


Article

The Potential Role of Short Food Supply Chains in Strengthening Periurban Agriculture in Spain: The Cases of Madrid and Barcelona

Carolina Yacamán Ochoa ¹, Alberto Matarán ², Rafael Mata Olmo ³, Jose María López ⁴ and Rafael Fuentes-Guerra ^{4,*}

¹ Facultad de Geografía e Historia, Departamento de Geografía, Universidad Complutense de Madrid, 28040 Madrid, Spain; cyacaman@ucm.es

² Departamento de Urbanística y Ordenación del Territorio, Universidad de Granada, 18071 Granada, Spain; mataran@ugr.es

³ Facultad de Filosofía y Letras, Universidad Autónoma de Madrid, 28049 Madrid, Spain; rafael.mata@uam.es

⁴ Habitat 4 SCA, 18001 Granada, Spain; eltaller.granada@habitat4.es

* Correspondence: cyacaman@ucm.es; Tel.: +34-652-367-606

Received: 19 February 2019; Accepted: 1 April 2019; Published: 8 April 2019



Abstract: Periurban agriculture is being hit by the effects of the globalized food system, as well as by concrete aspects of urban sprawl. Nonetheless, proximity to the main markets provides an opportunity to sustain agriculture in highly urbanized areas. In this sense, an increasing number of local initiatives is arising within the context of Short Food Supply Chains (SFSCs). The economic impact of these initiatives, however, is limited by problems and inefficiencies that hinder their capacity to scale up. The present paper sets forth the results of a research project developed in Madrid and Cataluña. The study is based upon documentary and empirical research addressing the main problems periurban farmers are facing in relation to local food distribution. Among other factors, these refer to regulatory barriers, logistics, competition and dealing with consumers' preferences. We conducted a questionnaire with a representative group of farmers from each region in three towns presenting different demographic sizes along with another questionnaire extended to the owners of small grocery stores, who play a vital role in the supply of fresh food in these municipalities. Our research demonstrates that most of the problems arising when dealing with SFSCs can be solved by introducing new forms of cooperation among the different agents of the food chain.

Keywords: short food supply chains; distribution; periurban agriculture; local food systems; farm questionnaire; small grocery questionnaire; governance

1. Introduction

Within a context of prolonged economic and financial crisis, along with financialization and liberalization of food-related issues, agriculture has been hit considerably harder than other economic sectors by climate change, volatile prices, the demands of the global markets [1], and by intense pressure from the city, which is encroaching upon the urban fringe [2–4]. The current crisis affecting periurban agriculture, which has seen a reduction of its area, along with the number of farms and their participation in the globalized market, all raise multiple questions regarding how to develop innovative practices at the local-regional scale that can represent a bona fide economic alternative for small agricultural farms and businesses.

The interest in short food supply chains (hereinafter SFSCs) lies mainly in the fact that they are generally recognized as constituting innovative initiatives that enable agricultural smallholdings to increase their participation in the local market, to better control the pricing of their products and

to become more independent with regard to what they produce. These initiatives are intended to strengthen the role they play in relation to the monopolised power of the big distribution enterprises, who seek to control the global food chains [5,6]. For some authors, concentrating the large distribution channels in a very limited amount of companies endows the latter with tremendous power of decision in the food supply, permitting them to subject the small farmers to harsh conditions of payment, low prices for their products, as well as the obligation to provide products with specific homogeneous characteristics under strict delivery conditions [7]; all this jeopardises the future of agriculture, particularly in periurban spaces where the pressures are much greater [8,9].

In this sense, different authors have pointed out that SFSCs are a game changer, representing social innovation, which allows the products of rural smallholders and periurban farmers to resist the standardization of food, as they promote greater recognition and better prices for quality produce [10–12]. This also helps to promote relations of proximity in the urban food systems, a fact that contributes to enhancing food safety and sovereignty [13].

In general terms, from the point of view of business economy, the main characteristic differentiating the distribution of short food chains from that of long ones refers exclusively to the number of intermediaries (a maximum of one in short supply chains) articulating production and consumption [14]. Nonetheless, some authors posit that this definition can be quite confusing and limited with regard to defining the “alternative” nature of these practices. For instance, Lyson et al. [15] state that some global food systems meet the requirements in order to be considered as a single intermediary. Moreover, to define it, they consider that other social criteria should be introduced in order to achieve social goals such as value of cooperation. Parker [16], for example, believes that not only is it necessary to have a small number of intermediaries, but that the geographic distances between consumption and production should also be short. Marsden et al. [17] and Renting et al. [18] argue that the key element defining short supply food chains has more to do with the organizational dimensions—participation and horizontality—operating between both ends of the food chain, a fact that enables new forms of food governance to be articulated. From this perspective, both Soler and Calle [19] and Whatmore et al. [20] consider that an equitable redistribution of power and of the added value within the chain are the main aspects defining SFSCs. In this sense it should be emphasized that the “functions” of the traditional marketing agents are not eliminated. Rather, they are taken over by the producers or by whatever integrating formula has been adopted (for example, consumer co-ops), and the only element eliminated is the speculative nature of the marketing agent” [21] (p. 66).

The present paper aims to provide an understanding of the principle problems and opportunities involved in the development of SFSCs in Spain for periurban agriculture. Our research draws upon an initial study of two metropolitan areas (Barcelona and Madrid) based on a methodology involving different sources, including the primary ones. The study attempts to answer the following key questions: (a) can SFSCs be considered as an economic alternative for small and medium-sized periurban farms?, (b) what are the main factors limiting turnover?, (c) which models provide the greatest potential for scaling-up in terms of participation? Thus, once we have identified the barriers limiting the scaling-up of SFSCs, the challenge we face involves providing a series of management criteria which, by way of a conclusion, will contribute to enhancing the efficiency, viability and competitiveness of periurban agriculture. These management criteria are based upon a sustainable development approach integrating three results: local economic development, promotion of sustainable farming and increased incomes of small-scale farms.

Having described our research framework and briefly defined SFSCs, we then conducted a literature review of the main issues arising in the scaling-up of SFSCs. These involve regulatory barriers, logistics, infrastructures, distribution, access to markets, and consumers’ preferences. Section 3 describes the study area and the methodology used to conduct the questionnaires in the different-sized cities in the metropolitan areas of Madrid and Barcelona. Section 4 discusses the results. Finally, the paper concludes with some recommendations that can be adopted by small-scale

periurban farmers to strengthen the local food supply in metropolitan regions, with emphasis on the sustainability dimension.

