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Stakeholder perspectives to improve risk management in European farming systems

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ABSTRACT

The challenges faced by agricultural systems call for an advance in risk management (RM) assessments. This research identifies and discusses potential improvements to RM across 11 European Union (EU) farming systems (FS). The paper proposes a comprehensive, participatory approach that accounts for multi-stakeholder perspectives relying on 11 focus groups for brainstorming and gathering suggestions to improve RM. Data analysis is based on content analysis and coding of suggested improvements, and their assessment through the lenses of main challenges faced, farms' flexibility, and dependence on subsidies. First, the results show that necessary improvements differ depending on whether they have their origin in sudden shocks or long-term pressures. Second, farm dependence on direct payments determines a stronger need to improve financial instruments, whereas farm flexibility suggests a need for more accessible and tailored tools for low-flexibility FS, and increased *know-what* and *know-how* for high-flexibility FS. Third, our findings indicate a potential for extending stakeholder involvement in RM to new or unconventional roles. Underlying specific improvements, the paper suggests and discusses three main avenues to improve RM as a whole: i) a developed learning and knowledge network; ii) new forms of collaboration; and iii) integrated financial and policy instruments.

1. Introduction

A growing number of challenges, materializing on both local and global scales, are threatening the capacity of EU farming systems (FS) to generate income and deliver private and public goods and/or services (Chartier and Cronin, 2017; Komarek et al., 2020). For example, concerns arise regarding the impact of climate change (Scocco et al., 2016), changes in the policy framework (Matthews, 2018), and the weak generational renewal affecting several EU regions (Zagata and Sutherland, 2015). The vulnerability of FS to these emerging challenges calls into question the conventional approach to risk management (RM), and points to other means to manage risks.

While standard RM tools (e.g. insurance, futures, income stabilization tools) help to cope with emerging threats, there are several limitations to their implementation. For instance, Santeramo et al. (2016) and Santeramo (2017) recognize a widespread underuse of RM tools, which might be due to a lack of knowledge and experience (Meuwissen et al., 2018; Santeramo, 2016), the low accessibility of these tools for small farms (Finger and Lehmann, 2012; Chartier and Cronin, 2017), lack of willingness to cooperate (Dyg and Mikkelsen, 2016; Kuliensis

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et al., 2017), and weak planning capacity (fi-compass, 2020). This is especially true in the EU, where institutions and stakeholders are calling for RM improvement (Tangermann, 2011; Bardají and Garrido, 2016).

In order to overcome these weaknesses, recent efforts in the RM literature emphasize the importance of learning, information and experience exchange in RM (Baumgart-Getz et al., 2012; Santeramo, 2016), as well as the need for further integrating available instruments and strategies (Tadesse et al., 2015; Novickite, 2018), and strengthening collaborations (Cordier, 2015; Severini and Sorrentino, 2017). To this end, more holistic approaches to RM were proposed to shed light on key interplays between different sources of risks, farmers' strategies and the policy framework (Anton and Kimura, 2011). In spite of these advances, we argue that existing approaches (for either academic or practical purposes) do not consider all the factors involved in RM. The implication is that any effort to improve RM efficacy is likely to be hindered by the underestimation of the real extent to which manifold strategies and stakeholders help to deal with challenges.

There are different aspects of current RM approaches that might improve further. The RM literature, for example, is mainly farmer-centred (Iyer et al., 2020) and disregards other actors around the farm business (e.g. input suppliers, banks, media, consumers), except governments that have been central in holistic research (Antón and Kimura, 2011). Likewise, the array of available strategies should not be limited to conventional tools (e.g. insurance and subsidies), but consider further options such as learning strategies, extension services and novel forms of cooperation. In addition, we find the mainstream literature focused on sudden-shocks and short-term risks, while also long-term pressures and stressors might be considered (Meuwissen et al., 2019).

Based on these considerations, this paper aims to extend the holistic RM assessment frameworks applied so far, to embrace a more comprehensive and participatory approach by taking into account multiple-stakeholder perspectives within manifold strategies, in order to tackle emerging shocks and long-term pressures in EU farming systems. Specifically, the objective of the paper is to identify and propose ways to improve RM strategies in EU farming systems through the stakeholder role, and to define whether these improvements differ depending on the FS characteristics and the type of challenges faced.

The study is based on 11 multi-stakeholder focus groups each held in a different European region, to capture the stakeholders' views and perspectives on RM. The goal of the focus groups was to identify the main challenges facing each FS, define the main RM strategies and the actors involved, and discuss potential improvements to the stakeholder roles. Data were analysed by coding suggested improvements and assessed according to the different types of challenges faced, diverse farm flexibility levels, and farm dependence on direct payments of the Common Agricultural Policy (CAP).

2. Methodological framework

2.1. Theoretical underpinning

Research on RM in agriculture has typically followed a linear approach that, depending on the risks to be addressed, considers the farmer as the central strategic decision maker (Chartier and Cronin, 2017). Throughout this linear process, which consists of the three phases of risk identification, assessment, and response (Janowicz-Lomott and Łyskawa, 2014), the main attributes taken into account have been farmer's perception of, and attitude to, risk (Iyer et al., 2020). The linear approach cannot fully account for the complex interactions between the sources of risk, farmers' strategies and the policy framework. Therefore, the OECD proposed a holistic approach to analyse such interactions (Antón and Kimura, 2011), which includes the effects of all policies affecting agriculture.

The paper proposes a shift in RM conceptualization by extending the current holistic view to embrace a more comprehensive and participatory approach. Three aspects of the holistic approach can be developed further: the type of challenges faced, the array of available strategies, and the actors involved in promoting new or improved RM strategies.

First, RM research considers mainly sudden shocks. This focus could be extended through the concept of challenges including long-term pressures and stressors affecting FS (e.g. climate change, reduction of consumption over time) (Meuwissen et al., 2019), and considers the complex interrelations between diverse challenges as in holistic approaches (Antón and Kimura, 2011). Second, most of the literature takes into account conventional RM tools (van Winsen et al., 2016; Iyer et al., 2020). The focus on conventional RM tools (e.g. insurance, mutual funds, diversification) can be broadened to include new strategies and their interplay. Indeed, a more holistic view of RM could highlight synergies (i.e. interactions leading to combined greater effects) across strategies (Novickytė, 2018), and the consideration of comprehensive strategies could be important for tackling multiple challenges and improving RM (Chambers and Quiggin, 2004). For instance, the literature has recently investigated other useful practices, such as learning (Thomas et al., 2020), and developments in knowledge systems (EU SCAR, 2015), as well as new forms of cooperation (Fonte and Cucco, 2017).

Third, while most of the literature is almost exclusively farmer-centred (with the exception of holistic studies that consider the role of policy makers at length), we argue that a broader range of actors should take part in RM analyses (e.g. supply chain actors, banks and insurance companies, associations and cooperatives, media and consumers). Multiple stakeholders are involved in RM strategies, and they influence existing challenges and strategic options. The impact of the behaviour of other stakeholders emerges clearly when moving from a single farm viewpoint to a FS perspective (Tendall et al., 2015; Vroegindewey and Hodbod, 2018). Recent advances in resilience literature (Meuwissen et al., 2019) highlight the importance of approaching the capacity to deal with challenges at FS level, considering all stakeholders involved in agri-food production in a specific region. Accordingly, recent developments in sustainable food system economics emphasize and encompass the wide range of actors playing a part in food production, processing, distribution and consumption (FAO, 2018).

