



## Food system integration of olive-oil-producing small farms in Southern Europe

Pavlos Karanikolas<sup>a,\*</sup>, Victor Martinez-Gomez<sup>b</sup>, Francesca Galli<sup>c</sup>, Paolo Prosperi<sup>c,d</sup>, Paola A. Hernández<sup>e</sup>, Laura Arnalte-Mur<sup>b</sup>, Maria Rivera<sup>e</sup>, Giannis Goussios<sup>a</sup>, Laura Fastelli<sup>c</sup>, Elpiniki Oikonomopoulou<sup>a</sup>, Ana Fonseca<sup>e</sup>

<sup>a</sup> Agricultural University of Athens, Department of Agricultural Economics and Rural Development, Iera Odos 75, 11855, Athens, Greece

<sup>b</sup> Universitat Politècnica de València (UPV), Department of Economics and Social Sciences, Camino de Vera s/n, 46022, Valencia, Spain

<sup>c</sup> University of Pisa - Department of Agriculture, Food and Environment, Via del Borghetto, 80, 56124, Pisa, Italy

<sup>d</sup> Mediterranean Agronomic Institute of Montpellier (CIHEAM-IAMM), UMR Moisa, Montpellier, France

<sup>e</sup> Instituto de Ciências Agrárias e Ambientais ICAAM, Universidade de Évora, Núcleo da Mitra, Apartado 94, 7006-554, Évora, Portugal

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### ABSTRACT

This study aims to identify the various forms of integration of olive-oil-producing small farms (OSFs) into food systems in four Southern European regions, as well as to identify the most beneficial strategies of integration. Drawing on data from the SALSA Project, the study has found that besides self-provision, OSFs are engaged in multiple types of integration, including reciprocity relations as well as relations with informal and formal markets. Multiple strategies with synergistic effects co-exist at the farm/farm household level. However, specific territorial resources are partially mobilized by actors' strategies; consequently, olive oil identities are valorized on the market to some extent, but less so through positive externalities. Therefore, the unrealized potential of localization of food systems in which OSFs operate is identified.

### 1. Introduction

Olive tree cultivation has characterized the Southern European landscape since antiquity, and olive oil is a hallmark of the diet and culture along the Mediterranean basin. Currently, 97% of worldwide olive-oil production occurs around the Mediterranean, while four Southern European countries (Spain, Italy, Greece, and Portugal) account for 69% of the world's production, with Spain exceeding all other countries by far, holding 45% of the world's production (average production for the period 2009/10–2018/19, see [IOC, 2019](#)). In these countries, the utilized agricultural area (UAA) of the majority of farms producing olive oil is less than 5 ha: 52% in Spain, 69% in Italy, 70% in Portugal, and 84% in Greece ([Eurostat, 2016](#)).

Olive oil agri-food systems face a number of serious challenges, including a larger increase in production than consumption in the medium- and long-term; an unbalanced market power in the value chains, which have a myriad of producers; fewer milling companies; a handful of retailers with a significant market share, which sometimes translates into unfair competition practices, as the product is sold to final

consumers below the acquisition cost as a marketing strategy; frequent price crises due to the alternate bearing pattern; the effects of climate change that make harvest more unpredictable than usual and increase the need for irrigation in the dry areas where it is produced; and changes in agri-trade policies ([Mili, 2010](#)). Generally, the participation of small farms in nowadays agri-food systems is severely constrained by factors such as the limited resource base (e.g., poor soil fertility, water constrained, unskilled labour, limited working capital), strict quality requirements, a minimum volume of production, and high costs of specific on-farm investments ([Rapsomanikis, 2015](#)). Furthermore, small farms usually suffer from a scale mismatch in comparison with other value chain actors ([Vorley, 2003](#); [McCullough et al., 2008](#)).

Since the 1990s, more intensive forms of cultivation are continually expanding in olive oil systems ([Fernández-Escobar et al., 2013](#)), which are also increasingly consolidating and globalizing; in this context, abandonment and intensification often occur in olive systems ([Rodríguez Sousa et al., 2019](#)), while OSFs run the risk of being marginalized, as, for example, it is hard to implement some technological innovations which require high fixed costs that can not be offset with small output. It

\* Corresponding author.

E-mail address: [pkaranik@aua.gr](mailto:pkaranik@aua.gr) (P. Karanikolas).

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is largely acknowledged that the shift from traditional olive groves to intensive modes of production has led to negative environmental consequences such as loss of biodiversity and landscape modifications, soil erosion as well as water resource depletion (Neves and Pires, 2018; Moreira et al., 2019; Rodríguez-Cohard et al., 2020). In this context, quality of olive oil also represents a challenging factor for concerned agri-food systems, as increasing demand and a market competition trigger the push towards the improvement of olive oil quality to obtain higher prices, trade-offs emerge between quantity and quality in olive-oil production, and link to territorial aspects of local production is more and more mobilized for marketing strategies (Moragues-Faus, 2014; Belletti et al., 2015; Rodríguez-Cohard et al., 2020).