2. The Conceptual Framework: Defining Short Food Supply Chains and Scaling-Up

Alternative food supply chains have been the subject of a number of studies, but they have hardly been analysed from the perspective of distribution and logistics, and few studies analyse in depth whether they truly represent an added value for the local economy or with regard to sustaining periurban farms. From the perspective of the small periurban producers, some studies indicate that the main barriers facing SFSCs in relation to the distribution process involve dispersion of the delivery points and low sales volumes, both of which raise transport costs; other obstacles include the decrease in the number of orders during summer and insufficient time for distribution and marketing [15]. For Aubry et al. [22] the principal problem identified by young farmers involves the low earnings for the amount of very hard work they do. Another issue highlighted is that the sector cannot always find sufficient demand for the total production, and as a result, in some areas producers value SFSCs more for promoting their products than for the turnover [23]. It is also possible that demand is not met due to the lack of suitable marketing channels for their products [24]. In this sense, motivation of consumers, as well as their demand for products, often responds to criteria of diversity, a fact that could clash with the seasonality and limitations of products at certain times of the year [14].

Box schemes are currently one of the most widespread direct initiatives in Spain [19]. Although they are spreading rapidly, their major vulnerability is that they depend on consumers' involvement and self-management, a conditioning factor for handling orders and for maintaining a stable income during the holiday periods. As for the organizational structure, "this mostly involves individuals who join a group and establish a casual relationship, although they occasionally formalise this by setting up a co-op" [25] (p. 683); thus, the tasks are generally voluntary, entailing rotation among group members, as opposed to professionalised management. This calls for a given consumer profile based on commitment and responsibility and sufficient time to spare, all of which generally constitutes a limitation to increased demand, which is in turn a prerequisite for scaling up the offer. For many community-supported agricultural box schemes, the so-called glass ceiling results from the limited physical space and the few and inefficient infrastructures for delivery of the baskets. Initiatives of this kind are essentially small-scale, and their growth therefore does not involve up-scaling, but rather the replication or networked articulation of previous similar experiences, including a possible sharing of infrastructures and other resources [21].

There are also some supply initiatives related to green procurement and public provision of food in schools, hospitals, care homes, etc., with local products that are still in the initial phase and are relatively unequal in Spain. The results of the study conducted by Soares et al. [26] on meals at schools involved in these initiatives in Spain show that the absence of a government strategy based on common development guidelines largely accounts for their limited scope. Other conditioning factors identified in a second, complementary study by the same research group refer to the legal environmental and social vacuum existing in the purchase of food in school canteens, the lack of infrastructures for storing fresh foodstuffs in school kitchens, the lack of actual kitchens in schools, as well as the outsourcing of canteen management services [27]. The geographic dispersion of the schools, the poor adaptation of the menus to the seasonal variation of local production and the increased amount of food containing animal protein and processed foodstuffs can all constitute other factors limiting scaling-up. On the contrary, both studies highlight the fact that stronger institutional support would help to integrate local food provisioning through public canteens, thus improving the quality of school food at a lower economic and environmental cost.

Producers' markets represent another commonplace example of alternative food chains in Spain. Although they are useful for promoting producers, they require a lot of time, especially at weekends, to set up and dismantle the stalls, as well as to run these and to work on the farms. In any case, in order to set up a business and grow, there is a need to professionalise the marketing tasks, including

participation in the markets [28]. Moreover, perhaps the biggest limiting factor is that the profile of the consumer visiting these places is not articulated, and is highly seasonal; consumers are generally more attracted by the complementary activities (workshops, talks, sampling, etc.) than by the products, a fact that generates low turnover. Another critical opinion regarding producers' markets reveals that in most experiences, for example in Madrid, there is very little participation by producers in the management of the events. This is limited to participating in consultancy meetings of the steering committee, a fact that casts doubt upon its transforming role [29].

Not all SFSCs have the same impact on the territory or upon aspects of economic and social sustainability, although it is the collective groups that generally show a greater capacity for transformation from the social, environmental and economic points of view. As demonstrated by the FAAN project [30], which analysed initiatives in five European countries, decentralised cooperation and governance constitute one of the key elements for creating closer and more stable relations and commitments reaching beyond market interests [30]: Decentralisation places the leading role back in the hands of producers and consumers in relation to accessibility, quality, origin, forms of production and the power to negotiate food prices. In the case of Spain, Producers' Markets have been studied in depth by Mauleón [31] and Méndez & Monteserín [29], all of whom indicated that when the social capital is strengthened, the income of the producers is increased, the agricultural economy is boosted and new business opportunities are created.

Transformation of food products is considered to be a crucial link of the SFSCs in that it enables producers to transform surpluses. Nonetheless, the report titled "Short Supply Chains in the Agro-Food Sector", drawn up by the Ministry of Agriculture, Foodstuffs and the Environment (MAAM), warns that "the low level of adaptation by small producers to sanitary requirements poses a fundamental problem in the sale of products transformed via short supply chains. Furthermore, SFSCs are operated by small producers for whom it is costly to meet the same requirements existing for the big enterprises" [32] (p. 162), a fact that also hinders the consolidation and expansion of SFSCs.

There is therefore a need for further research on the potential of SFSCs to reinforce the economic viability of periurban farms and to promote consumption of local products in view of the constant increase in the number of SFSCs and their broader geographical scope with regard to market share [29,33,34].

3. Study Areas: Metropolitan Regions of Madrid and Barcelona

The metropolitan areas of Barcelona and Madrid are two urban realities presenting different forms of territorial organization [24,35]. The capital city of Madrid, situated practically in the centre of Spain and of the regional autonomy, has great influence over the economic, environmental and social dynamics of the territory [4], whereas Barcelona's urban system is based on polycentric networks of urban systems, which indicates a different socioeconomic hierarchy [36]. Despite the difference between these two organizational models, both have a strong influence on the agricultures of the "rural-urban belt", as a result of the process of urban sprawl; this generates a functional break between city and country, between urban inhabitants and local producers, between urban food consumption and proximity production [37]. This phenomenon is not only increasingly affecting Spain's big metropolitan areas, but also many others around the world, as a consequence of globalized and delocalized agro-food systems, among other factors.