Based on our conceptual development, RM dynamics can be depicted as follows: sudden shocks and long-term pressures stress a FS, which responds by adopting manifold, integrated strategies involving multiple actors, that determine the efficacy of the RM response. Fig. 1 shows the conceptual framework of RM dynamics.

As depicted in the example in Fig. 1, the stakeholder behaviour might enlarge, reduce or improve the set of RM strategies available to farmers through the provision of products, services and collaborations. In the first place, farmers themselves shape the set of available strategies through horizontal cooperation and knowledge exchange. Cooperation supports several strategies, including risk pooling (Watson et al., 2018), increasing bargaining power (Michalek et al., 2018), adhering to quality production schemes (e.g. protected geographical identification) (Bardají et al., 2009), and collective farming practices (Sherman et al., 2019). In addition, abundant literature sheds light on the importance of farmers' social learning, learning from others and peer-to-peer learning (Urquhart et al., 2019; Thomas et al., 2020), useful to increase the adoption of, for example, RM instruments (Santeramo, 2016), and agro-ecological and innovative farming practices (Prager and Creaney, 2017; Laforge and McLachlan, 2018).

Along the supply chain, upstream actors influence the range of possible input, technologies and means of production implementable on the farm. Input suppliers are found to be central in boosting know-how and technology adoption (Gava et al., 2017), and to communicate and increase accessibility of most innovative and sustainable solutions (Long et al., 2016). Likewise, downstream industries have a growing buyer power (Velasquez and Buffaria, 2017), and control over production processes and quality (Severini and Sorrentino, 2017). Processors' behaviour determines the range of solutions that farmers might address in order to manage risk and integrate along the chain. Most common

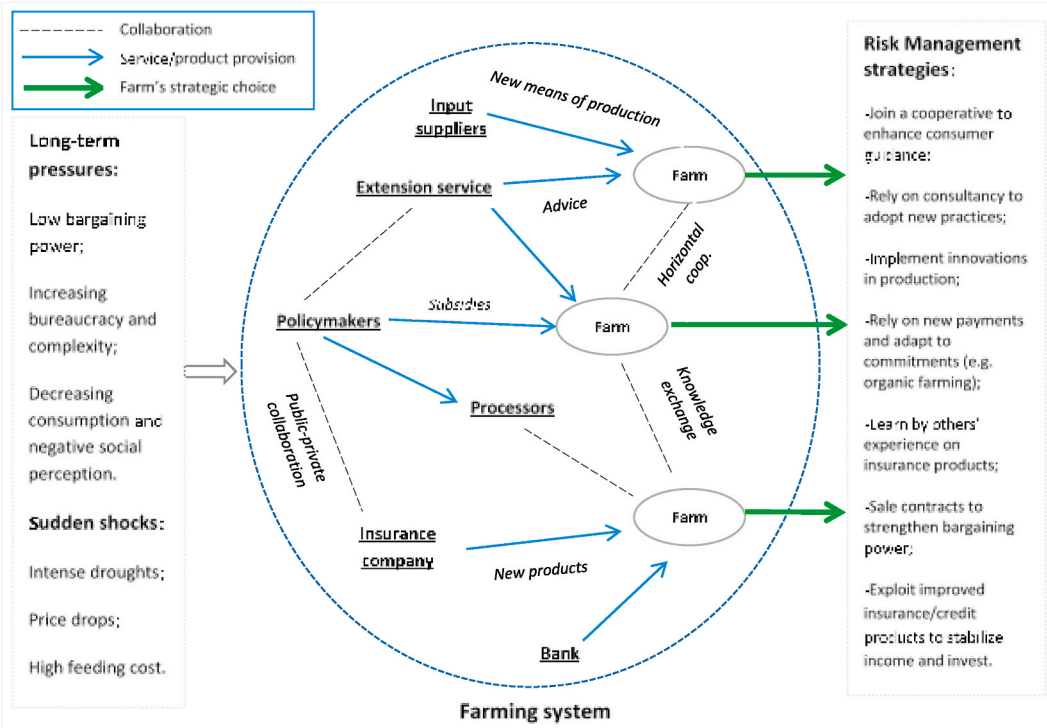

Fig. 1. Conceptual scheme of RM dynamic.

examples are fixed price and marketing contracts, contract farming, provision of capital, coordinated procurement decisions, and informal long-term relationships (Balmann et al., 2006; van Bergen et al., 2019).

The extension services affect the farmers' knowledge of and capacity to implement strategies. In particular, advisory services help improve risk communication, technology adoption and adaptation to climate change (Mahmudi and Knierim, 2015; Eastwood et al., 2019), and provide support to access public subsidies, meet regulatory compliance, and pursue farm diversification (Sutherland et al., 2017). Not less importantly, scientists are key to provide information, data and knowledge on new challenges and solutions about, for instance, climate change (Bolden et al., 2018).

Financial institutions can deliver several instruments to farmers, ranging from insurance (e.g. crop, livestock, yield, revenue) to credit products (from short-to long-term) (Meuwissen et al., 2018; fi-compass, 2020). These tools enlarge the set of strategies available to farmers to transfer risk and invest. Policy makers deliver numerous instruments as well, including mutual funds, income stabilization tools, and the wide set of subsidies and policy measures provided by the first and second pillars of the CAP. They also incentivize and support the adoption of private financial instruments, and frame public-private collaborations (Bardají and Garrido, 2016; Chartier and Cronin, 2017; Cordier and Santeramo, 2019). Policy makers influence the supply chain by regulating producers' organization, inter-professional agreements and contractualization (Severini and Sorrentino, 2017), and integrate the private extension service (Hermans et al., 2015).

The proposed conceptualization, therefore, extends the current holistic view by focusing on the interplay between all the stakeholders involved in a FS and the potential effect that improved interactions may entail for the number and efficacy of RM strategies available to farmers.

2.2. Data collection

Considering our conceptualization and research goal, we opted for a qualitative and participatory approach based on focus groups. As RM is assumed to be the result of complex interactions, we judged focus groups to be the best method for our research inquiry. Focus group is a widely used technique to engage stakeholders in informal or semi-structured group discussions focusing on one or more topics. It is a way of collecting qualitative data from multiple individuals simultaneously (Wilkinson, 2004). According to Kamberelis and Dimitriadis (2011), focus groups enables researchers to observe the dynamics of social interactions among specific groups of people, such as defining training needs or community reaction to face threats (Winlow et al., 2013), and stimulating multiple stakeholders to find a common approach to an issue that affects them all (Roloff, 2008).

The research was developed as part of the SURE-Farm[1] project, which defines and analyses 11 FS across the EU (Unay-Gailhard et al., 2018). The FS represent the diversity of specializations and issues across European agriculture. One focus group was carried out as part of each FS. A pilot focus group was conducted to test its structure and activities. Guidelines were then delivered to the other FS researchers, and a dedicated training session was held to explain the structure and objectives of the focus groups. Therefore, the focus groups followed a standard protocol.

The participants were chosen purposively to represent the stakeholders involved in the FS. In all cases, the participation of farmers and financial institutions was a priority because financial tools account for a significant part of the discussion on RM and farmers are central to the system. The focus groups each involved between five and 12 participants, with a grand total of 78. Participants included stakeholders from the supply chain (input suppliers, processors, distributors, consultants), financial institutions (banks and insurance companies), policy makers (from local to EU level), civil society (consumers, media, NGOs), research institutes, associations and cooperatives, and farmers participated in the focus groups. Information on the focus group participants are provided in Appendix A.

