Received: 19 July 2021 | Accepted: 9 October 2022

DOI: 10.1111/soru.12407

SPECIAL ISSUE ARTICLE

Sociologia Ruralis Journal of the European Society for Rural Sociology

ESRS

Disentangling the diversity of small farm business models in Euro-Mediterranean contexts: A resilience perspective

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Funding information
EU, Grant/Award Numbers: 677363, H2020-SFS-2015-2

Abstract

With growing concern for the unsustainability of food systems, the international research community has turned its attention to small farms as key actors to potentially face the global food crisis. This study aims to support a policy design that values the diversity of small farms business models vis-à-vis environmental, economic, social and institutional challenges affecting European farming systems. Building on the existing classification of five small farm types in the EU, our analysis targets the business model dynamics of small farms in

four Euro-Mediterranean countries: Greece, Italy, Portugal and Spain. For this analysis, we applied resilience thinking to the Business Model Canvas framework. This innovative conceptual framework allows us to depict the architecture of small farms business models and their role in farming systems. The diversity of small farms business models and their continuous adaptation to changing conditions allows for the identification of a strongly heterogeneous assemblage of farms that contribute to the resilience of food systems at local, regional and multiple other scales.

KEYWORDS
Business Model Canvas, local food systems, short food supply chains, small-scale farming systems, Values-Based Territorial Food Networks

INTRODUCTION

In the global context of growing concern for the unsustainability of food systems, the role of small farms is acknowledged to have positive effects on food security, community development and multiscale resilience (FAO, 2014; FAO & IFAD, 2019). Despite economic and environmental uncertainties and the increasing abandonment of rural areas, small farms play a critical role in global food production across diverse contexts, providing between 50% and 75% of food calories consumed globally (IFPRI, 2019; Ricciardi et al., 2018; Samberg et al., 2016). Therefore, the international community focuses on small farm realities as potential key sites for policies confronting global food system changes (Graeub et al., 2016). A systematic policy design aimed at boosting food and nutrition security, social-ecological sustainability and equitable socioeconomic development by supporting small farms is challenged by the strong diversity of farm characteristics within the global food system (Smith & Haddad, 2015). Thus, a supportive policy design needs to consider the diversity of small farm landscapes with respect to the context-specific adaptation of their business models to inform policy-making on the potential effects of a transition towards small farm models on the food system (Gaitán-Cremaschi et al., 2019; Galli et al., 2020b; Giller, 2013).

There is no consensus on a common definition of a small farm (Davidova & Thomson, 2014). Farm size can be calculated through physical size, economic size, labour force, livestock units and market integration of farms (European Commission, 2011). Most frequently farm size is assessed using farmland area (Guiomar et al., 2018) and the threshold applied by Eurostat and the Food and Agriculture Organisation (FAO) for the agricultural area of small farms is less than 5 ha (Davidova et al., 2012). According to this criteria, in Europe, ca. 45% of total farms have less than 5 ha and cover 4% of the total utilised agricultural area (Guiomar et al., 2018). With regard to the European context, small farms are distributed mostly in all Mediterranean countries, South-eastern Europe, Northern Scandinavia, Ireland and Scotland (Guiomar et al., 2018), including mountain

areas with marginal agricultural productivity (Pinter & Kirner, 2014; Salvioni et al., 2014). More recently, the European Commission (2021) have considered small farms as those farms that have an agricultural area below 10 ha, and they represent more than three-quarters of farm holdings in the European Union (European Commission, 2022). The relevance of small farms is related to their capacity to produce, manage and transfer value in several ways: economic, social and environmental. However, the contribution and impact of small farms on food systems are increasingly acknowledged to belong to the '*management question*' of farms rather than other factors such as farm size (Ebel, 2020, p. 25). Effective policy-making processes need to be informed of how value is managed through various mechanisms and dynamics within the landscapes of different types of small farms. The complexity of small farming requires new analytical tools to identify articulated key elements and organisational models. Furthermore, heterogeneity in small farms is increasingly reflected in a range of different responses in terms of resilience (Winter & Lobley, 2016), calling for specific approaches to explore and assess the resilience of different farm types within small farm populations (Unay-Gailhard et al., 2018). While exploring the diversity of farming systems, within which small farms are embedded, is crucial, understanding their dynamic interactions with specific contextual challenges is critical to defining their role within food systems (Gasselin et al., 2020). Overall, the diversity of small farms has been extensively investigated in the extant literature (Guiomar et al., 2018, 2021; Hazell, 2020; Palmioli et al., 2020; Rivera et al., 2020; Samberg et al., 2016); however, a specific analysis of the diversity of small farm business models, and in particular, their interactions with the challenges of farming and food systems, is still lacking. Moreover, the diversity of farm management remains central in the 'small farms' debate' (Ebel, 2020; Rapsomanikis, 2015), as well as in the debate on local food system dynamics (Chiffoleau et al., 2019). Efforts oriented towards the qualification and justification of farm practices within local food systems are particularly encouraged to grasp the dynamics of territorial food contexts and to understand their contradictions and complex interrelations, in what Nemes et al. (2023) defines as Values-based Territorial Food Networks. Thus, the primary question motivating this research is how business models reflect the diverse ways in which small farms create, propose and capture value. The secondary question is to ask how resilient these business models are in the face of various challenges faced by European farming systems.

Building on the Horizon 2020 project SALSA ('Small farms, small food businesses and sustainable food security'), this article presents a comparison between business models of different types of small farms, according to their specific dynamics of value creation, proposition and delivery and capture, as well as their resilience properties (these terms are defined more precisely below). Data were collected from a large set of indicators measured in different samples of small farms in nine reference regions in four Mediterranean countries (Greece, Italy, Portugal and Spain) and retrieved from a larger analysis at the European level (Guarín et al., 2020). In Southern European countries, the total number of small farms decreased by 33% between 2010 and 2019, and small farms now represent 62% of the total farms. In the reference regions studied,[1] small farms occupy approximately 38.8% of the total area and 17.4% of the utilised agricultural area (SALSA, 2020). Small farm production in Southern European countries is often not consumed within the region but is exported outside of the region, especially fruits, vegetables and olive oil for the European market. The total production of small farms in Southern European countries is so large and diverse that it has the potential to completely fulfil the regional demand for food (SALSA, 2020).

In this study, we first develop a theoretical framework to articulate the flow of concepts that link (a) resilience thinking to small farm activities and characteristics described through the lens of business models and (b) the diversity of small farm business models vis-à-vis multiple challenges for European farming systems. Then, the methodological approach is presented through

the description of the sample and case-study areas and data analysis performed on a large set of small farms. In the Results section, we present and discuss the outcomes of this analysis by highlighting the economic, environmental, social and institutional insights related to small farms' adaptation to dealing with multiple challenges, as well as the emerging opportunities and roles for small farms in current food systems at multiple scales.

THEORETICAL APPROACH

Resilience of small farms

European farming systems are being exposed to an increasing number of challenges that question their resilience to shocks and stress. Because farms and value chain actors are embedded in local biophysical and socioeconomic environments, a focus on the context of farming systems is needed to address the resilience issue effectively (Meuwissen et al., 2019). Based on Giller (2013), Meuwissen et al. (2019) understand farming systems as 'local network(s) of farms and other actors' (p. 2) that interact within a given agro-ecological context. Meuwissen et al. (2019) also provide a comprehensive definition of the resilience of farming systems as their 'ability to ensure the provision of the system functions in the face of increasingly complex and accumulating economic, social, environmental and institutional shocks and stresses, through capacities of robustness, adaptability and transformability' (p. 2). Thus, according to these authors, at a farming system scale, challenges can be defined as environmental, economic, social and institutional. These challenges can impact farms through multiple concurrent shocks and changes, resulting in temporary or long-term effects (Arnalte-Mur et al., 2020; Ortiz-Miranda et al., 2022). Meuwissen et al. (2019) highlight how farming systems' multiple functions can change over time and, therefore, they develop resilience properties through the capacity to cope with 'the unknown, uncertainty and surprise' (p. 3). The analysis of complex dynamics, in which different challenges are intertwined, requires a systemic approach to finding solutions for improving the resilience of farming systems (Lupton et al., 2020). At a more specific scale, Darnhofer (2014) explains how such challenges affect not only broader economies and farming systems but also farms and that farmers have always had to adapt to new solutions to deal with predictable or unexpected socioeconomic and biophysical trends and events. For instance, farmers' activities can be affected by extreme weather conditions, such as drought, flood and hail; crop or animal disease outbreaks (Darnhofer, 2014); market uncertainties or changes in the availability of family labour and generational renewal (McGuinness & Grimwood, 2017; Zagata & Sutherland, 2015). Additional uncertainty has been triggered by recent economic crises: the availability of public funds for agriculture in less protective policy contexts (Daugbjerg & Feindt, 2017), market globalisation and deregulation characterised by price volatility and trade wars (Maye et al., 2018), dietary transitions and the dynamic systemic nexuses linking agricultural, environmental and energy practices and policies (Darnhofer, 2014; Myers et al., 2016). The current Coronavirus disease (COVID-19) crisis is further challenging the resilience of farms and shows the timely relevance of both a policy and research approach to farming system dynamics based on the examination of adaptation opportunities and diversity between and within farms (Darnhofer, 2020a).

The adaptive capacities and abilities of farming systems to deal with challenges have often been conceptualised based on resilience theory (Bullock et al., 2017; Folke, 2016; Folke et al., 2010), which highlights the change, uncertainty and vulnerability of systems, but also involves optimistic perspectives by exploring the capacity of systems to adapt and transform (Holling & Gunderson,

2002; Shaw & Maythorne, 2013). Response opportunities and solutions to these challenges rely strongly on the local circumstances of farming systems and interactions at different spatial scales (Meuwissen et al., 2019). Furthermore, farms engage in interactions at multiple temporal scales; thus, the resilience properties of a given farm depend on the specific time they need, considering that both farm and context might change over time (Darnhofer, 2014). Downscaling from the farming system level, the concept of resilience also suitably applies to small farms as units of analysis. According to Darnhofer (2014), with relation to farms, 'resilience focuses on the persistence of the farm over the long term' (p. 471). With regard to the operational utility of the concept, Darnhofer (2014) adds that 'resilience thinking is particularly apt to contribute to those approaches within farm management which seek to explain why farmers do what they do' (p. 471). Moreover, resilience can be considered a crucial dimension of long-term sustainability (Almås & Campbell 2012) that 'provid[ing]es the elements to inform the decision process intrinsic to (sustainability)' (Allen & Prosperi, 2016, p. 967). Therefore, resilience thinking can contribute to a better analysis of the response strategies implemented by small-scale farmers to adapt and change their business activities vis-à-vis the contextual challenges characterising their business and natural environment. Those response strategies constitute what resilience scholars called '*recovery potential*' (Bohle et al., 1994) or the potential of a system unit to respond to change through adaptive and transformative capacities, which are applied against a '*potential impact*', defined as the likely effect of a stressor on the same system unit (Allen & Prosperi, 2016, p. 959).