In previous years, a significant body of literature has developed on the territorial dimension of food systems. For example, under the perspective of “localized agri-food systems” (originating from the research on *Systèmes agroalimentaires localisés*), food systems are rooted in specific places and cultures and are firmly attached to socially constructed territories (Bowen and Mutersbaugh, 2014; Bérard and Marchenay, 2006). By considering a value chain as embedded into a territorial production system, this approach highlights the ability of local food systems to generate positive externalities and public goods at both the value chain and territorial levels (Arfini et al., 2019). Thus, the “localization” of food systems is perceived as the process of utilization of specific territorial resources that are considered to be specific assets that can support the valorization of the identity of agri-food products (Sanz-Cañada and Muchnik, 2016).

In the context of the above-mentioned challenges and characteristics, small farms engaged in olive oil production try to achieve their goals through a series of strategies, including survival or adaptation in adverse conditions, various forms of diversification, strengthening of their business, intensification of production methods, etc. (Ilbery, 1991; Moran et al., 1993; Evans, 2009). Usually, the dual entity farm business/farm household uses more than one strategy in a complementary way. Of particular importance for this study are the strategies of small farms that aim to establish a strong link between olive oil and the territory in which it is produced. Such strategies operate as an effort to resist the “commodification” of olive oil – in other words, becoming into an anonymous mass-produced product without specific identity (Sanz-Cañada, 2009).

Based on a food system approach, the aim of this study is twofold. Firstly, it aims to identify the various forms of integration of olive-oil-producing small farms (OSFs) into food systems, spanning from self-provision to reciprocity relations and relations with markets; secondly, it aims to identify the strategies of those OSFs most effectively integrated into the food systems that contribute to the “localization” of olive oil food systems. Drawing on data from the SALSA Project, the study conducts an analysis of OSFs in the Mediterranean regions of Castellón (Spain), Lucca (Italy), Ileia (Greece), and Alentejo Central (Portugal).

The study has six parts. The conceptual framework of the study and the materials and methods are presented in the second and third sections, respectively. The findings are then presented in two separate parts, followed by a discussion of the results and conclusions.

## 2. Conceptual framework

This study adopts a food system approach, with food systems defined as “...all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes” (HLPE 2014, p.12). As Grando et al. stress (2019a), small farms are integrated into food systems through (i) food self-provisioning for the extended household, (ii) farms reciprocity relations, and (iii) farms’ relations with informal and formal markets. According to Meert et al. (2005) and Polanyi (1944), reciprocity is a form of economic integration that “implies that each participant has the capacity to produce some

resources, and assumes a social network with symmetric linkages between members (i.e., mutual trust between the members of a network, and lasting bonds between members and the network itself)” (Palmioli et al., 2020, pp. 6–7).

We consider both market and extra-market relations to be relevant to study farms’ integration into food systems because the informal and extra-market exchanges can be particularly relevant, e.g., as a strategy of households to cover part of their food needs with healthy and nutritious food and/or as a conscious effort to retain viable reciprocity relations with friends and neighbours. Multiple concurrent relations are possible between small farms and the food systems they are embedded in, resulting in hybrid models (Brown and Miller, 2008). For example, a farm may produce some products whose value chains are complex and geographically extended, or it may establish contacts with alternative food networks (e.g., solidarity purchasing groups, direct personal contacts), including self-production. So, we start by identifying the above-mentioned forms of integration of OSFs into diverse food systems.

Moreover, as with all farms, OSFs try to adapt to various constraints and opportunities and respond to changing climatic, economic, political, and demographic conditions by adopting “survival strategies” (Whatmore et al., 1987), “paths of development” (Bowler, 1992), “pluri-activity”, “adaptation”, “adjustment” and “development” strategies (Mills et al., 2013; Andrade, 2016). These terms indicate a broad range of targets that farmers try to achieve through their strategies. Scholarly research has indicated that one of the main strategies, which is especially relevant for small farms, is the “territorial integration” or “re-grounding” of farms into their territories, which is usually implemented in synergy with the re-valorization of small scale and proximity (Grando et al., 2019b; Van Der Ploeg and Roep, 2003). Hence, we continue by identifying the strategies adopted by the OSFs that are integrated into the markets most effectively, as the integration of the food systems in question is largely achieved through the markets. We argue that the effectiveness of this integration can be demonstrated in two ways.

