

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

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1 The drivers of change for the contribution of small farms to regional 2 food security in Europe

3 Abstract

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

18 Keywords: drivers of change, food system, food and nutrition security, European small farms, future

19 20 1. Introduction

21 Food systems have been experiencing transformations in the last decades due to their increased
22 orientation towards globalized markets and to changes in consumption patterns. These systems have

23 become more capital-intensive, characterized by high business concentration and vertical
24 integration, with the consequent modifications of governance frameworks. As a result, the
25 agricultural sector has been undergoing structural changes to concentrate its production (FAO, 2017)
26 in fewer and larger farms, and to integrate into vertically coordinated value chains.

27 These changing food systems are currently not meeting the world's expectations for sustainability.
28 Malnutrition in all its forms (undernutrition, micronutrient deficiencies and overweight and obesity)
29 now affects all countries, whether low-, middle- or high-income. Moreover, today's global food
30 systems produce significant environmental degradation and pollution, and cause extensive damage
31 to natural systems (HLPE, 2017:21). More sustainable food systems are needed to ensure food and
32 nutrition security (FNS) in its four dimensions for all, while also safeguarding human and
33 environmental health as well as socio-economic standards (HLPE, 2019). As Bené et al., (2019a: 149)
34 argue "improving our comprehension of the dynamics of food systems and their (un)sustainability
35 will depend on the identification of the main drivers that affect those dynamics". To achieve this,
36 more attention needs to be paid to food system governance, actors and drivers (Bené et al., 2019b).
37 In this direction, a whole new set of questions is emerging around the roles and responsibilities of
38 the different actors to ensure food security to the different segments of the population (Bené et al.,
39 2019b: 117).

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

45 The search for more sustainable food systems, together with the role played by small farms in
46 regional food supply and food and nutrition security in Europe, leads to the need to better

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47 understand the factors that can condition the potential contribution of small farms to FNS in the
48 future.

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

56 This is precisely the objective of this paper¹, which aims to identify and characterise, adopting a
57 regional scaling-up approach, the main drivers of change that would condition the future
58 contribution of small farms to regional food production and FNS in a diversity of European regions².

59 This research makes a number of contributions to the existing literature on food system drivers. First,
60 it is focused on Europe, while most debates on the future of food systems so far have frequently
61 adopted a global scale (FAO, 2017; Foresight, 2011), or have been more focused in the global South
62 (Palazzo et al., 2014; Jayne et al., 2014; Magnusson et al., 2012), with much fewer studies addressing
63 the European scale. Second, this paper adopts an original approach by focusing on the question of
64 the role of a key actor (small farms) in contributing to the future of food security and nutrition,
65 allowing to reach more concrete and tailored conclusions. Third, it adopts an expert-driven approach,
66 in contrast to other analyses based on literature review or that do not define the way the drivers are
67 identified. Finally, there is a relevant difference with most of the existing literature: the geographical
68 double scale of this research (regional and European). According to Ericksen (2008: 243), treating

56 ¹ This research is part of the EU Horizon 2020 research project SALSA - 'Small Farms, Small Food Businesses and
57 Sustainable Food Security', which studies the role of small farms in food and nutrition security and in regional
58 food systems.

59 ² The paper does not tackle other potential roles or contributions of small farms, as stemming from their
60 potentially multifunctional character.
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69 food systems as multi-scale “will facilitate the identification of critical drivers and determinant
70 outcomes, as well as the evaluation of tradeoffs”. Indeed, in this research the drivers of European
71 small farms’ future role in regional food systems and food and nutrition security have been derived
72 from a regional perspective, which allows to understand to what extent the regional diversity of
73 European small farms explains different perceptions about the drivers that will condition their
74 contribution to the future food and nutrition security.

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

76 Drivers of change have been defined as “factors causing change which affect or shape the future”
77 (EPRS, 2017) and characterized as “direct” (those which univocally influence an outcome in the
78 system) and “indirect/underlying” (those which operate more diffusely, altering one or more direct
79 drivers) (Forward Thinking Platform, 2014). More recently, in their critical literature review of the use
80 of food system drivers, Béné et al. (2019a: 152) propose the following definition of drivers:
81 “endogenous or exogenous processes that deliberately or unintentionally affect or influence a food
82 system over a long-enough period so that their impacts result in altering durably the activities, and
83 subsequently the outcomes, of that system”. The identification of new drivers and related variables is
84 essential to infer alternative and plausible future scenarios (Bourgeois, 2012), so that actors can
85 anticipate the necessary actions to achieve their objectives.

