



# The drivers of change for the contribution of small farms to regional food security in Europe

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## ARTICLE INFO

### Keywords:

Drivers of change  
Food system  
Food and nutrition security  
European small farms  
Future

## ABSTRACT

The capacity of the food system to respond to the economic, demographic and environmental challenges ahead has become a topic of increasing interest, with particular attention to the roles and responsibilities of the different actors to ensure more sustainable food systems that can guarantee food and nutrition security for all. In this paper we approach the need to better understand the factors that can condition the potential contribution of small farms to regional food and nutrition security in Europe, acknowledging the role that small farms play in Europe at present. The analysis is based on a survey to 94 experts from 17 regions (NUTS3 level) in 11 different European countries, which identified the drivers of change according to the regional experts. These drivers were then categorized and their relative relevance assessed. The results indicate that some relevant drivers in the European context are linked to the capacity to adopt technologies and practices allowing adaptation to climate change, and the capacity to connect to food markets, with emphasis in the need for cooperation and collective action. The weight of other more European-specific drivers such as ‘consumer values and habits’ reveal that the future role of small farms will be very dependent on a societal change, with equity becoming a relevant component of consumers’ choice.

## 1. Introduction

Food systems have been experiencing transformations in the last decades due to their increased orientation towards globalized markets and to changes in consumption patterns. These systems have become more capital-intensive, characterized by high business concentration

and vertical integration, with the consequent modifications of governance frameworks. As a result, the agricultural sector has been undergoing structural changes to concentrate its production (FAO, 2017) in fewer and larger farms, and to integrate into vertically coordinated value chains.

These changing food systems are currently not meeting the world’s

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<https://doi.org/10.1016/j.gfs.2020.100395>

Received 1 October 2019; Received in revised form 14 March 2020; Accepted 4 June 2020

Available online 28 August 2020

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expectations for sustainability. Malnutrition in all its forms (under-nutrition, micronutrient deficiencies and overweight and obesity) now affects all countries, whether low-, middle- or high-income. Moreover, today's global food systems produce significant environmental degradation and pollution, and cause extensive damage to natural systems (HLPE, 2017:21). More sustainable food systems are needed to ensure food and nutrition security (FNS) in its four dimensions for all, while also safeguarding human and environmental health as well as socio-economic standards (HLPE, 2019). As Béné et al. (2019a: 149) argue “improving our comprehension of the dynamics of food systems and their (un)sustainability will depend on the identification of the main drivers that affect those dynamics”. To achieve this, more attention needs to be paid to food system governance, actors and drivers (Béné et al., 2019b). In this direction, a whole new set of questions is emerging around the roles and responsibilities of the different actors to ensure food security to the different segments of the population (Béné et al., 2019b: 117).

In this context, according to Rivera et al. (2019), there are still many small farms in Europe and many of them are contributing to regional food availability through locally sourcing most of their production. Besides, it is recognised that “small farms in Europe play an important role in supporting rural employment and maintaining the social fabric of rural areas and thus contribute to the objective of balanced territorial development” (EU, 2011).

The search for more sustainable food systems, together with the role played by small farms in regional food supply and food and nutrition security in Europe, leads to the need to better understand the factors that can condition the potential contribution of small farms to FNS in the future.

The capacity of agricultural producers and the whole food system to respond to the economic, demographic and environmental challenges ahead has become a topic of increasing interest. Several studies and reports from international and national agencies and organisations have tried to identify the way different main drivers of change will impact on agricultural production, land use dynamics or food and nutrition security, either globally or in certain world regions. However, these studies have not addressed, particularly in Europe, to what extent there is a role to be played by some of the weakest and more numerous actors of the food system: the small farms.

This is precisely the objective of this paper,<sup>1</sup> which aims to identify and characterise, adopting a regional scaling-up approach, the main drivers of change that would condition the future contribution of small farms to regional food production and FNS in a diversity of European regions.<sup>2</sup> This research makes a number of contributions to the existing literature on food system drivers. First, it is focused on Europe, while most debates on the future of food systems so far have frequently adopted a global scale (FAO, 2017; Foresight, 2011), or have been more focused in the global South (Palazzo et al., 2014; Jayne et al., 2014; Magnusson et al., 2012), with much fewer studies addressing the European scale. Second, this paper adopts an original approach by focusing on the question of the role of a key actor (small farms) in contributing to the future of food security and nutrition, allowing to reach more concrete and tailored conclusions. Third, it adopts an expert-driven approach, in contrast to other analyses based on literature review or that do not define the way the drivers are identified. Finally, there is a relevant difference with most of the existing literature: the geographical double scale of this research (regional and European). According to Ericksen (2008: 243), treating food systems as multi-scale “will facilitate the identification of critical drivers and determinant outcomes, as

well as the evaluation of tradeoffs”. Indeed, in this research the drivers of European small farms' future role in regional food systems and food and nutrition security have been derived from a regional perspective, which allows to understand to what extent the regional diversity of European small farms explains different perceptions about the drivers that will condition their contribution to the future food and nutrition security.