Exploring small farm characteristics and activities from a resilience perspective can help focus on the management process and complex decision-making, on what a farm makes of its assets and skills, and how a farm creates, further develops and strategically modifies its assets when confronted with internal and external changes and challenges. Running farms over the long term require strong effort and involve complex processes. The diversity in farming activities and logic is rooted in the ability of farming system actors to adapt to and respond to different challenges. A perspective based on the relationship between resilience and diversity triggers a dynamic interpretation of a farmer's agency, that is, how a given farmer employs and operationalises the resources available, considering the perception of contextual limits and opportunities towards the fulfilment of their goals (Darnhofer, 2014). This approach helps understand farmer management and how management can lead to the emergence of new business models from the recombination, interaction and transformation of social and material resources (van der Ploeg et al., 2006). To cover the complexity of the environmental context in which farmers carry out their business activities, as well as the flexibility they apply vis-à-vis recurrent change, new theoretical and modelling approaches are needed to better describe management practices in farms (Darnhofer, 2014).

Small farm business models

To improve the analysis of the complex and diverse combinations of management practices and strategies of small farms building on available resources, we argue that a dynamic and flexible resilience-based description of their business models is needed. For a clear understanding of what a business model is, Osterwalder and Pigneur (2010) define it as 'the rationale of how an organization creates, delivers, and captures value' (p. 14). Thus, a business model describes the logic of a business, explaining how value is created and proposed to customers as well as how value is captured (Casadesus-Masanell & Ricart, 2010; Teece, 2010). With reference to small farms, according to the business model conceptualisation of Chesbrough (2010), Osterwalder (2004) and Joyce and Paquin (2016), a business model analysis implies three key aspects:

1. How key components and functions are combined to generate value (i.e., value creation).
2. How components and functions interact inside the small farm and along its value chain with different actors and networks (i.e., value proposition and delivery).
3. How the small farm creates profit through those interactions (i.e., value capture).

Value creation consists of structural, operational and relational activities that allow the production and provision of services and products (Richardson, 2008). It reflects the resource organisation needed to carry out activities that produce and bring value to customers. Value proposition and delivery are what an enterprise offers to potential customers and target markets (Richardson, 2008). This reflects the capability to make customers aware of the value created. Value capture is what an investment should return (Morris et al., 2005) in economic, social and environmental terms. To explore and understand the elements of the business models of organisations and enterprises, the Business Model Canvas (BMC) developed by Osterwalder and Pigneur (2010) is considered an effective tool that can help visualise the components of a business model, as well as the potential interconnections and impacts on value creation, delivery and capture, highlighting a system perspective for the interpretation of a business model (Joyce & Paquin, 2016) and the diversity among business models (Torquati et al., 2015). The BMC disentangles the business model of an enterprise into nine interconnected building blocks, namely, key resources, key activities, key partnerships, customer segments, customer relationships, channels, value propositions, cost structure and revenue streams; it is considered a 'relevant prism to study the functioning of organizations' that draws on the principles through which a business creates, delivers and captures value (Lanciano et al., 2019, p. 6).[2]

Business model diversity and resilience of small farms

Small farms, as business activities, can be identified and described as business model archetypes characterised by the diversity and complexity of connections and combinations between the elements of their business (i.e., strategies, actions, etc.). The diversity of the business model archetypes of small farms characterises farming systems. Diversified farming systems in which small farms are embedded are increasingly acknowledged to potentially contribute to the resilience of food systems vis-à-vis environmental, economic and social changes (Darnhofer, 2014; Galli et al., 2020a; Resilience Alliance, 2010; Valencia et al., 2019). Recent research on diverse types of small farms in the UK (classified as business farms, family farms, lifestyle farms and part-time farms) observe a large heterogeneity in responses to challenges from farms, implying the need for different and improved approaches to study the resilience of different farm types in small farm population (Winter & Lobley, 2016). Therefore, we can deem small farms as composing a heterogeneous assemblage[3] of business models within farming systems (at a local or regional scale) that, by their nature, express a diversity of characteristics and activities through which they respond to current challenges (Figure 1).

As explained in the previous sections, farming systems, and therefore individual farms such as small farms (and, in turn, the connected economic sectors within the food systems they belong to), are affected by various challenges (Darnhofer, 2014). Meuwissen et al. (2019) detail four sets of economic, environmental, social and institutional challenges that are likely to hinder the functioning and sustainability of farming systems over time in the EU. Applying the BMC helps us attain a better understanding of the characteristics of the selected small farm business models and their intrinsic dynamics of value management. It represents a structured analytical framework (already

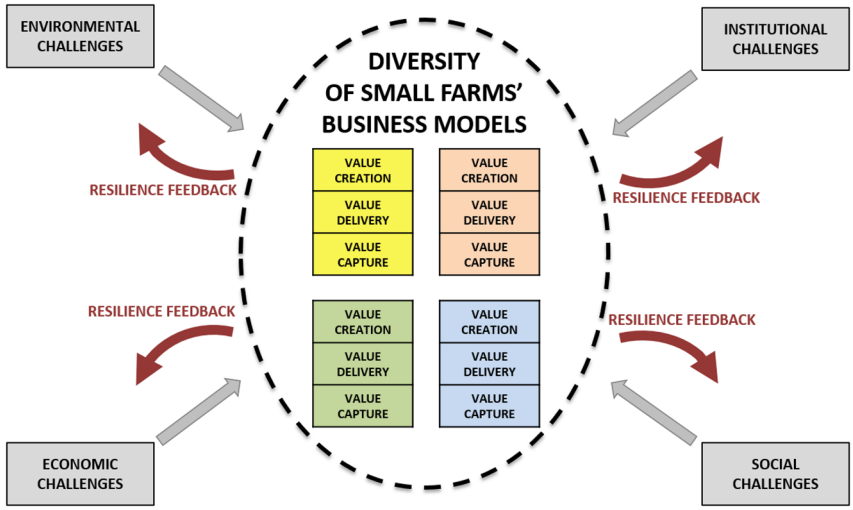


FIGURE 1 Interactions between multidimensional challenges affecting the farming systems and the diversity of small farm business models that, in turn, produce feedbacks for the resilience of farming systems at local or regional level (authors' elaboration based on previous researches and frameworks: Béné et al., 2019; Darnhofer, 2014; Meuwissen et al., 2019; Osterwalder & Pigneur, 2010; Valencia et al., 2019; Wubben et al., 2013)

applied in a number of studies on urban agriculture; e.g., Pölling et al., 2017; Torquati et al., 2015), which is particularly useful for systematising the results of a comparative analysis between different types of small farms settled in different territorial contexts regarding their business model characteristics and value dynamics.

METHODS

This research is based on a dataset of 316 farm households surveyed through a common and structured questionnaire in four Mediterranean countries (Greece, Italy, Portugal and Spain) within the framework of the EU Horizon 2020 SALSA project and by their respective national project partners from May to August 2017. Based on Guarín et al. (2020), sampling of small farms has been purposive, through the identification of 5 ha farms or less in size or below eight economic size units (the thresholds used for statistical and policy purposes within the European Union; European Commission, 2011) and then through snowballing as other suitable farms have been identified. The sample size varies between 24 and 40 depending on the region (see Table 1). The SALSA project has aimed for at least 30 small farms per region, but in some cases, the samples have been smaller due to practical resource constraints. In order to capture the largest possible diversity, the whole sample has covered a wide range of geographical locations within the region. This sampling method was not meant to be statistically representative but rather to capture a diverse set of small farms in the selected regions. These data provide a large set of quantitative and qualitative variables on demographics, activity, labour, income, market relations, governance issues, perceptions and future perspectives (see Guarín et al., 2020). For this study, we have selected a reduced set of variables (see the Appendix) to compose specific indicators of business models according to the structure and components of the BMC adopted. The indicators have been assessed for five different types of small farms in Europe that have been classified through a previous cluster analysis

TABLE 1 Composition of the sample of small farms per country and description of the case study areas

Country	Number of farms sampled	Reference regions
Greece	39	***Imathia***: Region located in Northern Greece. Agriculture plays a significant role in the regional economy. The region is characterised by minimal agricultural land surface. Extremely small farms exist in large numbers and have low incomes. Imathia ranks second in peach production in Greece. Irrigated crops like peach trees, cherries, pears and apple trees, as well as cotton, corn and sugar beet, reveal an intensive agricultural model
	38	***Larisa***: Region located in the centre of Greece. Here, the proportion of small farms is low, and they are relatively small and have low incomes. Alfalfa, durum wheat and cotton account for nearly three quarters of all cultivated land in Larisa region. The region ranks first in the production of sheep and goat milk and second in the production of cow milk in the country
	42	***Ileia***: Region located in South-Western Greece. This region is predominantly agricultural. There is a high number of small farms with low incomes. Olive groves for olive-oil production, alfalfa, citrus fruits and Corinthian currants are the main crops of small farms in the region
Italy	32	***Lucca***: Region located in the west coast of centre-north Italy. Small farms exist in large numbers, extremely small and with low incomes. On the coast, there are mainly vegetable gardens, small olive groves and orchards. In the plains, small-medium companies specialise in vegetables and flower crops, wine and oil production. In the valley, there is intensive land use, and in the upper lands, there is sheep farming and use of forest resources
	24	***Pisa***: Region located on the west coast of centre-north Italy. In this region, there is a high number of small farms with low incomes. The plain is characterised by traditional agro-ecosystems with olive groves, mixed crops and residual grazing areas. The flatlands and the valleys show specialised grain monoculture and nursery crops. On the hills, there are mainly olive groves, vineyards and arable crops
Portugal	36	***Oeste***: Region located in the western section of the central region of Portugal. This region has minimal agricultural land surface, and there is strong specialisation and competitiveness of the agricultural sector. The agricultural sector is mainly characterised by the production of many fruits and vegetables all year round. Small farms exist in large numbers, which are extremely small and have low incomes
	38	***Alentejo Central***: Region located in the interior-south of Portugal. This region is predominantly agricultural and is characterised by few small farms with medium incomes. In some areas, there are small- and medium-farm units with vineyards and olive groves. Cattle and pigs are produced for meat in the large-scale farms, while sheep are produced both in the large scale and the small-scale farms
Spain	27	***Castellón***: Region located on the western Mediterranean coast of Spain. In this region, there is a high proportion of small farms with low incomes. The agriculture activity is dominated by citrus crops, mainly clementine, with some horticulture in the North. Agriculture is mostly rainfed, dominated by almond, olive trees and often part of mixed farms with cereals, pastures, other tree crops or animal farms (pigs, poultry and some semi-extensive cattle and sheep)

