have signed a contract for the third modernisation."*⁶¹ However, some respondents indicated the lack of flexibility of this instrument, which is problematic for them – *"Each action is a five-year commitment, which means that a committing person who wants to use these programmes must develop a business plan, which is often a theoretical business plan. Because life really, especially in agriculture, is so changeable and dynamic that it is difficult to persevere even in optimistic and seemingly real intentions, because life is life."*⁶² Another problem is the requirement to increase production or acreage, mostly due to the lack of land available for purchase – *"There is one problem, either production must be increased, or the acreage increased within five years. With today's land prices, it is difficult. In addition, no one wants to sell the land."*⁶³ The respondents also perceive the extensive controls negatively – *"I have the impression that we are treated as fraudsters, as people who need to be bombarded with controls."*⁶⁴

Knowledge transfer and advisory services were considered important for the system. Many farmers indicated that they used the services of public advisors – *"From*

⁵⁸ „Korzystają. Tylko czasem może nie konieczne w całości, kompleksowo, tylko połowicznie. Ale te uprawy, na których bazują gospodarstwa, na których największy mają dochód to ubezpieczają.” (Interview 18, p. 3)

⁵⁹ „Ubezpieczaliśmy przez 15 lat, może więcej. Od jakiegoś czasu nie ubezpieczam. Był grad i nie dostaliśmy odszkodowania.” (Interview 1, p. 7)

⁶⁰ „Ludzie mają coraz lepszy sprzęt. Gdyby nie to dofinansowanie, to nie kupiliby tego za gotówkę, nie byłoby ich stać.” (Interview 3, p. 9)

⁶¹ „W ramach modernizacji skorzystaliśmy z dwóch, nawet teraz podpisaliśmy umowę na trzecią modernizację.” (Interview 13, p. 4)

⁶² „Każde działanie jest zobowiązaniem pięcioletnim, czyli taka osoba zobowiązująca się, która chce skorzystać z tych programów musi opracować biznesplan, który często jest teoretycznym biznesplanem. Bo życie naprawdę, szczególnie w rolnictwie jest tak zmienne i dynamiczne, że trudno jest wytrwać nawet w optymistycznych i jakby się wydawało prawdziwych zamierzeniach, bo życie jest życiem.” (Interview 15, p. 5)

⁶³ „Jest jeden problem, albo w ciągu 5 lat należy zwiększyć produkcję albo zwiększyć areał. Przy dzisiejszych cenach ziemi to jest trudne. Ponadto nikt nie chce sprzedawać ziemi.” (Interview 10, p. 4)

⁶⁴ „Ja mam wrażenie, że jesteśmy traktowani jako oszuści, jako ludzie, których trzeba bombardować kontrolami.” (Interview 13, p. 6)

*the Agricultural Advisory Centre. I also went private, but it is expensive, and here I am content. They not only prepared the application but also the business plan. They helped me a lot, because this business plan had to be improved, adapted to the prices of machines. It was corrected seven times. They are very scrupulous there. Because if you order a machine for 3,800 PLN and it costs 4,200, you have to change. And such small changes are time consuming.”*⁶⁵ However, some respondents complained about the too narrow scope of the advisory service, focused mostly on administrative issues – *“I always always thought and now think that this advice has gone the wrong way. It used to be said and only this probably remained that this consultancy is an extended arm of the administration and it is only dealing with it now. It does not take care of the farmer enough to help him.”*⁶⁶

Small farmers support within Pillar II was also indicated as an important instrument for the system. However, the regulations are considered too detailed, which makes it more difficult for farmers to use the funds in the most suitable way – *“I would like to buy a small tractor that can go everywhere, into an orchard, into crops, but I can't. Because according to the official, this is not a typical agricultural machine, and I gave up because he did not like it. Well, I don't understand it.”*⁶⁷

Young farmers support is considered a means of increasing acreage (*“He utilised a 'young farmer'. As a result, he expanded the farm by 3 ha.”*),⁶⁸ or making investments, although it does not affect the decision of young farmers to start working in agriculture. The support is considered too small to be significant – *“Support for the young farmer is negligible.”*⁶⁹

Social security policy is considered by the respondents as negatively affecting the availability of labour – *“Now they have 500+ and there is no one to collect raspberries. It really is so.”*⁷⁰ It is also considered a factor that stops small farmers from selling their land – *“We have another aspect, because we have the next thing like social security. It also holds this land close to these people.”*⁷¹

⁶⁵ „Z ODR. Byłem prywatnie, ale raz że drogo, a tam jestem zadowolony. Sporządzili nie tylko wniosek ale i biznesplan. Bardzo mi pomogli, bo ten biznesplan musiał być poprawiany, dostosowywany do cen maszyn. Był poprawiany ze 7 razy. Oni są tam bardzo szczegółowi. Bo jak maszynę zamówi się za 3800 zł, a ona kosztuje 4200, to trzeba zmieniać. I takie drobne zmiany są czasochłonne.” (Interview 6, p. 19)

⁶⁶ „Od zawsze, jak i teraz uważam, że to doradztwo poszło w złą stronę. Kiedyś się mówiło i chyba tylko to zostało, że to doradztwo to jest przedłużone ramię administracji i ono tylko tym się zajmuje w tej chwili. Za mało zajmuje się rolnikiem, żeby mu pomóc.” (Interview 9, p. 11)

⁶⁷ „Chciałbym kupić mały traktor, który wszędzie wjedzie, w sad, w uprawy, to nie mogę. Bo według urzędnika to nie jest maszyna typowo rolnicza, no i zrezygnowałem, bo jemu się nie podobało. No choroba, nie mogę tego zrozumieć.” (Interview 6, p. 24)

⁶⁸ „Skorzystał z młodego rolnika. Dzięki temu powiększył gospodarstwo o 3ha.” (Interview 11, p. 2)

⁶⁹ „Premia dla młodego rolnika jest znikoma.” (Interview 19, p. 9)

⁷⁰ „Teraz mają 500+ to nie ma komu zbierać malin. Tak naprawdę jest.” (Interview 7, p. 14)

⁷¹ „Mamy jeszcze następny aspekt, bo mamy następną rzecz jak ubezpieczenia społeczne. To też trzyma tą ziemię przy tych osobach.” (Interview 19, p. 7)

Weather risk management was considered inadequate by the respondents – “*Local governments support farmers in draining water that flows away irreversibly, and they do not think about collecting it. And we need to gather it.*”⁷² The insurance system is not considered reliable – “*We do not insure another one because insurance costs and insurers are dishonest. This is one more point. I do not insure. I have not insured for many years.*”⁷³

The respondents do not consider Pillar I as especially important for the fruit and vegetable farming system. They rely more on Pillar II – “*Under the RDP there is quite a lot of money to support farmers.*”⁷⁴ The respondents do not support Pillar I. Many of them see it as a way to maintain the *status quo*, where the land is kept by small farmers just to obtain the payments – “*Sometimes subsidies are important, but in this case, it is more damaging. A farmer with the equipment he has is able to cultivate several times more land than he has, but the amount of available land is limited. And the circle closes. In agriculture, there is really a large number of people who are not associated with this agriculture, and these subsidies keep them. They don't sow, don't plough.*”⁷⁵ Figure 13 shows a summary of the policies identified by the respondents as influencing the farming system.

The respondents suggested different changes to enhance the resilience of the farming system.

A common suggestion was diminishing the bureaucracy – “*I don't know how realistic it would be, I'd rather like to de-bureaucratise it all.*”⁷⁶ The respondents complained that the bureaucracy is so complicated that it is not possible to deal with the procedures by themselves – “*I want to write such an application. If I sit down to such an application, I will not write it in my life, I have to go to the company or a friend who deals with it professionally, pay him, because that is how it works in Poland.*”⁷⁷ It is also a reason for delays in receiving funds, which is problematic – “*Even the worst - it takes so long. This is due to all this paperwork, because you have*

⁷² „Samorządy wspierają rolników w zakresie osuszania, spuszczenia tej wody, która odpływa niepowracalnie, a nie myślą o zatrzymaniu. A nam trzeba ją gromadzić.” (Interview 5, p. 10)

⁷³ „Nie ubezpieczamy o następne, bo koszty ubezpieczeń i ubezpieczyciele są nieuczciwi. To jest jeszcze jeden punkt taki. Ja nie ubezpieczam. Od wielu lat nie ubezpieczam.” (Interview 16, p. 16)

⁷⁴ „w ramach PROW-u są dosyć duże pieniądze na wsparcie dla rolników” (Interview 5, p. 4)

⁷⁵ „czasami dopłaty są ważne, a w tym wypadku to bardziej szkodą. Rolnik mając ten sprzęt, który ma, jest w stanie uprawiać kilka razy nawet więcej ziemi niż posiada, ale ilość dostępnych gruntów jest ograniczona. No i kółko się zamyka. W rolnictwie jest naprawdę duża ilość osób, która nie jest z tym rolnictwem związana, a trzymają ich te dopłaty. To takie nie sieje, nie orze.” (Interview 5, p. 8)

⁷⁶ „Nie wiem na ile by było to realnie, chętniej chciałbym odbiurokratyzować to wszystko.” (Interview 3, p. 8)

⁷⁷ „Ja chcę sobie napisać taki wniosek. Jeżeli ja siadam do takiego wniosku, ja go w życiu nie napiszę, muszę sobie iść do firmy bądź do znajomego, który się tym zajmuje specjalistycznie, zapłacić mu, bo tak to funkcjonuje w Polsce.” (Interview 3, p. 8)

to go through everything. And to put it through, you need a lot of time, and it all slips away.”⁷⁸

Many respondents indicated that the policy should ensure sales of agricultural products – “Ensure the market, first of all. That is the basic thing. The most important thing is to ensure sales.”⁷⁹ However, these respondents do not indicate how such a policy change should be executed – “I think that the state should care, to some extent, I am not saying entirely, about this price. There is a chance. I do not know the procedures, how it would look like, but I see it as an opportunity to somehow, so to speak, stabilise the market at the price level it should be at.”⁸⁰

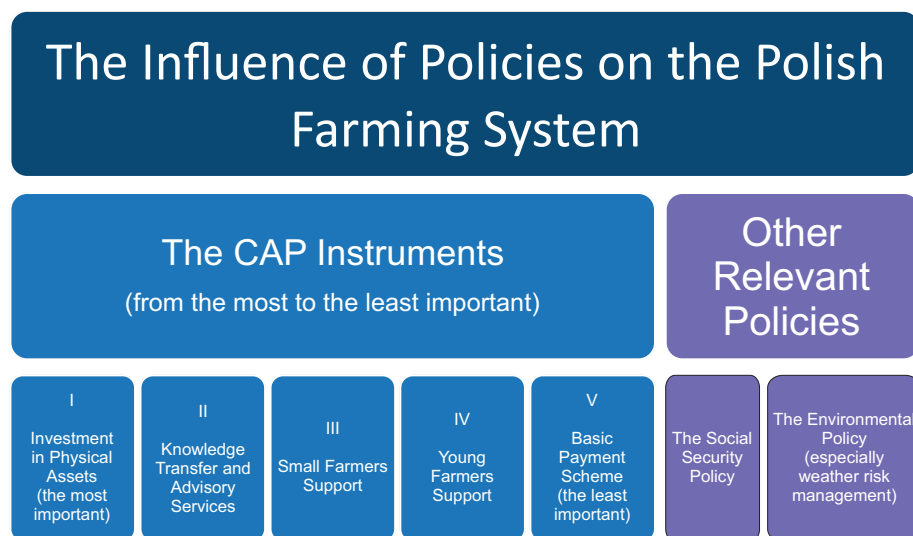


Figure 13. Policies identified by the respondents as influential with regard to the farming system

Source: Own study.