The first case study refers to Cataluña, specifically the metropolitan area of Barcelona. Cataluña is the sixth biggest regional autonomy in terms of agricultural area, with 1,646,413 ha, after Castilla León, Andalucía, Castilla La Mancha, Extremadura and Aragón (INE, 2017). As for the distribution of the crop area, this autonomous region is eminently dedicated to cereals and fodder; there is also a significant presence of olive trees, fruit trees and vines. The large agricultural areas are located on the plains of Lleida, el Camp de Tarragona, el Penedès, the Ebro delta and on the lands of the Ebro River and the Empordà in Girona. However, there are other smaller agricultural areas which have great potential for productivity and even for organization of the production chain, such as Baix Llobregat

(the location of the Parc Agrari-Agrarian Park-del Baix Llobregat), el Maresme (the location of the most recent agricultural park), and la Tordera or the plains of Vic, among others.

The towns chosen for the case study in Catalunya were Mataró (126.127 Hab.), El Prat de Llobregat (63.897 Hab.) and Malgrat de Mar-Palafolls (27.516 Hab.). The three towns are situated strategically with regard to soil productivity and commercialization. These areas have a long tradition of fruit and vegetable growing principally intended to supply the city of Barcelona. The small farms specialized in market gardening of Mataró and el Malgrat are situated on the fertile plains of the Maresme region and from the last third of the XIX century until well into the XX century, together with Vilassar de Mar they were considered to be the three main agricultural capitals of Catalunya for horticultural products [38]. The Maresme region is leader in Catalunya's agricultural exports sector, as well as in entrepreneurship and adaptation of the agricultural sector to the urban market [39]. Specifically, the small farms specialized in market gardening in Mataró are leaders in irrigated crops, although there has been a decline in surface area in the last few decades [40]. The agricultural land of Malgrat exhibits excellent climatic and agrological conditions. This area is characterized by an active society with a strong agricultural trade union movement that also formed the basis of the early cooperatives in the region and represented one of the biggest successes in terms of entrepreneurship. According to Pomés [38] it has enabled over half the active population to work in the agriculture sector. Nonetheless, as from the 1960s, some of the most fertile land came to be used for urban settlements or industry and the remaining land became polluted or unusable for agriculture due to the presence of infrastructures or facilities. As a result of protection through municipal town planning, 400 cultivated hectares remain, mostly used for market gardening. The third case study, el Prat de Llobregat, situated in the Llobregat delta, is Catalunya's oldest and most fertile agricultural area. Its proximity to the capital—only 10 km away—provides it with great opportunities to sell its products, although this agricultural space is also under intense urban pressure. The growth of infrastructures, facilities and residential areas has drastically reduced the area of fertile land. Noteworthy among these infrastructures are the logistics area of El Prat airport and the ZAL Port of Barcelona, as well as the dense transport network. Together with 12 other municipalities in the region, el Prat de Llobregat forms part of the Parc Agrari Baix Llobregat, which has earned it strong institutional support in promoting its products through direct sale.

The system of proximity sale, officially accredited by the Catalunya administration since the year 2013, guarantees the supply of a quality product and increases the added value and profit margin of products sold directly by the producers. The label makes a distinction between direct sale and short-chain sale. According to data from 2016 [40], in the Maresme region 60 producers are subscribed, three quarters of whom sell untransformed products. Additionally, in order to promote quality, denomination of origin and consumption of proximity products, the Parc Agrari Baix Llobregat possesses its own label for products within its scope of action, with the identification "Producte fresc (fresh Product) del Parc Agrari". This brand is associated with different campaigns aimed at restaurants and farmers' markets.

The second case study refers to the Madrid Regional Autonomy, which takes tenth place in terms of area of agricultural land, with a total area of 377,770 hectares (INE—National Statistics Institute—2017). In terms of socio-economy, the primary sector is quite insignificant, as less than 0.3% of the working population was employed therein in the year 2016, according to the data provided by the National Statistics Institute. Madrid's urban nature accounts for the low impact of the primary sector on the regional economy; that is to say, much of the fertile land has been gradually occupied for urban and industrial uses and has become fragmented by the dense network of communications infrastructures [4,41].

According to the results of the Survey on Agricultural Area [42], herbaceous crops occupy almost half the area (48.16%) of total croplands, with 99,225 ha compared with 40,812 ha of woody crops (19.81%). There is a considerable amount of fodder crops for livestock, whilst market gardening crops are characteristic of the Jarama fertile plain and the countryside in the south of Madrid.

The towns chosen for the case study in the Madrid Regional Autonomy are Fuenlabrada (194,669 inhabitants), Rivas-Vaciamadrid (83,767 inhabitants) and Ciempozuelos (23,737 inhabitants). In-depth study of all three cases revealed that they present a general tendency towards area loss and production intensity, and one can observe a process of production restructuring characterized by the current processes of desagrarization and increased importance of other economic sectors. Additionally, the horticultural production of the three towns is oriented mainly towards supplying Madrid's urban market. The Fuenlabrada irrigated agricultural lands, in the countryside to the southwest of the city, constitute a unique agricultural landscape, and represent one of the few agricultural spaces employed for professional farming in the Madrid region [43]. At the end of the year 2012, the Fuenlabrada Town Council set up an Agrarian Park aimed at preserving and promoting local agriculture. The market gardens of Rivas-Vaciamadrid are located on the fertile plains of the Jarama River and are protected by the Parque Regional del Sureste (Southeast Regional Park), as are the lands of Ciempozuelos. As with Fuenlabrada, much of the irrigated cropland, in this case municipally owned, is integrated within the Soto del Grillo Agro-ecological Park. The local administration clearly aims to facilitate the establishment and consolidation of new agriculture and livestock farming businesses intended to supply the local market. The third case in Madrid, the valleys of the lower Jarama River in Ciempozuelos, is integrated within the Vegas region, which has a longstanding agricultural tradition.