(Continues)

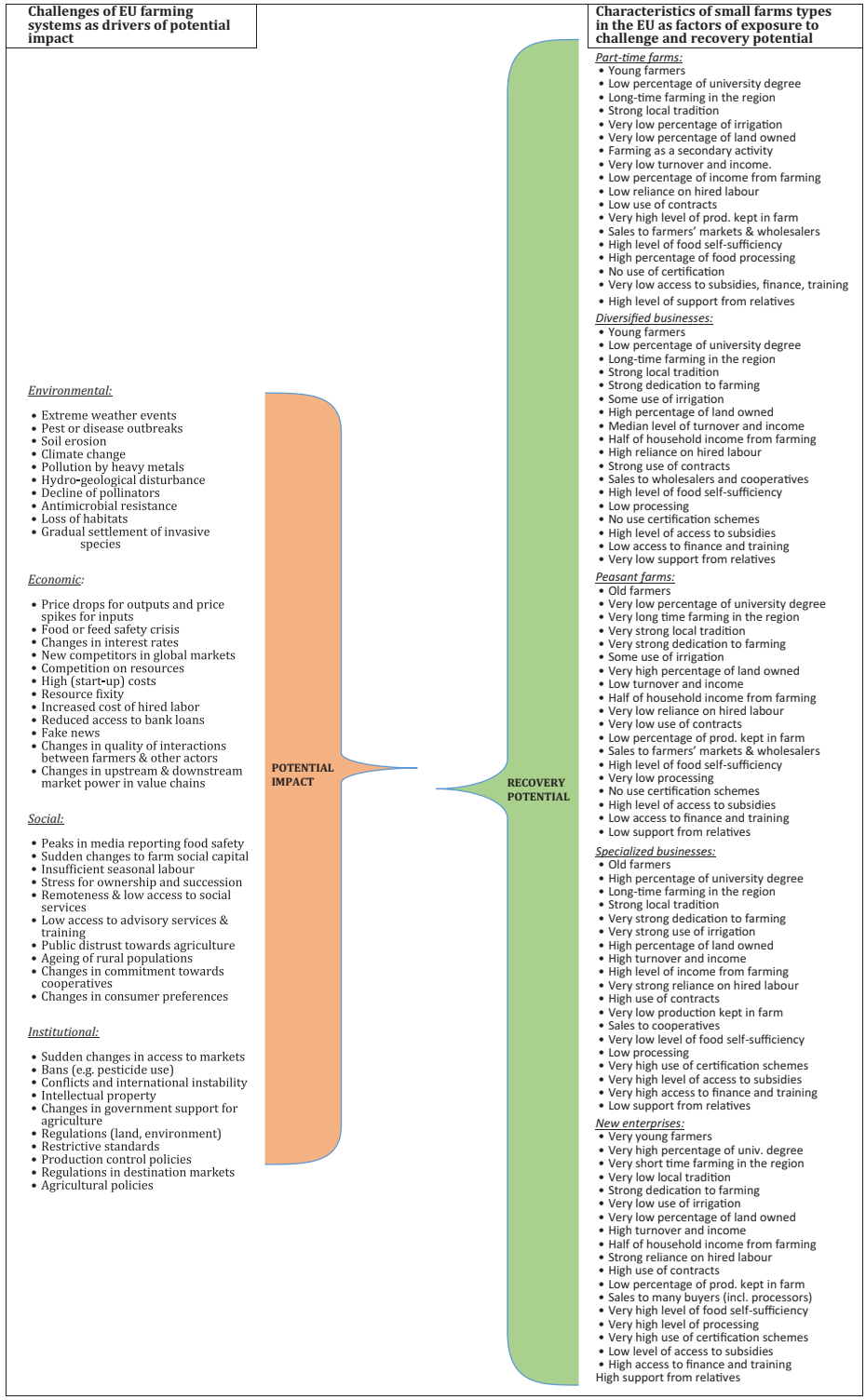
TABLE 1 (Continued)

Country	Number of farms sampled	Reference regions
	40	***Córdoba***: Region is located in the south of Spain. This region is predominantly agricultural with few small farms that have medium incomes. Intensive livestock breeding allows the local industry to produce ham, milk and dairy products. The central and southern areas are characterised mainly by the importance of the agricultural sector and agro-food industry, in which olive-growing and the production of olive oil acquire great relevance

by Guarín et al. (2020): part-time farms, diversified businesses, peasant farms, specialised businesses and new enterprises (see Guarín et al., 2020, and for a description of small farm types, see Table 2). The present analysis is limited to a sample of small Euro-Mediterranean farms from the larger sample of the SALSA project. The Mediterranean sample on which this work is based is composed of small farms of specific reference regions in Greece (Imathia, Larisa and Ileia), Italy (Lucca and Pisa), Portugal (Alentejo Central and Oeste) and Spain (Castellón and Cordoba) at the NUTS 3 (Nomenclature of territorial units for statistics - Small regions for specific diagnoses level (see Table 1 for descriptions of the geographical regions). The types of farm production in the sample are highly heterogeneous. In Greece, farms in the Imathia region produce peaches, cherries, wine and beef; in the Ileia region, farms produce olive oil, oranges, vegetables and Corinthian currants; and in the Larisa region, farms produce milk from sheep and goat, apples, pulses and almonds. In Italy, farms in the Lucca region produce vegetables, olive oil, fruits and wine. In the Pisa region, farms produce vegetables, wheat, beef and wine. In Portugal, farms in the Central Alentejo region produce wine, olive oil, tomatoes and sheep, while in the Oeste region, farms produce pears, potatoes, wine and eggs. In Spain, farms in the Castellon region produce olive oil, pork, citrus fruits and almonds. In the Cordoba region, farms produce wheat, olive oil, wine and cow's milk.

Building on the above-mentioned classification of small farm types (obtained through cluster analysis by Guarín et al., 2020), indicators related to each farm type have been assessed through average values across all countries and reference regions of the selected sample. We have assessed the variables selected using the typical normalisation method 'min–max' (OECD, 2008; for a more detailed description of the min–max method, see Prosperi et al., 2014). Then, we have aggregated variables in composite indicators with an equal weighting system to characterise each business model component (e.g., for value proposition, the indicator 'environmental certification' is composed of the variables 'Certification Organic' and 'Certification Integrated Production'; the indicator 'origin certification' is composed of the variables 'Certification Protected Designation of Origin', 'Certification Protected Geographical Indication' and 'Certification Traditional Specialties Guaranteed'). According to the BMC building blocks and the specific indicators, through the percent proportion calculation of each indicator value across different farm types, we have assessed the degree to which each type of farm relies on its specific characteristics (expressed by the specific indicators) in comparison to the other types of farms. Data are expressed through normalised values on a 0%–100% scale (distributed for each indicator across the five types of farms). This kind of normalisation presents limitations in terms of the interpretability of results between different clusters, especially if in the sample there are outlier values. Building on a previous cluster analysis that has classified five different small farm types (i.e., five business models), this

TABLE 2 EU farming system challenges (Meuwissen et al., 2019) applying *potential impacts* on small farm types (Guarín et al., 2020) that are potentially impacted and, in turn, potentially respond with *recovery potentials* according to their specific characteristics



quantitative–qualitative analysis aims to grasp the diversity of business models and the diversity of resilience feedbacks in the face of challenges rather than identifying the most resilient type of small farms in absolute terms.

In the second step, the findings related to small farm business model structures are further analysed and discussed against the economic, social, environmental and institutional challenges that affect the EU farming systems identified by Meuwissen et al. (2019; see Table 2). A resilience perspective allows the identification of *potential impact* and *recovery potential* (see definitions in the theoretical section above) of the business models of small farms. Table 2 shows the characteristics of the five small farm types identified by the previous work by Guarín et al. (2020), the description of the multiple sets of challenges for the EU farming systems retrieved from the previous work of Meuwissen et al. (2019) and their potential 'impact–response' interactions according to the conceptual dynamics of resilience developed in Section 2 and Figure 1 of this article. In Table 2, we illustrate the potential impacts generated by the farming system challenges on the potentially exposed small farm types and, in turn, the recovery potential that is mobilised by the specific small farm characteristics against the challenges. Table 2 explains the information used and the approach adopted, through which the following results have been obtained.

RESULTS AND DISCUSSION

The first output of this research focuses on developing the architecture of the basic building blocks of business models, according to the indicators identified, across the whole sample of different types of small Mediterranean farms preliminarily classified. Second, an analysis of business model archetypes helps emphasise potential success factors and detect barriers. Specifically, with respect to the value management components, it will also allow the detection of small farms' potential to contribute to resilience vis-à-vis a set of challenges for EU farming systems. Table 3 presents the assessment of the indicators according to the nine building blocks[4] of the BMC and related to the entire Mediterranean sample of 316 small farms.

Table 3 classifies and differentiates farm-type attributes according to different business model building blocks. For each building block of the business model on the horizontal lines, and according to the type of small farms in the columns, the highest values attributed to each farm characteristic distinguish each business model type with regard to the specific components of value creation, value delivery and value capture. The interpretation of the business archetypes obtained through the BMC analysis, beyond suggesting a characterisation across the different types of small farms explored, allows us to grasp the most characteristic business model components for each type of farm. In the next section, we illustrate the value dynamics for each small farm type.