Firstly, this occurs by using the criterion of net farm income (NFI). The NFI is calculated as the value of all goods and services produced by the farm plus any received subsidies, minus cash expenses of the farm and depreciation. The ratio of subsidies to NFI is an additional indicator of the vulnerability of a farm to policy changes. Sales make up the bulk of the total value of farm production, depending on both the yield and the price received by the producer. Yields depend on several territorial factors other than integration (e.g., natural factors such as soil fertility, slope, level of land suitability to olive growth, etc.). Prices reflect the marketing channels used by the farmer, for example, sales through traders, cooperatives, producer groups, open-air markets, producer–consumer networks, or other alternative channels; prices also reflect the bargaining power of food system participants. More generally, the prices reflect the terms of integration of a particular farm into the markets and the broader agri-food system (Courtois and Subervie, 2014).

NFI, or farm family income, has been used as a key indicator for measuring the economic sustainability of family farms. This is so because, by covering all cash expenses and depreciation, it ensures the reproduction of the productive system of the farm; also, it is a good indicator of the standard of living of the farm household, because it measures the returns to family labour, own capital, and management (Blank et al., 2009; Shadbolt et al., 2009; Dekker et al., 2011; Liontakis and Tzouramani, 2016). Thus, we use the term “effective market integration” in the sense that the higher the NFI of a farm, the more economically sustainable it is, and thus, the more strongly integrated into the markets. Respectively, the terms “moderate” and “minor” indicate less robust integration of OSFs with the markets. We use the indicator NFI per hectare of total farm area to correct for differences in farm size.

Secondly, we examine the potential of localization of the food systems in which OSFs operate. In this study, we approach the notion of

localization of food systems through the exploration of strategies developed by OSFs to establish strong links with the territory where olive oil is produced. Strategies include those contributing to the valorization of the quality and the territorial specificity of olive oil, as well as strategies resisting the “commodification” and de-localization tendencies in olive oil systems (Sanz-Cañada and Muchnik, 2016). Thus, we examine some of the territorially-based resources that are mobilized by OSFs to assign a specific identity to the olive oil they produce, namely, some of the biophysical, cultural, and socio-institutional practices and resources that are specific to the region in which OSFs are localized (Bowen and Mutersbaugh, 2014). Of particular interest to our study are native-traditional olive tree varieties and local social networks, which have been identified as core elements of “localized” food systems. Lastly, we examine the valorization of this identity, both on the markets and through the creation of positive externalities.

### 3. Methods and data

We use a mixed-method approach, comprising qualitative and quantitative methods. Following the broader methodology of the SALSA project (Brunori et al., 2019; Grando et al., 2019a), the data for this study were derived from four different sources:

- Desk research, with a literature review and statistical information from diverse sources, including Eurostat, national and regional statistical authorities, sectoral data, etc.
- Forty-four semi-structured interviews with key informants, conducted from March to July 2017. A broad range of stakeholders took part (see Appendix Table 1). After the interviews with these experts, an initial food system map and narrative was prepared for the olive oil system in each region. The map showed the main actors involved in the supply chains, as well as an estimation of the various flows that link these actors.
- Face-to-face interviews with 72 small farmers producing olive oil, conducted in the June–November 2017 timespan, which were selected according to four main criteria (Grando et al., 2019a): (1) small farmers with UAA of up to 5 ha and/or small farms of up to 8 Economic Size Units; (2) small farms with different degrees of market integration; (3) small farms that have different degrees of self-sufficiency in the household; and (4) geographically dispersed farms within each region. Selection criteria were meant to aid for cross-regional comparison.

Although there is no universally accepted definition of a small farm (Guiomar et al., 2018; Davidova and Thomson 2014), small farms are usually identified through thresholds set for different size indicators, influenced by the aim of the classification as well as by the geographical context in which the analysis is conducted (Hazell et al., 2010; Lowder et al., 2016). In this study, we define small farms as those with less than 5 ha of total UAA (EPRS 2014; EU, 2018) and/or those with an economic size of up to 8 Economic Size Units (Rivera et al., this issue).

**Table 1**  
Data sources by region.

	Castellón (Spain)	Lucca (Italy)	Ileia (Greece)	Alentejo Central (Portugal)	All Regions
Interviews with key informants	12	11	12	9	44
Focus groups on olive oil	5	10	13	4	32
Interviews with olive oil small farmers	14	17	25	16	72

- Four focus groups (one per region), held between September and December 2017, with 32 olive-oil-related stakeholders from all relevant sectors (e.g., small farmers, cooperatives, processors, advisors, etc., see Appendix Table 1). Focus groups were organized and facilitated by researchers of the SALSA project. The initial food system map was complemented with the information obtained from the small farms, and finally, revised and validated in the focus groups.