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

90 There has been a growing body of scientific and grey literature addressing the drivers of change of
91 agriculture and food systems at different scales in recent years. Some of these are foresight studies
92 that have used these drivers to derive a number of future scenarios to discuss their implications for
93 the food system. Most of them address this issue at a global scale, and fewer (mostly from other EU

94 research projects) do it at European level. This is evident for instance in the inventory made by
95 Bourgeois and Sette (2017) of 84 foresight studies, where only 5 seem to refer to the UE or a
96 European country. In any case, the identification of drivers of change in most of these studies is
97 carried out on a top-down basis, i.e. they are identified and defined (either by the own researchers of
98 by means of expert interviews) directly at global or European levels and, in some cases, they are used
99 later on to conduct down-scaled analyses.

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

107 The search has been done using some existing compilations and inventories (Jansson and Terluin,
108 2009; McEldowney, 2017 and Bourgeois and Sette, 2017, a review of scientific papers, and a targeted
109 search in EU research projects and European institutions. This has allowed to identify the following
110 15 European foresight studies (7 already compiled by Jansson and Terluin (2009):

- 111 1. A comparative analysis of seven scenario studies of rural areas in the EU, compiled and
112 analyzed in Jansson and Terluin (2009): ESPON (ESPON Project 3.2, 2006), Eururalis (Rienks et
113 al., 2008), SCENAR2020 (Nowicki et al., 2006), SENSOR (Kuhlman et al., 2006), SEAMLESS
114 (Pérez et al., 2007), PRELUDE (EAA, 2007) and 'Agriculture in the overall economy' (Banse
115 and Grethe, 2007).
- 116 2. Sustainable Agriculture, Forestry and Fisheries in the Bioeconomy. A Challenge for Europe.
117 4th SCAR Foresight Exercise (European Commission, 2015).
- 118 3. Delivering on EU Food Safety and Nutrition in 2050 (Mylona et al., 2016).

- 119 4. TRANSMANGO - Assessment of the impact of global drivers of change on Europe's food and
 120 nutrition security (Vervoort et al., 2016).
 121 5. Precision agriculture and the future of farming in Europe (EPRS, 2016).
 122 6. IMPRESSIONS - Impacts and Risks from High-End Scenarios: Strategies for Innovative
 123 Solutions (Kok and Pedde, 2016).
 124 7. SURE-Farm - Sustainable Resilient EU farming systems (Mathijs et al., 2018).
 125 8. Five Scenarios for 2050 – Conditions for Agriculture and land use (Öborn et al., 2011). From
 126 this study we refer to the factors used in European scenarios (not in global ones).
 127 9. ENDURE Foresight Study - European Crop Protection in 2030 (Labussière et al., 2010). From
 128 this study we refer to the factors used to shape the “Micro-scenarios on Agriculture in
 129 Europe”.

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

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

| 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] - <u>Human population (pattern of settlement) [8]</u> |
| Raise in consumers' income | - Evolution of economic growth [2] - EU economic growth [3] - Poverty and Economic Inequality [4] |