Different activities were developed during the focus group, as shown

[1] SURE-Farm project: towards SUstainable and REsilient FARMing systems (https://surefarmproject.eu/).

in Fig. 2. The first two steps of the focus groups helped identify the main challenges and strategies of the FS. In each focus group, stakeholders participated in identifying and ranking the top 10 challenges to be tackled, and up to five strategies to deal with the identified challenges (currently and with a view to the future).

To ensure that the identification of challenges and strategies was consistent with the existing empirical evidence, the researchers provided information on the most often perceived challenges and significant strategies derived from previous surveys in the same FS (Spiegel et al., 2019). The participants, therefore, could discuss, integrate and agreed with such rankings. Two case studies (BE and DE) made exception in the challenges' ranking, as in the related focus groups the challenges were ranked by researchers (again based on Spiegel et al., 2019) and then presented to participants as given. In these cases, however, ranked challenges served as a basis for the next steps, meaning that the participants' brainstorming was developed based on this information, ensuring causal linkages between the identified challenges and the following indications on strategies, actors and improvements.

Once the strategies had been selected, participants were invited to identify the actors involved in each strategy, and then to discuss their performance in the third and fourth steps. The last step was a brainstorming activity to suggest improvements on actor roles and behaviour. Improvements were proposed by participants within an open discussion, and each was written down on a post-it. Participants were allowed to suggest as many improvements as they wished.

An improvement is a suggestion (sentence) made by a focus group participant on how to improve the input of a specific actor to better implement a specific strategy. Therefore, each improvement is related to a FS, a strategy, and an actor involved in that strategy. A total of 592 differentiated improvements were collected across the 11 focus groups. A report including the records of each focus group and a list of suggested improvements were drafted for joint analysis.

2.3. Data analysis

Our investigation is based on a qualitative approach. Given the complexity in integrating diverse evidences from 11 CS, we have relied on the wide use of coding, categorization, indicators and data visualization. To manage this vast number of suggested improvements, they had to be codified, whereby improvements were grouped according to meaningful codes. The codification led to the identification of 15 coded improvements indicating the key aspects of RM to be improved. These coded improvements referred to three canonical RM strategies: on-farm RM strategies, risk sharing strategies, and risk transfer strategies. The coded improvements were analysed beyond the FS level. Evidence about common factors influencing RM may both ease the understanding and increase the generalizability of findings. The analysis of improvements was carried out based on three factors, which help identifying common patterns underlying single FS:

(i) The challenges faced by FS. Participants identified the 10 most important challenges. The challenges were ranked from 1 to 10 from the least to the most influential challenge. In turn, challenges are classified by type (economic, environmental, institutional, and social spheres) and the duration of their impact (shocks and long-term pressures) (Meuwissen et al., 2019). The ranking values were added to the classes, and expressed as the percentage share of the total ranking values assigned within a FS to identify the perceived impact of each type of challenge on the FS. Therefore, the 15 codes were analysed to detect the most significant improvements for tackling a major specific type of challenge in the respective FS. The relevance of a challenge in a FS was determined by comparing its import with the average significance of this type of challenge measured across the 11 FS: a challenge was considered important whenever its significance was above the average.

(ii) Farm flexibility to change. Flexibility is generally considered key to a farm's adaptability (Darnhofer et al., 2010). Thus, we assumed that the ways to improve RM could vary significantly depending on the ability of farms to change. Flexibility is measured as the share of a farm's fixed assets (SE441) in total outputs (SE131), based on FADN[2] data (extrapolated as of April 2020), where the higher the share, the lesser the flexibility, and vice versa. However, the land factor (SE446) was excluded from the set of fixed assets because it could cause distortions of reality: it considers owned land only, and some FS (e.g. ES, FR) rely heavily on rented land. Data refer to NUTS 2 regions and specializations of the 11 FS under study. As a result, the FS were grouped in two classes by flexibility: higher and lower (see Appendix C). FS with a larger arable farming component were considered more flexible (NL, GE, UK, BG).

(iii) Farm dependence on CAP direct payments. Farm dependence on CAP aid has a substantial impact on farm business and decision making (Lagerkvist, 2005; Uthes et al., 2011). CAP dependence was calculated as the share of direct payments in farm net value added by farm type. As indicated by the EU Farm Economics Overview (2018, p. 35), farm types where the share of direct payments in farm net value added was above the average ratio (30%) for the EU were considered CAP dependent, otherwise they were classed as non-dependent. The classification is reported in Appendix C.

We analysed and compared the most significant coded improvements across the two levels of flexibility and CAP dependence. Although, according to this approach, findings cannot be generalized to all FS, common evidence across FS may provide insights for other FS (Sutherland et al., 2017), and contribute to a broad reflection on RM in EU beyond our research specific contexts.

Lastly, the coded improvements were observed across different actors to analyse which stakeholder roles should be improved most. A total of 93 actors were assessed across the focus groups. They were grouped into seven stakeholder categories: farmers, policy makers, financial institutions, supply chain actors, associations and cooperatives, researchers, and NGOs, media, and civil society. The key suggested improvements were analysed for each stakeholder category.

3. Results

3.1. Codification of improvements to RM

Fig. 3 shows the 15 coded improvements by on-farm, transfer, and sharing strategies. On-farm RM strategies make up 49% of total improvements. They include any kind of learning process, knowledge exchange, and information and workable data access. They also cover the *Promotion and Public Awareness* code that refers to public awareness of the functions and values of farming.

Risk transfer strategies represent 30% of total improvements. They include an array of financial and policy instruments, such as policy aids (CAP payments and measures, and other national or regional subsidies), fiscal policy, and financial products (especially insurance, credit, and futures). They also cover farmers' financial learning and planning, and consultancy on the part of financial institutions to support know-what and know-how.

Risk sharing strategies constitute 21% of total improvements. They include improvements to horizontal cooperation between farmers (e.g. to strengthen bargaining power, or input sharing), vertical cooperation between farmers, supply chain actors and other cooperatives, and

[2] FADN. Farm Accountancy Data Network – European Commission (https://ec.europa.eu/agriculture/rica/). It collects standard result variables (labelled by codes SE#) on European farms accountability and structure.

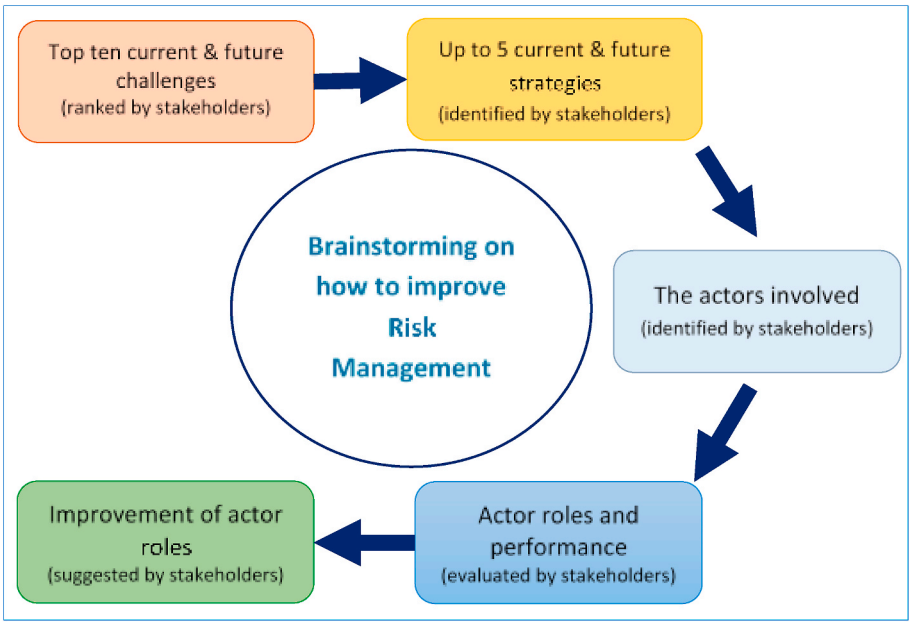

Fig. 2. Methodological design of focus group activities.