Despite the fact that Madrid does not avail of a system of proximity sales accredited by the regional administration, producers from Madrid can benefit from the Madrid food guarantee brand "M Producto Certificado (Certified Product)", which guarantees the origin and quality of agro-food products and helps to increase traceability. As with the Llobregat Agricultural Park, in order to enhance the value of local products and to promote sales through short chains, the Fuenlabrada Agricultural Park and the Soto del Grillo Agroecological Park have their own commercial brands: "Fresh proximity product from the Agricultural Park" and "Fresh product from the Soto del Grillo Agroecological Park".

4. Materials and Methods

4.1. Data Sampling and Collection

In our study we considered the periurban agriculture sector for three basic reasons: in the first place because it has been seen that it is very difficult to design strong and sustainable agro-food strategies aimed at relocating activities and practices if the proximity production is not oriented towards the urban market [2]. Second, because geographical proximity to urban areas constitutes yet another opportunity to strengthen an emerging urban food culture that prioritises consumption of "zero miles" food products provided by smallholdings operating close to the cities. Finally, because periurban agriculture constitutes an important land use element in the hinterland of urban agglomerations because it supplies the multiple goods and services demanded by urban society [44]. This field of research and action therefore endows periurban agriculture with a leading role in rearranging the relations between country and city [4,22,45].

We conducted a comparative study in six different towns located in the metropolitan areas of Barcelona (BCN) and Madrid (MAD). It was based on data gathered by means of a direct survey extended to the two main local economic agents operating in the short agro-food chain: small periurban producers and retailers. We selected these two functional regions because they are Spain's most populated metropolitan areas and because they constitute a suitable context for evaluating the difficulties and potentialities in relation to SFSCs arising in the different agri-urban initiatives for developing sustainable food systems within the framework of the Milan Urban Food Policy Pact. Furthermore, this choice of localities reflects the manner in which periurban agriculture responds to demands for food in areas subjected to urban sprawl.

The first phase of the research involved identifying the territorial cases (cities according to their population size): Large towns (over 100,000 inhabitants): Fuenlabrada (MAD) and Mataró (BCN),

medium-sized towns (between 50,000 and 100,000 inhabitants): Rivas-Vaciamadrid (MAD) and El Prat de Llobregat (BCN), and small towns (between 20,000 and 50,000 inhabitants): Ciempozuelos (MAD) and Malgrat de Mar (BCN). We also identified the types of SFSCs and the periurban farms.

In each locality the survey took in small farm managers and local fruit and vegetable retailers who expressed interest in participating in the study, and included in-depth face-to-face interviews. Regarding the interviews conducted with small farm managers, in order to ensure comparability of the data that had emerged referring to the different sizes of cities, we prepared a questionnaire using the same information. Keeping in mind the objectives of the survey, we then organized the sections of the producers' questionnaire relating to the following key aspects: type of production, public policies, regulations, funding, characterization of the periurban agricultural sector (type of products, innovation, professionalization, certifications, etc.), access to the local urban market and infrastructure, and logistics in SFSCs. The questionnaire applied to the retailers involved key aspects referring to who supplies them with vegetables, whether they purchase local products and whether they sell to public canteens within the municipal scope.

The final version of the questionnaire containing 20 questions for the periurban farms survey and 10 questions for the local retailers resulting from the orientations formulated by the research group coordinated by Madrid's Autónoma University within the framework of a project financed by the Spanish Ministry of Agriculture, Fisheries, Foodstuffs and the Environment. It is titled "Agro Food Hub: Feeding people, managing territories". To conduct the sampling of the farms we employed the "snowball technique", asking the first producers chosen to identify other producers in the towns selected. The direct survey involved 90 periurban producers selected according to categories of towns (small-medium-large) and to the typology of small-to-medium family (employing from two to five people throughout the year and full-time). We based the sampling on the data provided by the municipalities because there is a lack of updated statistical data in Spain (the last agrarian census is from 2009). Thus, in the metropolitan region of Madrid, we surveyed 15 of the 20 periurban farms in Fuenlabrada, all of the 15 farms in Rivas-Vaciamadrid and in Ciempozuelos. As for the metropolitan region of Barcelona, we surveyed 15 of the 42 periurban farms in Mataró and Malgrat de Mar, and 15 of the 20 farms in El Prat de Llobregat.

Among the retailers selected are supermarkets, fruit and vegetable shops, and traditional stores. We interviewed a total of 90 establishments, drawing up a final list of 15 establishments per town. To select the retail establishments, the sampling was based on neighbourhood characteristics, and we therefore included at least two municipal market stalls, two city-centre shops, two shops in a low-income quarter and two shops in an upmarket neighbourhood.

4.2. Data Analysis

Once we had analysed the global data, we compared the towns in terms of their demographic size, as opposed to their geographical location, which enabled us to comprehend the metropolitan territorial dynamics associated with demographic concentration and urban sprawl. It should be pointed out that it is not possible to perform a rigorous comparative analysis at the metropolitan level, due to the big differences in the territorial organization of both metropolitan areas, as will subsequently be seen.

The descriptive analysis provided in the study cases includes the frequencies of the variables studied by means of the questionnaire extended to primary periurban producers and retailers. As the analysis is of an exploratory nature, we employed a descriptive methodology with the aim of studying the distribution of frequencies (the number of percentage of cases studied) for each of the questions included in the different questionnaires. Thus, we provide information on the concrete values that the selected variables have adopted in relation to the number and percentage of times that each of these values is repeated. Likewise, to analyse possible patterns of association between the variables, we completed the descriptive analysis with the analysis of categorical variables using the contingency tables and we performed an analysis of the categorical variable "city size" to observe its relationship with the remaining variables. Incorporating categorical variables enables us to define the possible

patterns of association that can be established. Hence, the contingency tables were two-dimensional, based upon two criteria: city size and variable X measured in each question.

5. Results: Issues and Challenges for Scaling-Up of Short Food Supply Chains

5.1. Can SFSCs Be Considered as an Economic Alternative for Small- and Medium-Sized Periurban Farms?

In the first place, one of the common patterns we identified indicates that the professional farms located in the periurban contexts analysed, mainly grow vegetables, which represent 89.2% of their total production, regardless of the size of the town (big–medium–small). The fact that the main produce involves vegetables likely results from an historical intention to supply the urban market, which presents a demand for fresh products. This long-standing traditional link of direct selling in many Mediterranean cities, between the city and its surrounding countryside, is now being recovered by SFSCs [43].