## 2. The food system's drivers of change: a European review

Drivers of change have been defined as “factors causing change which affect or shape the future” (EPRS, European Parliamentary Research Service, 2016) and characterized as “direct” (those which univocally influence an outcome in the system) and “indirect/underlying” (those which operate more diffusely, altering one or more direct drivers) (Forward Thinking Platform, 2014). More recently, in their critical literature review of the use of food system drivers, Béné et al. (2019a: 152) propose the following definition of drivers: “endogenous or exogenous processes that deliberately or unintentionally affect or influence a food system over a long-enough period so that their impacts result in altering durably the activities, and subsequently the outcomes, of that system”. The identification of new drivers and related variables is essential to infer alternative and plausible future scenarios (Bourgeois, 2012), so that actors can anticipate the necessary actions to achieve their objectives.

This definition can be adapted to the purpose of this study, so that the drivers we are identifying and analysing are those processes, either endogenous to small farms or exogenous to them, that are expected to affect or influence over a long-enough period the future contribution of small farms to the regional food systems, both in terms of food production and of regional FNS.

There has been a growing body of scientific and grey literature addressing the drivers of change of agriculture and food systems at different scales in recent years. Some of these are foresight studies that have used these drivers to derive a number of future scenarios to discuss their implications for the food system. Most of them address this issue at a global scale, and fewer (mostly from other EU research projects) do it at European level. This is evident for instance in the inventory made by Bourgeois and Sette (2017) of 84 foresight studies, where only 5 seem to refer to the UE or a European country. In any case, the identification of drivers of change in most of these studies is carried out on a top-down basis, i.e. they are identified and defined (either by the own researchers or by means of expert interviews) directly at global or European levels and, in some cases, they are used later on to conduct down-scaled analyses.

None of these studies explicitly refer to the question of small-scale farming. They tackle issues like food security and nutrition, agriculture, the role of specific farming techniques or the overall dynamics of rural areas. Nevertheless, even if the topics of these foresight analyses do not coincide, it is relevant to contrast our results with them. This will allow to explore how the regional experts' views on the factors affecting the future role of small farms are aligned with those that, according to other works, will shape the future of European agriculture, food systems and even the rural areas where SF are located.

The search has been done using some existing compilations and inventories (Jansson and Terluin, 2009; McEldowney, 2017 and Bourgeois and Sette, 2017), a review of scientific papers, and a targeted search in EU research projects and European institutions. This has allowed to identify the following 15 European foresight studies (7 already compiled by Jansson and Terluin (2009):

1. A comparative analysis of seven scenario studies of rural areas in the EU, compiled and analyzed in Jansson and Terluin (2009): ESPON Project 3.2 (ESPON, 2006), Eururalis 2.0 scenario study (Rienks, 2008), SCENAR 2020 (Nowicki et al., 2006), SENSOR project (Kuhlman et al., 2006), SEAMLESS project (Pérez et al., 2007),

<sup>1</sup> This research is part of the EU Horizon 2020 research project SALSA - ‘Small Farms, Small Food Businesses and Sustainable Food Security’, which studies the role of small farms in food and nutrition security and in regional food systems.

<sup>2</sup> The paper does not tackle other potential roles or contributions of small farms, as stemming from their potentially multifunctional character.