Some respondents suggested that credits are a better solution than subsidies, because they require thinking the projects through and increase the chance for their success – “Even my colleague and I came to the conclusion that maybe it was better not to give these subsidies, but to give such good loans properly. Let it not be that this

⁷⁸ „Jeszcze najgorzej – to tyle trwa. To jest spowodowane tą całą papierologią, bo to trzeba wszystko przerzucić. A żeby to przerzucić, trzeba kupić czasu i to wszystko ucieka” (Interview 3, p. 9)

⁷⁹ „Zapewnić zbył przede wszystkim. To jest podstawowa sprawa. Najważniejsze jest zapewnienie zbytu.” (Interview 9, p. 9)

⁸⁰ „Ja myślę, że państwo miałyby pieczę, w jakimś stopniu, nie mówię, że w całości, nad tą ceną. Jest szansa. Nie znam procedur, jak by to wyglądało, ale ja to widzę w tym szansę żeby właśnie w jakiś sposób ten rynek tak, że tak powiem, ustabilizować na jakimś takim poziomie cenowym, na jakim powinien być.” (Interview 18, p. 2)

*is a free subsidy, only a loan. It may have lower interest rates, but the loan must always be paid back. Maybe these groups would work a little better.*⁸¹ Some indicated that the subsidies should be abolished altogether – *“This interventionism is very big. I have always been of the opinion that the Union as a whole is very good, i.e. without borders, capital flow, etc. – it should be. On the other hand, to abolish agriculture subsidies altogether, but everywhere.”*⁸² Other respondents point out that it might be hard to encourage new entrants to agriculture without subsidies – *“But the farmer must also feel the money. If the farmer feels a bit of this money, that something is from this job, he will do it. In this way, the young must be encouraged. We will not do everything just for the glory of our homeland. Firstly, the monetary effect of the incentive that a few pennies stay, that you can invest in new equipment, in new technologies.”*⁸³ It was also noted that the differences between policies in EU countries make it difficult to compete on the international market – *“In general, apparently Germany, France and other member states of the European Union have higher subsidies than Poland, higher subsidy rates. If these subsidies were to remain or Poland were to remain in the European Union, it would be appropriate to equalise these subsidy rates so that they would be the same throughout the European Union.”*⁸⁴

Other respondents suggested an increase in the support for group action to avoid the inefficient use of funds – *“Support should be directed towards helping groups of small farmers, larger ones too. Producer groups, cooperatives. For example, the expensive equipment we talked about is bought by a farmer who cannot afford it; this equipment will sometimes work for him a few hours a year and stand there.”*⁸⁵

The lack of a clear national strategy for agriculture was considered a weak point of the policy – *“Our national strategy like organic farming or high-quality food should*

⁸¹ „nawet żeśmy z kolegą sobie doszli do wniosku, że może lepiej było nie dawać tych dotacji, tylko dać porządnie takie korzystne kredyty. Żeby to nie było, że to jest za darmo dotacja, tylko to jest kredyt. Może on jest niżej oprocentowany, ale kredyt trzeba zawsze zwrócić. To może te grupy by trochę lepiej działały” (Interview 4, p. 9)

⁸² „ten interwencjonizm jest bardzo duży. Ja byłem zawsze tego zdania, że Unia jako całość jest bardzo dobra, czyli bez granic, przepływ kapitału itd. – to powinno być. Natomiast w ogóle, żeby znieść całkowicie dotowanie rolnictwa, ale wszędzie.” (Interview 4, p. 10)

⁸³ „ale rolnik też musi czuć te pieniądze. Jeśli rolnik poczuje troszkę tego grosza, że coś z tej pracy jest, on będzie to robił. W ten sposób tych młodych trzeba zachęcać. Ku chwale ojczyzny wszystkiego też nie będziemy robić. Najpierw ten efekt pieniężny zachęty, że parę groszy zostaje, że można zainwestować w nowy sprzęt, w nowe technologie.” (Interview 13, p. 9)

⁸⁴ „Ogólnie to podobno Niemcy, Francja i inne państwa członkowskie Unii Europejskiej mają od Polski większe dopłaty, większe stawki dopłat. Jeśli te dopłaty by miały w dalszym ciągu zostać albo Polska w Unii Europejskiej miałyby zostać, to wypadałoby wyrównać te stawki dopłat, żeby w całej Unii Europejskiej były takie same.” (Interview 14, p. 3)

⁸⁵ „wsparcie powinno być ukierunkowane w kierunku wspierania grup małych rolników, większych również. Grup producenckich, spółdzielni. U nas na przykład sprzęt drogi o którym mówiliśmy, kupuje rolnik, którego nie stać na to, to ten sprzęt czasami będzie u niego pracował parę godzin w roku i stoi.” (Interview 5, p. 6)

*be a priority and should be our national good that we can offer all over the world.*⁸⁶ Another suggestion was related to the time scope of actions, which is currently too short – *“We should go in the direction that lets there be fewer farmers, but lets them be permanently connected with this land and lets their thinking be long-term, multi-generational. Let us reach up to our grandchildren, and not only what will happen in the sixth year.”*⁸⁷

The respondents also noticed that the amount of training is not sufficient and should be increased – *“There is some training there. However, there should also be more. It boils down to organising some training. Nevertheless, no matter how many people are in this training. A few or a dozen people will come, and the training will be done. It should be more massive, to reach more people, not a handful. I see in it that the policy of the administration or the state is not going in this direction.”*⁸⁸

4.2.4. The resources and network

The availability of social networks and contacts to discuss policies was considered sufficient by most of the respondents – *“We also get a lot of knowledge from others.”*⁸⁹ However, many farmers do not consider social networks as a main source of information about policies.

The respondents access information and learn about policies mainly via organisations and memberships (“conferences, fairs, meetings”),⁹⁰ media (mostly Internet and agricultural magazines, such as *“Działkowiec”*, *“Owoce, warzywa, kwiaty”*, *“Hasło ogrodnicze”* or *“Lubelskie aktualności ogrodnicze”*), and conversations with advisors (*“If necessary, we use the services of a private consultant, mainly in the field of legal and economic advice.”*)⁹¹ Less common ways to learn about policies are conversations with farmers (*“You can learn a lot from other farmers”*)⁹² as well as civil servants and scientists (*“Limanowa, we went to Limanowa very often, to the Agricultural University*

⁸⁶ „Taka nasza narodowa strategia jak rolnictwo ekologiczne czy żywność wysokiej jakości powinna być priorytetem i powinna być naszym dobrem narodowym, które możemy oferować na cały świat.” (Interview 13, p. 6)

⁸⁷ „My powinniśmy iść w kierunku, że niech tych rolników będzie mniej, ale niech oni będą na trwale związani z tą ziemią i niech to takie ich myślenie będzie długofalowe, wielopokoleniowe nawet. Żebyśmy sięgali aż do swoich wnuków, a nie tylko, co będzie w szóstym roku.” (Interview 5, p. 4)

⁸⁸ „Tam trochę szkoleń jest. Ale też powinno być więcej. Sprowadza się to głównie do tego, żeby zorganizować jakieś szkolenie. Ale nieważne ile ludzi jest na tym szkoleniu. Przyjdzie kilka, kilkanaście osób i odfajkowane jest szkolenie. To powinno być, żeby było bardziej masowo, żeby dotrzeć do większej ilości ludzi, ale nie do garstki. Ja to widzę w tym, że polityka administracji czy państwa nie idzie w tym kierunku.” (Interview 9, p. 12)

⁸⁹ „My też czerpiemy dużą wiedzę od innych.” (Interview 15, p. 8)

⁹⁰ „konferencje, targi, spotkania.” (Interview 1, p. 9)

⁹¹ „W razie potrzeby korzystamy z usług prywatnego doradcy, głównie w zakresie porad prawno-ekonomicznych” (Interview 6, p. 18)

⁹² „Dużo można się dowiedzieć od innych rolników.” (Interview 11, p. 16)

of Lublin – the professor organised conferences, seminars and other meetings.”)⁹³ None of the respondents indicated conversations with clients as a way to access information about policies.

The respondents often considered the availability of information on policies as sufficient – *“If someone wants to acquire knowledge, they will acquire it.”*⁹⁴ However, some respondents indicated that learning about policies and legal issues requires the initiative of the farmer – *“We have all kinds of restrictions, even water law, and of course a farmer must intervene to find out what it is at all.”*⁹⁵

The comprehension of relevant policies differed between the respondents. Some assessed it relatively highly (*“What interests me, which is relatively important to me, I try to deepen and expand this knowledge.”*)⁹⁶ Other respondents indicated that they could not say much about agricultural policy.

The comprehension of relevant policies by other actors was assessed highly – *“Farmers are interested in what is happening on the market, use these aid funds, modernisation and restructuring.”*⁹⁷ The respondents were aware of the learning process and the improvement of the comprehension of policies – *“Only a few years ago there were people who applied for this payment for the first time. Now probably everyone knows that it is all to be fulfilled.”*⁹⁸ However, some respondents pointed out that the extensive bureaucracy makes it difficult for farmers to comprehend all the rules – *“I would still like to raise such a thing as bureaucracy. There really is a lot of it when it comes to the order, the procedures associated with it, to get some profit for the damage. I will say that, because there are a lot of them. A farmer, as a person himself, is not able, I do not say everyone, but for the one fully unaware of these administrative procedures, it really is hard for the farmer, maybe I will put it this way.”*⁹⁹

The availability of capital to manage challenges was assessed differently by the respondents. Some pointed out that it is not easy to obtain funds – *“I started in three programmes, but in two I didn’t get on these lists. Once there were no points, once there*

⁹³ „Limanowa, do Limanowej bardzo często jeździliśmy, do Akademii Rolniczej w Lublinie – pan profesor organizował konferencje, seminaria i inne spotkania.” (Interview 1, p. 9)

⁹⁴ „Jeśli ktoś chce wiedzę pozyskać, to ją pozyska.” (Interview 14, p. 8)

⁹⁵ „Mamy wszelakiego rodzaju obostrzenia, chociażby prawo wodne, no i siłą rzeczy rolnik musi sam zainteresować, żeby się dowiedzieć co to jest w ogóle.” (Interview 18, p. 1)

⁹⁶ „To, co mnie interesuje, co jest w miarę istotne dla mnie, to staram się tę wiedzę pogłębiać i poszerzać.” (Interview 11, p. 20)

⁹⁷ „Rolnicy interesują się tym, co się dzieje na rynku, korzystają z tych funduszy pomocowych, z modernizacji, z restrukturyzacji.” (Interview 17, p. 5)

⁹⁸ „Jeszcze parę lat temu były osoby, które po raz pierwszy ubiegały się o tą płatność. Teraz już chyba raczej każdy wie, że jest to wszystko do spełnienia” (Interview 15, p. 6)

⁹⁹ „Ja bym jeszcze chciał podnieść taką rzecz jak biurokracja. Naprawdę jest tego mnóstwo jeśli chodzi o kolejność, procedury z tym związane, żeby uzyskać jakieś profity za szkody. Ja to tyle powiem, bo naprawdę tam jest mnóstwo. Rolnik, jako sama osoba, nie jest w stanie, nie mówię wszyscy, ale tak nieświadomiony w pełni tych procedur administracyjnych, naprawdę jest rolnikowi ciężko, może tak to ujmę.” (Interview 18, p. 2)

were no funds. I was able to take it the third time. It wasn't easy."¹⁰⁰ Others assess the availability of capital and its influence highly – “This is a chance for farmers because they get money for development, for the opportunity to invest in machinery. With some activities, from the ‘Young farmer’ they can buy a field for this money. It is a chance; it supports their development, because thanks to that their market position increases.”¹⁰¹

4.2.5. A summary of stakeholder proofing

The stakeholder check started from the presentation including the information about the goals of the meeting, the definition of the farming system used in the research, literature review regarding the challenges of the Polish fruit and vegetable farming system, and the chosen approach to the resilience of farming systems (see Meuwissen et al., 2019), including the capacities of robustness, adaptability, and transformability. The types of policies supporting these capacities and the main characteristics of such policies were also presented (see Termeer et al., 2018). After that, the research goal, method, and techniques were described. The results were presented in separate sections: challenges and risks, ways of coping with challenges, policy elements influencing the resilience of the farming system, changes in policies proposed by the respondents, and the influence of the policies on each of the three capacities of resilience. After each section, discussion took place. At the end of the stakeholder check, the participants were asked to rate the level of policy support for each characteristic on a sheet of paper – on the scale from one (not enabling) to five (very enabling). The average of points that the participants gave in each scenario are shown in Figure 14, Figure 15, Figure 19, and Figure 20.

The participants agreed with the main risks and challenges indicated by the respondents, related to income and fair prices, the lack of labour, weather events and climate change, water supply, market and competition, input and maintenance prices, and cooperation with other farmers. The main discussion points related to the risks, and challenges were related to the market. It was pointed out that the Russian embargo was the reason for the shrinkage of the market. It was stressed that the Ministry does not plan to regulate the market, so the farmers cannot count on that type of risk management. It was also stated that farmers are afraid of overregulation, especially in organic farming. Another important challenge stressed by the stakeholders was the problem with the insurance system, which is highly ineffective.