Another reason for intensive vegetable production can be accounted for by the fact that periurban farms are generally smaller than those operating in spaces free from urban pressures (high land prices and lack of affordable land near urban populations for new entrants in the sector), a fact that calls for more intensive land use and a small number of key products that attract urban consumers (local, seasonal and fresh vegetables). Within this context, the report “Innovative Short Food Supply Chain management” from the EIP-AGRI Focus Group [46] points out that SFSCs are a suitable alternative for this predominant type of periurban farms, as they are structured in such a way as to ensure that the producer retains a greater share of the value of the produce sold and because the food is designed to be produced and eaten within a defined geographical area, respecting seasonality and procuring territorial added value.

The research results demonstrated that direct selling to restaurants and shops (25.8%) and farmers’ markets (21.7%) represented the SFSCs most used by periurban farmers, far ahead of ecommerce and local purchases by companies catering to public canteens. If we consider the results by city size, sales on farmers’ markets are higher in the big towns (27.2%), while in the case of the small towns, direct sales to restaurants and shops represent the most significant SFSCs (31.6%) of the total sales of periurban farmers. However, many of the producers interviewed point out that, whilst selling at farmers’ markets generates high margins per unit, these do not offset the low sales volumes.

A high percentage of retailers purchase directly from farmers (51.1%), which in the case of the small towns is greater (71.0%); this figure decreases for the medium-sized towns (31.0%).

In addition to this, when retailers are asked whether they buy certain products directly from the farms in their municipality or in the vicinity, a high percentage of them (66.3%) answer affirmatively. Nonetheless, in this case there are significant differences according to size; in the medium-sized towns this falls to almost one third (34.5%) and in the big and small ones, it is over three quarters (76.7% and 86.7% respectively).

When asked whether they are familiar with the agricultural products of their municipality, they furnish data similar to those provided for the aforementioned aspect, thus indicating the possibilities to develop the local market. In general terms, in the provinces of Barcelona and Madrid, 78% of respondents are familiar with local products. Surprisingly, in the medium-sized towns, less than half of the retailers (48.3%) have knowledge of the local products, whereas this percentage is much higher for the big and small towns (93.3% and 90.3%, respectively). Likewise, businesses in the medium-sized towns show a similar lack of interest in selling local products (55.2%), compared to the big towns (90.0%) and to the small ones (96.8%).

As can be seen in Figure 1, with regard to the manner and place of purchase from local farmers, most shops prefer direct delivery to the premises (53.8%), a preference that is slightly greater in the medium-sized towns; this is followed by direct on-farm purchase (31.3%), especially in the small towns (50%), followed by the big ones (29.6%), a percentage that is much lower in the medium-sized towns (12.0%).

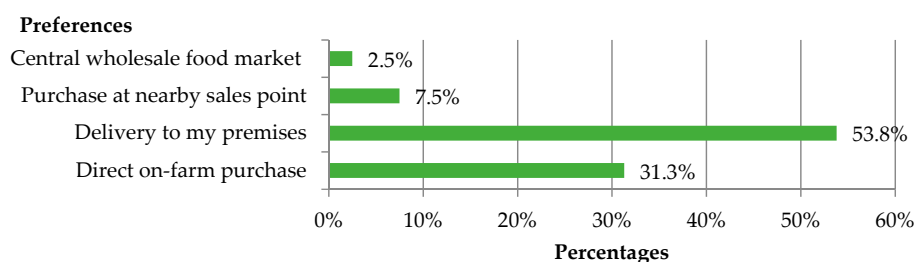


Figure 1. Preferential means of purchase from farmers by small shops.

In the three types of towns analysed according to size, retailers are evidently disinterested in purchasing through the internet as an innovation in their supply chain, mainly because it is difficult to verify the quality of the produce. The big- and medium-sized towns show a degree of interest lower than 20% (16.7 and 17.2% respectively); this is somewhat higher in the small towns (35.5%). Notably, the highest percentage of doubt (Do not know / Do not answer) is observed in the medium-sized cities (20.7% compared with around six percent on the other scales), which suggests a potential for strengthening the link between producers and retailers by means of specific campaigns.

Finally, just over one third of the shops consulted (36.7%) sell products to collective points of sale in the municipality, such as restaurants, schools, catering companies or similar entities. In this sense, the shops in small towns score higher (51.6%) than in big- and medium-sized ones (40% and 17.2%) because of a closer relationship with these clients. This appears to indicate that a closer relationship between retailers and local producers could promote the purchase of local products in the HORECA (food service industry: Hotel, restaurants and catering industry) channel.

All this shows that both the farmers and the small retailers would prefer a different food supply system than the one promoted by the conventional food policies. SFSCs therefore constitute a real economic alternative for periurban farms. However, 75.3% of the farmers interviewed refer positively to the opportunities provided by SFSCs, with 100% of them in the medium-sized cities showing an interest in developing them. This datum responds to the fact that 80% of the farmers interviewed consider that their products present a differential value due to involving periurban agriculture, in comparison with their more distant competitors. On analysing this value according to town size, the percentage is much higher in the small towns (70%).

5.2. What Are the Main Factors Limiting an Increase in Turnover?

The possibilities for periurban farms to scale up SFSCs depend on their capacity to resolve important issues limiting their efficiency. These mainly involve the size of their businesses, as most of them are small to medium farms. A direct consequence of this is the lack of agricultural employment, measured in annual Agricultural Work Units. Most of the periurban farms analysed (61.4%) only need between two and five employees, who tend to be family and workers are only occasionally hired. There are also many family smallholdings with little paid labour. On analysing the data, one can observe that the general pattern is confirmed regardless of city size: from two to five work units represent 76.7% of the total of farms for big cities, 63.3% of all farms in medium towns and 39.1% for small towns. This means that farmers and producers cannot ensure a direct and simultaneous supply of diversified produce in real time because they do not have enough workers or time. Other issues relate to the fact that smaller farms with relatively low assets generally make limited investments in equipment and technology.

A second factor limiting scaling-up refers to the sales channels employed. The central wholesale food markets continue to represent the main channel in 20.3% of the periurban farms selling over 70% of their production, as well as other conventional food supply chains. Another barrier is the narrow range of products, because they produce only one or two in order to reduce costs; this is due to the lower price unit in comparison to SFSCs (in the direct contact between consumers and producers there are no intermediaries).