- PRELUDE project (EEA, 2007) and ‘Agriculture in the overall economy’ (Banse and Grethe, 2007).
- Sustainable Agriculture, Forestry and Fisheries in the Bioeconomy. A Challenge for Europe. 4th SCAR Foresight Exercise (European Commission, 2015).
  - Delivering on EU Food Safety and Nutrition in 2050 (Mylona et al., 2016).
  - TRANSMANGO - Assessment of the impact of global drivers of change on Europe's food and nutrition security (Vervoort et al., 2016).
  - Precision agriculture and the future of farming in Europe (EPRS, 2016).
  - IMPRESSIONS - Impacts and Risks from High-End Scenarios: Strategies for Innovative Solutions (Kok and Pedde, 2016).
  - SURE-Farm - Sustainable Resilient EU farming systems (Mathijs et al., 2018).
  - Five Scenarios for 2050 – Conditions for Agriculture and land use (Öborn et al., 2011). From this study we refer to the factors used in European scenarios (not in global ones).
  - ENDURE Foresight Study - European Crop Protection in 2030 (Labussière et al., 2010). From this study we refer to the factors used to shape the “Micro-scenarios on Agriculture in Europe”.

In their review on the literature about food system drivers, Béné et al. (2019a) identify twelve main food system drivers. We have used these main drivers to show the way they are included (or not) in this European review (Table 1). Needless to say, there is not a bi-univocal relationship between Béné et al.'s compilation of drivers and the ones from the other studies considered. Indeed, some drivers from other studies can respond to more than one category in Béné et al.'s classification, and the other way round also applies. In any case, this scanning is useful as it allows for assessing and clustering European food system drivers, as well as for identifying some gaps (in comparison to what European researchers have done) in Béné et al.'s review.

The table shows the diversity of terms –and in some way also of approaches– that these European studies have used. It also shows the relative importance given to each category, with consumers' income, technology and global trade receiving particular attention. Nevertheless, this comparison allows for the identification of two categories of (interrelated) drivers considered in the European studies that are not explicitly mentioned in Béné et al.'s analysis (so they do not appear in the table). On the one hand, political governance expressions (stability and quality of governance [6], regulation intensity [5], balance between global and national levels [5], power of states and intergovernmental organisations [8]) are identified in European studies as relevant food system drivers, this would include as well agricultural and rural development policies [8]. On the other hand, European studies pay particular attention to prevailing social values (respect [6], cohesion [3, 6], solidarity [1], culture [1]) in shaping future food systems. Although these two interrelated sets of drivers are related to other drivers already considered by Béné et al. (for instance consumer preferences and concerns, or factors affecting trade expansion), the relevance they acquire in European studies contrasts with the lack of explicit attention in that review. Interestingly, ‘Policy’/‘Governance’ and ‘Human behaviour’ are identified by Bourgeois and Settle (2017) as “new/emerging” drivers that are being increasingly used in recent foresight studies “for bringing discontinuities leading to different paths” (p. 117). These two aspects (public intervention and social values) also came up in our empirical analysis.

### 3. Data collection and methodology

The core information for the analysis came from 94 face-to-face interviews to experts from 17 European regions in 11 different countries (at NUTS3 level, see Table 2). Interviewees were asked two open-answer questions about the future role of small farms in regional food

**Table 1**  
European food system drivers (in brackets, the number of the document quoted in the list above).

Source: Authors' elaboration.

Drivers from Béné et al. (2019a)	Drivers from European foresight studies
Urbanization	- Urban and rural population dynamics [4] - Net migration/Mobility [6] - Labour availability [7] - Human population (pattern of settlement) [8]
Raise in consumers' income	- Evolution of economic growth [2] - EU economic growth [3] - Poverty and Economic Inequality [4] - Speed of economic growth [5] - Economic development [6, 8]
Population growth	- Evolution of the world population [2] - World population growth [3] - Speed of population growth [5] - Human population (growth, demographics) [8]
Attention paid to diet and health issues	- Consumer preferences [1] - Food values [3] - Consumption patterns (meat and sugar) [4] - Demand of meat/Consumption trends [7] - Consumption patterns/Consumption of different animal products [8]
Technological innovations	- Technological progress [1] - Technology uptake [3] - Social and Technical Innovation [4] - Speed of technological development [5] - Technology development [6] - Land productivity growth [7]
Intensification and homogenization of the agricultural sector	- Natural resources (availability of agricultural inputs) [8] - European agricultural production [9] - Climate change [1] - Climate change [2] - Speed of climate change [7]
Increase in frequency and intensity of extreme events	- Depletion of natural resources [3] - Resource Use [4] - Land availability [7] - Natural resources (availability of land, fertility, water) [8]
General degradation in soils and agro-ecological conditions	- Agro-food chain structure [3] - Power and Market Concentration [4] - Food industry structure/Vertical coordination [7]
Improved access to infrastructure and information	- Evolution of economic globalization [2] - Global trade [3] - Trade Agreements [4] - Liberalization of international trade [5] - International cooperation/Globalization [6] - International trade/Feed import [7] - European agricultural trade [9]
Trade policies and other processes influencing trade expansion	- Evolution of economic globalization [2] - Agro-food chain structure [3] - Power and Market Concentration [4] - Globalization [6] - Food industry structure/Vertical coordination [7]
Internationalization of private investments	- Consumer preferences [1] - Food values [3]
Concerns for food safety	