The main responses to the challenges and risks indicated in the interviews, namely the diversification of practices, intensifying farming business, contacting farming-systems actors, and upscaling farming business, were considered by the participants as

¹⁰⁰ „Ja startowałem w trzech programach, ale w dwóch nie załapałem się na te listy. Raz zabrakło punktów, raz zabrakło środków. Mi się po raz trzeci dopiero udało to wziąć. To nie było tak łatwo”. (Interview 20, p. 5)

¹⁰¹ „To jest szansa dla rolników, bo dostają pieniążki na rozwój, na możliwość inwestowania w maszyny. Z niektórych działań, z *Młodego rolnika* mogą kupić pole za te pieniążki. Jest to szansa, wspomaga ich rozwój, bo dzięki temu zwiększa się ich pozycja towarowa.” (Interview 17, p. 2)

very typical responses. The participants considered diversification as a good strategy, because specialising in one product is more difficult. It was stressed that the quality of production is very important, more important than quantity. The important point raised by the stakeholders was that farmers have a demanding attitude and even young farmers often see themselves as victims of the market. However, it was also noted that the whole value chain is dominated by the big capital. An important point was also that fruit production and vegetable production have slightly different problems, for example regarding the need for labour. According to the participants, the strategies that were lacking or not visible enough included the professionalisation of the occupation as a farmer, obtaining knowledge, branding, innovations, searching for one's own niche, using agrotechnics to deal with drought, and insurance.

The key point related to the policies influencing the resilience of the system was that the broad range of stakeholders is not included in the process of policy creation. The problem for farmers to meet the requirements of RDP programme instruments, such as the requirement of a 10% increase in production, was stressed. It was pointed out that there is a need for spatial development and the improvement of the policy of land management. In addition, according to the stakeholders, the insurance system needs a reform. The participants considered the importance of increasing the flexibility of policy important, as well as the rationality of regulations. The goal, not separate actions, should be more important. A significant notion was that direct payments are not as important for Polish fruit and vegetable farms as for other production types, because this makes up 14–15% of their income, compared to around 50% for many other production types. It was suggested that innovations should be mostly supported by Regional Development Funds, not the Rural Development Programme, which is already too complicated.

At the end of the meeting, the participants estimated the level of support for the robustness of the farming system on average at 2.86 (on a scale of 1–5), for adaptability it averaged 2.29, and for transformability – 1.86. This suggests that, although none of resilience capacities is highly enabled, relatively the policy most enables robustness and transformability the least.

The results of the stakeholder check were integrated into the results of the analysis by adapting the ResAT wheel colours after a discussion with the stakeholders. There were no adaptations of the wheel regarding robustness or transformability. In the case of adaptability, the medium-term focus was changed from level 3 to level 2. The change amounted to one point on a scale and was a result of the recognition of the participants' arguments regarding the difficulties in creating not only long-term, but also medium-term plans by the actors.

4.2.6. The identification of the strengths and weaknesses of policies in terms of resilience

Policies support different capacities of the resilience of farming systems to various extents. Relatively the highest support is directed at robustness (see Figure 14).

Short-term focus was assigned to level 3 (see Figure 14 – yellow) – fairly enabling, because there is short-term support, but frequently this is not sufficient. There are also yearly allocations of the direct payments; however, they are not a very important part of the income of fruit and vegetable farms in Poland. These are also not always considered beneficial for the system, because short-term profits for small farmers discourage them from selling their land to commercial farmers – “*Payments destroy our agriculture, direct payments.*”¹⁰²

Protecting the status quo was assigned level 4 (see Figure 14 – green) – enabling, due to existing support for small farms, direct payments, and the favourable social insurance for farmers. There is also still some coupled support, although at a very limited level – “*We now have funding for a particular crop in the area.*”¹⁰³

Buffer resources were assigned level 4 (see Figure 14 – green) – enabling, due to the availability of funds for investments in physical assets, smallholders’ support, young farmers support, or direct payments. However, some respondents pointed to inequalities in relation to buffer resources support in different EU countries – “*For example, farmers get direct payments. It has to be everywhere evenly. So why do farmers in the West get a higher subsidy? We can’t compete in this way.*”¹⁰⁴

Other risk management strategies were assigned level 3 (see Figure 14 – yellow) – fairly enabling, due to the fact that despite the existence of risk-management instruments, they do not always work properly, for example insurances – “*We’re insured for 15 years, maybe more. We have not been insuring for some time, there was hail, and we did not receive compensation.*”¹⁰⁵

Adaptability was considered less supported than robustness. This is revealed by the following scoring by the stakeholders.

Medium-term focus was assigned level 2 (see Figure 14 – orange) – slightly enabling, due to the scope of Pillar II instruments. However, the respondents found it difficult to meet the requirements set by the funding agency – “*Once I went to ask, but you have to meet a lot of different conditions. There is one problem, either production must be increased, or the acreage increased within five years. With today’s land prices, it is difficult. In addition, no one wants to sell the land.*”¹⁰⁶

Flexibility was also assigned level 2 (see Figure 14 – orange) – slightly enabling, because of the focus on the means of achieving the above necessary goals and the lack of procedural flexibility, with little regard to the situation of the system and the market – “*Why are we not flexible in some way and this whole common policy is*

¹⁰² „Dopłaty rozwalają nasze rolnictwo, dopłaty bezpośrednie.” (Interview 1, p. 16)

¹⁰³ „Teraz mamy dofinansowanie do danej uprawy w obszarówce.” (Interview 15, p. 6)

¹⁰⁴ „Na przykład rolnicy dostają dopłaty bezpośrednie. Ma być wszędzie równo. A dlaczego rolnicy na zachodzie dostają większą dopłatę? Przecież my nie możemy w ten sposób konkurować.” (Interview 3, p. 7)

¹⁰⁵ „Ubezpieczaliśmy przez 15 lat, może więcej. Od jakiegoś czasu nie ubezpieczamy, był grad i nie dostaliśmy odszkodowania.” (Interview 1, p. 7)

¹⁰⁶ „Kiedyś poszedłem zapytać ale trzeba spełnić bardzo dużo różnych warunków. Jest jeden problem, albo w ciągu 5 lat należy zwiększyć produkcję albo zwiększyć areał. Przy dzisiejszych cenach ziemi to jest trudne. Ponadto nikt nie chce sprzedawać ziemi.” (Interview 10, p. 4)

also not flexible? The farmer and producer should decide what is better for him and not some official telling me what to do. There can't be such a thing."¹⁰⁷

Variety was assigned level 3 (see Figure 14 – yellow) – fairly enabling, due to the existence of different instruments within Pillar II for the modernisation of farms and supporting young farmers, as well as advisory services, but there are not many instruments dedicated to fruit and vegetable farming. Some are available, though – *“There were probably resources for fruit growers who could get extra big money for the preparation of these storage rooms and activities. However, I can't tell you much in detail. It is the most supportive for groups and it is not a small amount of money.”*¹⁰⁸

Social learning was also assigned level 3 (see Figure 14 – yellow) – fairly enabling, because advisory services are provided; however, according to some respondents, they are not sufficient – *“There is some training there. But there should also be more.”*¹⁰⁹ There is also support for groups of producers, which can be a platform for social learning – *“Certainly much progress has been made through these investment subsidies. Even this group is also an example of this. I don't know if it would have been created had it not been for these subsidies.”*¹¹⁰

The stakeholders considered transformability to be the least supported. The marks for each element of its composition were evaluated as follows.

Long-term focus was assigned level 1 (see Figure 14 – red) – not enabling, due to the lack of long-term strategies for the system – *“We should go in the direction that lets there be fewer farmers, but lets them be permanently connected with this land and lets their thinking be long-term, multi-generational, that we reach to our grandchildren. Not just what will be in the sixth year.”*¹¹¹

Dismantling the *status quo* was assigned level 2 (see Figure 14 – orange) – slightly enabling, because of the direct payments, which still maintain the *status quo*, although they are not as important for the fruit and vegetable farming system as for other farming systems. Coupled support is diminishing, although it still exists at a limited level – *“We now have funding for a particular crop in the area”*¹¹².

¹⁰⁷ „Dlaczego nie jesteśmy w jakiś sposób elastyczni i ta cała wspólna polityka też nie jest elastyczna, że rolnik, producent powinien decydować, co jest dla niego lepsze, a nie mi jakiś urzędnik będzie mówił, co ja mam robić. Nie może czegoś takiego być.” (Interview 13, p. 14)

¹⁰⁸ „Były środki bodajże dla sadowników, którzy mogli uzyskać dodatkowe duże pieniądze na przygotowanie tych przechowalni i działalność. Aczkolwiek nie potrafię Panu tak szczegółowo powiedzieć. Jest dla grup jak najbardziej wsparcie i to nie są małe pieniądze.” (Interview 17, p. 10)

¹⁰⁹ „Tam trochę szkoleń jest. Ale też powinno być więcej.” (Interview 9, p. 12)

¹¹⁰ „Na pewno duży postęp został zrobiony poprzez te dopłaty do inwestycji. Chociażby ta grupa też jest przykładem tego. Nie wiem, czy by powstała, gdyby nie było tych dotacji.” (Interview 4, p. 9)

¹¹¹ „My powinniśmy iść w kierunku, że niech tych rolników będzie mniej, ale niech oni będą na trwale związane z tą ziemią i niech to takie ich myślenie będzie długofalowe, wielopokoleniowe nawet, żebyśmy sięgali aż do swoich wnuków. A nie tylko, co będzie w szóstym roku.” (Interview 5, p. 4)

¹¹² „Teraz mamy dofinansowanie do danej uprawy w obszarówce.” (Interview 15, p. 6)



Figure 14. The Resilience Assessment Tool wheel for the Polish fruit and vegetable farming system in the view of stakeholders

Source: Own study.

In-depth learning was assigned level 1 (see Figure 14 – red) – not enabling. The respondents could not indicate any policy instruments supporting in-depth learning.

Niche innovations were assigned level 2 (see Figure 14 – orange) – slightly enabling, due to the possibility of getting funds for innovations from the Regional Operation Programme, although the process is characterised by extensive bureaucracy, and it is hard to acquire funds for experimental projects. The definition of innovation in the Rural Development Programme covers a broad range of activities, which makes it possible to spend money on projects that are characterised by a low level of innovation – “*For example, if there was no tractor on a given farm and you bought it, it is already an innovation. There was no particular crop. The entire RDP is an innovation. Whatever that means [laughs].*”¹¹³

¹¹³ „Na przykład jak w danym gospodarstwie nie było traktora, a zakupił to już jest innowacja. Nie było danej uprawy. Cały PROW stoi innowacją. Cokolwiek to nie znaczy. [śmiech]” (Interview 15, p. 11)

4.2.7. The future of the CAP – the results of the workshop on policy recommendations

The results of the workshop covered policy recommendations generated by the participants to obtain levels of support for robustness, adaptability, and transformability, considered by the stakeholders as the most desirable. Most of the recommendations were related with, but not limited to the CAP. The results also include stakeholder views on different future scenarios and differences in the desired mix of support for various resilience capacities.

4.2.7.a. Round 1: Generic policy recommendations

The stakeholders first discussed whether enhancing robustness should be a priority, due to its short-term focus. The public sector, both at the European Union and national level (considering the participation from national funds), is considered necessary to ensure the continuity of actions, which increases the robustness of the system. The stakeholders agreed that the first existing policy instruments to enhance robustness need to be improved before new ones or new (better targeted) policies are created. Direct market intervention mechanisms exist, although they are being withdrawn. The European Union funds can have a big influence on the stabilisation of incomes, which are important buffer resources strengthening robustness. A possible change would be to condition them more on farmers providing public goods by actions such as greening (but more precise in the evaluation of specific public goods' value). Two main risks need to be addressed: risks related to the weather and the price risk. However, there is very limited influence on either of them. Actors from all over the world influence prices and it is not possible to make predictions based on small, unstable markets. However, the policy can influence insurance to affect the risk level. In the current system, it is not profitable for private companies due to a very high risk – the differences in prices on the fruit and vegetable markets are several times higher than on the grain market. The stakeholders pointed to the importance of retention in ensuring robustness, which should be addressed by the cohesion policy on rural areas, as well as by the CAP and national environmental policies.