Part-time small farms

These farms rely on farming activities and off-farm household revenues. Table 3 illustrates that in the value creation dynamics, particularly with regard to key resources available and invested by small farms, part-time farms rely on informal (unpaid) labour (from family or non-family members). The key activities that characterise these farms, in comparison with other farm types, are mainly represented by small-scale food processing, and there is a strong relationship with partnerships characterised by social capital support (such as neighbours and relatives). Consistently, the

TABLE 3 Assessment of the small farm business model components and indicators (values are expressed in percent proportion for each indicator value across the five types of farms)

Components & indicators	Part-time farms	Diversified businesses	Peasant farms	Specialized businesses	New enterprises
VALUE CREATION					
Key resources					
Informal/unpaid labour (family/non-family)	28%	13%	18%	15%	26%
Education	17%	24%	12%	21%	26%
Experience, knowldege, integration in the territory	17%	21%	23%	22%	17%
Land	23%	16%	20%	16%	25%
City proximity	19%	22%	22%	22%	16%
Irrigation	16%	17%	23%	26%	18%
Financial credit from banks	22%	16%	16%	24%	22%
VALUE DELIVERY					
Key activities					
Farming	18%	22%	20%	22%	18%
Processing	23%	17%	9%	21%	30%
Direct sale	18%	14%	28%	16%	24%
Key partnerships					
Farm advisory services	15%	22%	22%	25%	18%
Cooperatives		33%	33%	33%	
Social capital contribution (neighbours, relatives)	29%	13%	13%	20%	25%
Customer segments & channels					
Consumers requesting products from the territory	18%	14%	28%	16%	24%
Wholesalers	18%	19%	28%	15%	21%
Processors	46%	7%	5%	9%	32%
Small retailers (local retail)	23%	15%	7%	13%	42%
Cooperatives (collective organizations)	4%	36%	14%	45%	
Value propositions					
Environmental certification				52%	48%
Origin certification				48%	52%
Diversity of proposition	17%	13%	21%	26%	22%
Customer relationships					
Direct sale/Personal	18%	14%	28%	16%	24%
Formal contracts	13%	35%	14%	16%	22%
Farmers' associations	18%	14%	28%	16%	24%

(Continues)

TABLE 3 Continued

Components & indicators	Part-time farms	Diversified businesses	Peasant farms	Specialized businesses	New enterprises
VALUE CAPTURE					
Revenue streams					
Income from farm	19%	22%	20%	22%	17%
Wages (family labour)	24%	15%	21%	20%	20%
Self-consumption/provisioning (food/inputs)	22%	18%	21%	17%	22%
Support from public policies	18%	21%	21%	21%	20%
Costs					
Wages (non-family labour)	21%	24%	9%	9%	37%
Various inputs	17%	20%	19%	23%	20%
Gifts	21%	18%	29%	11%	21%

value delivery of part-time farms relies more on customer segments and processor market channels (still with low levels of market integration). For part-time farms, in comparison with other farm types, self-consumption of food and self-provisioning of inputs represent key factors of value capture.

Diversified businesses

These businesses are characterised by a diverse set of customers and market channels. The value creation dynamics of diversified businesses are characterised more so than the other farm types by education and city proximity as key resources. The key activity is farming, and the key partnership is represented by relationships with co-operatives. For value delivery dynamics, diversified businesses rely on the customer segment of co-operatives within the market channel of collective organisations established through formal contracts. The value capture dynamics of diversified businesses are characterised by their relatively higher revenue streams from the farm income, while costs are mostly structured by wages for non-family labour.

Peasant farms

These businesses represent the most traditional type of farm in the sample. With regard to the value creation dynamics, the peasant farms, in comparison with the other types, rely more on attributes of experience, knowledge, and territorial integration as key resources of their business model. In addition, city proximity is a relevant attribute of the key resources. In turn, for this group of farms, direct sales activity is much more important than for the other groups, and their key partnerships are more focused on actors such as co-operatives. Regarding value delivery dynamics, peasant farms distinguish themselves from other types of farms to address mainly consumers interested in territorial products and wholesalers, through farmers' markets and wholesale channels, as well as through relationships based on the direct sale and personal dealings or through farmers' associations.

Specialised businesses

For these strongly entrepreneurial farms, the value creation dynamics build on key resources such as city proximity, the use of irrigation and credit from banks on which this type of farm strongly relies. Specialised businesses create value through farming activities and rely more on partnerships built through farm advisory services and co-operatives. For the value delivery dynamics, specialised businesses mostly rely on co-operatives as customers and market channels. Specific attributes of value delivery, such as environmental and origin certifications, as well as the diversity of product propositions, particularly distinguish specialised business groups. The value capture dynamics of specialised businesses are characterised for revenue streams by the income from the farm, while costs depend on various inputs that are bought outside the farm.

New enterprises

The new enterprise group, mainly represented by new farmers, with regard to the value creation dynamics, relies more on key resources such as informal unpaid labour (both from family and non-family members) and on the level of education. Within the whole sample of farms, new enterprises rely relatively more on processing activities, and with regard to key partnerships, support from social capital (such as neighbours and relatives) plays a more important role than in other groups of farms. As for value delivery dynamics, this type of farm further addresses segments of consumers interested in territorial products, processors and small retailers. Therefore, they rely more on local retail as channels built through customer relationships, such as direct sales, personal dealings and farmers' associations. The specific factors characterising value delivery to customers rely mainly on environmental and origin certifications (i.e., organic certification and geographical indications). With regard to value capture dynamics, new enterprises rely on self-consumption and self-provisioning of inputs relatively more than other farm types, while costs are structured by wages for non-family labour.

In general, for value creation, diversified businesses, peasant farms and specialised businesses rely on key resources such as experience and knowledge of the territory, proximity to urban centres and the possibility of obtaining credit from banks. Part-time and new enterprises, instead, strongly rely on social relationships that procure informal and unpaid labour, mainly from family and extended family members that, according to background traditions, might contribute to farm activities (Simões et al., 2021). In addition, education is an important key resource, particularly for typical production factors, such as land and irrigation systems for new enterprises and specialised businesses, respectively. Concerning value delivery dynamics, beyond the results already presented, the analysis shows that for the new enterprise group, it is important to consider their reliance on processors and small retailers as customer segments as well as their reliance on origin certifications as value delivery factors.

The effects of multiple challenges on small farms

To inform policy-making on the resilience of small farms in Euro-Mediterranean farming systems, our analysis of the business models allows us to identify the resilience potential that can be triggered, encouraged or at least preserved by policies. Across the types of small farms categorised in our sample, we observe that, beyond supporting farming and processing activities,

integrated policies that maintain or develop connectivity for small farms with urban centres (city proximity), informal social capital interaction close to farms and the activity of co-operatives can positively contribute to the recovery potential (i.e., the potential of a system unit to respond to change through adaptive and transformative capacities) of the value creation dynamics of small farms in general.

For value delivery dynamics, small farms can be supported through policies that act on collective and co-operative organisations, initiatives related to direct sales and farmers' associations, encouraging quality certification, and work on consumer awareness, as well as on the quality and localness of products. Value capture dynamics can be preserved by maintaining viable income from farming activities and allowing small farms to produce food for self-consumption. In addition, administrative costs of labour should be kept accessible for the viability of small farms (e.g., tax burden on employment).

As key environmental, social and economic components of local and regional farming systems, small farms interact with farming systems that pose challenges that could impede their delivery of services and goods. Building on the business model characteristics and diversity, in the next sections and in Figure 2, we discuss how economic, social, environmental and institutional challenges for EU farming systems (identified by Meuwissen et al., 2019) can potentially impact small farms. Parallelly, we highlight the characteristics of specific business models that represent the recovery potential for resilience strategies of small farms, which can be applied against harmful shocks and stresses.

Environmental challenges

According to the environmental challenges potentially affecting farming systems in Europe identified by Meuwissen et al. (2019), the types of small farms that are likely to be more exposed to these biophysical challenges are those that, according to their business models, rely more on ecological factors. Environmental resources are crucial for all types of farms. More specifically, extreme weather events and climate change, epidemic outbreaks and settlement of invasive species, soil erosion, pollution and water depletion are key ecological challenges that affect EU farming systems (Meuwissen et al., 2019). With regard to value creation dynamics among the five types of small farms studied, new enterprises and specialised businesses rely mostly on agricultural activities (in comparison with the other farm types), land and irrigation resources. Nonetheless, these two groups of small farms rely on a more diverse set of resources, activities and partnerships. For instance, partnerships with co-operatives and farm advisory services, which mainly concern diversified businesses, peasant farms and specialised businesses, can help cope with environmental depletion owing to the knowledge and technical-economic information within these collective and network organisations. Furthermore, part-time, diversified businesses and peasant types, which rely on other key resources, strongly rely on farming, food processing and direct sale activities that are, in turn, dependent on agricultural outcomes. These elements, therefore, would affect value capture because income from the farm—on which diversified and specialised businesses, in particular, rely— would be uncertain in the event of environmental degradation, as degradation would endanger the quality and reliability of agricultural production. For value delivery dynamics building on the environmental challenges mentioned, small farms that strongly rely on the production of certified typical products from the territory, as well as organic products, are likely to cope better with greater consumer awareness of lower-quality agricultural products due