**Table 2**  
Regional experts' profiles.  
Source: Authors' elaboration.

Expert category	Number	Comments
1. Advisory services	7	Experts from public and private advisory services, including those belonging to farmers' organisations. They are in charge of technical advice to small farmers.
2. Agricultural association	17	Farmers unions, chambers of agriculture
3. Agricultural public administration	13	Staff and representatives of agricultural public agencies (local, regional, national)
4. Input/finance supplier	3	Technical and directive staff from input and finance suppliers
5. Processor/Retailer/Consumer	11	Down-stream companies, retailing and consumer associations
6. Producer cooperative	20	Representatives and technical staff from agri-food cooperatives uniting many small farmers
7. Public administration (non-agricultural)	6	Staff and representatives of non-agricultural public agencies (economic development, local administrations)
8. Research/Academy	7	Experts from universities and research centres
9. Rural association	6	Rural NGOs, LEADER groups
10. Small farmer	5	Individual small farmers

systems<sup>3</sup>:

- Which factors<sup>4</sup> (internal and external to the small farm) would condition the increase of the small farms' significance (relative importance) on the overall food production in the region in the next 20–30 years?
- Which factors (internal and external to the small farm) would condition an increase of the qualitative and/or quantitative contribution of small farms to an adequate diet<sup>5</sup> for the population of the region (for consumers in general and also for producers themselves) in the next 20–30 years?

Experts provided 494 answers in total, of which 20 were not considered as they did not respond to the concept of driver or factor of change.<sup>6</sup> Finally, 474 valid answers were categorized for quantitative analysis. Both questions were merged in a single variable of drivers as they refer to complementary dimensions of the contribution of small farms to FNS. These categories are specific from our study, i.e. they have been constructed from the aggregation of the regional experts' answers. The construction of the categories took into consideration the way the food system drivers have been approached in the aforementioned foresight studies. Nevertheless, it prioritized an inductive approach to group the answers and create original categories not to lose the small-farm specificities and the richness and diversity of experts' views.

Experts' profiles and backgrounds were also categorized. Table 2 shows these profiles as well as their distribution. These categories were used to explore by means of contingency analysis (using SPSS 16.0®) possible relationships between experts' profile and the drivers they identified as relevant. It is important to highlight that the selection included non-agricultural actors (categories 5, 7 and 9) as well as some researchers (apart from the organisers of the workshops). This facilitated the adoption of a more integral approach, in line with the claim of Slaughter's concept of 'integral futures' (Slaughter et al., 2008).

<sup>3</sup> The template provided to the research teams to use and to report the content of the interviews is provided as 'Additional material'.

<sup>4</sup> The research groups considered the term 'driver' (that is used in the literature) not to be totally familiar for the regional experts and not easy to translate to the several national languages. For this season, it was replaced by 'factor' which could be translated in a more homogeneous way.

<sup>5</sup> It has to be noted that the questions do not use the term 'food security' or 'food and nutrition security'. It is so because, in some countries, these terms are mostly associated exclusively to 'food safety'. The experts were explained that the expression 'adequate diets' referred to "healthy, balanced, diverse and environmentally friendly".

<sup>6</sup> Most of these discarded answers revolved around the level of either input or production general prices. Prices are not usually considered in the existing foresight literature as a process of change, but the outcome of a combination of processes already considered as drivers.

The regions for the analysis were selected according to two criteria: (a) an operational one: one region in each participant country, which also spread the geographical coverage, and (b) the diversity of regions as classified in the regional typology elaborated by Guiomar et al., 2018 based on the different degrees of importance and characteristics of SF.

Similarly, regions were also categorized to explore with contingency analysis the possible existence of relationships between the relevance of the drivers in different types of regions. For this, two alternative criteria were used to categorize regions. On the one hand, we used the typology from Guiomar et al., 2018. On the other hand, regions were classified according to the EDORA structural types (Copus and Hörnström, 2011). The regional coverage of the analysis is shown in Table 3.