The stakeholders pointed out that value chains as well as horizontal and vertical integration need to be supported by increasing cooperation, as for example in Germany, where producers cooperate in processing the goods produced. There are instruments to support cooperation by farmers in Poland, although farmers take little responsibility for action and there is a fear that they will need to repay the money if their actions have too little effect. The low level of social trust is also a barrier. In this context, advice is important, which is proven by the good examples in countries like Denmark, where there is an extensive advisory system. It is important not only to improve technological advice, but also to involve facilitators who work with the region, not only with one farmer. Such facilitators can encourage the introduction of common projects. In addition, innovation brokers are useful, who encourage

different groups, such as farmers, advisors, scientists, etc., to realise common projects. Such projects are a chance to gain significant funds from the EU budget. In the current system, one advisory agent is responsible for different tasks and there is not enough time for all these activities. The stakeholders see the need to divide these tasks between technological advisors, facilitators, and innovation brokers. However, some stakeholders wondered if it makes sense to develop public advisory services, while in the Polish fruit and vegetable farming system, private consulting is used more often and considered more effective. The stakeholders agreed that it is important to finance processing within producer groups, because financial incentives for cooperation are easier and faster to introduce than a change of mentality. It is important to note, however, that producer groups that are formed around capital are more likely to succeed if there is a higher level of trust between members than in the groups, where the level of trust is lower. There was a suggestion that processing can be supported by food-quality systems that push farmers to create products which can make their mark.

The stakeholders concluded that it is important to focus on the long term, because this is lacking both in Poland and in the EU. In some countries, like China (although with all positive and negative aspects of the strategy), the strategic scope is 50 years. One of the long-term goals suggested by the stakeholders is vertical integration, for example by facilitating the co-ownership of processing facilities by producers. One of the ideas to do this is subsidising enterprise shares instead of loans, which are costly. In this way, in over a dozen years, it would be possible to increase the capital connection of different actors, which is viewed as beneficial for the Polish fruit and vegetable farming system. According to the stakeholders, it is important to study trends of consumption (preferences and tastes) and adjust the production profile to them. It is also important to improve the health value of products, which affects the choices of consumers. There is a need for a more comprehensive look on policy, including demand-side, for example by creating demand for fruit and vegetables by promoting a healthy diet. Innovation in production should focus on health value and the novelty of products. However, some stakeholders suggested that there is too much focus on innovation and too little on cooperation and improvements in common-project realisation, which bonds the actors in the system much more than individual actions.

The discussion ended with the following question: “if we apply the proposed policies and courses of action, what will the level of desired robustness, adaptability, and transformability as well as their 12 policy-enhancing characteristics be?” The stakeholders were given printed versions of the ResAT wheel and were asked to fill in the numbers on a scale 1–5, where one (red) was the lowest value and five (dark green) was the highest one. This approach made it possible to see the future mix of capacities that the stakeholders desired under a *status-quo* scenario useful as a baseline for the comparison with future scenarios. According to the stakeholders, in a future *status-quo* scenario, priority should be given to supporting adaptation at a high level, followed by moderate support for transformability and robustness (see Figure 15).



Figure 15. The Resilience Assessment Tool wheel for the Polish fruit and vegetable farming system in a future *status-quo* scenario, based on the stakeholder assessment on the scale 1–5 during the CAP recommendations workshop

Source: Own study.

The ResAT was also useful to find out how consistent proposed policies and courses of actions were with 12 resilience-enhancing policy characteristics. The results show that the generic policy recommendations suggested by the participants were in line with the level of support of the particular characteristics of resilience capacities assessed by the participants as desired in the *status-quo* scenario. In the case of robustness, enabling a short-term focus was considered fairly important, mostly relevant to ensuring the continuity of actions. The stakeholders proposed changes to existing instruments and the adoption of new, more focused ones, so maintaining the *status quo* was considered only marginally significant. Buffer resources were considered fairly important, significant mostly for the stability of incomes. However, the participants saw the need for conditioning this on farmers providing goods with a precise evaluation of the value of public goods produced. Enabling risk was considered the most important characteristic of robustness, as risks related to

weather and price volatility need to be addressed. According to the participants, this can be targeted indirectly by reforming insurance system. Another suggested means of dealing with risks related to unfavourable weather conditions was investment in retention, where not only the CAP but also the cohesion policy and national environmental policy should play a crucial role.

Regarding adaptability, a medium-term focus was considered fairly important. Flexibility was considered important, as bureaucracy and very strict rules about the results that must be accomplished by supported projects are raising farmers' fears of having to repay the money due to potential difficulties in achieving these effects. Variety and tailor-made responses were considered important. Participants emphasised the need to introduce technological advisors and regional facilitators to encourage farmers to initiate joint projects. They also suggested employing innovation brokers to foster collaboration among various groups, including farmers, advisors, and scientists, to realise common projects. This variety of advisory roles would be important in terms of social learning, another important characteristic of adaptability, especially in the context of value chains and vertical integration. Such activities have a value in fostering collaboration, which is difficult to achieve in the Polish fruit and vegetable farming system due to the lack of social trust.

In the case of transformability, a long-term focus was considered important for goals such as the vertical integration of the system, as well as policies aimed at promoting a healthy diet and the consumption of local fruits and vegetables, in order to boost demand for these products. Dismantling the *status quo* was regarded as only slightly important. In-depth learning was considered very important, because it is crucial to shift farmers' mindsets in order to adapt to consumer demands and begin new forms of collaboration, such as agricultural producers co-owning processing facilities. The enhancement of niche innovations was considered fairly important, although the participants stressed that facilitating innovations is not as important as support for cooperation. According to the participants of the workshop, the most important is support for innovations increasing the health value of the products and their novelty.

4.2.7.b. Round 2: The CAP – recommendations

The stakeholders indicated several policy changes needed to enhance robustness (see Figure 16). Many proposed actions were related to the short term, although some suggestions were indicated in mid-term and even long-term, as they could not be conducted within several months. In the short term, the most important action, according to the participants, was improving the risk-management system at the national level, with a special emphasis of reforming the insurance system. Some stakeholders suggested the liberalisation of the national law on the labour market (especially internationally) to increase labour resources.

Among suggestions that could be introduced in the mid-term was income stabilisation through mutual funds. To ensure water supply, the National Water

Management Programme needs to include actions allowing regional governments to provide water retention.

The main suggestion to be realised in the long term was increasing the share of greening payments in the CAP. Improving farmers' managerial skills was indicated as improving robustness, although this can also support other resilience capacities. Some stakeholders suggested national market intervention as a way of increasing robustness. Others suggested improving the law to prevent price fixing.

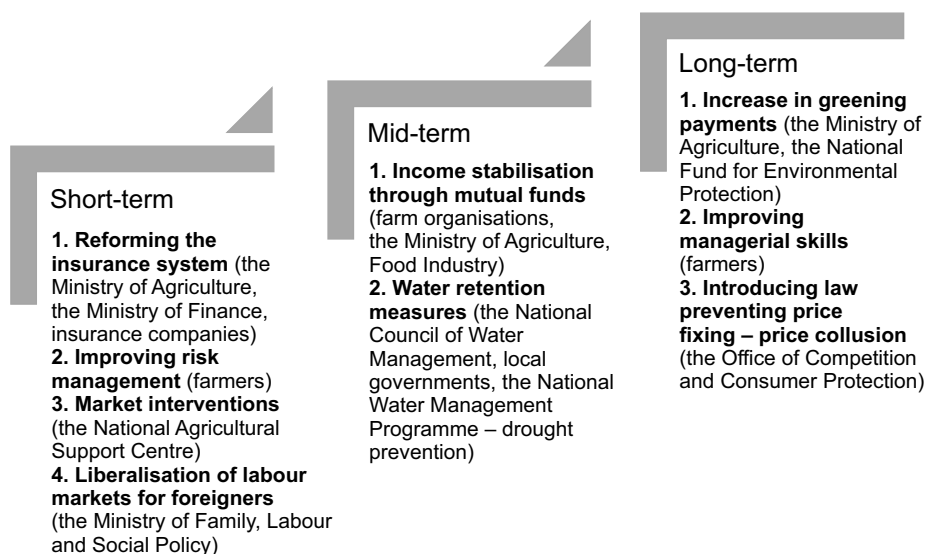


Figure 16. Selected specific policies/actions for enabling robustness in the order of their importance (top-down) and the main actors involved, according to the stakeholders

Source: Own study (based on discussion during the workshop).

To enhance adaptability, the participants suggested mid-term and long-term actions (see Figure 17). Among the mid-term solutions, support for processing by farmers was considered the most important. It was pointed out that the support for the transfer of knowledge between science – advisors – farmers (both ways) should be supported more strongly, for example by networking and database creation.

The most important long-term strategy, according to the participants, was to increase the budget for programmes enhancing vertical and horizontal integration. Changing the scope of advisory services by including facilitators and innovation brokers, and increasing the salaries of public advisory agents, was also suggested. Another suggested action was changing the law on the Chambers of Agriculture to increase their competences. The creation of national food-quality system, which would enforce adaptability, was also suggested. In addition to policy changes, the need for changes in mentality in the context of cooperation was stressed.

The participants had several ideas to enhance transformability mid-term and long-term (see Figure 18). According to the participants, the most important

action mid-term was the creation of a national programme to support precision farming. There was also an idea to launch a national programme to integrate farmers through joint capital groups. Another one was to increase funds for the support of the diversification of activities among producers and to simplify procedures to obtain them.

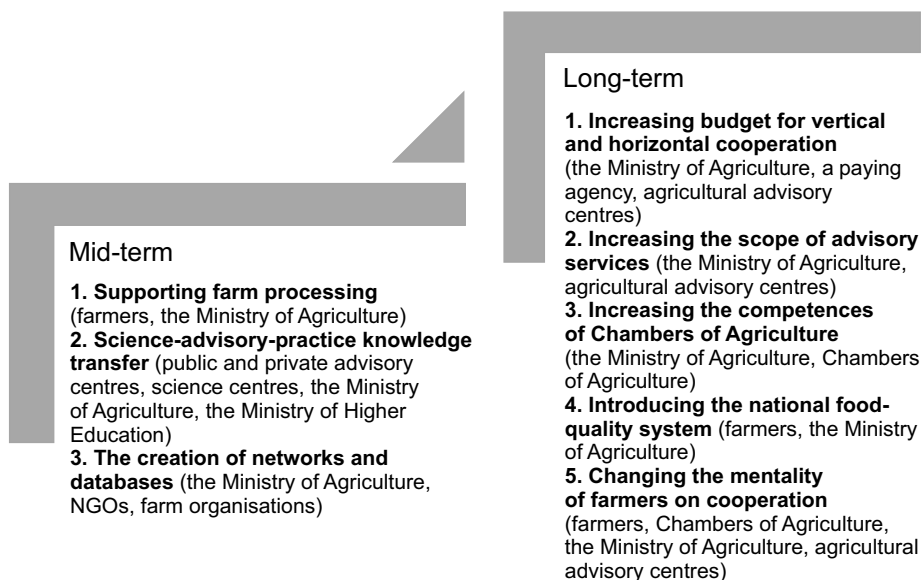


Figure 17. Selected specific policies/actions for enabling adaptability in the order of their importance (top-down) and the main actors involved, according to the stakeholders

Source: Own study (based on discussion during the workshop).

The most important idea to be realised long-term was mutual learning by consumers and producers, i.e. on the one hand, the producers would learn the consumers' preferences, and on the other, the consumers would learn via an EU-wide education campaign about healthy food, which could increase demand for fruits and vegetables. Also, introducing national programmes for innovations to improve quality and reduce labour consumption was suggested. The importance of support for niche markets was also stressed. Other suggestions included increasing funds for joint projects by groups of farmers and the search and support for niche markets.

Summing up, actions considered by the participants as the most important for enabling robustness included a reform of the insurance system, improvements to risk management by farmers, and the stabilisation of incomes by mutual funds (see Table 5). The most important actions for adaptability, according to the participants, included an increase in funds for vertical and horizontal cooperation, supporting farm processing, and increasing the scope of advisory services, including facilitators and innovation brokers. Transformability mostly requires mutual learning by consumers and producers, labour-saving innovations, and the introduction of precision farming.