Fig. 3. Shares of the 15 coded risk management improvements as part of three canonical options.

coordination with administrators and policy makers.

3.2. Improvements to challenges

The relative significance of different types of challenges in each FS was measured, then FS were grouped based on the main type of challenge. These results are reported in Appendix C. Next, the relative significance of codes was inferred within each group. Full results are reported in Appendix D, whereas Table 1 below shows the key aspects to be improved, as proposed by focus groups stakeholders.

Farmers' need for knowledge (*Data Transparency and Information Provision*, *Learning of New Practices and Innovation*, and *Training and Consultancy Improvement)* appear to be significant in all cases. Generally, risk sharing strategies, especially *Horizontal Cooperation* and *Administrative Coordination and Processes* appear to be more relevant when long-term pressures are prominent. Besides, risk transfer strategies need to be improved to combat economic pressures by strengthening financial consultancy services.

Comparing environmental shocks and pressures, *New Aids and Fiscal Policy* are needed to manage or reduce risk in FS with a higher perception of shocks. Unlike shocks, environmental pressures require substantial improvements in the institutional and policy frameworks

Table 1
Key improvements by type of challenge.

	Shock	Pressures
Economic	*Focus on insurance to be adapted to specific FS needs (e.g. quality parameters, integrate index insurance with other insurance types)*	*Much more focus on a financial consultancy service enhancing farmers' planning capacity and use of RM tools*
Social		*Stronger farmers' cooperation to adapt to evolving consumer demand, and to increase social awareness on agricultural functions and values*
Environmental	*Focus on new tools to be provided, in order to cope with growing risks (e.g. droughts)*	*Focus on the institutional and regulatory framework. Reorganize administrations and specialize departments against environmental threats*
Institutional	*Focus on the decentralization of policy design and flexibility along the decision-making path, to adapt policy to the regional diversities. Need for more bottom-up approaches.*	

(*Administrative Coordination and Processes*, and *Reduction of Regulatory Constraints*), which is consistent with the long-term perspective. The policy implications for environmental issues are identified in the literature. For example, weaknesses in the CAP alignment to environmental goals has been underlined (see, for example, Matthews, 2013), as well as the impact of policy reform and the regulatory framework on land use and abandonment (Louhichi et al., 2010; Renwick et al., 2013) and on farm response to climate change (Finger and Calanca, 2011).

Regarding the social dimension, there are two codes related to social pressures that appear to be characteristic of FS: *Promotion and Public Awareness*, and *Horizontal Cooperation*. They point to a need to improve consumer guidance, especially related to livestock systems and mixed farms. According to previous research (Boogaard et al., 2011; Clark et al., 2016), livestock systems, particularly, suffer from a negative or undervalued public perception, highlighting the need for cooperation to improve consumer guidance and shape a more positive, long-term public acceptance.

For FS facing institutional pressures and shocks, the identified improvements are *Reduction of Regulatory Constraints* and *Administrative Coordination and Processes*. The goals are diverse, ranging from the elimination of regulatory constraints to diversification and more local decision making in DE, through the improvement of environmental regulations in the NL, to the need for more aids in FR. The wide diversity across FS leads to the prescription of very wide-ranging policy options, more flexibility along the top-down paths of policy making, and more decentralized policy design.

3.3. Improvements across different levels of flexibility and CAP dependence

3.3.1. Flexibility

Fig. 4 shows the relative significance of a code across FS with high and low flexibility. The significance of the codes within the two categories of FS was measured as the proportion of improvements contained in a code over the total improvements within the FS category (low and high flexibility). The code significance ratio for FS with high and low levels of flexibility indicates whether a code is more important in one or other case. If the value is negative, the code attracts more attention in FS with low flexibility, and vice versa. The logarithmic unit is used to facilitate comparison on a −1/+1 scale. Some codes show a ratio of around zero, meaning that they are similarly important across FS that are CAP dependent and non-dependent.

The improvements to risk sharing strategies differ across FS with high and low levels of flexibility. Farms having less ability to implement on-farm changes need more coordination with other actors (*Vertical* and *Horizontal Cooperation*). By contrast, FS that are highly flexible need more coordination and synergies with the administration and policy makers.

FS with low levels of flexibility show more interest in *Public-Private Collaboration* and *New Aids and Fiscal Policy*, indicating that financial and policy instruments are not easily accessible for farmers or not tailored to farmers' needs, and public programmes could facilitate the use of such tools. For example, in the case of IT, stakeholders suggest new insurance policies based on hazelnut quality parameters determining the sale price, whereas insurance could cover new, emerging pests and diseases in PL, and loans and insurance are considered to be more tailored to larger farms and less accessible to smaller farms in RO. In addition, *Financial Planning* underlines the need to better embed such tools in the farm business and organization. In highly flexible FS, financial instruments are more accessible, but farmers have to know what instruments are available and how to use them, which is why *Financial Consultancy* is very significant, as in the case of the NL, BG and DE.

3.3.2. CAP dependence

The coded improvements were also analysed across FS that are CAP dependent and non-dependent. Like the flexibility analysis, we

Fig. 4. The significance of improvements across FS with low and high flexibility.

calculated the ratio of code significance in non-dependent to dependent FS, as shown in Fig. 5.

The weight of *New Aids & Fiscal Policy* and *Financial Product Improvement* codes across CAP dependent and non-dependent FS is similar. However, dependent FS reveal a stronger focus on financial management of risk. They address improvements to the farmers' ability to use financial instruments (*Financial Consultancy*, *Finance & Policy Learning*), and *Public-Private Collaboration* to improve accessibility. Interestingly, our findings suggest that farms that are supported by policy aids need much more learning, consultancy, and public incentives to increase the usage of such instruments.

While CAP dependent farmers need available and transparent data and scientific-based experience, farmers not dependent on CAP appear to rely more on external guidance and support (*Training & Consultancy Improvement*).

3.4. Improvements by actors

The relative significance of codes was inferred for each actor. Full results are reported in Appendix E. Table 2 below shows the key aspects on which stakeholders focused.

An interesting finding is that actor involvement in RM could be extended to different or unconventional roles. *Training & Consultancy Improvement* is not limited to expert consultants, but also refers to other upstream and downstream supply chain actors. This suggests that while value-chain coordination involves technical issues that farmers in FS cannot implement without external technical support, there is also a need for training on the side of supply chain actors. Supply chain actors should participate in learning processes (*Learning of New Practices & Innovations*), and enhance *Data Transparency and Information Provision*.

Researchers should be involved in *Promotion and Public Awareness* in order to increase the awareness of the functions and values of farming, especially with respect to livestock systems affected by negative social perception (e.g. SE), the idea being that scientific findings should help to combat a priori negative beliefs among the general public. However, media and civil society actors are considered instrumental in shaping long-term consumer preferences (e.g. SE, FR).