#### 4. Results: the drivers of small farms' future role in regional food systems and FNS

Table 4 shows the categories of drivers conditioning the contribution of small farms to regional food production and FNS, according to the regional experts interviewed. It also shows the relative relevance of each driver in terms of the times they were mentioned by the regional experts.<sup>7</sup>

In what follows, we unfold what kind of experts' responses were included in each driver category.

1. **Access to technology and knowledge on farm management.** Interestingly, the most mentioned driver revolves around small farms' access to assets and knowledge to adopt on-farm productive and managerial changes. This reflects experts' concerns about the constraints of smallholders to respond and adapt to future challenges. It includes also several modalities of retro-innovation –i.e. the recovery of traditional production methods and old varieties in which traditional knowledge, handcraft and regional resources that have been revalorized and combined with new technologies and creative marketing strategies (Šūmane et al., 2018).
2. **Consumers' values and habits.** For many experts, the role of small farms in regional food systems will be very much conditioned by the level of consumers' awareness about the health and environmental implications of their diets and, in particular, about the social recognition of small-scale and local farming. Therefore, this is a driver exogenous to small farms, based on the pull effect of regional demand.
3. **Public budget and expenditure** are one of the two drivers directly linked to state intervention. This one would reflect the capacity and willingness of the State to mobilize public resources towards small farmers' needs. It would include, according to the experts, several

<sup>7</sup> Experts were not asked to weight the relevance of the different drivers they pointed out. We use the percentage of answers included in each category as a proxy of their relevance.

**Table 3**

Regions included in the analysis.

Source: Authors' elaboration.

	Classification according to Guiomar et al., 2018	EDORA structural type
Ileia (Greece)	C1	Agrarian
Pisa (Italy)	C1	Consumption countryside
Nowotarski (Poland)	C1	Agrarian
Rzeszowski	C1	Diversified (strong private services sector)
Giurgiu (Romania)	C1	Agrarian
Lochaber, Skye and Lochalsh, Arran and Cumbrae, Argyll and Bute (UK)	C1	Consumption countryside
Córdoba (Spain)	C2	Agrarian
Alentejo Central (Portugal)	C2	Agrarian
Jihočeský kraj (Czech Rep.)	C3	Diversified (strong secondary sector)
Larisa (Greece)	C3	Agrarian
Castellón (Spain)	C3	Consumption countryside
Vaucluse (France)	C3	Diversified (strong private services sector)
Latgale (Latvia)	C3	Agrarian
Lucca (Italy)	C4	Predominantly urban regions
Nowosadecki (Poland)	C4	Agrarian
Oeste (Portugal)	C4	Diversified (strong private services sector)
Hedmark (Norway)	C5	Consumption countryside

C1: Predominantly agricultural region with extremely high number of small farms with very low incomes.

C2: Predominantly agricultural region with few small farms, which are relatively small and have medium incomes.

C3: Region with a balanced distribution between agriculture and other land uses and with a low proportion of small farms, which are relatively small and have low incomes.

C4: Region with little agricultural land surface and where small farms exist in large numbers, which are extremely small and have low incomes.

C5: Region with little agricultural land surface where small parts of the region are occupied by small farms, which are relatively large and have a medium income.

**Table 4**

Relative relevance of the drivers of small farms' future role in regional FNS according to the experts consulted.

Source: Authors' elaboration.

Driver category	Number of answers	%
1. Access to technology and knowledge on farm management	94	20%
2. Consumers' values and habits	86	18%
3. Public budget and expenditure	63	13%
4. Integration of small farms into non-conventional value chains	58	12%
5. Integration of small farms into conventional value chains	39	8%
6. Strength of collective action	39	8%
7. Public regulations	32	7%
8. Demography	27	6%
9. Access to land	18	4%
10. Poverty and inequality	9	2%
11. Trade openness	9	2%
TOTAL	474	100%

modalities of financial support for small farms, either generalized (e.g. CAP payments), or by means of more targeted programs (new entrants, public infrastructures).

**4. Integration into non-conventional value chains.** The way small farms will integrate into food systems is expected to play a key role in explaining their contribution to regional FNS. Nevertheless, the answers of regional experts allow for differentiating two modalities of market engagement. This one relates to market access through a diversity of short food supply chains, either individual (direct selling, in occasions combined with other on-farm non-agricultural activities) or collective (farmers markets, digital platforms), with mentions also to public procurement.