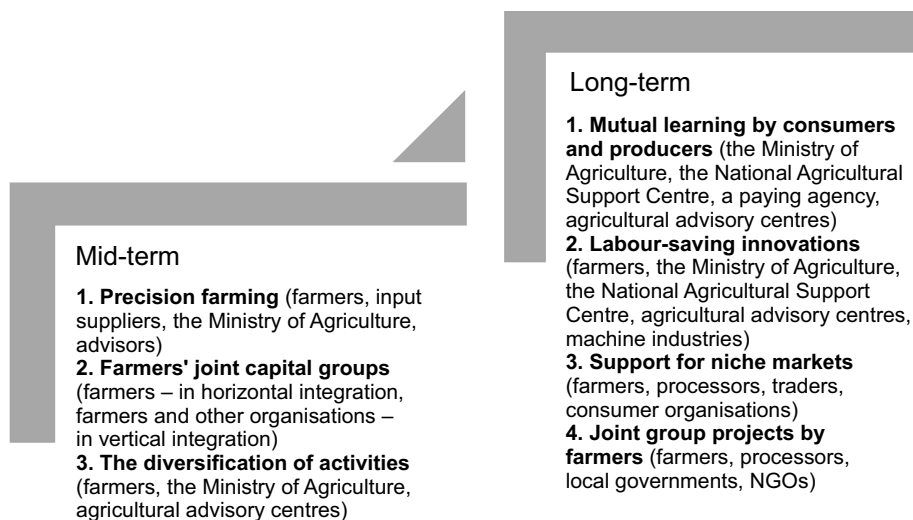


Figure 18. Selected specific policies/actions for enabling transformability in the order of their importance (top-down) and the main actors involved, according to the stakeholders

Source: Own study (based on discussion during the workshop).

Table 5. The most important actions to enable robustness, adaptability, and transformability, based on workshop results

Resilience capacity	the most important action, according to the participants	the 2 nd most important action, according to the participants	the 3 rd most important action, according to the participants
Robustness	1. Reforming the insurance system	2. Improving risk management	3. Income stabilisation through mutual funds
Adaptability	1. More funds for vertical and horizontal cooperation	2. Supporting farm processing	3. Increasing the scope of advisory services
Transformability	1. Mutual learning of consumers and producers	2. Labour-saving innovations	3. Precision farming

Source: Own study.

4.2.7.c. Round 3: Recommendations under two scenarios

In the third round of the workshop, the stakeholders assessed the desired mix of policies under two different scenarios for future EU farming. The scenarios were based on Shared Socioeconomic Pathways (SSP), developed by O'Neil and colleagues (2014). Mathijs and colleagues (2018) adjusted the available SSP narratives, which were developed for a whole global economy, to narratives significant for the EU farming systems. Of the five scenarios (see Table 1), two were chosen that were different

from each other in terms of policy – the most protectionist scenario (SSP 3) and the most liberal scenario (SSP 5). After discussing each scenario, the participants filled in the Resilience Assessment Tool wheel for the Polish fruit and vegetable farming system in this scenario on a scale 1–5. At the end of the workshop, there was feedback about important take-aways and suggestions. The SSP 3 (Regional rivalry) and SSP 5 (Fossil-fuel development) scenarios were described to the participants as stated in Table 6.

Table 6. The description of the SSP 3 (Regional rivalry) and SSP 5 (Fossil-fuelled development) provided to participants in the workshop

SSP 3 Regional rivalry	SSP 5 Fossil-fuelled development
<ul style="list-style-type: none"> • Ecological awareness is low. • International trade is strongly constrained by protectionist measures at the borders. • Consumption patterns: meat-based but origin is important (local preferences). • As a result of a relatively high meat consumption and reduced imports of soy and other feed, the production of own feed increases, as well as the use of by-products and waste streams for animal feed. • Food prices are high as productivity growth remains slow due to the limited uptake of biotechnology-based innovations. • Prices are relatively stable due to governmental intervention. • Temporary food surpluses are used for feed and non-food purposes. • Due to the restriction of trade, the concentration of livestock production in north-western Europe decreases and livestock production in Central and Eastern Europe increases. • Dairy production also decreases due to export restrictions. • Land is scarcely accessible due to high demand for fodder production and a relatively low level of technology development. • There is a labour shortage as migration is constrained under protectionist trade policies. • Small and medium-sized enterprises play a relatively large role in the food industry as many multinationals are from outside Europe. • Vertical coordination between the food industry and farms is limited due to the intensive market intervention policy. 	<ul style="list-style-type: none"> • Environmental awareness is mainly focused on local issues, ignoring global problems. • International trade is very open, resulting in regional specialisation in production. Diets are rich in meat, variety is important – both imported and produced in the EU using imported feed. • Low pressure to reduce food waste and food losses. • Food prices are low, mainly because of high productivity, but very volatile. • The concentration of livestock production and associated air and water pollution in north-western Europe remains, although dependence on imported feed eventually declines due to full participation of the land-use sector in international climate change agreements. • Technological development is still supported by fossil fuels; an emphasis on resource efficiency through precision farming • Land relatively accessible due to high levels of productivity and open trade. • Labour relatively accessible due to high levels of productivity and open trade. • Concentration in the agri-food industry increases even more so that the food industry is dominated by multinationals. • Vertical coordination between agriculture and the food industry remains limited as global cash markets dominate. • Consumer sovereignty dominates, because consumers prefer a wide selection of products from all over the world.

Source: Based on Mathijs et al., 2018.

Scenario SSP 3 – Regional rivalry (the most protectionist scenario)

According to the stakeholders, in the SSP 3 scenario, the desired level of robustness would be higher than in the current situation (see Figure 19). Less specialisation would give more chance for robustness. In the SSP 3 scenario, increasing mechanisation and less labour-intensive activities would be needed to maintain a desired level of robustness due to the lack of labour caused by migration limitation as a result of a protectionist policy. Such changes would need an increase in the desired level of buffer resources. More labour-intensive types of products might be imported from countries like China. Risk management would be slightly less important than in the *status-quo* scenario due to a protectionist policy reducing risks related to price volatility. However, risks related to climate change and weather conditions still need to be addressed.



Figure 19. The Resilience Assessment Tool wheel for the Polish fruit and vegetable farming system in a future regional rivalry scenario

Source: Own study based on the stakeholder assessment on the scale 1–5 during the CAP recommendations workshop.

According to the stakeholders, in the SSP 3 scenario, it would be important to promote the deconcentration of capital and the diversification of production to meet the needs of the local market. The public advice would need to be supported more strongly due to high public intervention in the market, but the social learning and in-depth learning would be limited by the low level of vertical cooperation. Flexibility would be less desired than in the *status-quo* scenario due to relatively stable market conditions.

Transformability would not be much desired, especially in the area of niche innovations and in-depth learning, due to strong public market interventions and protectionism (see Figure 19). Furthermore, caused by a lack of ecological awareness, ecological innovations would receive little support.

Scenario SSP 5 – Fossil-fuelled development (the most neoliberal scenario)

In the SSP 5 scenario, there would be a greater desire for supporting adaptability and transformability (see Figure 20) because of the increased competition against



Figure 20. The Resilience Assessment Tool wheel for the Polish fruit and vegetable farming system in a future fossil-fuel development scenario

Source: Own study based on the stakeholder assessment on the scale 1–5 during the CAP recommendations workshop.

producers from other countries, such as the USA. However, the stakeholders do not consider this scenario very plausible, because it will be too risky for European agriculture due to difficulties in competing with producers from other places in the world. Local producers would be heavily dependent on exports.

In the case of robustness, according to the stakeholders, greening and renewable energy would lose its importance in the SSP 5 scenario because of its high costs and the focus on technological development driven by fossil fuels. It would therefore be important to assure business continuity that the importance of buffer resources might increase.

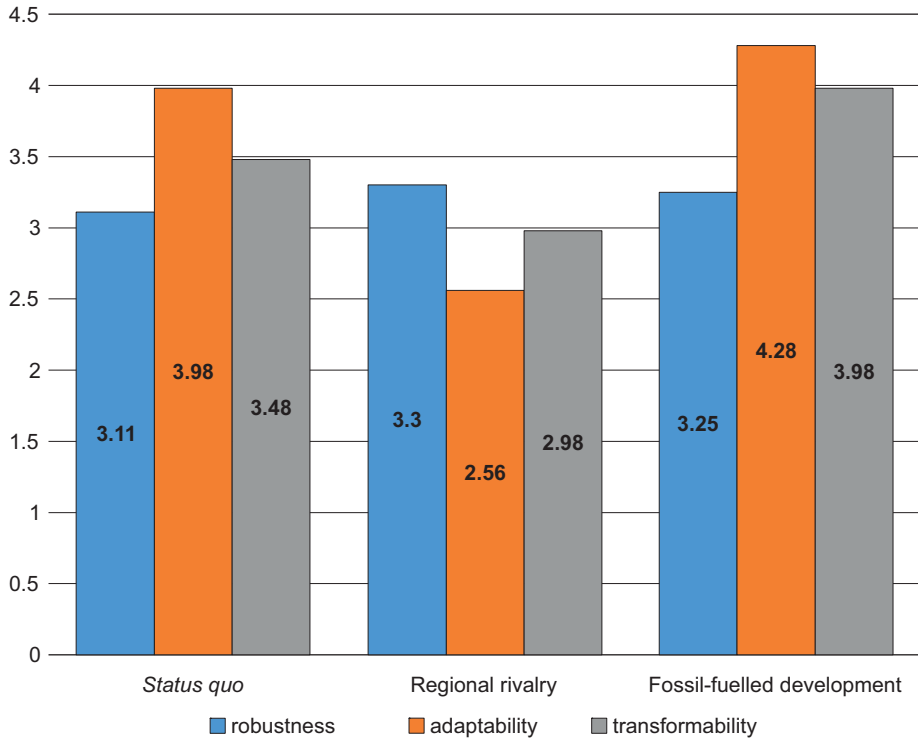
Considering adaptability, the stakeholders assume that rapid adaptation processes will be very important in the SSP 5 scenario due to more numerous threats. Flexibility would thus be very much desired. Vertical integration would not develop, because large, international corporations would dominate the food industry, and the disproportion in the size would not allow producers to integrate with these companies. It would be necessary to support the concentration of capital. Only horizontal integration would be developed to help farmers to be able to get contracts with these big companies not interested in the small-scale supply of products. However, they would likely mostly consider big farms, not many small ones. Corporations seeking the cheapest products may impede this by increasing competition and hindering integration between producers. To avoid such negative effects, strengthening social learning would be very beneficial. Another way in which the internationalisation of the food industry and free trade might affect, adaptability of the system is that public advice would not be supported, and private services would predominate.

According to the stakeholders, in the liberal scenario, capital concentration would be encouraged in order to compete globally, and large corporations would be unwilling to share capital. Since competing with big multinational companies in mainstream production would be difficult, smaller producers would need to develop in-depth learning, seek niches, and develop production within them.

4.2.7.d. A comparison of different future scenarios

The workshop concluded that the desired level of three resilience capacities differs depending on the scenario (see Figure 21). Compared to the *status-quo* scenario, in SSP 3, robustness was slightly more desired, adaptability and transformability had lower desired levels, while the SSP 5 scenario was characterised by higher desired levels of all resilience capacities.

In certain cases, the participants evaluated desired levels of specific resilience capacities at similar levels in all three scenarios, whereas in others they differed. The biggest differences between the scenarios were observed in the case of two characteristics of adaptability, namely flexibility (SSP 3 vs SSP 5) and social learning (SSP 3 vs SSP 5), as well as two characteristics of transformability, namely in-depth learning (*status quo* and SSP 5 vs. SSP 3) and niche innovations (*status quo* and SSP 3 vs SSP 5). The results suggest that robustness is a capacity that requires a similar level



Note: on a scale 1 (lack of support) to 5 (very high support).

Figure 21. Desired levels of three resilience capacities in different future scenarios

Source: Own study based on the stakeholder responses during the CAP recommendations workshop.

of enabling regardless of the future scenario, whereas adaptability and transformability require more support the more neoliberal the future policy is.