It has to be noted that the four data sources complement each other. Statistical information, key informants, and focus groups allow for the identification of quantified flows between the different actors as well as the extent of self-provision, reciprocity relations, and the commercialization pathways available to OSFs. On the other hand, despite the fact that the sample of farms is not “representative” in a strict statistical sense, interviews with farmers provided valuable detailed information (through 51 questions), which along with all the information from the other sources, allowed for the representation of OSFs within their food systems and connections to their respective value chains.

### 4. Results

An impressive inter- and intra-regional diversity of food systems related to olive oil has been detected. As a result of historical trajectories of the regional economies and various spatial specificities, the four regions are highly differentiated in terms of farming systems, quality of the product, the relative importance of OSFs and small food businesses, the scale of operations, as well as interlinkages between food systems actors (for a more detailed description, see Karanikolas et al., 2018a).

#### 4.1. Types of integration

##### 4.1.1. Self-provision and reciprocity relations

Interviews with key informants, as well as material from the focus groups show that olive oil systems in the four regions are mainly export-oriented, as a large share of the oil produced is exported or sold to other national regions, ranging from 40% in Lucca to 93% in Alentejo Central. Most OSFs are engaged in multiple types of integration, including reciprocity relations as well as relations with various markets covering a variety of spatial scales (Table 2). OSFs in all regions present a high degree of self-provision in quality olive oil, accompanied by extended non-market exchanges in the context of kinship and friends as well as the informal networks of customers; part of the latter involves the disposal of olive oil in agri-tourism activities carried out at the farm as well as to customers in the adjacent areas.

We used the data derived from interviews with 72 olive oil small farmers in the four regions to distinguish among three different categories of integration into markets. By using the criterion of NFI per hectare, we identified an effective, a moderate and a minor degree of market integration, with a high (>2000 €), medium (1000–2000 €) and low (<1000 €) NFI per ha, respectively (Table 3); the whole sample was almost evenly distributed among these three categories. Astonishing differences between these categories were observed in both NFI per ha and NFI per farm; the latter was less dependent on subsidies in the case of the effectively integrated farms.

Olive cultivation is part of a mixed farming system, encompassing in our sample more than three different crops per farm intended for sale (Table 3) that co-exist with numerous other crops for self-provision. Interviewed OSFs that are effectively integrated have the most intensified farming systems, as is evidenced by the highest percentage of their UAA that is irrigated (46%, in comparison to 39% and 23% for the other categories). Higher irrigation rates imply a specialization of the farms in more intensified cultivations with high yields, such as vegetables and citrus fruits, as well as intensive olive groves in some cases.

All farms in our sample are fully integrated into the markets, selling 85%–87% of their production value, while 13%–15% is not sold (Table 4). The vast majority of the production value of produce that is not sold is intended for self-consumption by household members,

**Table 2**  
Types of integration of olive-oil-producing small farms.

	Self-Provision of Olive Oil	Reciprocity Relations	Relations with informal markets	Relations with formal markets
Castellón (Spain)	Yes	Non-market exchange of olive oil among extended family and friends	Direct informal sales by farmers to their own network of consumers inside the region	A relevant share is sold through cooperatives and small retailers or to restaurants in the province and a small percentage goes to neighbouring provinces. About 40% of production (low-quality oil) is sold to refineries in other provinces or abroad
Lucca (Italy)	Yes	Non-market exchange of olive oil	Informal sales from OSFs only within the farms and the adjacent areas	Formal sales within the region, outside the region, and for exports to oil mills, sales representatives, exporters.
Ileia (Greece)	Yes	Non-market exchange of olive oil	Direct informal sales from farmers to their own network of consumers, both inside and outside of the region	Formal sales within the region to wholesalers, packaging enterprises, oil mills, and to restaurants/hotels. Also, sales to other national regions and exports.
Alentejo Central (Portugal)	Yes	Non-market exchange of olive oil and canned olives	Informal olive oil sales of own-branded olive oil to a small network of customers. Done mostly for local residents but sometimes for tourists too.	Olive oil produced from intensive and super intensive olive grove production via cooperatives, mainly for export outside of the region. Own-branded olive oil sales can also take place at farmers' markets and local shops.

Source: Interviews with key informants and Focus Group discussions

including olive oil; interestingly, almost one-fifth of this production value is given as a gift by the moderately and least integrated farms, which is an indication of some kind of reciprocity relation (Table 4).