**5. Integration into conventional value chains.** The second set of market engagement answers –less mentioned by the experts—are related to the access to more conventional value chains. In this regard, smallholders' contribution to regional FNS would depend on their ability to comply with private quality standards or to access logistics centres, but also on large retailers' willingness to include small farms-sourced food in their supply.

**6. Strength of collective action.** The need to overcome the limitations of small-scale is reflected on the relevance given to cooperation between farmers. According to the experts consulted, the capacity of small farmers to engage in regional food systems will be very much related to their willingness and capacity for collective action, for instance regarding collective planning of production.

**7. Public regulations.** A second dimension of public governance (besides the aforementioned public budget and expenditure) revolves around the legal frameworks regulating the hygiene, health or environmental mandatory requirements for small farmers' activity. The model of public governance, either by means of strong and rigid or flexible and tailored direct regulations would condition to a greater extent small farmers' capacity to operate and access legal markets.

**8. Demography** is a frequent driver in several studies. Interestingly, demography-related topics were not emphasized by the regional experts that have participated in this research. When it was, the focus was more on rural demographic trends and, in particular, their relationships with local/regional labour markets, work force availability and their impact on farm succession likelihood.

**9. Access to land** is another element that would condition small farmers' contribution to regional food production, very often in relation to institutional frameworks regulating that access (customary institutions, legal constraints).

**10. Poverty level** is a driver that receives (together with inequality, economic growth or consumers' income) much more attention in existing food system studies than in our experts' answers. Indeed, only 9 mentions were made to income levels and poverty, related to society income level, not focused on the specific situation of small farmers.

**11. Trade openness** has received much less attention in our study than in other more general studies, where trade agreements and policies, liberalization and trade expansion are considered extensively. The focus of the interviewees is on the influence of trade openness on the regional competition with imported food.

An immediate question coming up from these results is to what extent experts' perceptions about the key drivers conditioning the future contribution of small farms to FNS, are related to their profile. A

contingency analysis was carried out to check the independence between these categorical variables (drivers and expert groups). The results show that there is not a significant relation between the drivers pointed out by the experts and their profile (Chi-square = 1.015E2,  $s = 0.191$ ). In other words, those experts closer to the production side (farmers, farmers unions, cooperatives) do not pay necessarily more attention to the access to assets to produce or market, or to more tailored public support. Similarly, downstream actors (retailers, consumer representatives) seem not to emphasize consumer side drivers (food habits, poverty) above the relevance given by other actors. This means there is a kind of uniformity among experts regarding the relevance given to the drivers. This is important for the robustness of the analysis, because in case of non-independence between the experts' profiles and their answers, the results would have been very biased by their selection in each region, as the distribution of experts –based on researchers' networks and snow-balling- was not equally balanced in all of them.

A second question revolves around the extent the geographical location of the region, or its particular features, explain the regional differences found. As before, some contingency analyses were conducted.

We have found some significant relations regarding the region to which these experts belong. First, the location of the region (Mediterranean, Eastern, and Northern) is related to the relative weight of some drivers (Chi-square = 39.06,  $s < 0.01$ ). For instance, experts from Eastern Europe give more relevance<sup>8</sup> to the role of 'Poverty and inequality' levels in explaining the future contribution of small farms to regional FNS than those from other countries. This seems to be consistent with the incidence of higher levels of poverty (both nationally and in rural regions) in Eastern countries and poorer regions within these countries (as Rzeszowski in Poland). Second, the weight given to the driver 'Access to land' also shows differences. Interestingly, the relevance of this driver is relatively high in Northern and low in Mediterranean countries. In the Scottish region, access to land is a big reform agenda with widespread challenges for new entrants, as small agricultural plots are not widely available, crofts in particular, and do not easily change hands with hereditary rights passing to absentee relations. In Norway, this could be related to national obligations to wildlife conservation (large carnivores), which constrain the use of outfield pastures for sheep. In the Mediterranean, this low relevance was found in Italy, Greece and one of the Spanish regions. Third, the opposite applies regarding the role of the 'Strength of collective action', which is particularly relevant for Southern European experts, interestingly in regions that have a consolidated cooperative structure (e.g. Castellón in Spain, Oeste in Portugal) and also where the cooperative tradition is much weaker (e.g. Larisa in Greece).

Beyond this geographical classification, the contingency analysis has shown that the answers of the experts are independent of the regional typologies used in the analysis, one based on the relevance and economic characteristics of small farms (Guiomar et al., 2018) and the other on the economic structure of the region (EDORA). In other words, we have not found a clear pattern connecting the weight of the drivers and the regional characteristics considered in these two classifications. Nevertheless, the question of to what extent the drivers are related to other regional specificities remains open.