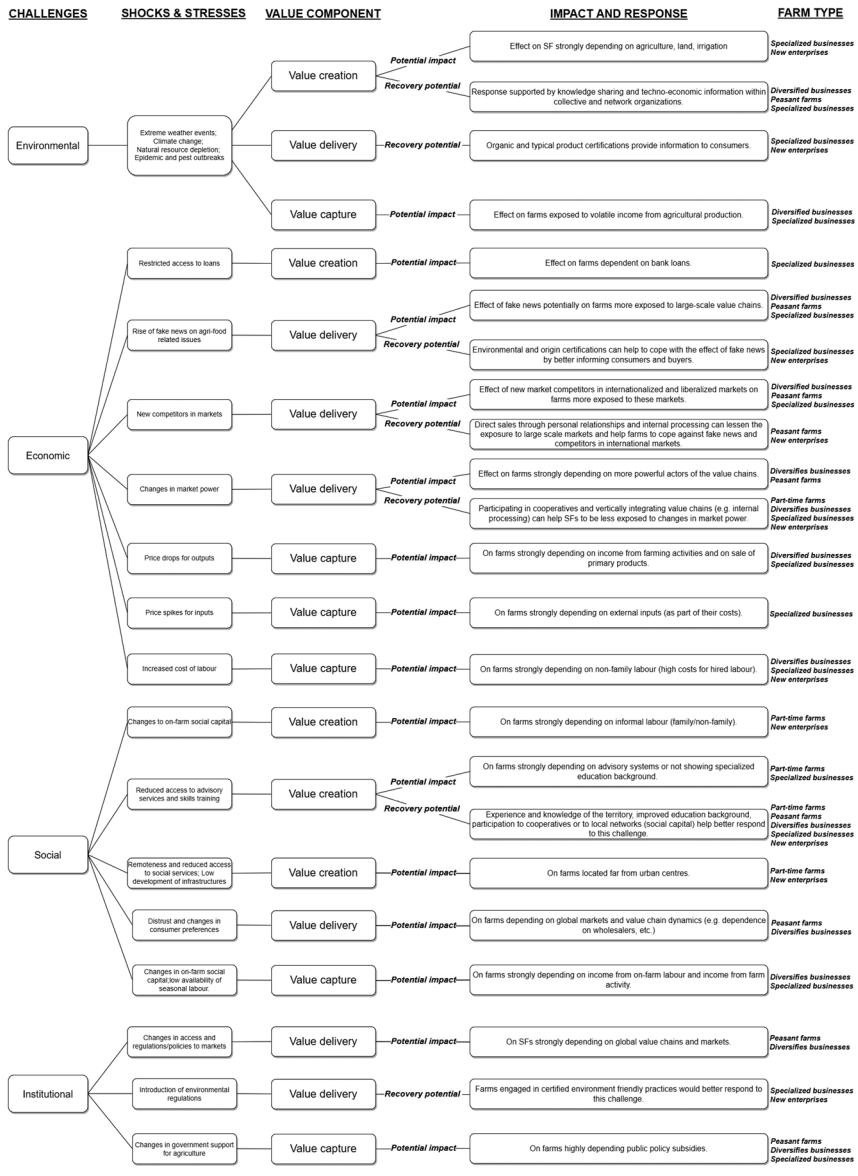


FIGURE 2 Potential impact and recovery potential from each small farm type vis-à-vis challenges of EU farming systems

to environmental degradation because consumers can track information on the provenance of their products through standard certifications.

Economic challenges

Economic challenges affect the activities of small farms through various shocks and stresses. Building on Meuwissen et al. (2019), it is possible to select a number of economic shocks and stresses that are likely to concern farms in the EU, such as reduced access to bank loans, the rise

of fake news (i.e., the spread of false or misleading information) on agro-food issues, changes in market power along the value chain, development of new competitors in internationalised and liberalised markets, price drops for outputs, price spikes for inputs and increased cost of hired labour. With regard to value creation, our analysis shows that reducing access to loans affects the value creation dynamics of small farm business models. In fact, our results show that credit from banks appears to be a key resource, especially for specialised businesses, which would need to rely on alternative resources in the case of reduced access. Regarding interactions with value delivery dynamics of the farms studied, fake news is likely to affect farms that are linked to large-scale value chains. Environmental and origin certifications, which are key elements of value delivery for specialised businesses and new enterprises, can help cope with the effect of fake news by better informing consumers and buyers of the quality of the products. The activity of new competitors in internationalised and liberalised markets can affect small farms that are more exposed indirectly to international markets, such as farms that sell their products to wholesalers (peasant farms) and to co-operatives (diversified and specialised businesses). On the flip side, value delivery activities, such as direct sales through personal relationships and internal processing (for peasant farms, part-time and new enterprises), can diminish the exposure to global market dynamics and, thus, help farms cope against the generalised effects of fake news on food products and against the presence of new competitors. Furthermore, changes in market power along the value chain can mainly affect farms characterised by a strong dependence on other actors in the value chains. For instance, peasant farms stand out as being strongly associated with wholesalers, relative to other types of small farms; thus, they are likely to be exposed to the power imbalance in the value chains, while some co-operatives and integrated value chains (e.g., through internal processing) can help farms to be less exposed to changes in market power. With regard to value capture dynamics, price drops for outputs can affect farms that rely more on income from farming activities, such as diversified and specialised businesses, as well as farms that rely more on selling primary products. However, price spikes for inputs are likely to affect small farms for which inputs represent a stronger part of their costs. In addition, the viability of new enterprises and diversified businesses, which stand out as relying strongly on non-family labour, would be particularly affected in the case of an increase in hired labour.

Social challenges

Within the social challenges identified by Meuwissen et al. (2019), small farms could be particularly impacted by changes in on-farm social capital,[5] insufficient availability of seasonal labour, remoteness and reduced access to infrastructure and social services, reduced access to advisory services and training skills and various factors engendering public distrust towards agriculture (i.e., the lack of trust of citizens towards the integrity of agricultural practices) and changes in consumer preferences. Value creation dynamics could be particularly affected by sudden changes in on-farm social capital (e.g., illness, death, divorce) so that the availability of informal or unpaid labour could potentially be impacted. From a wider perspective, this is particularly true in labour-intensive agricultural systems, such as Mediterranean horticulture, where small farms no longer involve more than one member of the family. In such cases, extended family arrangements (e.g., multifamily farms held by brothers living in different households), formal or informal, help farmers cope with the complexity of farm management in this farming system (Moreno-Pérez & Lobley, 2015). In turn, value capture dynamics would also be affected, especially for small farms such as part-time, diversified businesses and specialised businesses, since they rely more on income

from family labour as well as on income from farm activity. A related social challenge could occur through reduced access to advisory services and skill training. Value creation relying on experience and knowledge of the territory (peasant farms) as well as an improved educational background (diversified businesses and new enterprises) would be less affected by a lack of skilled human resources. Specialised businesses are negatively impacted by this potential challenge since they depend on advisory services to carry out their activities and resource utilisation. Regarding value delivery dynamics, small farms might be impacted by public distrust for agriculture and changes in consumer food preferences (e.g., scepticism about food safety, animal welfare, etc.). Generally, small farms are likely to be less exposed to these challenges than larger farms that belong to large-scale and global value chains. For instance, farms that share partnerships and value chain dynamics with wholesalers risk being strongly impacted by potential changes in consumer behaviour and perception. An additional social challenge is represented by remoteness and reduced access to social services as well as the low development of infrastructure. Beyond factors characterising the quality of life, this challenge might impact the value creation dynamics of small farms, in particular part-time farms and new enterprises, since they are located far from urban centres. Furthermore, potential changes in commitment towards co-operatives, and therefore potential changes in the power of co-operatives, would lead specialised businesses, peasant farms and diversified businesses to shift towards different forms of co-ordination, partnership and marketing strategies.

Institutional challenges

Building on the institutional challenges list by Meuwissen et al. (2019; Table 2), we discuss the changes in government support for agriculture, changes in access to markets and regulations, and the introduction of environmental regulations with regard to small farms business models. With regard to value creation and capture dynamics, in the case of changes in public support for agriculture, the new enterprises group would be particularly affected because, in comparison to the other types of small farms, it is relatively more supported by public policies. Other challenges, such as changes in access to and regulations/policies governing markets, are more likely to affect large-scale and global value chains rather than local consumers. Furthermore, with regard to value delivery dynamics, in case of stricter regulations on pesticide use or other environmental regulations, small farms that have environmental and origin certifications might better resist green regulatory transitions as they would better adapt to such regulations because of their environmentally friendly production system.

Main opportunities and resilience options of small farms

Small farms in the Mediterranean region bring diverse multifunctional capacities to regional farming systems, which also include typical mainstream agricultural producers (Ortiz-Miranda et al., 2013). Recovery potential stems often from the multiple capacities of small farms in engaging within collective organisations and local networks, establishing direct sales to consumers (Rivera et al., 2020), or further integrating activities within their business, including processing activities, in order to increase value added from their own production (Karanikolas et al., 2021). For instance, from our results, the participation in co-operative organisations and the vertical integration of the value chain (such as internal processing) are common factors (for all types of farms

except for peasant farms) of recovery potential against the changes in market power. Furthermore, all the types of small farms sampled show relevant experience and knowledge in local territory and networks as factors of recovery potential against reduced access to advisory services and skills training. Moreover, small farms are often associated with 'short food supply chains' and 'alternative food networks', especially in developed countries and European contexts, as strategic and marketing organisations to cope with the challenges of conventional and mainstream agro-food systems (Berti & Mulligan, 2016; Cleveland et al., 2014; Sellitto et al., 2018; Syrovátková et al., 2015). Therefore, consistent with our findings, resilience opportunities for small farms can be found in market diversification, in 'new markets' (Hebinck et al., 2014) and in collective organisations within local networks (including co-operatives) that integrate small farms in regional food systems and more balanced markets (Hernandez et al., 2021; Yacamán Ochoa et al., 2019). However, construction and participation in short supply chains and alternative networks are also a challenge for small farms because of the multiple practical and economic constraints that can affect the performance of these business initiatives. For local producers, such as small farms, participation in local and alternative networks or conventional mainstream markets is not always a choice between alternative and separate options. Ilbery and Maye (2005) show how local producers are often obliged to 'dip in and out' of different value chains according to the most viable option for their business at a given time. Forms of co-ordination between actors in the value chains, in which small farms are integrated, can be built and embedded in local contexts and trust-based relationships (Chiffoleau et al., 2019; Yacamán Ochoa et al., 2019). Therefore, small farm businesses appear as elements of diversification in regional food systems that trigger new practices and contrast (or even influence) dominant food systems characterised by the homogenisation of products and detachment from local specificities (Lanciano et al., 2019). This '*promise of difference*' that Le Velly (2019) attributes to local food systems dynamics, which contribute to the emergence of the so-called '*hybrid food systems*' (Le Velly, 2019), is reflected in the extremely diverse set of business models that characterise local, regional and global food systems. Thus, from our analysis, such small farms' diversity can be described as a heterogeneous assemblage (Brunori et al., 2020) of diverse business models that populate regional farming systems and contribute to their resilience, as well as to the resilience of food systems at different scales, as shown in Figure 3.