Moreover, although the share of the total farm production value of

**Table 3**  
Olive-oil-producing small farms (OSFs) by effectiveness of market integration.

	Net farm income (NFI) per Ha	No of Farms	Total no. of different crops sold	Utilized Agricultural Area Irrigated (% of utilized agricultural area (UAA))	NFI per Ha (€)	NFI per Farm (€)	Subsidies (% of NFI)
Effective Market Integration	High (>2000 €)	22	3.0	46%	4396	19403	7%
Moderate Market Integration	Medium (1000–2000 €)	25	3.2	39%	1460	8262	15%
Minor Market Integration	Low (<1000 €)	25	3.6	23%	294	3570	18%
All Farms	All Farms	72	3.3	34%	1952	10037	10%

Source: Interviews with olive oil small farmers

which is given as a gift is not impressive, ranging between 1.1% and 2.5%, many farms develop significant reciprocity relations through various forms of support (such as financial, technical, labour, in kind or other) given to farmers from neighbours or relatives. Approximately one-third of the effectively integrated farms and 40% of the other two categories receive such support (Table 4).

#### 4.1.2. Relations with markets

The interviewed farms are connected with markets through different channels (Table 5). The effectively integrated farms sell most of their products either directly or to wholesalers, while they provide small retailers with a non-negligible share of 11% of the value of production. Wholesalers and cooperatives are the main channels for moderately integrated OSFs, whereas the least integrated farms present a relatively even distribution pattern of sales, with direct sales being the most important. It has to be noticed that part of “direct selling” represents informal activities on behalf of farmers, e.g., sales to own networks of customers without official documents.

#### 4.2. OSF's strategies to effectively integrate into the food system

The interviewed farmers stated that they follow different strategies to secure their livelihoods, as is evident from the composition of the sources of income. More specifically, the effectively integrated farms source their household income mainly from the farm, in contrast to the other two categories, which rely mostly on income from the off-farm activities of their members. However, even within the effectively integrated farms, several other important activities beyond agriculture take place (e.g., agri-tourism, catering), thus contributing to a significant share of the NFI (Table 6).

Another important differentiation is observed in the strategies of OSFs in terms of labour usage, both on- and off-the farm. The effectively integrated farms mostly rely on hired labour (three-quarters of all on-farm employment), in contrast to the moderately integrated farms, which largely use family labour. Interestingly, the farms with minor integration have the highest recourse on hired labour which, nevertheless, besides its trivial absolute magnitude, has to be seen in the context of extended off-farm employment of family members. In addition, cooperative membership ranges between 52% in the least integrated to 72% in the moderately integrated farms.

Consideration of the quality of olive oil appears as a relevant strategy adopted by OSFs to integrate into the food systems of the examined regions. Interviews with key informants and material from focus groups show that 60% of the olive oil produced in Castellón is characterized as virgin or extra virgin, while almost the totality of produce in Ileia is extra virgin olive oil; also, monocultivar and organic olive oils are largely produced in Lucca, whereas oil from traditional and organic olive groves is produced in Alentejo Central.

In addition, interviews with OSFs revealed a striking difference in the percentage of farms that use certification of farm products between the effectively integrated (55%) and the moderately and least integrated farms (16% and 28%, respectively). Certification concerns mainly organic oil and, to a lesser degree, oil from integrated production; the

**Table 4**  
Allocation of production value and reciprocity relations.

	Total Sales	Production Not Sold			Total Value of Farm Production	“Do You receive support (financial, technical, labour, in-kind or other) from neighbours or relatives?” (% of “Yes” in each category)	
		Total Value of Farm Products Not Sold	Of which, for Household food consumption	Of which, for Gift			Of which, Other
Effective Market Integration	84.5%	15.5%	14.3%	1.1%	0.1%	100.0%	32%
Moderate Market Integration	86.9%	13.1%	10.4%	2.5%	0.2%	100.0%	40%
Minor Market Integration	87.2%	12.8%	9.4%	2.4%	1.0%	100.0%	40%
All Farms	85.8%	14.2%	12.1%	1.8%	0.3%	100.0%	38%

Source: Interviews with olive oil small farmers

**Table 5**  
Disposal of farm production (allocation of production value).

	Sales						Production Not Sold	Total Value of Farm Production
	Direct Selling (Farmers markets, Directly to consumers, etc.)	To Wholesalers	To Processors	To Small Retailers	Through Cooperatives	Total Sales		
Effective Market Integration	39%	25%	9%	11%	1%	85%	15%	100%
Moderate Market Integration	15%	37%	4%	0%	31%	87%	13%	100%
Minor Market Integration	32%	16%	11%	12%	16%	87%	13%	100%
All Farms	31%	26%	8%	8%	12%	86%	14%	100%

Source: Interviews with olive oil small farmers

**Table 6**  
Composition of income, labor usage, and cooperative membership of OSFs.

	Share of NFI in Total Household Income	Share of NFI from non-agricultural activities	Hired Labour/Total Labour on-farm	Farm holders in each category who are a member of a cooperative (%)	Certification of farm products (%)
Effective Market Integration	59%	46%	76%	64%	55%
Moderate Market Integration	39%	8%	22%	72%	16%
Minor Market Integration	25%	38%	88%	52%	28%
All Farms	45%	35%	77%	65%	33%

Source: Interviews with olive oil small farmers

use of geographical indications was shown to be negligible.