<sup>8</sup> From now on, we will refer to those crosses of categories where the corrected normalized residue is above 1.96 or below  $-1.96$ . In these cases, accepting a confidence level of 95%, it can be assumed that there is a relation between those attributes. In other words, a value higher than that threshold indicates that the driver has been mentioned by the experts more times than what would have been expected in case of independence between the region and the relevance of the driver. The opposite would apply in case the corrected normalized residue is lower than the threshold.

## 5. Discussion

Results show that the drivers that, according to the regional experts, will condition the future contribution of small farms to regional food security are very much in line with the global drivers of change for the whole food system.

For instance, the great relevance that the regional experts gave to drivers related to 'Access to technology and knowledge on farm management' (see Table 4), has its reflection on the attention paid in the existing studies. Access to technology and innovation (also to de-intensify agriculture) is mentioned by Béné et al. (2019a) and other studies (see Table 1). Also, in this driver, experts made several mentions to the smallholders' capacity for agricultural diversification, which is related to the driver 'intensification and homogenization of the agricultural sector' pointed out by Béné et al. (2019a).

Similarly, the second most mentioned set of drivers ('Consumers' values and habits') is very much in line with the relevance of the several demand-side drivers encountered by Béné et al. (2019a) (consumers' income and the way it impacts on diets, attention paid to health and food safety), as well as that of other European studies (consumption patterns and trends in Vervoort et al. (2016) and Mathijs et al. (2018); food values in Mylona et al. (2016)).

Nevertheless, besides these similarities, we can identify interesting nuances and specificities between our results and the existing literature that very much relate to the specific challenges for small farms. Governance model has been pointed out as a driver in other studies (strength of governance, EPRS, 2016); yet the compilation made by Béné et al. (2019a) does not include any direct mention to government action. Our analysis enriches the role of public policies, identifying the different ways in which public policies can impact small farms' role in regional food systems, that include all the modalities of policy tools: (i) public regulations that set up the barriers and constraints to produce, process or sell; (ii) financial instruments to support smallholders' activities and access to markets (e.g. by means of investments in infrastructures), and (iii) though less explicitly, informative instruments to raise consumers' awareness about the importance of the role of regional small farms. In short, according to the interviewees the state will play a decisive role in setting up the conditions for the contribution of small farms to regional FNS.

The structure of food markets that shape the way economic actors are connected is, in one way or another, frequently referred as a key food system driver (Vervoort et al., 2016; Mathijs et al., 2018; Mylona et al., 2016). However, the focus on smallholding agriculture has led to split this driver into two modalities of market integration, either non-conventional or conventional market value chains. This reflects two, sometimes opposite, views: the future of small farms would require either changes allowing them to be able to integrate in dominant corporate food systems, or the transition towards an alternative food system where local small farms are more directly connected with consumers. These two modalities are also related to other identified drivers. On the one hand, most of the attention paid to collective action is oriented towards allowing smallholders to concentrate supply and take advantage of economies of scale. On the other hand, the development of non-conventional value chains for small farms was frequently linked to the extent consumers will be more aware about the role of this type of farms in their regional systems, and willing to shift their food habits, including more local and small farm-oriented purchase.

As explained in the beginning of the paper, our analysis differs from several foresight studies in that the drivers we have identified come from an extensive collection of primary information from almost a hundred of regional interviewees. This allows also to discuss about the perceptions and the anticipatory capacity of these experts in three senses.

Firstly, even if experts were not asked to interconnect the drivers in order to deepen into their relationships, we can resort to the approach proposed by Inayatullah (1998) as Causal Layered Analysis (CLA). It