CONCLUSION

This study builds on the development of a conceptual framework that describes the interconnections between the diversity of small farms business models and the challenges affecting local and regional farming systems from a resilience perspective. The first contribution of this work is the conceptual effort that operationalises the BMC framework through a food system approach by integrating it with the theory of resilience applied to small farms' role within farming systems. This prism of analysis (Figure 1) guides the empirical observation of the large diversity of business model dynamics among different types of small farms in the Mediterranean region. These results contribute to a better understanding of the role of small farms in farming systems and their resilience.

The aim of this research was not to identify the most resilient business models of small farms but to describe the strong diversity that small farms can provide to the resilience of Euro-Mediterranean regional farming systems in the face of a number of environmental, economic, social and institutional challenges.

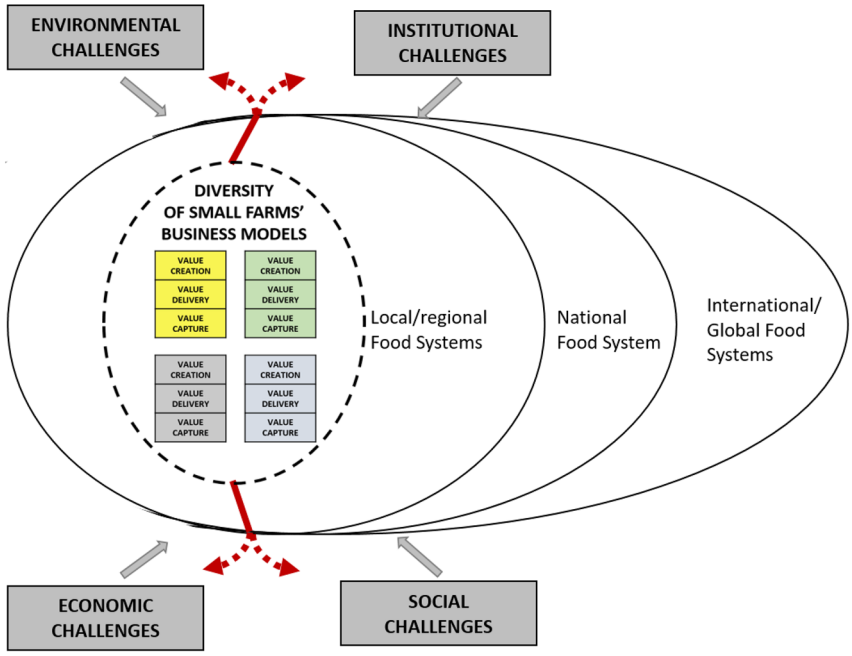


FIGURE 3 The assemblage of diverse small farm business models contributes to the resilience of multiple-scale food systems (building on Figure 1: grey arrows represent the potential impact of challenges, and the red arrows the recovery potential from small farms)

We observe that the value creation of small farms tends to be supported by aspects related to experience and knowledge of the territorial context, farming activity and relationships with co-operatives and advisory services. More specifically, for value delivery, consistent with previous general findings on Mediterranean small-scale farming systems (Guarín et al., 2020), small farms strongly rely on co-operatives as buyers (e.g., fruits and oil plants for export; Rivera et al., 2020), environmental certification, and formal contracts. Overall, the combination and coexistence across different small farm business models, diverse communication and partnership strategies, forms of co-ordination, product and production diversification, social capital interactions and proximity to urban centres are crucial factors that characterise the recovery potential and resilience opportunities that small farms can bring to the resilience and sustainability of farming systems, at local and regional scales, over time. In our analysis, we also refer to the role of small farms in local food systems and the opportunities that these food systems provide to farms, for example, through short food supply chains.

The theoretical and methodological approaches operationalised through this analysis represent an innovative and systemic paradigm of analysis and could be a useful tool in decision-making because they allow for a better understanding of the potential impact that small farms experience vis-à-vis the economic, environmental, social and institutional challenges of European farming systems, as well as the related recovery potential they can apply. Applications of this approach that carry out multiple assessments of business models over time could show time-sensitive findings on the resilience of small farms, thus considering the transitory aspects of adaptation. Our results confirm the diversity of the resilience dynamics that small farms can manifest. Such diversity observed within business model dynamics allows us to depict small farms gathered as a heterogeneous assemblage of farms that can contribute to the resilience of food systems at the local level

but potentially characterise and contribute to food systems at larger national and international scales.

While this study mainly focuses on the characterisation and analysis of different small farm business models confronted with regional and global challenges, it does not consider the interactions that can occur between specific business model characteristics and the socioeconomic and agro-environmental context of the farming systems in which those businesses are actually carried out. Further adaptations of the present approach could include the consideration of those interactions, for instance, through a process-relational perspective (Darnhofer, 2020b), and therefore improve the conceptual framework proposed to better capture the transformative change in farms (Darnhofer, 2021). The emerging concept of Values-Based Territorial Food Networks (Nemes et al. 2023) could provide an improved holistic view of these interactions in a territorial context as a complex social-ecological system.

ACKNOWLEDGEMENTS

We want to thank all farmers from Greece, Italy, Portugal and Spain who kindly took part in interviews related to the research on which this article is based. This work was funded under the EU grant agreement 677363, H2020-SFS-2015-2 (SALSA: Small farms, small food businesses and sustainable food security). Paolo Prosperi and Yuna Chiffoleau are grateful to the Fondation Maison des Sciences de l'Homme and the Fondazione Luigi Einaudi onlus, for funding through the ATLAS programme the visiting research scholarship of Paolo Prosperi on 'business models of small farmers within short food supply chains' at INRAE Montpellier in 2018. The authors thank the two anonymous reviewers for their valuable and thoughtful comments and efforts towards improving our manuscript.

CONFLICT OF INTEREST

The authors have no conflict of interest to disclose.

DATA AVAILABILITY STATEMENT

Data sheets are available from authors under request.

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ENDNOTES

[1] Greece (Imathia, Larisa, Ileia), Italy (Lucca, Pisa), Portugal (Alentejo Central, Oeste), Spain (Castellón, Cordoba).

[2] According to Osterwalder and Pigneur (2010), *Key resources* are the assets required to offer and deliver products and services; *Key activities* are the activities performed to offer and deliver products and services; *Key partnerships* are the network of suppliers and partners that make the business model work; *Customer segments* are the different

groups of people and organisations that the enterprise reaches by its products and services; *Customer relationships* are the types or relationships a company establishes with specific customer segments; *Channels* are the ways products and services are distributed, sold and communicated to customers; *Value propositions* are the set of products and services that satisfy the specific requirements of a customer segment; *Cost structure* involves all costs incurred for operations related to products and services in a business model; *Revenue streams* represent the cash an enterprise generates from customer segments.

[3] According to Brunori et al. (2020), an assemblage is '*a combination of a heterogeneous set of elements that retain their autonomy while entering into relation with other components*'. With regards to food systems, '*sets of agri-food sectors can be conceptualised as assemblages*' (Brunori et al., 2020; p. 115).

[4] The two business model components of 'customer segments' and 'channels' were merged as 'customer segments & channels'.

[5] According to Putnam (2000), in this study we consider social capital as stocks of social trust, networks and values on which farmers can rely to maintain or enhance their livelihoods and strive for their goals. On-farm social capital consists of trust, networks and values that are shared between and within people living and having a role in a farm.

REFERENCES

Arnalte-Mur, L., Ortiz-Miranda, D., Cerrada-Serra, P., Martinez-Gómez, V., Moreno-Pérez, O., Barbu, R., Bjorkhaug, H., Czekaj, M., Duckett, D., Galli, F., Goussios, G., Grivins, M., Hernandez, P., Prosperi, P. & Šūmane, S. (2020) The drivers of change for the contribution of small farms to regional food security in Europe. *Global Food Security*, 26, 100395.

Allen, T. & Prosperi, P. (2016) Modeling sustainable food systems. *Environmental Management*, 57(5), 956–975.

Almås, R. & Campbell, H. (Eds.) (2012). *Rethinking agricultural policy regimes: food security, climate change and the future resilience of global agriculture*. Bingley, UK: Emerald Publishing Limited.

Béné, C., Prager, S.D., Achicanoy, H.A., Alvarez Toro, P., Lamotte, L., Bonilla Cedrez, C. & Mapes, B.R. (2019) Understanding food systems drivers: a critical review of the literature. *Global Food Security*, 23, 149–159.

Berti, G. & Mulligan, C. (2016) Competitiveness of small farms and innovative food supply chains: the role of food hubs in creating sustainable regional and local food systems. *Sustainability*, 8(7), 616.

Bohle, H.G., Downing, T.E. & Watts, M.J. (1994) Climate change and social vulnerability: toward a sociology and geography of food insecurity. *Global Environmental Change*, 4(1), 37–48.

Brunori, G., Galli, F. & Grando, S. (2020) Food systems as assemblages. In Brunori, G. & S. Grando (Eds.), *Innovation for sustainability* (pp. 125–169). Bingley, UK: Emerald Publishing Limited.

Bullock, J.M., Dhanjal-Adams, K.L., Milne, A., Oliver, T.H., Todman, L.C., Whitmore, A.P. & Pywell, R.F. (2017) Resilience and food security: rethinking an ecological concept. *Journal of Ecology*, 105(4), 880–884.

Casadesus-Masanell, R. & Ricart, J. E. (2010) From strategy to business models and onto tactics. *Long Range Planning*, 43(2-3), 195–215.

Chesbrough, H. (2010). Business model innovation: opportunities and barriers. *Long Range Planning*, 43(2-3), 354–363.

Chiffoleau, Y., Millet-Amrani, S., Rossi, A., Rivera-Ferre, M G. & Merino, P.L. (2019) The participatory construction of new economic models in short food supply chains. *Journal of Rural Studies*, 68, 182–190.

Cleveland, D.A., Müller, N.M., Tranovich, A.C., Mazaroli, D.N. & Hinson, K. (2014) Local food hubs for alternative food systems: a case study from Santa Barbara County, California. *Journal of Rural Studies*, 35, 26–36.

Darnhofer, I. (2014) Resilience and why it matters for farm management. *European Review of Agricultural Economics*, 41(3), 461–484.