Interviews with key informants and material from focus groups showed that OSFs source high-quality olive oil from their own production, whereas high-quality olive oil is the main vehicle through which OSFs are linked to markets at the local and regional levels, as well as in national and international markets. Although high-quality olive oil is exported from three of the examined regions, in Castellón, it is the low-quality oil that is exported in bulk for refining, whereas in Ilea, more than half of all high-quality oil is exported in bulk.

Furthermore, from our interviews with key informants and focus groups discussions, it ensues that intensive and super-intensive olive tree cultivating systems are already spreading in Castellón and Alentejo Central. This is in contrast to Lucca and Ilea, where more extensive and traditional systems prevail. In Alentejo Central, farms with intensive and super-intensive production systems are entirely mechanized and mostly process olives in their own mills, while olives from OSFs are mainly converted into olive oil in cooperative oil mills. A series of native-local varieties of olive trees are cultivated in the examined regions, including “Farga”, “Serrana de Espadán” and “Borriolenca” in Castellón; “Frantoio”, “Leccino” and “Moraiolo” in Lucca; and “Koroneiki”, “Kollyreiki”, and “Matsolia” in Ilea.

The OSFs engaged in extensive and traditional cultivating systems

provide a series of positive externalities. Although we did not measure these positive externalities exactly in our study, as they are documented by an ample body of literature, these systems, while lagging behind intensive systems in terms of yield, economic outcomes, and profit, provide, in many cases, landscape and habitat diversity, along with multiple benefits for the local communities (Russo et al., 2016; Borzęcka et al., 2018; Rodríguez Sousa et al., 2019).

It has to be noted that key informants and focus group participants pointed out that building local networks is another strategy for OSFs to establish market relations. Solidarity purchasing groups in Lucca are a notable example in this category; in the same region (and to a lesser extent in the other regions), in cases where the whole food system structure is less concentrated, networks of small farms with small food businesses have been found to exert a countervailing power effectively, which translates into better prices for the olive oil producers. Finally, key informants and focus groups participants in all regions agreed that small farmers ensure higher producer prices—firstly, when they sell olive oil from traditional varieties or organic; secondly, through direct sales to consumers; and thirdly, through labelling and branding.

## 5. Discussion

Olive cultivation in small farms in the examined Southern European regions is part of mixed farming systems, encompassing more than three different crops per farm; these crops are part of diverse value chains, which vary in terms of structure, geographical scope, and governance arrangements. Self-provision of olive oil (as well as of some other products) seems to be the norm in the case of the OSFs, while noteworthy reciprocity relations also play an essential role in supporting their activity. This support (in the form of financial, technical, labour, in-kind or other, given to farmers from neighbours or relatives) not only compensates OSFs inability to recur to use paid labour, but also eases the circulation of the product in the territory and keeps social ties. The extended non-market relations that OSFs develop with relatives and friends can be seen as forms of social proximity (Dubois, 2018), i.e., interpersonal ties based on kinship and acquaintance. Also, OSFs develop their own informal networks of customers that are usually based either on interpersonal relationships or on on-farm diversification strategies, such as the disposal of olive oil in agri-tourism activities. Simultaneously, OSFs are strongly integrated into formal markets, spanning local, regional, national, and international scales. Thus, our findings corroborate the argument of Winter, who described “*a continuum, with embedded relations based on close social ties and loyalty on one end, and disembodied, impersonal, price-based relations at the other end*” (Winter 2003).

Reciprocity relations developed by OSFs, include various forms of proximity between producers and consumers, thus fostering social ties and trust (Hendrickson and Heffernan, 2002), which in turn are essential ingredients of the notion of embeddedness (Hinrichs, 2000; Thorsøe and Kjeldsen, 2016). Therefore, the reciprocity dynamics observed show how social embeddedness of olive oil production plays a relevant role in facilitating technical and economic arrangements between farmers and local actors of the market. We also confirmed results from previous studies about the concurrent engagement of small farmers in multiple forms of market relations (Thorsøe and NOE, 2016), as well as in both alternative and conventional food systems (Brown and Miller, 2008; Tregear, 2011).

OSFs’ integration into formal markets is developed through various channels—in the case of effectively integrated farms, through direct sales and sales to wholesalers. This is in contrast to sales to wholesalers and cooperatives for moderately integrated farms, whereas the least integrated farms present a relatively even distribution pattern of sales, with direct sales being the most important.