| | |
|--|--|
| | <ul style="list-style-type: none"> - Speed of economic growth [5] - Economic development [6, 8] |
| Population growth | <ul style="list-style-type: none"> - Evolution of the world population [2] - World population growth [3] - Speed of population growth [5] - <u>Human population (growth, demographics) [8]</u> |
| Attention paid to diet and health issues | <ul style="list-style-type: none"> - Consumer preferences [1] - Food values [3] - Consumption patterns (meat and sugar) [4] - Demand of meat / Consumption trends [7] - <u>Consumption patterns / Consumption of different animal products [8]</u> |
| Technological innovations | <ul style="list-style-type: none"> - Technological progress [1] - Technology uptake [3] - Social and Technical Innovation [4] - Speed of technological development [5] - Technology development [6] |
| Intensification and homogenization of the agricultural sector | <ul style="list-style-type: none"> - Land productivity growth [7] - <u>Natural resources (availability of agricultural inputs) [8]</u> - <u>European agricultural production [9]</u> |
| Increase in frequency and intensity of extreme events | <ul style="list-style-type: none"> - Climate change [1] - Climate change [2] - Speed of climate change [7] |
| General degradation in soils and agro-ecological conditions | <ul style="list-style-type: none"> - Depletion of natural resources [3] - Resource Use [4] - Land availability [7] - <u>Natural resources (availability of land, fertility, water) [8]</u> |
| Improved access to infrastructure and information | <ul style="list-style-type: none"> - Agro-food chain structure [3] - Power and Market Concentration [4] - Food industry structure / Vertical coordination [7] |
| Trade policies and other processes influencing trade expansion | <ul style="list-style-type: none"> - 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] - <u>European agricultural trade [9]</u> |
| Internationalization of private investments | <ul style="list-style-type: none"> - Evolution of economic globalization [2] - Agro-food chain structure [3] - Power and Market Concentration [4] - Globalization [6] - Food industry structure / Vertical coordination [7] |
| Concerns for food safety | <ul style="list-style-type: none"> - Consumer preferences [1] - Food values [3] |

140 Source: Authors' elaboration

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142 The table shows the diversity of terms –and in some way also of approaches- that these European
143 studies have used. It also shows the relative importance given to each category, with consumers'
144 income, technology and global trade receiving particular attention. Nevertheless, this comparison
145 allows for the identification of two categories of (interrelated) drivers considered in the European

146 studies that are not explicitly mentioned in Béné et al.'s analysis (so they do not appear in the table).
147 On the one hand, political governance expressions (stability and quality of governance [6], regulation
148 intensity [5], balance between global and national levels [5], power of states and intergovernmental
149 organisations [8]) are identified in European studies as relevant food system drivers, this would
150 include as well agricultural and rural development policies [8]. On the other hand, European studies
151 pay particular attention to prevailing social values (respect [6], cohesion [3, 6], solidarity [1], culture
152 [1]) in shaping future food systems. Although these two interrelated sets of drivers are related to
153 other drivers already considered by Béné et al. (for instance consumer preferences and concerns, or
154 factors affecting trade expansion), the relevance they acquire in European studies contrasts with the
155 lack of explicit attention in that review. Interestingly, 'Policy'/'Governance' and 'Human behaviour'
156 are identified by Bourgeois and Settle (2017) as "new/emerging" drivers that are being increasingly
157 used in recent foresight studies "for bringing discontinuities leading to different paths" (p. 117).
158 These two aspects (public intervention and social values) also came up in our empirical analysis.

3. Data collection and methodology

160 The steps followed to carry out this analysis are schematized in Figure 1. The core information for the
161 analysis came from 94 face-to-face interviews to experts from 17 European regions in 11 different
162 countries (at NUTS3 level, see Table 2). Interviewees were asked two open-answer questions about
163 the future role of small farms in regional food systems³:

- 164 - Which factors⁴ (internal and external to the small farm) would condition the increase of the
165 small farms' significance (relative importance) on the overall food production in the region in
166 the next 20-30 years?

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

⁴ 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 reason, it was replaced by 'factor' which could be translated in a more homogeneous way.

167 - Which factors (internal and external to the small farm) would condition an increase of the
168 qualitative and/or quantitative contribution of small farms to an adequate diet⁵ for the
169 population of the region (for consumers in general and also for producers themselves) in the
170 next 20-30 years?

171 Experts provided 494 answers in total, of which 20 were not considered as they did not respond to
172 the concept of driver or factor of change⁶. Finally, 474 valid answers were categorized for
173 quantitative analysis. Both questions were merged in a single variable of drivers as they refer to
174 complementary dimensions of the contribution of small farms to FNS. These categories are specific
175 from our study, i.e. they have been constructed from the aggregation of the regional experts'
176 answers. The construction of the categories took into consideration the way the food system drivers
177 have been approached in the aforementioned foresight studies. Nevertheless, it prioritized an
178 inductive approach to group the answers and create original categories not to lose the small-farm
179 specificities and the richness and diversity of experts' views.