Another limiting factor refers to the fact that the conventional channels predominate in over half of periurban farms. In the particular case of on-farm sales, representing 7.5% of their sales, these have fallen, likely as a result of urban regulations and byelaws restricting this modality. In relation to the demographic dimensions of the towns, the preference of the main conventional channel (central wholesale food markets) is even greater (61.5%) in big towns, whereas in the medium-sized ones, the conventional distribution companies still play a significant role (42.1%).

Among the limiting factors of marketing through SFSCs, no single food chain was deemed to be relevant by over 20% of the farmers interviewed. Nonetheless, with regard to the issues presenting a medium or high level of incidence (values from 3 to 5), we can highlight distribution costs (79.3%), logistics (62.2%) and a lack of interest by consumers (60.5%). Lastly, competition in the sector also scores a high value (47.5%). As can be seen in Figure 2, on considering the size of towns, the lack of interest by consumers is an issue of greater concern in the big towns (78.6%), likely due to the lack of connectivity between cities and countryside. Furthermore, the distribution costs associated with time, labour and fuel (86.2%) and competition in the sector (62.1%) in the big cities are also considered to be relevant in relation to the medium-sized towns (80% and 46.7% respectively). As is common in this type of farming, the vast majority believe that logistics constitutes one of the biggest disadvantages in the big- and medium-sized cities (87.7% and 93.3%) in relation to the time required to organize small orders, to cover producers' markets throughout a full day, etc. For the small towns, results indicate a serious lack of consumer interest as the main problem. The remaining issues are given equal importance in all the different localities.

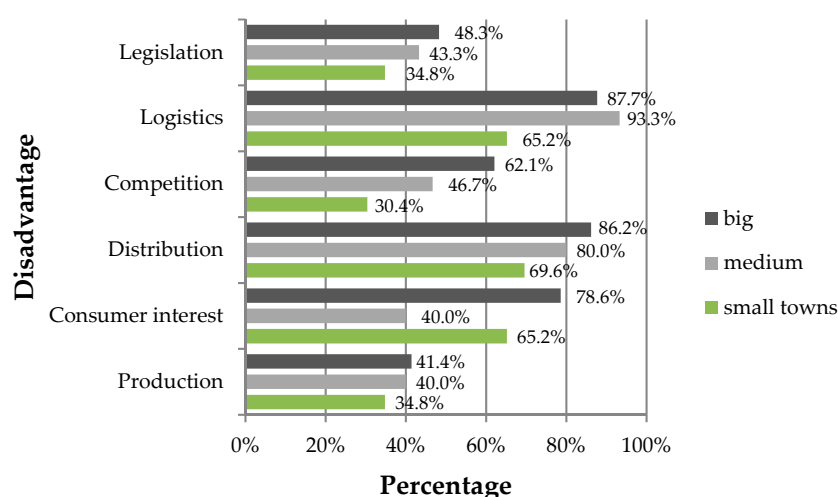


Figure 2. Answers by farmers regarding the main disadvantages associated with Short Food Supply Chains according to town size.

Another serious limitation is related to the retailers' preferences. As can be seen in Figure 3, a high percentage of retailers prefer to buy from wholesalers (73.3%), a percentage that rises in the case of the medium-sized towns (82.8%) and decreases in the small towns (61.3%).

In general terms, only 23.3% of the retailers interviewed buy directly from local co-ops. This percentage is higher for the small towns (35.5%), due to the fact that there is still a greater tradition of co-ops among producers compared to the large- and medium-sized towns (16.7% and 17.2%, respectively). Of the total amount of retailers buying directly from co-ops, half belong to the small towns (52.4%). Only 15.6% buy from other retailers; noteworthy in this sense are the ones from the large- and small-sized towns (20.0% and 19.4%) compared to the medium-sized ones (6.9%).

Without yet differentiating according to town size, among the reasons given by the retailers for buying from wholesalers are, in descending order, the following factors: quality of the product (66.2%), guaranteed production throughout the year (55.9%), price (49.2%) and convenience (43.5%).

The least appreciated aspects in this respect are the possibility to register a complaint (12.3%) and ease of payment (10.5%).

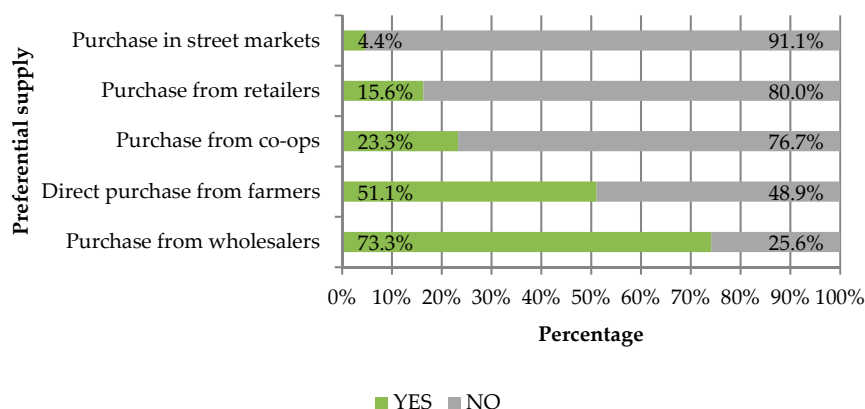


Figure 3. Preferential supply of horticultural products for retailers (in green, percentage of positive answers, and in grey, percentage of negative answers).

Interestingly, the criterion of quality is very highly valued precisely in the small towns (94.7%), clearly higher than in the medium-sized towns (72.7%) and well above the large ones (40.7%). Moreover, price as a reason for buying from wholesalers is valued in the small towns (62.5%) somewhat more than in the medium- and large-sized ones (45.5% and 44.4%).

The criterion of ensuring production throughout the year exhibits no differences according to town size (they fall within a range of around eight percent) and the convenience factor presents even greater homogeneity (a difference of around six points). This likely indicates that this question is already resolved in any food supply chain as consumers demand this kind of product despite it being out of season.

Strikingly, in the small towns, purchases from wholesalers are lower, although this is due to reasons of quality and price, as opposed to convenience.

All the reasons given by the retailers for preferring wholesalers represent both a limitation and a challenge for the development of SFSCs.