Conclusions and future areas of research

A variety of threats and challenges affect European farming systems. Resilience thinking can assist in a better grasp of the interconnections and challenges of building sustainable food production, diverse agri-ecosystems, and thriving rural areas. The research aimed to address the scientific problem of assessing the impact of European Union policies on the resilience of Polish farming systems. Even though some farming systems, such as dairy, benefit more from the CAP funds than others, little is known about how useful the CAP is for less supported systems, such as fruit and vegetable production. The application of the concept of three types of policies supporting resilience to assess support for the resilience of Polish farming systems, the use of a new tool for analysing and evaluating agricultural policy – the ResAT in Poland, and the evaluation of the implementation of the CAP in Poland from the perspective of farming system resilience, as exemplified by the case study of the fruit and vegetable farming system, all constitute the research's added value. According to the resilience theory, the research provides for the verification of the use of the proposed dynamic concept of resilience, assessing current and future public policy design. The proposed study adds to the continuing discussion about the CAP's future and its impact on farming system resilience by examining that impact in terms of its robustness, adaptability, and transformability capacities, as well as their 12 primary characteristics.

Conclusions

The framework used in the analysis of the resilience of the farming system proved useful in the given application due to its relevance both for literature on resilience and future policy. Thanks to the focus on farming system, the framework matches with current agricultural policy trends within the European Union, which aim at providing more flexibility at the national and regional levels to be able to concentrate on challenges which are specific to particular contexts. The approach included the triangulation of techniques used to answer Hypotheses 1 and 2 (see Table 7).

The verification of Hypothesis 1, “The CAP supports the resilience more intensively by ensuring robustness rather than adaptability and transformability in Polish farming systems”, was based on three research techniques. The top-down approach was represented by the Resilience Assessment Tool, and the bottom-up approach by the in-depth interviews and a workshop conducted with stakeholders. The most significant support for robustness was identified in all techniques used, hence

the hypothesis was verified positively. Policies support different capacities of the resilience of farming systems to a different extent. Relatively the highest support is directed at robustness (especially protecting the *status quo* and buffer resources), and the lowest one to transformability (the least at long-term focus and in-depth learning). The results are in line with other research suggesting that the political situation in the EU is not conducive to changes but, rather, to maintaining the *status quo* (Figiel et al., 2019).

Table 7. The results of the analysis conducted with different research techniques in relation to Hypotheses 1 and 2

Hypothesis	ResAT	Interviews	Workshop
H1: The CAP supports resilience more intensively by ensuring robustness rather than adaptability and transformability in Polish farming systems.	Yes	Yes	Yes
H2: Current CAP's support for the adaptability of the fruit and vegetable farming system restricts it from increasing resilience.	Not addressed	Yes	Yes

Source: Own elaboration.

To verify Hypothesis 2, “Current CAP support for the adaptability of the fruit and vegetable farming system restricts it from increasing resilience”, two research techniques were used – in-depth interviews and the workshop. As the hypothesis refers to the system and its stakeholders, the bottom-up approach was relevant to examine the perception of different actors, and a qualitative analysis of the results was conducted. The results of both interviews and the workshop indicated insufficient support for adaptability in the view of the stakeholders, hence the hypothesis was verified positively.

On the basis of the analyses and verified hypotheses, answers were given to the research questions posed in the book.

Question 1: What are the main challenges for the farming system examined?

Based on the results of in-depth interviews, the main challenges for the Polish fruit and vegetable farming system are related to income and fair prices, the lack of workforce, weather events and climate change, market and competition, input and maintenance prices, water supply, horizontal and vertical collaboration, farm succession, and plant diseases. The results obtained, pointing to the income and fair prices as the greatest concern, indicated by all the respondents, are in line with other research conclusions that farmers mainly worry about economic challenges, in particular long-term pressures (Spiegel et al., 2020). Issues related to collaboration are noticed by agribusiness organisations of fruit and vegetable growers, such as the nationwide *Krajowy Związek Zrzeszeń Plantatorów Owoców i Warzyw*, which considers the promotion of cooperation between farmers and the integration of the community as one of its main priorities (Śpiewak et al., 2016).

Question 2: How do the actors within the farming system cope with these challenges?

Based on the results of in-depth interviews, the farming system is partly capable of dealing with risks and of capturing opportunities. The respondents and the farming system mainly cope with the risks and developments mentioned by the diversification of non-agricultural and agricultural practices, intensifying and upscaling farming business, contacting farming-system actors, anticipating events, trying new selling practices, innovations, additional income, and taking out insurance. The diversification strategy is common at the level of farms (Bullock et al., 2017) and farming systems in the case of high price volatility (see de Roest et al., 2018), such as the fruit and vegetable farming system in the Lubelskie region. In the case of the diversification of agricultural practices, it was demonstrated to have a beneficial effect on resilience in various ways, such as buffering agricultural production from the impact of increased climate variability and extreme events, or increased capacity to control pest outbreaks and dampen pathogen transmission, which may intensify under forthcoming climate changes (Lin, 2011). Such strategy in the farming system examined seems to have a rational basis and is likely to increase the resilience of the system.

It is important to note that the strategies used within the system mostly support the delivery of private goods, with less emphasis on public goods, such as biodiversity or attractive landscape. The result is in line with other research results (see Meuwissen et al., 2020).

The question about information sources was added to the interviews, as previous research shows that local farmers' knowledge contributes to sustainability and resilience (Sumane et al., 2018), as not only the structure of social networks but also the flow of information within them has a significant impact on motivation and cooperation between stakeholders (Walker et al., 2006). In the farming system examined, the respondents access information and learn about policies mainly via organisations and memberships, media (mostly the Internet and agricultural magazines), and conversation with advisors. Less common ways to learn about policies include conversations with farmers, civil servants, and scientists. None of the respondents indicated conversations with clients as a way of accessing information about policies.

Farmers pointed out that the lack of cooperation, both horizontal and vertical, is a factor that constrains resilience, caused by the lack of trust and will to cooperate. Indeed, previous research shows that an inadequate horizontal integration of agricultural producers is one of the major issues in Polish agriculture (Pawlewicz & Szramowski, 2015). The respondents suggest that it might be related to mentality. They also point to the lack of local leaders. Changes in mentality are long-term processes, which can be encouraged by policy actions aimed at integrating the system (Koopmans et al., 2018). Farmers would benefit from cooperative schemes that promote processes and innovations targeted at forming new alliances and reorganising labour as well as logistical and communication processes in order to share and jointly build know-how

that optimises local farming and food supply systems (Lutz et al., 2017). It is important to address this problem, as the lack of trust and interference with information flow or the structure of the social network both reduce resilience (Walker et al., 2006).

Question 3: How does the focus on resilience capacities differ between policy goals, policy instruments, and the implementation of the CAP 2014–2020?

The main conclusion from the ResAT analysis is that at the level of instruments, the CAP is more focused on robustness than at the level of goals, where there is more balance between robustness and adaptability. At the level of both goals and instruments, transformability is the least supported of all three resilience capacities.

Question 4: What are the strengths and weaknesses of the CAP 2014–2020 in Poland in terms of robustness, adaptability, and transformability?

Taking into account the challenges of the fruit and vegetable farming system, the results of the ResAT analysis show that the CAP does not address the economic challenges of the system sufficiently. It does not offer solutions to price volatility due to production changes, and the buffer resources offered do not always cover the financial burden related to this problem. Other forms of risk management, such as insurance, are enabled by the CAP, although, as stated in the stakeholder check, their implementation in Poland was relatively slow and the intake is very insufficient due to farmers' lack of the awareness of their importance and availability. Productivity in farming is closely related to environmental factors, so the instruments related to the mitigation of climate risks should also be implemented more efficiently. All in all, robustness, although supported by the CAP, could be supported much more effectively if the implementation of the instruments were more intensified in the system. Better implementation requires the improvement of educational activities. Social education is only fairly enabled by the CAP and, as the stakeholder check suggests, it is not sufficiently implemented to meet the needs of the system. Other characteristics of adaptability are also supported by the CAP to a moderate level in the case of both goals and instruments.

For the fruit and vegetable farming system, the needs for in-depth learning and supporting niche innovations are seriously neglected by the CAP policy in the case of both goals and instruments. The system is relatively innovative, although the CAP does not support this process and does not support spreading niche innovations and good practice among farmers. This result is in line with the results of previous research suggesting that farmer-led innovation and alternative practices are undervalued (Knickel et al., 2018). According to Nosecka, Bugała, and Zaremba (2019), introduction to agriculture scientific and research accomplishments first and foremost requires a dynamic increase in R&D expenditure in this sector, the removal of all restrictions to obtaining available support funds from the EU and national funds, and the disruption of behavioural attitudes among the sector participants and entities operating in the environment towards cooperation. The CAP instruments also do not sufficiently support a long-term focus. For the fruit and vegetable farming system,

which is one that benefits from direct payments the least, the support of adaptability and transformability seems to be vital for its development.

According to the results of in-depth interviews, the policies that influence the farming system the most are related to Pillar II of the CAP, such as investment in physical assets, knowledge transfer and advisory services, smallholders' support, and young farmers' support. In addition, other policies affect the system, such as social security or weather risk management. Social security seems mostly to have a negative effect, noticed by the respondents, but is also supported by the other research results showing that in non-developing farms in Poland, social insurance involves a sizable portion of labour and land resources, while also constituting a large, ongoing budget expense that is still increasing (Pawłowska-Tyszko, 2019). Farmers use the basic payment scheme, but it is less important for this system than for others.

Extreme bureaucracy was considered an important factor constraining resilience, especially in the case of adaptability and transformability. The respondents complained that the bureaucracy is so complicated that it is not possible to deal with the procedures by themselves. This corresponds to the results of previous research on the use of support from the European Union in Poland (Olewnicki & Marzec, 2016). It is also a reason for delays in receiving funds, which is problematic. For example, the Regulation of the Ministry of Agriculture and Rural Development of 13 March 2015 on the detailed conditions and procedure for granting financial aid under the "Organic farming" measure was amended seven times. As a result, the Agency for Restructuring and Modernisation of Agriculture had to make numerous changes to the procedure for organic farming support, resulting in delayed grant and disbursement decisions (Łuczka et al., 2021). Such problems were raised both in the context of the CAP and the Cohesion Policy (Regional Operation Programmes). This corresponds to the data obtained in other research, suggesting that extensive bureaucracy is a constraining factor for bottom-up initiatives (Navarro et al., 2015).

According to the results of the research, the CAP provides a robustness-oriented strategy that is intended to buffer strains and disruptions, whereas adaptability gets less assistance, and transformability is overlooked. Policies should build a wider, more integrated strategy for improving the resilience of farming systems.

Question 5: What policy mix would be the most desirable by stakeholders in different future scenarios for EU farming?

The stakeholders consider adaptability as the main capacity of the resilience of the fruit and vegetable farming system in Poland in the *status quo* and SSP 5 neoliberal scenarios. Transformability is considered less important, although it gains importance in the case of young and educated farmers. Older generations pay more attention to robustness. According to the results of the workshop, stakeholders consider resilience dependent on many different actors and believe that actions of many different actors, not only policymakers, are crucial for enabling it. Except for actions needed from policymakers, they indicate many others, where the actions of farmers

are important. At times it was difficult for the participants to determine the exact actions and institutions in the second round of workshop.

It is important to point to some methodological limitations of the workshop. The most important one was the very many difficult issues discussed given the limited time, which made it difficult to gain an in-depth insight into the particular issues. However, the workshop's length was optimum in terms of attentiveness. Another limitation was that varying configurations of stakeholders may produce somewhat different rankings, even though the overall findings were likely to be the same or comparable.

During the workshop, several recommendations for the CAP post-2020 were formed, which were suggested at the European Union level, although most participants' recommendations were related to the national level of implementation. There is a high potential of the CAP to affect the resilience capabilities of Europe's farming systems and it is related to many different areas of the policy. To address the needs of different farming systems, the CAP needs to be flexible, and national policies, not only agricultural, but also regional, environmental, social, etc., need to be compatible in order to achieve synergy effects. Currently, the level of support for different resilience capabilities differs greatly across countries and farming systems. At the national level, according to the stakeholders, the most important action related to robustness is the national reform of the insurance system, which would make it more attractive for insurance companies and credible for farmers. In the case of adaptability, the participants find it important to increase the budget for integration programmes, both vertical and horizontal, to change the scope of advice by including facilitators and brokers, and to increase the salaries of public advisors. However, according to Kania (2017), in Poland, we can see that the state budget provides less funding for agricultural advisory services each year, necessitating a search for alternative sources of funding (i.e. commercial services with a marketing approach, EU funds). It is anticipated that farmers would pay for the majority of the services provided by advisory personnel. The issue is that Polish smallholders, who predominate, may not be able to afford such services. For transformability, the stakeholders consider promoting the demand for healthy food and support for learning consumers' preferences to be the most important.