Financial institutions are called upon to provide an agriculture-specific financial consultancy service. In fact, beyond instrument design and accessibility, the skills required to use and integrate these instruments within ordinary farm business management might be missing (e.g. the NL, DE). Policy makers have a role in providing information and workable data, and training programmes (not confined to farmers only), and farmers are, in turn, called upon to improve learning (*Learning of New Practices & Innovations*) and financial management (*Finance & Policy Learning*, *Financial Planning*), and to rely on external consultancy.

Associations and cooperatives should improve information provision, training programmes and consultancy services, in conjunction with financial institutions and expert consultants (e.g. PL, RO). Indeed, they could deliver financial services such as credit to smaller farms (RO). They can play a leading role in improving consumer guidance and public awareness (*Promotion & Public Awareness*, *Horizontal Cooperation*) (e.g. ES, FR, SE).

Table 2
Key aspects to improve by actor.

Actors	Key aspects to improve
Farmers	*Much higher involvement in cooperatives (to manifold purposes) and pro-active participation in learning processes to foster innovation and strengthening financial planning capability.*
Associations & Cooperatives	*Stronger role in extension services, and consumer guidance. Special focus on the wide range of specialized consultancies they could provide to farmers.*
Supply Chain Actors	*Higher participation in learning processes (as much as farmers do), especially input suppliers who are asked to provide many more innovative products and novelties to farmers*
Financial Institutions	*Focus on a structured, agricultural-specific financial consultancy service supporting the know-what and know-how plan business and use financial tools.*
Policymakers	*Much more effort in building a structured extension service to provide training programmes to farmers as well as supply chain actors (mainly regarding financial management and new climate issues). Focus on innovative digital tools to foster data exchange.*
Research	*Should play a greater part in fostering consumer understanding and societal knowledge of agricultural services and values. More attention to design new products and strengthen the farmers' capacity to promote them.*

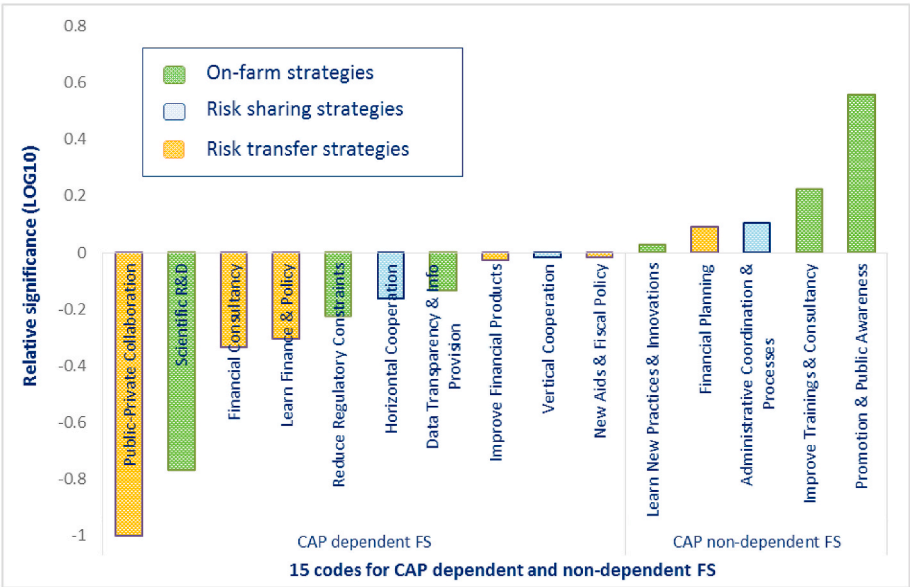

Fig. 5. Main improvements in FS that are CAP dependent and non-dependent.

4. Discussion: three main avenues for improving RM

4.1. Developing learning and knowledge networks

In general, human capital has been described as a driver of economic processes and growth (Cuaresma, 2017). The role of knowledge, information and learning has received growing attention from the RM literature in the last decades. Goodwin et al. (2002), for instance, support that experience has a positive effect on farm performance, and therefore is worth being considered in the insurance rating process. Recent advances in RM studies (Santeramo, 2016) put emphasis on farmers' learning by doing and learning from others as key factors to foster understanding of and participation in RM tools. On the other hand, Bolden et al. (2018) argue that knowledge networks can promote information flows between scientists and other stakeholders, and encourage the implementation of adaptation strategies.

According to the literature, when exploring options to improve RM considerable importance is attached to learning and knowledge networks. Such a learning and knowledge network could be aligned with the concept of agricultural knowledge and innovation systems (AKIS) (EU SCAR, 2015). However, the traditional AKIS concept refers mainly to the actors of extension services (private advisors, research, public information services), while, like previous research (Hermans et al., 2015), we found that more stakeholders could be involved. Adding to this knowledge, our findings highlight that other actors, such as financial institutions, could develop specific advisory services to expand extension services.

Besides, AKIS are based particularly on knowledge as a stock to be transferred (Poppe, 2016), whereas, in our FS, learning emerges as a significant aspect of the knowledge network. Our focus groups paint a picture of a network where all actors are engaged in individual or collective learning, including regional/local public officers, insurance companies and input suppliers. Since farmer learning depends on knowledge support by others (e.g. training, data provision, experience exchange), and that other actors are asked for learning as well, our understanding corroborate the concept of networks as learning entities (Gibb et al., 2017).

As there is consistent evidence about the contribution of knowledge and learning to the RM efficacy, policymakers might prioritize this aspect when designing RM policy. In line with Labarthe and Laurent (2013) and Hermans et al. (2015), public authorities should integrate more deeply the private extension service to increase dissemination and research, and reach those farms that are less connected to the network. Santeramo (2016), for instance, proposes a policy strategy to increase information campaigns and to trigger farmers' learning by doing and spill-overs through highly-supported first-participation schemes in RM tools. Also, Cordier and Santeramo (2019) propose the creation of public platforms to favour experience exchange.

4.2. New forms of collaboration

Collaborations can take different forms depending on the needs and challenges of the FS. Therefore, most farms are likely to pursue some sort of cooperation (Dias and Franco, 2018). Even though the actual, social impact of cooperatives is not always clear (Benos et al., 2018), cooperation can lead to important changes in farm structure and performance (Balmann et al., 2006). However, different forms of cooperation could affect farm performance in diverse ways (Kontogeorgos et al., 2018).

In the first place, cooperation helps strengthening RM tools and strategies. The literature investigates the dynamics of cooperative RM and determinant factors, including trust, confidence and their interplay with risk perception (Earle and Siegrist, 2008). On the one hand, Santeramo (2017) suggests that cooperation may help foster participation in RM tools. On the other hand, cooperative RM assumes great relevance as it might lead to new or improved strategies. This is the case, for instance, with cooperative strategies for contracting farming and fixed price contracts (van Bergen, 2019). Also, Watson et al. (2018) describe new, promising cooperative forms of indemnity insurance based on risk pooling. As indicated by the focus groups, there is room for advances in this direction.

Furthermore, the focus groups underlined how cooperatives may help to create new, locally-based organizations to strengthen connections among multiple actors (e.g. farmers, local administrations, consumers), which is consistent with recent developments in research (Berti and Mulligan, 2016; Fonte and Cucco, 2017). We found that new forms of cooperation may serve numerous purposes beyond the strict field of RM. Accordingly, recent investigations show the potential of cooperation and networks to improve the effectiveness of collective farming practices (Sherman et al., 2019), and highlight the need for designing formalized structures and rules in this respect. Likewise, Levy and Lubell (2018) underline the role of cooperative networks for the diffusion of innovation. In our focus groups, outstanding importance is also attached to cooperation for learning, which is likely to be one of the key strategies in the future (Prager and Creaney, 2017; Thomas et al., 2020).