The effectively integrated OSFs combine various strategies to participate in food systems, including diverse income sources (on- and off-farm), although they rely mainly on on-farm income; on-farm activities beyond agriculture (e.g., agri-tourism and catering); multi-cropping systems including olive groves, both irrigated/intensified and rainfed/extensive cultures; certification of products; membership to cooperatives; and entrepreneurial characteristics, such as the extensive use of hired labour. Therefore, we observed the coexistence of multiple strategies at the farm/farm household level that have a complementary character and synergistic effects (see also Grando et al., 2019b).

As the data of this study show, the special identity of olive oil in the examined regions is usually recognized by the consumers (mainly in relation to its production from local varieties); however, olive oil has rarely obtained an official certification denoting a geographical indication. Yet, it has to be noted that consumers appreciate the quality of the virgin or extra-virgin olive oil produced in their region, even without branding, and look for it in cooperatives’ shops, small retailers, and through direct sales from OSFs.

This recognition of quality enables the formulation of strategies for building “short” chains between producers and consumers, as well as for ensuring premium prices. Besides product differentiation (e.g., traditional olive oil, organic olive oil), we have seen that another strategy that ensures high producer prices is labelling and branding on behalf of

some successful cooperatives or OSFs with “entrepreneurial” characteristics. In this way, small farms can overcome some major constraints emanating from the unequal distribution of power across the value chains.

Nonetheless, some differences were observed in the representation of the quality and value of the olive oil issuing from traditional olive groves and tree varieties. This explains the differences among the regions, especially in the added value of this higher quality olive oil vis-à-vis oil resulting from more intensive production. The examined Spanish and Portuguese regions’ capacity to develop marketing mechanisms to obtain higher returns for the oil from traditional groves showed to be lacking in our results. What tends to happen is that most olives from both extensive and intensive OSFs are pressed together and olive oil is sold with no distinct quality; while the Italian and Greek regions show a higher valorization of this oil in the market through labelling and certification, making it possible for small farms to give added value to their product and link it to the market.

Although intensification is an option to be at least partly adopted by OSFs, we observed that, in the examined regions, extensive olive farming systems are involved to varying degrees. In addition, the cultivation of traditional olive tree varieties indicates that many OSFs are engaged in activities of on-farm maintenance of agricultural biodiversity. The latter implies the generation of some positive externalities, which could be key “causal/anchorage factors” for the construction of the specific identity of local olive oils (Sanz-Cañada and Muchnik, 2016). This endeavour could build on the fact that intensified olive farming is a major cause of one of the biggest environmental problems affecting the EU today: the widespread soil erosion and desertification in all southern EU countries (Beaufoy, 2001). The expansion of irrigated olive production is increasing the over-exploitation of water resources that have already been eroded by other agricultural sectors. Adversely, traditional olive production systems contribute substantially to the preservation of agricultural biodiversity. As recent research shows, two critical factors/prerequisites for the on-farm conservation of local landraces (including olive trees varieties) are, firstly, their integration into both domestic and export markets and, secondly, the embeddedness of their products into the local culture and diet (Karanikolas et al., 2018b). The former has been highlighted in this study and, therefore, with targeted strategies could help OSFs to resist further marginalization.

Besides OSFs’ involvement in various informal networks, some local social networks that integrate both producers and consumers have been identified. Solidarity purchasing groups in Lucca are a notable example in this category; in the same region (and to a lesser extent in the other regions), in cases where the whole food system structure is less concentrated, networks of OSFs and small food businesses effectively exert a countervailing power. This is a manifestation of “organizational proximity” (Boschma, 2005) with effective collective coordination. Finally, important coordinating activities related to the valorization of local produce have been undertaken by some cooperatives. Thus, in Castellón, some oil mill cooperatives are taking the lead in promoting high-quality oil from local varieties (some organic), developing a range of olive products and selling them through their own shops, supplying small retailers, and selling online. One marketing strategy put forward by these co-ops, and successful branding concept, is to emphasize the value of this high-quality oil as a way of preserving ancient olive trees (up to a thousand years old) as part of the natural heritage in this area. In contrast, in the Ileia region, an extreme fragmentation of both OSFs and small food businesses, along with inadequate collective action and a lack of coordinating activities, has consolidated an imbalance in the system; consequently, a large portion of extra virgin olive oil is sold in bulk, resulting in an inability of OSFs to capture a larger share of the added value.