Finally, a market niche that can be promoted involves direct sale for the public provision of food to schools, hospitals, care homes, prisons, etc. However, over half of the farms do not sell directly to school or hospital canteens. As we pointed out in the introduction section, this low percentage is related to the limits posed by very strict regulations in this sense, as well as to the little local support with regard to consuming local products in this kind of institution. It is also associated with the problems individual small- and medium-sized farmers encounter when attempting to cover the needs of this kind of consumer without a collective organisation that could manage production and distribution.

5.3. Which Models Provide the Greatest Potential for Scaling-Up in Terms of Participation?

One of the main possibilities for scaling-up through participation refers to the cooperation between farmers that traditionally sell the products of other farmers. As can be seen in Figure 4, 40% of all periurban farms market the primary or processed products of other producers in order to supplement their offer. The medium-sized towns are notable in this sense; they have more agreements with other producers, perhaps due to being located in the agricultural parks of Rivas and Baix Llobregat, where active policies are in place to support direct sales. A total of 82.6% of producers from medium-sized towns sell the food products of other producers, followed by 43.5% of producers located around the small towns, compared with only 3.3% in the big cities. Interestingly, 61% of the farms are not associated with any group, platform or co-operative aimed at marketing their products, although some of them say they do associate in order to purchase supplies.

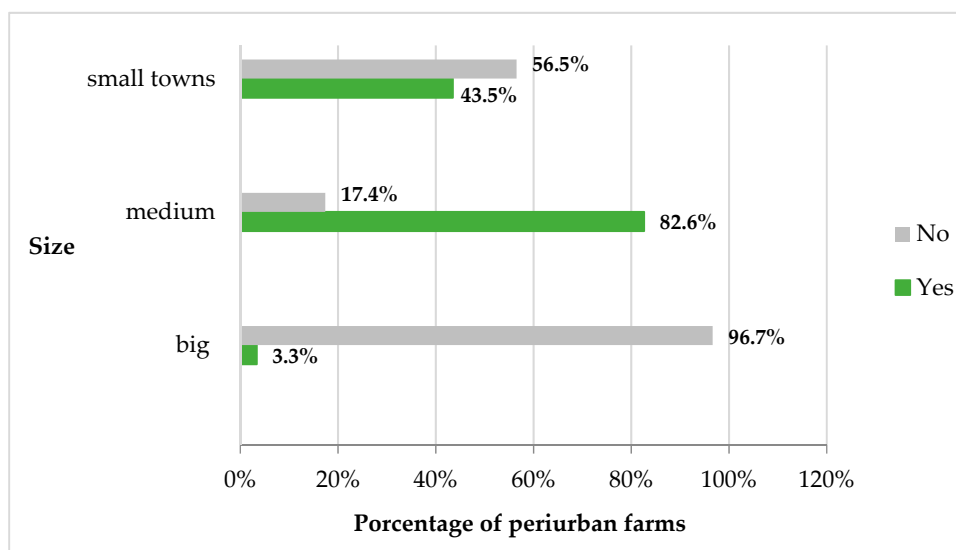


Figure 4. Percentage of periurban farms marketing the primary or processed products of other producers by town size.

In any case, when asked about the possibility of extending their sales channels, 78% of the farmers answered positively in relation to articulating a joint offer with other producers; this percentage rises to 91.3% for the small towns due to the fact that there is still a greater tradition of co-ops among producers in less urbanized areas.

As can be seen in Figure 5, when we asked the farmers to specify the channels that they consider to be the most interesting with regard to extending or enhancing the economic viability of the farms, in first place they indicated community-supported agriculture and box schemes (40.2%) and in second place, proximity or farmers’ markets (39%). These represent two collective possibilities for scaling-up by means of participation and a more direct link between producers and consumers.

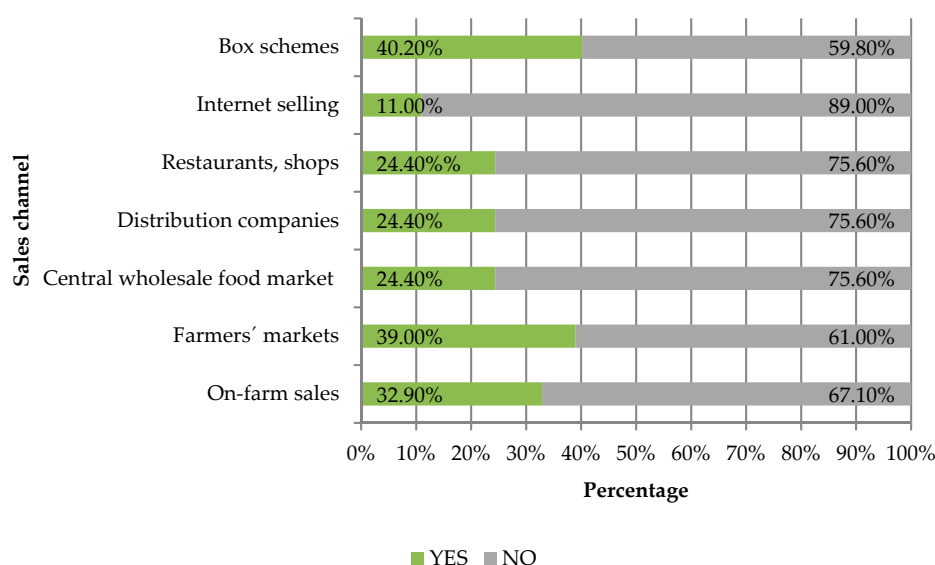


Figure 5. The most interesting channel of expansion or improvement for farmers in the selected periurban areas (in green, percentage of positive answers, and in grey, percentage of negative answers).

Analysis of these data according to town size reveals that in the bigger cities farmers prefer to increase sales through community-supported agriculture and box schemes (48.3%) and farmers’ markets (44.8%) as opposed to other channels. In contrast, 44% of the farms in the medium-sized towns

opt for on-farm sales that are not normally collective but which include a more direct relationship with retailers, restaurant managers and eventually, consumers. Finally, the producers from the small towns prefer to increase their sales through community-supported agriculture and box schemes (65.25%).