Interestingly, the focus groups highlight the opportunity to extend cooperation beyond regional/national borders and productive orientation, grouping different sectors within a region (see Regan et al., 2017, for an example), and the same specializations across different EU countries. These findings could suggest alternative forms of collaboration between actors that typically do not cooperate (Dyg and Mikkelsen, 2016). Likewise, the scope of analyses on cooperation could be enlarged to consider changes in relationships between actors (Severini and Sorrentino, 2017).

Though there is a margin to improve the scope and efficacy of cooperation, our findings point to the need for further developments in the regulatory framework. Cordier and Santeramo (2019) provide useful recommendations regarding the sectorization and enlargement of pooled farmers involved in IST and mutual funds. Moreover, Bardají and Garrido (2016) suggest empowering farmers' cooperatives by providing them with further instruments (e.g. coordinated production withdraw from markets). Previous research suggests also that, under the current policy framework, cooperatives are likely to be set up for the sole purpose of getting public aid (Michalek et al., 2018), and that the CAP is not entirely effective in favouring the creation of producer organizations (Velázquez and Buffaria, 2017). Therefore, according to Severini and Sorrentino (2017), the CAP could be rethought to support the emergence of novel, more tailored organizational forms.

4.3. Integrated financial and policy instruments

The 11 focus groups highlighted several limitations for the use of RM tools. According to previous investigations, we found that hedging with futures (contracts to secure price of commodity assets at a specified time) are mainly used by dairy and large arable farms (Garrido et al., 2016; Schulte and Musshoff, 2018), but most of the farmers are still unfamiliar with how futures work. Insurance products are seldom tailored to farmers' specific needs (Meuwissen et al., 2001), the use of livestock insurance is uncommon (Meuwissen et al., 2018), and individual savings are often preferred to crop and yield insurance (see, for example, Farrin et al., 2016 on the preference between savings and insurance). While some research focus on new or unconventional regional risk pooling and index-based risk transfer strategies (Linnerooth-Bayer and Hochrainer-Stigler, 2015), recent assessments of RM in the EU highlight the potential in integrating existing strategies (Cordier and Santeramo, 2019).

As part of our findings, a key factor to improve RM is the collaborative design and implementation of financial and policy tools to exploit synergies. The literature explores synergies between financial tools, policy instruments and on-farm strategies. For instance, in accordance with Carter et al. (2016), we found that insurance products and loans could be designed jointly to reduce the risks assumed by financial institutions, and, therefore, costs and requirements. This is also consistent

with Farrin and Miranda (2015), who demonstrate the potential of contingent credit contracts to reduce default rates. In addition, in agreement with Tadesse et al. (2015) we found that the integration of different insurance types (e.g. weather index, yields, and revenues) may help in coping with multiple shocks.

Further examples of potential synergies are provided by Cordier (2015) on savings and direct payments; Bardají and Garrido (2016) on insurance and direct payments; Akhtar et al. (2019) on agricultural credit and off-farm income; and Santeramo (2017) on flexible insurance schemes, diversification and off-farm labour. In conformity with the literature, therefore, the focus groups suggest that there is a large margin to improve RM based on all those synergies that are currently under-exploited, and not formally ruled by the policy framework.

Second, there needs to be more structured planning of integrated strategies from a long-term farm business perspective. Indeed, the business planning gap has been identified as one of the factors reducing, for example, access to credit (fi-compass, 2020). A focus on emerging, long-term challenges and changes that might develop strategies over a longer period is missing. This is consistent with findings by Meuwissen et al. (2018), who point to new types of insurance based on 'ensuring the continuity of farms' over time rather than confining RM to short-term purposes. For example, according to Varga (2016), loan re-payments and insurance premiums could be adapted to the vagaries of farm cash flow and public funding in the medium to long term. This suggests the need to create specific comprehensive tools to design, plan, and manage the usage of integrated instruments within farm accounting over longer business plan periods.

5. Conclusions

This paper proposed a comprehensive, participatory approach to risk management (RM) as an extension of the current holistic view, considering the multiple actors involved in manifold strategies, and their potential to improve RM in the light of shocks and long-term pressures.

Recent RM research across the EU suggest that smaller, highly-subsided, and less-diversified farms are less likely to exploit RM tools (Finger and Lehmann, 2012; Lefebvre et al., 2014; van Asseldonk et al., 2016). Adding to the literature, we found that less flexible and CAP dependent farms show a greater need for value chain cooperation and new policy and financial tools better adapted to farm business. However, while more flexible farms show easier access to RM tools, they are missing the know-what and know-how to use them. The significant diversity of needed improvements across different farming systems (FS), poses a challenge for policy design in the EU. Yet, according to Koopmans et al. (2018) and Schleyer et al. (2015), our findings emphasize the opportunity to re-think a flexible policy framework based on more decentralized, locally-based and bottom-up approaches to cope with regional-specific issues.

Findings on improvements by actors highlight that stakeholder involvement in RM could be extended to new or unconventional roles. This would increase the range of strategies available to farmers, as well as their effectiveness. To our knowledge, little attention has been paid to other stakeholders beyond farmers and policymakers in the RM literature, and our findings augment the mainstream focus on RM. Consequently, we suggest that future research on RM should go beyond farmers and public institutions, and also point to all those stakeholders who might influence mechanisms behind RM. Not less importantly, our approach indicates that challenges on alternative time horizons entail different aspects of RM to be improved. Hence, we suggest that RM research should not be limited to strategies against shocks (e.g. droughts, price drops), but further develop the focus on the ability to anticipate challenges in the long-run (e.g. climate change, changing consumer preferences).

Underlying the FS-specific characteristics and improvements, there are three mainstays, underpinning an improved RM approach: developing learning and knowledge networks; foster new forms of collaboration; and design integrated financial and policy instruments. The focus groups called into question the current policy framework. Along with the design of the new CAP post-2020, there is space for relevant improvements, which are in line with recent advances in the RM literature (Bardají and Garrido, 2016; Severini and Sorrentino, 2017; Santeramo, 2016; Cordier and Santeramo, 2019). Greater attention should be paid to the knowledge system and the implementation of inclusive digital platforms for knowledge exchange, capillary informative campaigns and structured extension services. In addition, there is a need to further developing regulations to allow new or improved forms of cooperation. This includes insurance products and mutual funds based on novel risk pooling schemes, but also formalized rules to cooperate for less conventional purposes like collective farm management and learning. Yet, more effort should be made to provide detailed regulations to formalize and exploit synergies between existing tools, and to promote their use in those countries where they are underexploited.

Our research is subject to some methodological limitations. Our findings rely on the codification of the records translated to English from different national languages, converting the number of verbal statements gathered in moderated discussions into quantitative evaluations. In addition, the number of gathered improvements was different across FS. Although these were normalized at the FS level, there are still potential sources of noise, aggregation errors or researcher bias. Our findings, though, offer insights that warrant more attention in future research, and have specific policy relevance with respect to agricultural policy design.

Declaration of competing interest

None.