identifies a number of layers in the way individuals frame problems and solutions: the litany, the systemic causes, the discourse/worldviews and the myth –the deep unconscious story. The drivers found in this paper can be somehow associated with these layers. First, some drivers seem to be responding to a litany redirecting to immediate factors affecting the day-to-day future of SF. This would be the case of the technocratic focus of the driver ‘Access to technology’, the constraints and/or opportunities arising from ‘Public budget and expenditure’ as well as ‘Public regulations’ of the specific question of ‘Access to land’. Second, the majority of identified drivers do address –from the experts’ view– the systemic causes of the future threats to SF, in terms of how they are integrated in different forms of value chains, or how certain processes (demography, poverty, trade openness) will be underlying causes of the changing future of SF. Third, some drivers refer to alternative worldviews, as it would be those linked to a change in social or economic dominant paradigm (‘Consumers’ values’, ‘Collective action’, or even the retroinnovation included in ‘Access to technology’). The connection between these layers is linked to the underlying relationships between the drivers –e.g. as direct and indirect. This was not addressed in the interviews and would deserve further research. Nevertheless, regardless of how these drivers are or not connected, what seems evident is that this collection of drivers shape a consistent frame of how the regional experts perceive the combination of drivers upon which the future of small farmers would depend. It is a frame embedded into the dominant views and discourses on the problems of small scale agriculture.

Second, this also connects to the interviewees’ anticipatory systems. Miller (2015: 513) claims that “today’s dominant anticipatory systems and processes impede the identification and invention of discontinuity”, i.e. to anticipate what does not yet exist. The drivers pointed out by the regional experts, even when considering the long term, are very much related to processes and issues that are taking place right now or have taken place in the past, leaving no room for novel drivers. This would also explain the low attention paid to drivers that, despite being frequently considered at the global or European scale, experts seemed not to consider important for their regions (e.g. demography, with only a 6% of answers). In any case, this is not uniquely an issue in our study, as the existing literature on the drivers of change (see above) also tends to focus on well-known current transformations (e.g. urbanization, trade agreements, etc.).

Finally, it is noteworthy the extremely low mentions to climate change among the experts’ answers. This is interesting in relation to the results from a survey made to small farmers in these regions as part of the SALSAs project (Rivera et al., 2018), where it was found farmers’ high concern about natural hazards and climate change. This seeming contradiction could be explained because experts could be assuming that the change of ecological conditions is somehow ‘given’. Actually, when mentioned, experts’ approach stressed the relevance of the drivers revolving around the capacity of small farmers to adapt to changing ecological circumstances, including both the capacity to shift production practices and the ability to respond to climate-driven changes of consumers’ demand. In other words, what would be the driver conditioning the future of small farms is not climate change per se but the conditions allowing (or not) small farmers to operate under new ecological conditions. Remarkably, Béné et al. (2019a) also argue that climate change is too vague to be considered a useful food system driver, and that weather-related extreme events are neither drivers. Rather, the “recurrence or the increase in the frequency and the intensity of those extreme events will eventually become a driver –as people, individually or collectively, will start to adapt (change their behaviour/technology), which will eventually alter the system durably” (p. 151). It is precisely this adaptive capacity what was stressed by regional experts, explaining in part the weight of the most mentioned driver (‘Access to technology and knowledge on farm management’).

## 6. Conclusions

Despite the pace of disappearance of small farms, they still represent a high percentage of European farms and keep being responsible for an important part of food supply. Their role in contributing to confront the big challenges for European food security will depend on a number of processes of change. Unsurprisingly, many of the drivers that the European regional experts that participated in this study highlighted as determinant of the future of small farms and their contribution to FNS, are very much in line with the challenges that have been already identified elsewhere and relate to the supply side, like the capacity to adopt technologies and practices allowing adaptation to climate change, and the capacity to connect to food markets (e.g. HLPE, 2013; FAO, 2017). Although these issues are usually raised in relation to small farms in the Global South, we have found them to be totally consistent with the European experts’ views, who also emphasize the need of co-operation and collective action to undertake the necessary measures to adopt technological and managerial innovation and to guarantee an adequate access to markets (both conventional and non-conventional).

There are, though, other drivers that seem to receive more attention in the European context. This is illustrated by the weight of the driver ‘consumer values and habits’, i.e. changes in consumers’ habits and preferences, more oriented for instance towards valorising small-scale food providers. This issue coincides also with the attention paid in other European foresight studies (Jansson and Terluin, 2009; Kok and Pedde, 2016; Mylona et al., 2016). This driver relates to some of the key agroecological principles (HLPE, 2019: 41): social values and diets<sup>9</sup> and fairness<sup>10</sup>, which could underpin (HLPE, 2019: 58–59) the transition towards sustainable food systems for FNS.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Acknowledgements

This research was supported by the ‘Small Farms, Small Food Businesses and Sustainable Food Security’ (SALSAs) project, which has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 677363.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.gfs.2020.100395>.

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<sup>9</sup> Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally and culturally appropriate diets.

<sup>10</sup> Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment and fair treatment of intellectual property rights.

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