Darnhofer, I. (2020a) Farm resilience in the face of the unexpected: lessons from the COVID-19 pandemic. *Agriculture and Human Values*, 37, 605–606.

Darnhofer, I. (2020b) Farming from a process-relational perspective: making openings for change visible. *Sociologia Ruralis*, 60(2), 505–528.

Darnhofer, I. (2021) Farming resilience: from maintaining states towards shaping transformative change processes. *Sustainability*, 13(6), 3387.

Daugbjerg, C. & Feindt, P.H. (2017) Post-exceptionalism in public policy: transforming food and agricultural policy. *Journal of European Public Policy*, 24(11), 1565–1584.

Davidova, S., Fredriksson, L., Gorton, M., Mishev, P. & Petrovici, D. (2012) Subsistence farming, incomes, and agricultural livelihoods in the new member states of the European Union. *Environment and Planning C: Government and Policy*, 30(2), 209–227.

Davidova, S. & Thomson, K. (2014) *Family farming in Europe: challenges and prospects*. EPRS: European Parliamentary Research Service. Retrieved September 01, 2022, from https://policycommons.net/artifacts/1338807/family-farming-in-europe/1947816/

Ebel, R. (2020) Are small farms sustainable by nature?—review of an ongoing misunderstanding in agroecology. *Challenges in Sustainability*, 8(1), 17–29.

European Commission. (2011) *What Is a Small Farm?* EU Agricultural Economics Brief 2. R https://agriculture.ec.europa.eu/system/files/2019-11/agri-economics-brief-02_en_0.pdf

European Commission. (2021) *A greener and fairer CAP*. Retrieved September 01, 2022, from https://agriculture.ec.europa.eu/system/files/2022-02/factsheet-newcap-environment-fairness_en_0.pdf

European Commission. (2022). The small farmers scheme. Retrieved September 01, 2022, from https://agriculture.ec.europa.eu/common-agricultural-policy/income-support/additional-optional-schemes/small-farmers-scheme_en#documents

FAO (2014) *World Programme for the Census of agriculture*. Retrieved September 01, 2022, from http://www.fao.org/economic/ess/ess-wca/en/

FAO and IFAD (2019) United Nations Decade of Family Farming 2019–2028. The future of family farming in the context of the 2030 Agenda. Rome. 16pp. Retrieved September 01, 2022, from http://www.fao.org/3/ca4778en/ca4778en.pdf

Folke, C., Carpenter, S., Walker, B., Scheffer, M., Chapin, T. & Rockström, J. (2010) Resilience thinking: integrating resilience, adaptability and transformability. *Ecology and Society*, 15(4), 20.

Folke, C. (2016) Resilience (republished). *Ecology and Society*, 21(4), 44.

Gaitán-Cremaschi, D., Klerkx, L., Duncan, J., Trienekens, J.H., Huenchuleo, C., Dogliotti, S., Contesse, M.E. & Rossing, W.A. (2019) Characterizing diversity of food systems in view of sustainability transitions. a review. *Agronomy for Sustainable Development*, 39(1), 1.

Galli, F., Grando, S., Adamsone-Fiskovica, A., Bjørkhaug, H., Czekaj, M., Duckett, D G., Almaas, H., Karanikolas, P., Moreno-Perez, O.M., Ortiz-Miranda, D., Pinto-Correia, T., Prosperi, P., Redman, M., Rivera, M., Toma, I., Sanchez-Zamora, P., Sumane, S., Zmija, K., Zmija, D. & Brunori, G. (2020a) How do small farms contribute to food and nutrition security? Linking European small farms, strategies and outcomes in territorial food systems. *Global Food Security*, 26, 100427.

Galli, F., Prosperi, P., Favilli, E., D'Amico, S., Bartolini, F. & Brunori, G. (2020b) How can policy processes remove barriers to sustainable food systems in Europe? Contributing to a policy framework for agri-food transitions. *Food Policy*, 96, 101871.

Gasselin, P., Lardon, S., Cerdan, C., Loudiyi, S. & Sautier, D. (2020) The coexistence of agricultural and food models at the territorial scale: an analytical framework for a research agenda. *Review of Agricultural, Food and Environmental Studies*, 101, 1–23.

Giller, K.E. (2013) Can we define the term 'farming systems'? A question of scale. *Outlook on Agriculture*, 42(3), 149–153.

Graeub, B.E., Chappell, M.J., Wittman, H., Ledermann, S., Kerr, R.B. & Gemmill-Herren, B. (2016) The state of family farms in the world. *World Development*, 87, 1–15.

Guarín, A., Rivera, M., Pinto-Correia, T., Guiomar, N., Šūmane, S. & Moreno-Pérez, O.M. (2020) A new typology of small farms in Europe. *Global Food Security*, 26, 100389.

Guiomar, N., Godinho, S., Pinto-Correia, T., Almeida, M., Bartolini, F., Bezak, P., Biró, M., Bjørkhaug, H., Bojnec, Š., Brunori, G., Corazzin, M., Czekaj, M., Davidova, S., Kania, J., Kristensen, S., Marraccini, E., Molnár, Z., Niedermayr, J., O'Rourke, E., Ortiz-Miranda, D., Redman, M., Sipilainen, T., Soovali-Sepping, H., Sumane, S., Surova, D., Sutherland, L.A., Tcherkezova, E., Tisenkopfs, T., Tsiligiridis, T., Tudor, M.M., Wagner, K., Wastfelt, A. (2018) Typology and distribution of small farms in Europe: towards a better picture. *Land Use Policy*, 75, 784–798.

Guiomar, N., Godinho, S., Rivera, M., Pinto-Correia, T., Machado, R., Czekaj, M., Tyran, E. & Puchała, J. (2021) Assessing food availability: a novel approach for the quantitative estimation of the contribution of small farms in regional food systems in Europe. *Global Food Security*, 30, 100555.

Hazell, P. (2020) Importance of smallholder farms as a relevant strategy to increase food security. In S. Gomez y Paloma, L. Riesgo, & K. Louhichi (Eds.), *The role of smallholder farms in food and nutrition security* (pp. 29–43). Cham: Springer

Hebinck, P., Schneider Importance, S. & van der Ploeg, J. D. (Eds.) (2014) *Rural development and the construction of new markets*. New York: Routledge.

Hernández, P.A., Galli, F., Prosperi, P., Šūmane, S., Duckett, D. & Almaas, H.E. (2021) Do small food businesses enable small farms to connect to regional food systems? Evidence from 9 European regions. *Global Food Security*, 29, 100505.

Holling, C.S. & Gunderson, L.H. (2002) Resilience and adaptive cycles. In: Gunderson, L.S. & Holling, C.S. (Eds.) *Panarchy: understanding transformations in human and natural systems* (pp. 25–62). Washington, DC: Island Press.

IFPRI. (2019) *Global food policy report. 2019*. Washington, DC: International Food Policy Research Institute (IFPRI). https://doi.org/10.2499/9780896293502

Ilbery, B. & Maye, D. (2005) Alternative (shorter) food supply chains and specialist livestock products in the Scottish–English borders. *Environment and Planning A*, 37(5), 823–844.

Joyce, A. & Paquin, R.L. (2016) The triple layered business model canvas: a tool to design more sustainable business models. *Journal of Cleaner Production*, 135, 1474–1486.

Karanikolas, P., Martinez-Gomez, V., Galli, F., Prosperi, P., Hernández, P.A., Arnalte-Mur, L., Rivera, M., Goussios, G., Fastelli, L., Oikonomopoulou, E. & Fonseca, A. (2021) Food system integration of olive-oil-producing small farms in Southern Europe. *Global Food Security*, 28, 100499.

Lanciano, E., Lapoutte, A. & Saleilles, S. (2019) What business models for food justice? *Systèmes Alimentaires*, 2019(4), 159–183.

Le Velly, R. (2019) Allowing for the projective dimension of agency in analysing alternative food networks. *Sociologia Ruralis*, 59(1), 2–22.

Lupton, S., Meuwissen, M. & Ingrand, S. (2020) Editorial introduction to the special issue risk management in agriculture. *Agricultural Systems*, 178, 102748.

Maye, D., Chiswell, H., Vigani, M. & Kirwan, J. (2018) 'Present realities' and the need for a 'lived experience' perspective in Brexit agri-food governance. *Space and Polity*, 22(2), 270–286.

McGuinness, T. & Grimwood, G.G. (2017) *Migrant workers in agriculture*. House of commons briefing paper 7987. Available at: http://researchbriefings.files.parliament.uk/documents/CBP-7987/CBP-7987.pdf

Meuwissen, M.P., Feindt, P.H., Spiegel, A., Termeer, C.J.A.M., Mathijs, E., de Mey, Y., Finger, R., Balmann, A., Wauters, E., Urquhart, J., Vigani, M., Zawalińska, K., Herrera, H., Nicholas-Davies, P., Hansson, H., Paas, W., Slijper, T., Coopmans, I., Vroege, W., Ciechomska, A., Accatino, F., Kopainsky, B., Poortvliet, P.M., Candel, J.J.L., Maye, D., Severini, S., Senni, S., Soriano, B., Lagerkvist, C.-J., Peneva, M., Gavrilescu, C. & Reidsma, P. (2019) A framework to assess the resilience of farming systems. *Agricultural Systems*, 176, 102656.

Moreno-Pérez, O.M. & Lobley, M. (2015) The morphology of multiple household family farms. *Sociologia Ruralis*, 55(2), 125–149.

Morris, M., Schindehutte, M. & Allen, J. (2005) The entrepreneur's business model: toward a unified perspective. *Journal of Business Research*, 58(6), 726–735.

Myers, J.P., Antoniou, M.N., Blumberg, B., Carroll, L., Colborn, T., Everett, L.G., Hansen, M., Landrigan, P.J., Lanphear, B.P., Mesnage, R., Vandenberg, L.N., vom Saal, F. S., Welshons, W.V. & Benbrook, C.M. (2016) Concerns over use of glyphosate-based herbicides and risks associated with exposures: a consensus statement. *Environmental Health*, 15(1), 19.