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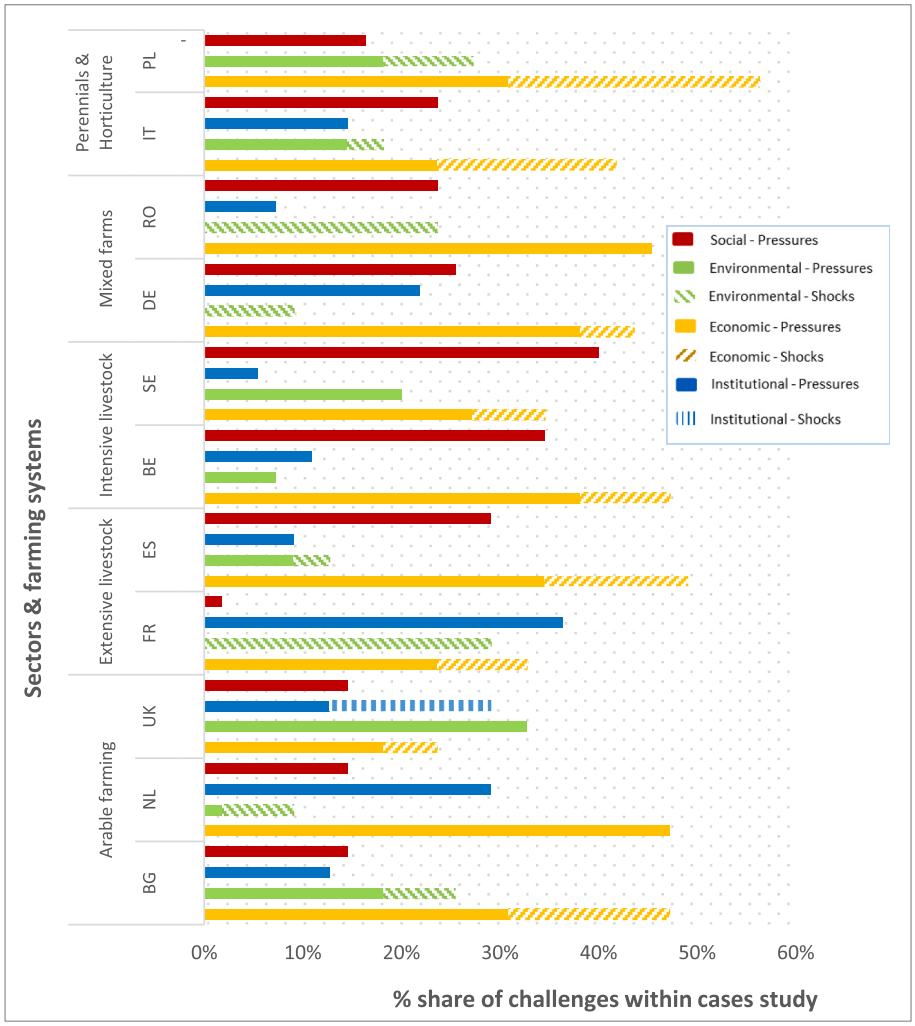
Appendix A. Information on focus groups' participants

Country	Number of participants (women): sectors	Farming system	Sectors
Poland (PL)	9 (4): 1 Insurance Company; 2 Chamber of Agriculture representative; 1 Plant Health Inspector; 1 Parliamentary Assistant; 1 Advisory Service; 1 Scientist; 1 Producer; 1 Employment Office Representative	Fruit and vegetable farming in the Mazovian region	Perennials & horticulture
Italy (IT)	6 (1): 2 Agricultural Producers; 2 Insurance Companies (1 Agronomist); 1 Producer Organization's President; 1 Technical & Financial Advisory Service	Small-scale hazelnut production in Lazio, central Italy	
Romania (RO)	5 (0): 2 Farmers (1 representing a Farmers' Association too); 2 Banks (1 representing an Insurance Company too); 1 Insurance Company	Small-scale mixed farming in Northeast Romania	Mixed farms
Germany (DE)	6 (1): 3 Farmers; 2 Financial Sector; 1 Consulting Service	Large-scale corporate arable farming with additional livestock activities in the Altmark in East Germany	
Sweden (SE)	5 (1): 3 Farmers; 1 Banker; 1 Branch Organization representative	High-value egg and broiler systems in Southern Sweden	Intensive livestock
Belgium (BE)	12 (2): 6 Banks & Insurance Companies; 1 Governmental Institution; 1 Advisory Service; 1 Processing Industry	Intensive dairy farming in Flanders	
Spain (ES)	9 (0): 1 Farmer; 2 Farmers' Organization; 1 Bank; 1 Insurance Company; 1 Cooperative; 1 Policy maker; 2 Local Administration	Extensive sheep farming in Northeast Spain	Extensive livestock
France (FR)	8 (4): 4 Producers' Organization; 2 Insurance Companies; 2 Banks	Extensive beef cattle systems in the Massif Central	
United Kingdom (UK)	7 (5): 4 Business Advisory, 2 Bankers, 1 National Farmers' Union representative	Arable farming in the East of England	Arable farming
The Netherlands (NL)	5 (0): 2 Farmers (1 engaged to Dutch Farmers Union); 1 Insurance Company; 1 Regional Policy maker; 1 Agrochemical Trader (engaged in Local government)	Intensive arable farming in Veenkoloniën	
Bulgaria (BG)	6 (1): 3 Agricultural Producers; 1 Insurance Company; 1 Local Administration; 1 Cooperative	Large-scale arable farming in Northeast Bulgaria	

Appendix B. Classification of FS by flexibility and CAP dependence

Farming System	Type of farming (FADN id)	Total output/Fixed assets (excluding land)	Flexibility	CAP dependence
PL	Perennials & Horticulture (36)	2.6	Lower	non-dependent
FR	Extensive beef livestock (49)	2.5	Lower	dependent
RO	Mixed farms (80)	2.0	Lower	dependent
ES	Extensive sheep livestock (48)	1.6	Lower	dependent
BE	Intensive dairy farming (45)	1.5	Lower	dependent
SE	Intensive egg & broiler (50)	1.4	Lower	non-dependent
IT	Perennials & Horticulture (36)	1.3	Lower	non-dependent
NL	Arable farming (16)	1.2	Higher	dependent
DE	Mixed farms (80)	1.0	Higher	dependent
UK	Arable farming (15)	0.9	Higher	dependent
BG	Arable farming (15)	0.7	Higher	dependent