180 Experts' profiles and backgrounds were also categorized. Table 2 shows these profiles as well as their
181 distribution. These categories were used to explore by means of contingency analysis (using SPSS
182 16.0®, step 4) possible relationships between experts' profile and the drivers they identified as
183 relevant. It is important to highlight that the selection included non-agricultural actors (categories 5,
184 7 and 9) as well as some researchers (apart from the organisers of the workshops). This facilitated
185 the adoption of a more integral approach, in line with the claim of Slaughter's concept of 'integral
186 futures' (Slaughter, 2008).

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⁵ 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".

⁶ 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.

188 Table 2. Regional experts' profiles

| Expert category | Number | Comments |
|---|--------|--|
| 1. Advisory services | 7 | Experts from public and private advisory services, including those belonging to farmers' organizations. 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 |

189 Source: Authors' elaboration.

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

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

200 Table 3. Regions included in the analysis

| | 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 |
| Jihocecký 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 |

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

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

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

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

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

210 Source: Authors' elaboration.

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212 4. Results: the drivers of small farms' future role in regional food 213 systems and FNS

214 Table 4 shows the categories of drivers conditioning the contribution of small farms to regional food
215 production and FNS, according to the regional experts interviewed. It also shows the relative
216 relevance of each driver in terms of the times they were mentioned by the regional experts⁷.

217 Table 4. Relative relevance of the drivers of small farms' future role in regional FNS according to the
218 experts consulted

| 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% |

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

| | | |
|----------------------------------|-----|------|
| 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% |

Source: Authors' elaboration.

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 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.

242 Nevertheless, the answers of regional experts allow for differentiating two modalities of
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2 243 market engagement. This one relates to market access through a diversity of short food
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4 244 supply chains, either individual (direct selling, in occasions combined with other on-farm
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7 245 non-agricultural activities) or collective (farmers markets, digital platforms), with mentions
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9 246 also to public procurement.

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11 247 5. **Integration into conventional value chains.** The second set of market engagement answers
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14 248 –less mentioned by the experts- are related to the access to more conventional value
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16 249 chains. In this regard, smallholders’ contribution to regional FNS would depend on their
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19 250 ability to comply with private quality standards or to access logistics centres, but also on
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21 251 large retailers’ willingness to include small farms-sourced food in their supply.

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23 252 6. **Strength of collective action.** The need to overcome the limitations of small-scale is
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26 253 reflected on the relevance given to cooperation between farmers. According to the experts
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28 254 consulted, the capacity of small farmers to engage in regional food systems will be very
29
30 255 much related to their willingness and capacity for collective action, for instance regarding
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32 256 collective planning of production.

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35 257 7. **Public regulations.** A second dimension of public governance (besides the aforementioned
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38 258 public budget and expenditure) revolves around the legal frameworks regulating the
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40 259 hygiene, health or environmental mandatory requirements for small farmers’ activity. The
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42 260 model of public governance, either by means of strong and rigid or flexible and tailored
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44 261 direct regulations would condition to a greater extent small farmers’ capacity to operate
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46 262 and access legal markets.

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49 263 8. **Demography** is a frequent driver in several studies. Interestingly, demography-related
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51 264 topics were not emphasized by the regional experts that have participated in this research.
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53 265 When it was, the focus was more on rural demographic trends and, in particular, their
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55 266 relationships with local/regional labour markets, work force availability and their impact on
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57 267 farm succession likelihood.
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268 9. **Access to land** is another element that would condition small farmers' contribution to
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2 269 regional food production, very often in relation to institutional frameworks regulating that
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4 270 access (customary institutions, legal constraints).
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7 271 10. **Poverty level** is a driver that receive (together with inequality, economic growth or
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9 272 consumers' income) much more attention in existing food system studies than in our
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11 273 experts' answers. Indeed, only 9 mentions were made to income levels and poverty, related
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13 274 to society income level, not focused on the specific situation of small farmers.
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16 275 11. **Trade openness** has received much less attention in our study than in other more general
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18 276 studies, where trade agreements and policies, liberalization and trade expansion are
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20 277 considered extensively. The focus of the interviewees is on the influence of trade openness
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22 278 on the regional competition with imported food.
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27 279 An immediate question coming up from these results is to what extent experts' perceptions about
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29 280 the key drivers conditioning the future contribution of small farms to FNS, are related to their profile.
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31 281 A contingency analysis was carried out to check the independence between these categorical
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33 282 variables (drivers and expert groups). The results show that there is not a significant relation
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35 283 between the drivers pointed out by the experts and their profile (Chi-square=1.015E2, s=0.191). In
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37 284 other words, those experts closer to the production side (farmers, farmers unions, cooperatives) do
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39 285 not pay necessarily more attention to the access to assets to produce or market, or to more tailored
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41 286 public support. Similarly, downstream actors (retailers, consumer representatives) seem not to
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43 287 emphasize consumer side drivers (food habits, poverty) above the relevance given by other actors.
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45 288 This means there is a kind of uniformity among experts regarding the relevance given to the drivers.
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47 289 This is important for the robustness of the analysis, because in case of non-independence between
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49 290 the experts' profiles and their answers, the results would have been very biased by their selection in
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51 291 each region, as the distribution of experts –based on researchers' networks and snow-balling- was
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53 292 not equally balanced in all of them.
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293 A second question revolves around the extent the geographical location of the region, or its
294 particular features, explain the regional differences found. As before, some contingency analyses
295 where conducted.