Nemes, G., Reckinger, R., Lajos, V., & Zollet, S. (2023) 'Values-based Territorial Food Networks'—Benefits, challenges and controversies. *Sociologia Ruralis*, 63, 3–19. https://doi.org/10.1111/soru.12419

OECD (Organisation for Economic Co-Operation and Development). (2008) Handbook on constructing composite indicators: methodology and user guide. Paris, France: Organisation for Economic Co-Operation and Development. http://www.oecd.org/std/42495745.pdf

Ortiz-Miranda, D., Alegre, E.V.A. & Faus, A.M.M. (Eds.) (2013) *Agriculture in Mediterranean Europe: between old and new paradigms*. Bingle, UK: Emerald Publishing.

Ortiz-Miranda, D., Moreno-Pérez, O.M., Arnalte-Mur, L., Cerrada-Serra, P., Martinez-Gomez, V., Adolph, B., Atela, J., Ayambila, S., Baptista, I., Barbu, R., Bjørkhaug, H., Czekaj, M., Duckett, D., Fortes, A., Galli, F., Goussios, G., Hernández, P.A., Karanikolas, P., Machila, K., Oikonomopoulou, E., Prosperi, P., Rivera, M., Satoła, Ł.,

Szafrańska, M., Tisenkopfs, T., Tonui, C. & Yeboah, R. (2022) The future of small farms and small food businesses as actors in regional food security: a participatory scenario analysis from Europe and Africa. *Journal of Rural Studies*, 95, 326–335.

Osterwalder, A. (2004) *The business model ontology: a proposition in a design science approach*. Doctoral dissertation, Université de Lausanne, Faculté des hautes études commerciales.

Osterwalder, A. & Pigneur, Y. (2010) *Business model generation: a handbook for visionaries, game changers, and challengers*. Hoboken, NJ: John Wiley & Sons.

Palmioli, L., Grando, S., Di Iacovo, F., Fastelli, L., Galli, F., Prosperi, P., Rovai, M. & Brunori, G. (2020) Small farms' strategies between self-provision and socio-economic integration: effects on food system capacity to provide food and nutrition security. *Local Environment*, 25(1), 43–56.

Pinter, M. & Kirner, L. (2014) Strategies of disadvantaged mountain dairy farmers as indicators of agricultural structural change: a case study of Murau, Austria. *Land Use Policy*, 38, 441–453.

Pölling, B., Prados, M. J., Torquati, B. M., Giacchè, G., Recasens, X., Paffarini, C., Alfranca, O. & Lorleberg, W. (2017) Business models in urban farming: a comparative analysis of case studies from Spain, Italy and Germany. *Moravian Geographical Reports*, 25(3), 166–180.

Prosperi, P., Allen, T., Padilla, M., Peri, I. & Cogill, B. (2014) Sustainability and food & nutrition security: a vulnerability assessment framework for the Mediterranean region. *Sage Open*, 4(2), 2158244014539169.

Putnam, R. D. (2000) *Bowling alone: the collapse and revival of American community*. New York: Simon and Schuster.

Rapsomanikis, G. (2015) Small farms big picture: smallholder agriculture and structural transformation. *Development*, 58(2-3), 242–255.

Resilience Alliance. (2010) Assessing resilience in social-ecological systems: workbook for practitioners. Retrieved September 01, 2022, from http://www.resalliance.org/3871.php.

Ricciardi, V., Ramankutty, N., Mehrabi, Z., Jarvis, L. & Chookolingo, B. (2018) How much of the world's food do smallholders produce? *Global Food Security*, 17, 64–72.

Richardson, J. (2008) The business model: an integrative framework for strategy execution. *Strategic Change*, 17, 133–144.

Rivera, M., Guarín, A., Pinto-Correia, T., Almaas, H., Arnalte Mur, L., Burns, V., Czekaj, M., Ellis, R., Galli, F., Grivins, M., Hernández, P., Karanikolas, P., Prosperi, P., Sánchez Zamora, P. (2020) Assessing the role of small farms in regional food systems in Europe: evidence from a comparative study. *Global Food Security*, 26, 100417.

Salvioni, C., Papadopoulou, E. & Santos, M.D. (2014) Small farm survival in Greece, Italy and Portugal. *EuroChoices*, 13(1), 52–57.

Samberg, L.H., Gerber, J.S., Ramankutty, N., Herrero, M. & West, P.C. (2016) Subnational distribution of average farm size and smallholder contributions to global food production. *Environmental Research Letters*, 11(12), 124010.

Sellitto, M.A., Vial, L.A.M. & Viegas, C.V. (2018) Critical success factors in Short Food Supply Chains: case studies with milk and dairy producers from Italy and Brazil. *Journal of Cleaner Production*, 170, 1361–1368.

Shaw, K. & Maythorne, L. (2013) Managing for local resilience: towards a strategic approach. *Public Policy and Administration*, 28(1), 43–65.

Simões, F., Unay-Gailhard, I., Mujčinović, A. & Fernandes, B. (2021) How to foster rural sustainability through farming workforce rejuvenation? Looking into involuntary newcomers' spatial (im) mobilities. *Sustainability*, 13(15), 8517.

Smith, L. C. & Haddad, L. (2015) Reducing child undernutrition: past drivers and priorities for the post-MDG era. *World Development*, 68, 180–204.

Syrovátková, M., Hrabák, J. & Spilková, J. (2015) Farmers' markets' locavore challenge: the potential of local food production for newly emerged farmers' markets in Czechia. *Renewable Agriculture and Food Systems*, 30(4), 305–317.

Teece, D.J. (2010) Business models, business strategy and innovation. *Long Range Planning*, 43(2-3), 172–194.

Torquati, B., Tancini, C., Paffarini, C. & Illuminati, R. (2015) Empirical survey on business models of kindergarten farms. *Agricultural and Food Economics*, 3(1), 25.

Unay-Gailhard, I., Balmann, A. & Appel, F. (2018) Dimensions of SURE-Farm farm typology for farm resilience assessments. Horizon 2020 SURE-Farm Project. Deliverable D1.3.

Valencia, V., Wittman, H. & Blesh, J. (2019) Structuring markets for resilient farming systems. *Agronomy for Sustainable Development*, 39(2), 25.

van Der Ploeg, J.D., Verschuren, P., Verhoeven, F. & Pepels, J. (2006) Dealing with novelties: a grassland experiment reconsidered. *Journal of Environmental Policy & Planning*, 8(3), 199–218.

Winter, M., Lobley, M.N. (2016) Is there a future for the small family farm? A report to The Prince's Countryside Fund. Retrieved September 01, 2022, from https://ore.exeter.ac.uk/repository/bitstream/handle/10871/25485/Is%20there%20a%20future%20for%20the%20small%20family%20farm%20in%20the%20UK%20report%20June%202016.pdf?sequence=1

Wubben, E.F.M., Fondse, M. & Pascucci, S. (2013) The importance of stakeholder-initiatives for business models in short food supply chains: the case of the Netherlands. *Journal on Chain and Network Science*, 13(2), 139–149.

SALSA (2020) Policy Brief Southern Europe. EU Horizon 2020 SALSA Project.

Yacamán Ochoa, C., Matarán, A., Mata Olmo, R., López, J. M. & Fuentes-Guerra, R. (2019) The potential role of short food supply chains in strengthening periurban agriculture in Spain: the cases of Madrid and Barcelona. *Sustainability*, 11(7), 2080.

Zagata, L. & Sutherland, L.A. (2015) Deconstructing the 'young farmer problem in Europe': towards a research agenda. *Journal of Rural Studies*, 38, 39–51.

How to cite this article: Prosperi, P., Galli, F., Moreno-Pérez, O.M., Chiffoleau, Y., Grando, S., Karanikolas, P. et al. (2023) Disentangling the diversity of small farm business models in Euro-Mediterranean contexts: A resilience perspective. *Sociologia Ruralis*, 63, 89–116. https://doi.org/10.1111/soru.12407

APPENDIX: Variables surveyed through structured questionnaires to the sampled farm households

1) Time of activity in the area (score)
2) Education (score)
3) Dedication to farming (score)
4) Time farming (score)
5) Farm size (ha)
6) Total UAA (ha)
7) Number of plots
8) % land owned
9) Distance to nearest city (score)
10) Time to nearest city (score)
11) % Land irrigated
12) Permanent unpaid family labour (no.)
13) Occasional unpaid family labour (no.)
14) Occasional unpaid non-family labour (no.)
15) Permanent paid family labour (no.)
16) Permanent paid non-family labour (no.)
17) Occasional paid family labour (no.)
18) Occasional paid non-family labour (no.)
19) On-farm post-harvesting processing (Y/N)

20) Importance of processing as a source of revenue (score)
21) Access to credit or finance for farming (Y/N)
22) Member of a co-operative (Y/N)
23) Support (financial, technical, labour, in kind or other) from neighbours or relatives (Y/N)
24) Access to production and marketing advice or training (Y/N)
25) Yearly turnover (EUR PPP)
26) Total annual income of the farm (EUR PPP)
27) % of farm agricultural and non-agricultural activities in the total farm income
28) % of household income from farm (ag and non-ag)
29) Number of product sold
30) Number of products not sold
31) % non-bought cereal
32) % non-bought oil
33) % non-bought vegetables
34) % non-bought potatoes
35) % non-bought fruit
36) % non-bought wine grapes
37) % non-bought dairy
38) % non-bought meat
39) % non-bought eggs
40) % of products consumed in household satisfied through farm's production
41) % product kept
42) % product not sold for HH food consumption
43) % Not sold animal feed in farm
44) % Not sold for gift
45) Subsidies or any other kind of public financial support (Y/N)
46) Subsidies (%)
47) input ranking seeds (score)
48) input ranking water (score)
49) input ranking fertilizers (score)
50) Input ranking pesticides and herbicides(score)
51) Input ranking petrol (score)
52) Input ranking Machinery work (score)
53) Input ranking transportation (score)
54) Input ranking hired labour (score)
55) Input ranking animal feed (score)
56) Input ranking energy (score)
57) Input ranking other (score)
58) % products sold to farmers markets
59) % products sold to wholesaler
60) % products sold to processor
61) % products sold to small retailers
62) % products sold to co-operatives
63) % products sold to other
64) Contract with buyer (Y/N)
65) Certification (Y/N)
66) Certification organic (Y/N)

67) Certification integrated production (Y/N)
68) Certification protected designation of origin (Y/N)
69) Certification protected geographical indication (Y/N)
70) Certification traditional specialties guaranteed (Y/N)
71) Certification other (specify; Y/N)