The success (or lack of) of these valorization strategies to act as a tool to avoid marginalization can also have impacts on land use. Cropland abandonment is a common phenomenon in Europe (Strijker, 2005;

Pointereau et al., 2008), with the problem being particularly acute in the case of permanent crops as olive groves. The lack of profitability is the main reason for cropland abandonment, although there are many other interlinked reasons (Benayas et al., 2007; Pointereau et al., 2008). Land abandonment implies a loss of production potential and entails a greater risk of fires, rural depopulation, and soil degradation (OECD, 2001; López-Iglesias et al., 2013). The body of literature on this field presents land consolidation policies, and Sikor and Müller (2009) critically assessed state-led (i.e., top-down) versus community-based (i.e., bottom-up) initiatives. Thus, public strategies to prevent land abandonment have to necessarily support community-based actions on land-use policies, such as the common management of lands or easing land sales, rentals, and cessions. Along the same vein, bolstering valorization strategies started by OSFs or their associations—like the territorial integration efforts presented in this paper—can also be part of the agricultural policies aimed at deterring land abandonment via supporting OSFs.

Finally, it should be noted that despite the worth of our findings, the preceding analysis has some limitations, primarily due to the small sample of farms surveyed, which is not representative in the strict statistical sense and, secondly, due to the fact that olive oil trees are just one of the crops grown on these farms under multi-crop systems. However, these limitations are tempered by the fact that farm-level information is supplemented by data from key informants and corroborated in focus group discussions.

## 6. Conclusions

The aim of this study was, firstly, to identify the various forms of integration of olive oil producing small farms to food systems and, secondly, to identify the strategies adopted by the OSFs that are integrated into the food systems most effectively and contribute to the “localization” of olive oil food systems.

Olive cultivation on small farms in the examined Southern European regions is part of mixed farming systems, which encompass more than three different crops per farm; these crops are integrated into diverse value chains. All forms of integration of OSFs into food systems have been identified, i.e., self-provision of olive oil, reciprocity relations (mainly through various forms of support given to farmers from neighbours or relatives), extended non-market relations with relatives and friends, informal networks with customers that are usually based either on inter-personal relationships or on on-farm diversification strategies, as well as a strong integration into formal markets, spanning local, regional, national, and international scales.

## Appendix

Appendix Table 1

Detailed list with interviewees and participants per region.

	Castellón (Spain)	Lucca (Italy)	Ileia (Greece)	Central Alentejo (Portugal)	All Regions
<b>Interviews with key-informants</b>	<b>12</b>	<b>11</b>	<b>12</b>	<b>9</b>	<b>44</b>
Producers' cooperatives	8	1	1	4	14
Processors (small/large)		3	1		4
Retailers	1		1		2
Caterers		2			2
Importers				1	1
Farm inputs suppliers		1	1		2
Advisory services		1		1	2
Agricultural administration/Ministry of Agriculture	3	1	4	1	9
Consumers' groups/organizations		2			2
Political leaders and PMs			1		1
Other programs/initiatives			2		2
NGOs				2	2
Chamber			1		1
<b>Interviews with OSFs</b>	<b>21</b>	<b>18</b>	<b>28</b>	<b>21</b>	<b>88</b>
<b>Focus Groups on Olive Oil</b>	<b>5</b>	<b>10</b>	<b>13</b>	<b>4</b>	<b>32</b>

(continued on next page)

The degree of market integration of OSFs of our sampled farms (72 in total) was almost evenly divided into three groups with effective, moderate, and minimal integration, respectively. Multiple strategies with synergistic effects were found to co-exist at the farm/farm household level. Thus, the effectively integrated OSFs combine various on- and off-farm diversification strategies; cooperative membership; certification of products; and entrepreneurial characteristics, such as extensive use of hired labour. The specific combination of these strategies defines their marketing strategies and the adoption of multi-cropping production systems.

Strategies for building “short” chains between producers and consumers as well as for ensuring premium prices for olive oil are enabled by product differentiation (e.g., traditional olive oil, organic olive oil) and labelling and branding on behalf of some successful cooperatives or OSFs with “entrepreneurial” characteristics.

A series of specific territorial resources have been identified in the examined regions, including local olive tree varieties, extensive olive farming systems, recognition of the quality of olive oil by the consumers, as well as OSFs' involvement in various informal and formal networks that integrate both producers and consumers and indicate forms of social and organizational proximity. However, these resources are only partially mobilized by actors' strategies, thus not creating a “strong” identity for the various olive oils. The identities of olive oils are, to some extent, valorized on the markets, but less so through positive externalities. Therefore, the unrealized potential of localization of the food systems in which OSFs operate points to the need for targeted strategies that contribute to the valorization of the quality and territorial specificity of olive oil.

## Declaration of competing interest

None.

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Appendix Table 1 (continued)

	Castellón (Spain)	Lucca (Italy)	Ileia (Greece)	Central Alentejo (Portugal)	All Regions
Small farmers	3	2	4	1	10
Producers' cooperatives		1	2	2	5
Processors (small/large)		2	3		5
Caterers		2			2
Other small food business		1		1	2
Advisory services	2	1			3
Agricultural administration/Ministry of Agriculture			4		4
Other programs/initiatives		1			1

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