296 We have found some significant relations regarding the region to which these experts belong. First,
297 the location of the region (Mediterranean, Eastern, and Northern) is related to the relative weight of
298 some drivers (Chi-square=39.06, $s < 0.01$). For instance, experts from Eastern Europe give more
299 relevance⁸ to the role of 'Poverty and inequality' levels in explaining the future contribution of small
300 farms to regional FNS than those from other countries. This seems to be consistent with the
301 incidence of higher levels of poverty (both nationally and in rural regions) in Eastern countries and
302 poorer regions within these countries (as Rzeszowski in Poland). Second, the weight given to the
303 driver 'Access to land' also shows differences. Interestingly, the relevance of this driver is relatively
304 high in Northern and low in Mediterranean countries. In the Scottish region, access to land is a big
305 reform agenda with widespread challenges for new entrants, as small agricultural plots are not
306 widely available, crofts in particular, and do not easily change hands with hereditary rights passing to
307 absentee relations. In Norway, this could be related to national obligations to wildlife conservation
308 (large carnivores), which constrain the use of outfield pastures for sheep. In the Mediterranean, this
309 low relevance was found in Italy, Greece and one of the Spanish regions. Third, the opposite applies
310 regarding the role of the 'Strength of collective action', which is particularly relevant for Southern
311 European experts, interestingly in regions that have a consolidated cooperative structure (e.g.
312 Castellón in Spain, Oeste in Portugal) and also where the cooperative tradition is much weaker (e.g.
313 Larisa in Greece).

⁸ 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.

314 Beyond this geographical classification, the contingency analysis has shown that the answers of the
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2 315 experts are independent of the regional typologies used in the analysis, one based on the relevance
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4 316 and economic characteristics of small farms (Guiomar et al., 2018) and the other on the economic
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7 317 structure of the region (EDORA). In other words, we have not found a clear pattern connecting the
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9 318 weight of the drivers and the regional characteristics considered in these two classifications.
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11 319 Nevertheless, the question of to what extent the drivers are related to other regional specificities
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14 320 remains open.

321 5. Discussion

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21 322 Results show that the drivers that, according to the regional experts, will condition the future
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23 323 contribution of small farms to regional food security are very much in line with the global drivers of
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25 324 change for the whole food system.

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29 325 For instance, the great relevance that the regional experts gave to drivers related to 'Access to
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31 326 technology and knowledge on farm management' (see Table 4), has its reflection on the attention
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33 327 paid in the existing studies. Access to technology and innovation (also to de-intensify agriculture) is
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35 328 mentioned by Béné et al. (2019a) and other studies (see Table 1). Also, in this driver, experts made
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37 329 several mentions to the smallholders' capacity for agricultural diversification, which is related to the
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39 330 driver 'intensification and homogenization of the agricultural sector' pointed out by Béné et al.
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42 331 (2019a).

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46 332 Similarly, the second most mentioned set of drivers ('Consumers' values and habits') is very much in
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48 333 line with the relevance of the several demand-side drivers encountered by Béné et al. (2019a)
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50 334 (consumers' income and the way it impacts on diets, attention paid to health and food safety), as
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52 335 well as that of other European studies (consumption patterns and trends in Vervoort et al. (2016)
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55 336 and Mathijs et al. (2018); food values in Mylona et al. (2016)).