Recommendations suggested by the stakeholders could be useful in both scenarios; however, their importance may increase or decrease in particular scenarios. For example, supporting niche innovations would be very important in the SSP 5 scenario (neoliberal scenario) to increase competitiveness on international markets, but moderately important in the SSP scenario (protectionist scenario), where market intervention is high.

In the SSP 3 scenario (protectionist scenario), the desired level of robustness would be higher than in the current situation. Less specialisation would give a greater chance of robustness. Increasing mechanisation and less labour-intensive activities would be needed to maintain a desired level of robustness due to the lack of labour caused by migration as a result of the protectionist policy. In the SSP 3 scenario

(protectionist scenario), it would be important to promote the deconcentration of capital and the diversification of production to meet the needs of the local market. The public advisory services would need to be more strongly supported. Transformability would be less desired, especially in the area of niche innovations, due to strong public market interventions and protectionism.

In the SSP 5 scenario (neoliberal scenario), there would be a greater desire for supporting adaptability and transformability because of the increased competition with producers from other countries. Local producers would be heavily dependent on exports. In the case of robustness, greening and renewable energy would lose its importance because of its high costs and focus on technological development driven by fossil fuels. Rapid adaptation processes would be very important due to a more unstable economic environment. In the case of transformability, it would be necessary to search for niches and develop production within them due to high levels of international competition in mainstream production.

According to the stakeholders, both regional and farm-based efforts to enhance resilience can benefit from government assistance. Aid for collaborative projects, co-learning and co-innovation initiatives, or community capacity-building are all examples of this type of support. While it is ideal for public assistance to take an integrated approach to building regional and local resilience, numerous case studies have found that assistance is typically provided on a farm-by-farm basis, with no clear regional perspective or plan (Knickel et al., 2018). The results of this research support the recommendation for increased efforts to strengthen resilience-oriented activities at the level of the farming system alongside the farm-by-farm approach.

Future areas of research

An analysis of the support and attitudes for particular capacities of resilience (robustness, adaptability, and transformability) as well as their characteristics shows the relationship between different capacities in relative rather than absolute terms. That is, we can conclude which capacity is more or less supported or desired. This is useful for assessing the potential imbalances in capacities and possible areas of intervention for policy support. However, the comparisons between countries are difficult. Further research may focus on the methods of precise measurement of the desired levels of support for particular capacities and their characteristics.

An interesting area of research is related to *ex-ante* evaluation. National Strategic Plans, which are being promoted in the CAP in place of Rural Development Programmes, can be seen as an opportunity to better support various resilience capacities; however, these plans shift more responsibility onto member states than before, hence there is a risk that countries that must report the results of the strategies implemented may choose support that provides quick and easy-to-measure effects, which may not provide the best long-term solutions. In Poland, there are indications that robustness will still be strongly promoted, which is indicated by the decision stated in Poland's CAP Strategic Plan 2023–2027 (2022) for the allocation of the maximum amount

of money (30%) from Pillar II to Pillar I. Measuring various resilience capacities is still difficult, hence research is needed as well as practical methods and indicators that policymakers may employ.

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Annex

Annex 1: List of documents for the ResAT analysis

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- Ecorys, Institute for European Environmental Policy & Wageningen University. (2016). Mapping and analysis of the implementation of the CAP. Executive Summary. Brussels
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- European Commission (2013a). CAP Reform – an explanation of the main elements. Brussels
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Ministry of Infrastructure and Development (2014). Programowanie perspektywy finansowej 2014–2020 – Umowa Partnerstwa

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Annex 2: Code book for interviews – part 1 – the first round of coding

<i>The general Code book (the first round of coding)</i>	
QUESTIONS	DEFINITIONS
CODES	
Challenges – risks and drivers	
1. What are the main risks and developments that (the respondents expect to) affect the farming system?	
1.a Income and fair prices	Challenges related to generating income and receiving (fair) prices for goods received.
1.b Upscaling and intensification	Challenges related to the upscaling of farm businesses and the intensification of farming practices; the feeling that upscaling the farm business is necessary.
1.c Downscaling and extensification	Challenges related to the downscaling of farm businesses and the extensification of farming practices (production); the feeling that downscaling the farm business is the only solution or a necessity.
1.d Land acquisition and land prices	Challenges related to the acquisition of land for farming practices, and the prices of acquiring new land.
1.e Input and maintenance prices	Challenges related to (the raising) prices of inputs and maintenance (e.g. seeds, fertilisers, pesticides, equipment, fuels).
1.f Market & competition	Challenges related to the agricultural market, such as fluctuating market prices, the unpredictability of markets, (un)fair competition. Also challenges related to keeping up with (global) economic developments.
1.g Debt	Challenges related to (financial) indebtedness due to borrowed funds or high investments.
1.h Supply agreements & contracts	Challenges related to agreements made with other actors in the food chain (e.g. farmers who have made supply agreements with the food processing industry).
1.i Diversification agricultural practices	Challenges related to introducing new agricultural activities (agricultural functions to the system) in place or in addition to the traditional / main farming pursuit (e.g. introducing new crops).
1.j Diversification non-agricultural practices	Challenges related to introducing non-agricultural activities (non-agricultural functions to the system) in place or in addition to the traditional / main farming pursuit (e.g. starting to generate renewable energy, or tourist activities).
1.k Farm succession	Challenges related to farm succession (e.g. finding a successor, financing succession, inheritance tax).

<i>The general Code book (the first round of coding)</i>	
QUESTIONS	DEFINITIONS
Challenges – risks and drivers	
CODES	
1.1 Workload	Challenges related to the (increasing) workload of farming-system actors, both physical and physiological. This is related to the (experienced) increasing administrative tasks (e.g. related to applying for funds, taxes, etc. – “paperwork”).
1.m Balance family–farm	Challenges related to balancing family life with the farming business (e.g. a farmer can feel that he/she is placing a burden on their family). This also includes challenges related to the inclusion of family members in the farming business.
1.n Horizontal collaboration	Challenges related to collaboration between actors at the same level or stage in the food supply chain, for instance to achieve common goals and/or greater ease of work (e.g. farmer–farmer collaboration). This also includes challenges related to trust.
1.o Vertical collaboration	Challenges related to collaboration between actors from different levels or stages in the food supply chain, for instance by sharing their resources, information, responsibilities to serve relatively similar end customers (e.g. farmers who have made supply agreements with the food processing industry. The Farmer–processing industry collaboration). This also includes challenges related to trust.
1.p Innovation	Challenges related to experimentation, innovation, and new technology and techniques. Also, the challenge of keeping up with (new) technological evolutions.
1.q Changing policies and legislations	Challenges related to the lack of clarity about policies, to the changing of policies – both too fast and too slow – and increasing legislation. The need to keep up with new and different policies and legislation.
1.r The lack of agriculture-related knowledge	Challenges related to the (experienced) absence of agriculture-related and practical knowledge with farming-system actors and non-farming-system actors.
1.s Changing the image of and societal appreciation for agriculture	Challenges related to a changing image of and appreciation for the farming system, or agriculture in general. This also includes challenges related to the trust of non-farming-system actors in the farming system, and questioning the legitimacy of farming-system actors / licence to produce.

	Challenges related to changes in the demands of consumers related to food and food production.
1.t Changing consumer demands	
1.u Differences in policies between EU member states	Challenges related to (experienced) differences in policies, legislations, and governmental decisions between EU member states.
1.v Weather events and climate change	Challenges related to (extreme) weather events (e.g. heavy rainfall, drought) or climate change.
1.w Water supply	Challenges related to the supply of fresh water for agricultural practices.
1.x The protection and enhancement of biodiversity	Challenges related to the protection and enhancement of biodiversity (a variety in species, genetics/genes, and ecosystems).
1.y Plant and/or animal diseases	Challenges related to the prevention of pests and diseases, controlling outbreaks, and securing and improving the biosecurity.
1.z The environmental and climate impact of agriculture	Challenges or concerns related to the impact of agricultural practices on the environment and/or on the climate. Thinking of environmental pollution, or emissions, or the impact of agriculture on (the quality of) natural resources.
1.aa The lack of workforce	Difficulties in finding workers (including seasonal workers).
2. To what extent is the farming system capable of dealing with risks?	
2.a Yes, capable of dealing with risks	The respondent indicates that the farming system is capable of dealing with risks (with the reason(s) given).
2.b Partly capable of dealing with risks	The respondent indicates that the farming system is partly capable of dealing with risks (e.g. "on the one hand on the other hand....") (with the reason(s) given).
2.c No, not capable of dealing with risks	The respondent indicates that the farming system is not capable of dealing with risks (with the reason(s) given).
3. To what extent is the farming system capable of taking opportunities?	
3.a Yes, capable of taking opportunities	The respondent indicates that the farming system is capable of taking opportunities (with the reason(s) given).
3.b Partly capable of taking opportunities	The respondent indicated that the farming system is partly capable of taking opportunities (e.g. "on the one hand on the other hand....") (with the reason(s) given).

<i>The general Code book (the first round of coding)</i>	
QUESTIONS	DEFINITIONS
Challenges – risks and drivers	
CODES	
	<p>3.c No, not capable of taking opportunities</p> <p>The respondent indicates that the farming system is not capable of taking opportunities (with the reason(s) given).</p>
<p>4. How do the respondents and the farming system cope with the mentioned risks and developments, and how do they take opportunities?</p>	<p>4.a Anticipating events</p> <p>Anticipating events by making proper preparations and/or planning work in advance. The preparations help to brace for shocks – to buffer against impacts. A specific kind of anticipating events is by <i>saving money</i> (e.g. save a share of profit, reduce production costs) that might function as a buffer for worse times.</p> <p>4.b Upscaling (farming) business</p> <p>The respondent indicates that actors aim to increase the growth of their (farming) business, for instance by buying land or by making (other) investments that increase production.</p> <p>4.c Downscaling (farming) business</p> <p>The respondent indicates that actors aim to minimise their (farming) business, for instance, by selling land.</p> <p>4.d Intensifying (farming) business</p> <p>The respondent indicates that actors are increasing the production of their business by for instance, using new machines, changing cultivation plans, etc.</p> <p>4.e The specialisation of (farming) business</p> <p>Increasingly focusing on a single dominant activity (e.g. producing only a single crop), which then provides a large share of the farm income.</p>
	<p>4.f Diversification agricultural practices</p> <p>Introducing new agricultural activities (agricultural functions to the system) in place of or in addition to the traditional / main farming pursuit (e.g. introducing new crops). This also includes differentiating from other producers and/or exploring agricultural niche markets.</p>
	<p>4.g Conversion to alternative farming methods</p> <p>A conversion of farming practices towards alternatives to conventional farming methods. Alternatives consist of organic farming, permaculture, or applying agroecological farming practices.</p>
	<p>4.h Diversification non-agricultural practices</p> <p>Introducing new non-agricultural activities (non-agricultural functions into the system) in place of or in addition to the traditional / main farming pursuit (e.g. starting to generate renewable energy, or starting bed & breakfast) (but also processing and selling (farm) products on the farm).</p>

4.i Additional income	Income earned via an additional job (or job of a partner/family member) to make ends meets / that flows back into the (farming) business. (This income flow is not necessarily part of the (farming) business).
4.j Experiment / Innovate	The respondent indicates that experiments with new agricultural practices are taken and that new methods/innovations are used in the farming system. Investments are made to make use of innovative farming practices. Investments are made to promote experimentation and innovation in the farming system.
4.k Offering or taking out insurance	The respondent indicates that insurance is offered or taken out to cope with risks.
4.l Forming cooperative(s)	The respondent formed / is part of a cooperative to work as a collective to meet common interests and share resources.
4.m A member of trade union(s) / an advocacy organisation	The respondent is part of a trade union or another organisation that represents and advocates his/her interests.
4.n Lobbying	Actions aimed at influencing the actions, policies, or decisions of businesses or governmental actors.
4.o Contacting farming-system actors	Collaborating with and/or developing and exchanging knowledge through social processes with farming-system actors. This includes, for instance, collaborating with family members, friends, neighbours/acquaintances (exchanging services or materials); this also includes consulting agricultural advisors or accountants specialising in the agricultural sector.
4.p Contacting non-farming-system actors	Collaborating with and/or developing and exchanging knowledge through social processes with non-farm actors. Learning across institutional boundaries (i.e. social learning).
4.q Reflecting upon what you do	Reflecting on the patterns that underlie the farming system of which they are part. To reflect and challenge the dominant mindset and to adjust it to changing conditions (i.e. in-depth learning).
4.r Putting into perspective	Placing risks and developments into perspective. This can be done by referencing to or comparing with previous years, or by mentioning that "not every year is the same". Or by arguing that risks and developments are inseparable from the farming system. The respondent indicates that he/she just has to deal with it. – For example: "... is simply part of being a farmer".
4.s Alternative sales practices	Increasing income by selling goods produced outside of the standard sales channels (for example by own retail sales).