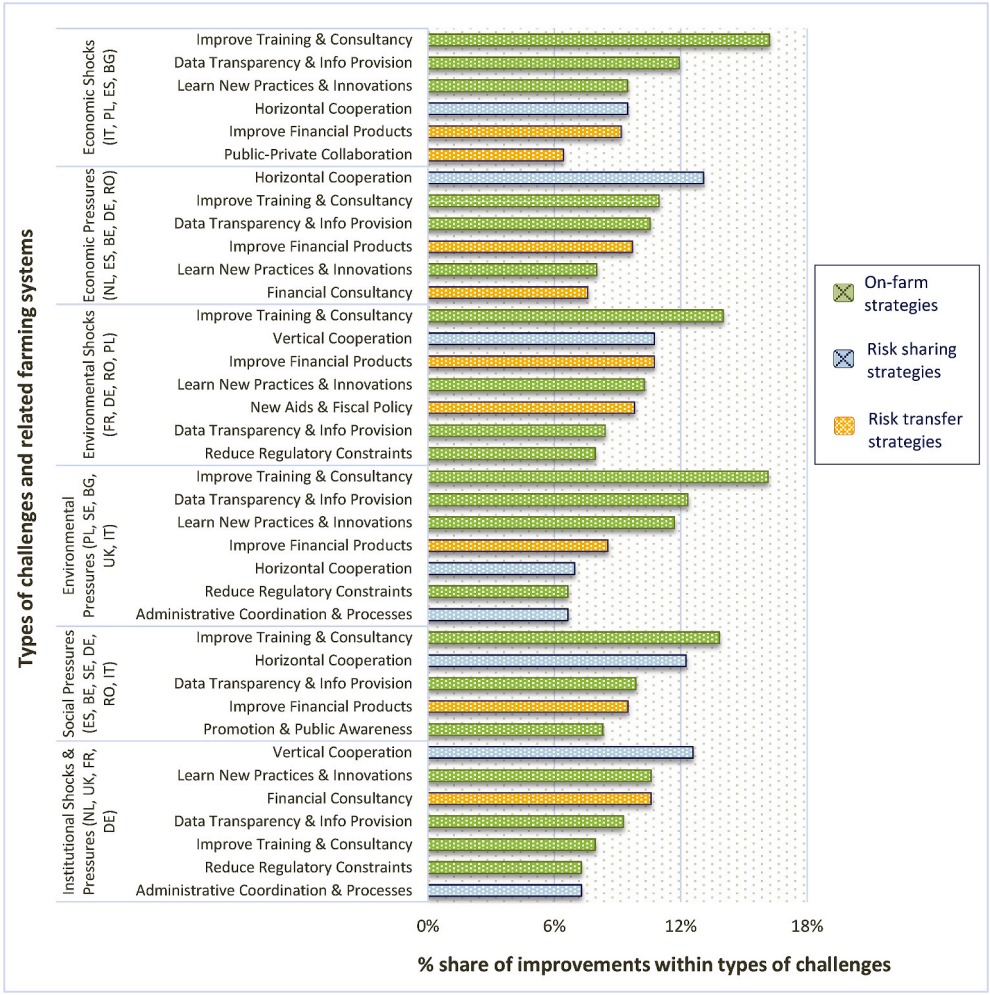
Appendix C. The perceived challenges: percentage share of the summed ranking values for economic, environmental, institutional, and social influences broken down by sudden shocks and long-term pressures within a FS



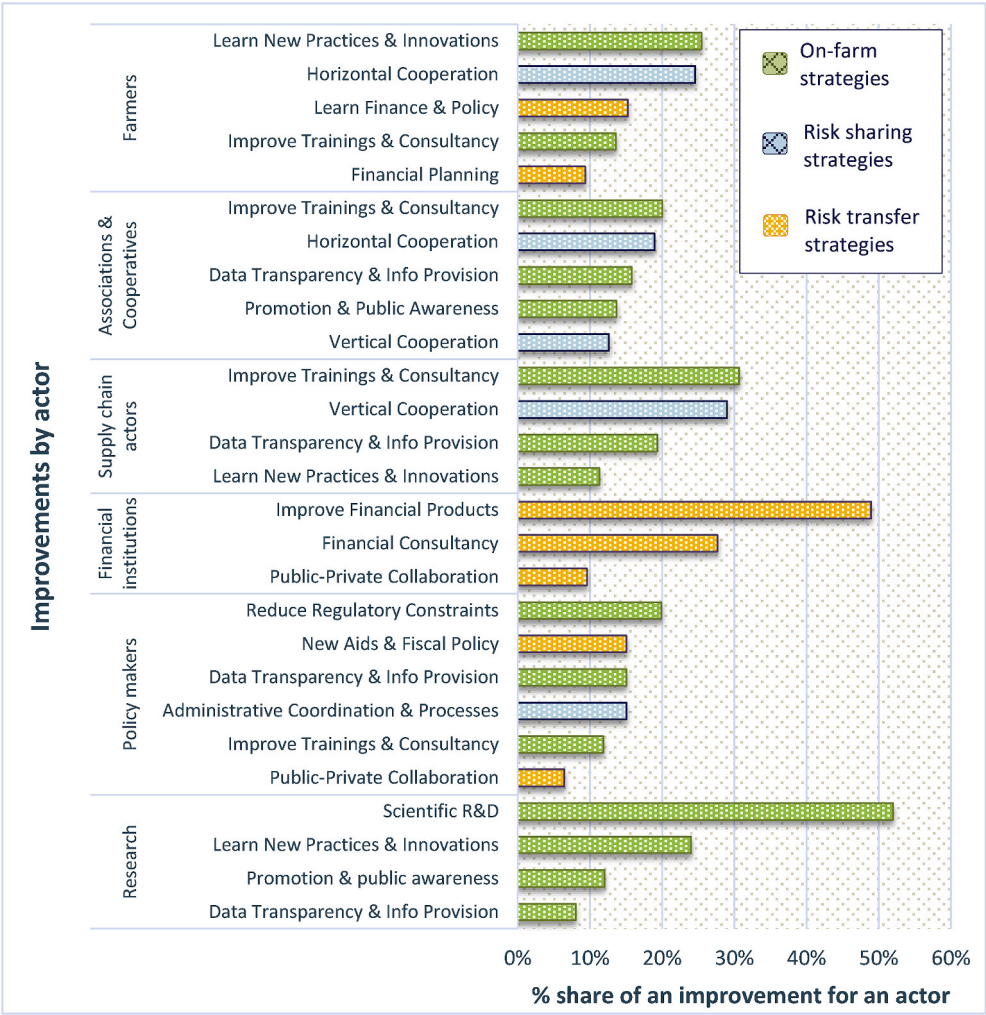
Challenges	Average (11 FS)	Above average FS
Economic shocks	10%	BG, ES, IT, PL
Economic pressures	33%	NL, ES, BE, DE, RO
Environmental shocks	8%	FR, DE, RO, PL
Environmental pressures	11%	BG, UK, SE, IT, PL
Social pressures	22%	ES, BE, SE, DE, RO, IT
Institutional pressures & shocks	16%	NL, UK, FR, DE

Groups of FS based on major challenges.

Appendix D. The relative significance of codes within each group based on major challenges



Appendix E. The relative significance of codes for each actor, measured as the percentage share of improvements referred to a code for a specific actor over the total improvements referred to that actor



Appendix F. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jrurstud.2021.04.004.

Authors statement

Bertolozzi-Caredio, Daniele: Writing - original draft; Data curation; Formal Analysis; Investigation; Conceptualization. Bardaji, Isabel: Data collection, Conceptualization; Methodology; Investigation; Writing-Reviewing. Garrido, Alberto: Data collection, Conceptualization; Methodology; Investigation; Writing-Reviewing. Berry, Robert: Data collection; Validation; Reviewing, Bijttebier, Jo: Data collection; Methodology; Validation; Reviewing, Gavrilescu, Camelia: Data collection; Validation; Reviewing, Harizanova, Hristina: Data collection; Validation; Reviewing, Jendrzejewski, Błażej: Data collection; Validation; Reviewing, Meuwissen, Miranda M.P.: Data collection; Methodology; Validation; Reviewing, Ollendorf, Fransiska: Data collection; Validation; Reviewing, Pinsard, Corentin: Data collection; Validation; Reviewing, Rommel, Jens: Data collection; Validation; Reviewing, Severini, Simone: Data collection; Validation; Reviewing, Soriano, Barbara: Data collection, Conceptualization; Methodology; Investigation; Writing-Reviewing.

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