337 Nevertheless, besides these similarities, we can identify interesting nuances and specificities
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2 338 between our results and the existing literature that very much relate to the specific challenges for
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4 339 small farms. Governance model has been pointed out as a driver in other studies (strength of
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6 340 governance, EPRS, 2016); yet the compilation made by Béné et al. (2019a) does not include any
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8 341 direct mention to government action. Our analysis enriches the role of public policies, identifying the
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10 342 different ways in which public policies can impact small farms' role in regional food systems, that
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12 343 include all the modalities of policy tools: (i) public regulations that set up the barriers and constraints
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14 344 to produce, process or sell; (ii) financial instruments to support smallholders' activities and access to
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16 345 markets (e.g. by means of investments in infrastructures), and (iii) though less explicitly, informative
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18 346 instruments to raise consumers' awareness about the importance of the role of regional small farms.
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20 347 In short, according to the interviewees the state will play a decisive role in setting up the conditions
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22 348 for the contribution of small farms to regional FNS.
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28 349 The structure of food markets that shape the way economic actors are connected is, in one way or
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30 350 another, frequently referred as a key food system driver (Vervoort et al., 2016, Mathijs et al., 2018
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32 351 and Mylona et al., 2016). However, the focus on smallholding agriculture has led to split this driver
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34 352 into two modalities of market integration, either non-conventional or conventional market value
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36 353 chains. This reflects two, sometimes opposite, views: the future of small farms would require either
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38 354 changes allowing them to be able to integrate in dominant corporate food systems, or the transition
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40 355 towards an alternative food system where local small farms are more directly connected with
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42 356 consumers. These two modalities are also related to other identified drivers. On the one hand, most
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44 357 of the attention paid to collective action is oriented towards allowing smallholders to concentrate
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46 358 supply and take advantage of economies of scale. On the other hand, the development of non-
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48 359 conventional value chains for small farms was frequently linked to the extent consumers will be more
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50 360 aware about the role of this type of farms in their regional systems, and willing to shift their food
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52 361 habits, including more local and small farm-oriented purchase.
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362 As explained in the beginning of the paper, our analysis differs from several foresight studies in that
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2 363 the drivers we have identified come from an extensive collection of primary information from almost
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4 364 a hundred of regional interviewees. This allows also to discuss about the perceptions and the
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6 365 anticipatory capacity of these experts in three senses.
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10 366 Firstly, even if experts were not asked to interconnect the drivers in order to deepen into their
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12 367 relationships, we can resort to the approach proposed by Inayatullah (1998) as Causal Layered
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14 368 Analysis (CLA). It identifies a number of layers in the way individuals frame problems and solutions:
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16 369 the litany, the systemic causes, the discourse/worldviews and the myth –the deep unconscious story.
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18 370 The drivers found in this paper can be somehow associated with these layers. First, some drivers
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20 371 seem to be responding to a litany redirecting to immediate factors affecting the day-to-day future of
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22 372 SF. This would be the case of the technocratic focus of the driver ‘Access to technology’, the
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24 373 constraints and/or opportunities arising from ‘Public budget and expenditure’ as well as ‘Public
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26 374 regulations’ of the specific question of ‘Access to land’. Second, the majority of identified drivers do
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28 375 address the –from the experts’ view- systemic causes of the future and threats of SF, in terms of how
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30 376 are they integrated in different forms of value chains, or how certain processes (demography,
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32 377 poverty, trade openness) will be underlying causes of the changing future of SF. Third, some drivers
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34 378 refer to alternative worldviews, as it would be those linked to a change in social or economic
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36 379 dominant paradigm (‘Consumers’ values’, ‘Collective action’, or even the retroinnovation included in
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38 380 ‘Access to technology’). The connection between these layers is linked to the underlying relationships
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40 381 between the drivers –e.g. as direct and indirect. This was not addressed in the interviews and would
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42 382 deserve further research. Nevertheless, regardless of how these drivers are or not connected, what
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44 383 seems evident is that this collection of drivers shape a consistent frame of how the regional experts
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46 384 perceive the combination of drivers upon which the future of small farmers would depend. It is a
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48 385 frame embedded into the dominant views and discourses on the problems of small scale agriculture.
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