<i>The general Code book (the first round of coding)</i>	
QUESTIONS	DEFINITIONS
Challenges – risks and drivers	
4.t Applying for public funding	Increasing resources for investments by applying for public funding.
4.u Replacing crops	Ceasing one type of crop and introducing another.
4.v Minimising losses	Taking action aiming at optimising costs to avoid or minimise potential losses.
5. Which policies influence the farming system?	5.a Basic payment scheme Pillar I of the CAP – basic income support granted to farmers based on the number of hectares farmed.
	5.b “Green” direct payments Pillar I of the CAP – complementary income support for agricultural practices beneficial to climate and environment.
	5.c Young farmer payments Pillar I of the CAP – complementary income support for young farmers.
	5.d Coupled support The link between the receipt of a direct payment and the production of a specific product.
	5.e Product quotas Caps set on the amount of products that a farmer can sell per year without paying levies to bring rising production under control.
	5.f Market interventions Measures or interventions used if normal market forces “fail” (e.g. falling prices due to (temporarily) oversupply, drop in demand due to health scare), such as market-support measures, safety-net interventions, crisis reserves.
	5.g Producer organisations and inter-branch organisations Measures and interventions aimed at improving farmers’ negotiating position in the food chain through establishing and improving organisations / collectives.
	5.h Knowledge transfer & advisory services (Pillar II) Pillar II of the CAP – measures that make training and skills acquisition possible. Also, support for demonstrations and information actions. Moreover, it includes support through advisory services.

5.i Investments in physical assets (Pillar II)	Pillar II of the CAP – support for investments in physical assets, such as agricultural holdings, the processing/marketing and/or development of agricultural products, infrastructure (related to the development, modernisation or adaptation of agriculture), non-productive investments linked to agri-environment-climate objectives.
5.j Young farmers support (Pillar II)	Pillar II of the CAP – measures that support young farmers, such as business start-up grants (up to €70,000), general investments in physical assets, training and advisory services.
5.k Smallholders' support (Pillar II)	Pillar II of the CAP – business start-up aid up to €15,000 for smallholdings.
5.l Basic services and village revitalisation (Pillar II)	Pillar II of the CAP – investment in rural areas to secure basic services and to improve the liveability of rural villages (areas).
5.m Support for non-agricultural activities (Pillar II)	Pillar II of the CAP – business start-up aid for non-agricultural activities (e.g. micro- and small businesses) in rural areas.
5.n Support for producer groups / organisations (Pillar II)	Pillar II of the CAP – support for setting up groups and/or organisations on the basis of a business plan and limited to entities defined as SMEs.
5.o Agri-environment – climate payments (Pillar II)	Pillar II of the CAP – payments for agri-environment-climate commitments and support for conservation and the sustainable use and development of genetic resources in agriculture.
5.p Support for organic farming (Pillar II)	Pillar II of the CAP – support (i.e. payments) to convert or maintain organic farming practices and methods.
5.q Co-operation (Pillar II)	Pillar II of the CAP – support measures for technological, environmental, and commercial cooperation (e.g. pilot projects, joint environmental schemes, the development of short supply chains and local markets).

<i>The general Code book (the first round of coding)</i>	
QUESTIONS	DEFINITIONS
Challenges – risks and drivers	CODES
	5.r LEADER (Pillar II)
	Pillar II of the CAP – support for the rural development project initiated at the local level aimed to revitalise the rural areas and to create economic benefits. This encourages experiments in rural development; supports cooperation between rural areas; and creates networks between rural areas for knowledge-sharing.
	5.s Rural Development Programme (RDP) (CAP)
	Pillar II of the CAP – national and regional programmes co-funded by the EU that address specific needs and challenges facing the rural area of the farming system. This code to be used when not sure or not clear which aspect of the CAP Pillar II – Rural Development is precisely mentioned.
	5.t Legislation on plant protection products
	Legislation on the use of plant protection products that are used to protect plants against pests or diseases, based on their safety for humans, animals, and the environment (e.g. setting maximum residue levels of plant-protection products in or on food or feed).
	5.u Legislation on manure and fertilisers
	Legislation on the use and processing of manure and fertilisers. For example by setting rules on the amount of nitrogen and phosphorus that may be used for growing crops. (This, for instance, also includes references to the EU Nitrates Directive).
	5.v Weather risk management
	Risk management to address potential (financial) losses caused by unusual / extreme weather events (e.g. weather insurance).
	5.w Taxes
	Compulsory contribution to state revenue levied by government (e.g. income tax, inheritance tax).
	5.x Legislation on animal health and welfare
	Legislation aimed at ensuring that food-producing animals are healthy and are able to cope with the conditions in which they live (i.e. comfortable, well-nourished, safe, able to express innate behaviour, no suffering/sickness).
	5.y Legislation on labour conditions
	Legislation related to safe and healthy labour conditions to ensure a proper work environment.
	5.z Spatial planning
	Policies affecting spatial organisation – the distribution of people and activities / functions in spaces (different scales). Policies focused on the division, coordination, and planning of land use.
	5.aa Social security
	Policies aimed to guarantee income and care for people who are no longer (temporarily or permanently) capable of generating income themselves.

5.bb Legislation on water quality	Legislation aimed at governing the release of pollutants into water resources to reduce / prevent water pollution and to ensure high water quality. EU Water Framework Directive
5.cc Legislation on air quality	Legislation aimed at governing the emission of air pollutants into the atmosphere to reduce / prevent air pollution and to ensure high air quality.
5.dd Legislation on food safety and quality	Legislation aimed to ensure that food intended for human consumption will not cause harm or to prevent food-borne illness (hygiene) during production, processing, distribution, and placing on the market.
5.ee Land-tenure legislation	Legislation aimed at governing how property rights to land are to be allocated within the member state.
5.ff Quality schemes and labels	Policy focused on protecting the names of specific products to promote their unique characteristics, linked to their geographical origin as well as traditional production (e.g. geographical indications (GIs), traditional speciality guaranteed (TSG))
5.gg Other policies	Policies that do not necessarily fit the previous codes.
6. What changes to the policies would the respondent make to enhance the resilience of the farm and/or farming system?	6.a Suggested policy changes The respondent provides suggestions, alternatives, recommendations for policies – what can be done differently according to the respondent? 6.b Suggested other changes The respondent provides suggestions, alternatives, recommendations not directly related to policies – what can be done differently according to the respondent?
Resources & network	
7. The availability of social networks / contacts to discuss policies	7.a High The respondent indicates that there is a high availability of social networks and / or contacts to discuss policies. References to the respondents' professional network regarding policies.
7.b Low	
8. How does the respondent access information or learn about policies?	8.a Conversation with farmers The respondent indicates having conversations with farmers (to learn) about policies.

<i>The general Code book (the first round of coding)</i>		
QUESTIONS	DEFINITIONS	
Resources and network	CODES	
Resources and network	8.b <i>Conversation with civil servants</i>	The respondent indicates having conversations with civil servants (to learn) about policies.
	8.c <i>Conversation with clients</i>	The respondent indicates having conversations with clients (to learn) about policies.
	8.d <i>Conversation with advisors / accountants</i>	The respondent indicates having conversations with advisors / accountants (to learn) about policies.
	8.e <i>Via organisations and memberships</i>	The respondent indicates accessing information and learns about policies through organisations (e.g. agricultural interest representation) via events, workshops and/or meetings, or by being part of administration or study groups.
	8.f <i>Media</i>	The respondent indicates accessing information and learns about policies through traditional media (television, radio, newspapers and/or magazines) and digital media (the Internet/social media).
	8.g <i>Scientists & research</i>	The respondent indicates accessing information and learns about policies via contact with scientists by following research projects or by reading scientific papers.
	9. The availability of information on policies	9.a <i>High</i> The respondent indicates that the availability of information on policies is high. 9.b <i>Low</i> The respondent indicates that the availability of information on policies is low.
	10. Own comprehension of relevant policies	10.a <i>High</i> The respondent indicates having a high comprehension of policies. 10.b <i>Low</i> The respondent indicates having a low comprehension of policies.
	11. Comprehension of relevant policies with other actors	11.a <i>High</i> The respondent indicates that there is a high comprehension of policies with other (farming-system) actors. 11.b <i>Low</i> The respondent indicates that there is a low comprehension of policies with other (farming-system) actors.
	12. The availability of capital to manage challenges	12.a <i>High</i> Respondent indicates that the availability of capital to manage challenges is high. 12.b <i>Low</i> Respondent indicates that the availability of capital to manage challenges is low.
	13. Other codes related to resources & network	13.a <i>Own role in information-sharing</i> The respondent's own role in sharing information about (new) policies.

Annex 3: Code book for interviews – part 2 – coding policies

The coding policy		
Are policies restricting or enabling?		
Robustness	1.a <i>Not enabling robustness (score 1)</i>	The policy does not enable robustness.
	1.b <i>Slightly enabling robustness (score 2)</i>	The policy slightly enables robustness.
	1.c <i>Fairly enabling robustness (score 3)</i>	The policy fairly enables robustness.
	1.d <i>Enabling robustness (score 4)</i>	The policy enables robustness.
	1.e <i>Very enabling robustness (score 5)</i>	The policy very much enables robustness.
	1.f <i>Not clear (score 0)</i>	Not clear if the policy enables robustness.
Adaptability	2.a <i>Not enabling adaptability (score 1)</i>	The policy does not enable adaptability.
	2.b <i>Slightly enabling adaptability (score 2)</i>	The policy slightly enables adaptability.
	2.c <i>Fairly enabling adaptability (score 3)</i>	The policy fairly enables adaptability.
	2.d <i>Enabling adaptability (score 4)</i>	The policy enables adaptability.
	2.e <i>Very enabling adaptability (score 5)</i>	The policy very much enables adaptability.
	2.f <i>Not clear (score 0)</i>	Not clear if the policy enables adaptability.
Transformability	3.a <i>Not enabling transformability (score 1)</i>	The policy does not enable transformability.
	3.b <i>Slightly enabling transformability (score 2)</i>	The policy slightly enables transformability.
	3.c <i>Fairly enabling transformability (score 3)</i>	The policy fairly enables transformability.
	3.d <i>Enabling transformability (score 4)</i>	The policy enables transformability.
	3.e <i>Very enabling transformability (score 5)</i>	The policy very much enables transformability.
	3.f <i>Not clear (score 0)</i>	Not clear if the policy enables transformability.
Do the respondents experience contradictions within and between policies?		
	4.a <i>Contradictions</i>	Contradictions within and between policies.
Do the respondents experience differences between policy objectives and the instruments or the implementation of policies?		
	4.b <i>Discrepancies</i>	A discrepancy between policy goals, policy instruments, and the implementation of policies.

The author's original research makes it possible to verify the usefulness of the dynamic concept of resilience proposed in the book for evaluating planning processes and assessing implementation activities within public policies. In this sense, Maritkainen's book makes a significant contribution to the practical aspects of implementing EU agricultural policies and, more broadly, EU cohesion policies.

What is novel – at least in the context of the Polish academic environment – is the formulation of a theoretical framework for describing the resilience of agricultural systems and the application of research methods originally rooted in environmental studies, creatively expanded to include economic aspects.

Prof. Krystian Heffner
University of Economics in Katowice

The book brings new value to the debate on the resilience of agricultural systems by combining the perspective of public policy, systems analysis, and qualitative research. The use of the ResAT and bottom-up approach in the Polish context of fruit and vegetable farms is unique and serves as an inspiration for further research.

Dr. Agnieszka Poczta-Wajda, Associate Professor
Poznań University of Economics and Business

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