Moreover, with regard to the use of new technologies and the social networks to promote and sell products that could involve collaborative approaches, some of the respondents in charge of the farms stated that they have made use of web pages (23.2%), on-line shopping (20.7%) and especially the social networks (34.1%) as part of their marketing strategy, a fact that appears to indicate a certain interest in adapting to the current marketing challenges. In this context, it should be pointed out that it is in the medium-sized towns where most people use the internet (46.7%), as well as the social networks (83.3%); this figure reflects the impact of a training campaign promoted by the Llobregat Administration in the case of Barcelona to promote the use of social networks.

As for the possible effects of guarantee certifications, denominations of origin and commercial brands upon production value as another participative and collective approach for scaling-up, we first point out that 70% of the farmers interviewed do not avail of any of these. Among the remaining 30% of farmers, the positive effect of guarantee certifications, denominations of origin and brands is considered considerably greater in medium-sized (83.3%) and big (58.6%) towns than in the small ones (30.4%). This is mainly due to the existence of commercial brands and to the use of ecological certifications promoted by the local administrations of some medium-sized (Rivas-Vaciamadrid and El Prat de Llobregat) and large-sized towns (Fuenlabrada and Mataró).

6. Discussion: Issues and Challenges for Scaling-Up of Short Food Supply Chains

The results of our research, which compares different types of towns in Spain's two main metropolitan areas, highlight a great potential for development of SFSCs in the ongoing process of transformation of urban food systems, which are thus confirmed as constituting an emerging economic sector and an interesting innovation with regard to addressing the problems of periurban farmers and small retailers. One can observe a tendency running parallel to the increasing demand for local, seasonal and proximity products in Spain [24,29,33]. The analysis performed emphasizes that the main strength of the small periurban producers still prevailing in the metropolitan areas of Barcelona and Madrid lies in the fact that their production is still oriented towards horticultural and fruit crops, which favours the development of SFSCs, a circumstance existing since the foundation of these cities.

Results show that the vast majority of producers operating in periurban contexts whom we interviewed believe that SFSCs can enhance and promote consumption of local fresh products. Nonetheless, the current model is inefficient in terms of distribution and logistics in the SFSCs, especially because of small size delivery, small minimal order, and dispersion of the delivery points, aspects that must be resolved for the development of sustainable SFSCs. The findings of our study agree with the literature in that the main problems of distribution of food in SFSCs result from a lack of capacity in terms of efficient logistical delivery infrastructure to meet the growing urban demand for fresh and local products, and also in terms of variety and volume produced [47]. Among the three main issues that periurban farmers consider in the two metropolitan areas, they highlight, in the first place, distribution costs resulting from the dispersion of the direct sales points, which requires precious time to manage orders. Secondly, they point out a lack of organisational and physical structures necessary to compete with the global conventional food supply chain. This is also a key issue for small retailers who demand a stable delivery system from their grocery stores. One of the most important challenges of scale within SFSCs therefore involves reducing to the greatest degree the number of distribution points. In order to reduce the costs associated with logistics, it would be interesting to adopt a collective or co-operative organizational model that provides greater opportunities for sharing resources and facilities [28]; there is a tendency towards group models that are more profitable in terms of time and fuel saving [24]. Cooperative innovative solutions can help to concentrate the logistics and the flows derived, a fact that helps to optimize the amount of cargo transported by road. Local producers can also implement internet-based solutions (online platforms, apps) to ensure better planning, implementation

and control of the flows of goods, information and values across a wide-ranging logistics chain [47,48]. Logistical infrastructure can be costly, especially when “cold chain” conditions or transformation processes are required, which can be a problem in the case of small to medium farms, because of their lower investment capacity. However, this should be addressed not only by increasing their business size, but also through effective public collaboration, coordination among SFSC partners, and through the promotion of community-based organisation [49] and networks of many small-scale periurban farms. An interesting example in this sense are the food hubs, through which different stakeholders in the chain cooperate to respond to increased demand for local food markets, whilst being able to supply different types of clients (individuals, family, retailers, restaurants, schools, etc.) requiring bigger production volumes [50,51].

Despite the growing interest by consumers in locally produced food, the other big problem pointed out by the producers involves the current lack of interest by citizens in local food products. This is a result of the low number of awareness campaigns promoting fresh and seasonal products, price and a lack of familiarity with these products. This issue is more important in bigger cities, which suffer from a lack of connectivity with the countryside. The low level of consumer interest is also related to a lack of specialized knowledge and mistrust of e-commerce and of the social networks to publicize their products and farms.

Another obstacle observed is the fact that many farmers predominantly continue to sell through conventional food supply chains even if new channels are established, for example the Milan Urban Food Policy Pact. This can hinder scaling-up of SFSCs, first, because they cannot provide a wide range of products due to their specialization in one or two varieties, and second, because of the few subsidies they receive due to being localized in cities, which hampers their ability to change their business model over a short period of time. Less diversity of SFSCs also has a negative influence on scaling-up in general terms in towns and regions, and not availing of a diversified approach to marketing can represent another economic risk in this process.

Analysis of the data obtained from the retail survey reveals a clear disconnection between the links of the food chain. Our study highlights the fact that in the metropolitan areas of Madrid and Barcelona, retailers preferentially buy their supplies from conventional channels, mainly wholesale companies. This is due to aspects of convenience and quality and because all-year-round production is ensured, which is fundamental, given consumers’ demand for products out of season. These issues can be addressed by means of collaboration among periurban farmers in order to centralize the process, which would help to increase the variety and volume of the direct supply by local producers. This is another reason identified by small shop owners for preferring big city markets. Creating a direct and more personal relationship with producers in the vicinity could help to increase retailers’ levels of trust; this also involves a collaborative approach aimed at improving the financial situation of both sides, which is jeopardized by the big distribution companies and large supermarket chains. Additionally, this poses an opportunity for new farmers to participate in the urban market, as these newcomers are habitually excluded from the big commercial distribution networks. Ultimately, this would favour the local economy in general terms by helping to retain the added value at local level [14]. In addition, as we stated in the initial paragraphs, direct participation of small-scale farmers in the SFSC scheme constitutes a key factor for sustainability [52].

Results also indicate that the role of public administration is essential with regard to promoting the consolidation and continuity of SFSCs, to addressing the principal issues detected, and above all, to improving the viability of periurban agriculture. Furthermore, the administrations can implement the following processes to enhance the role of SFSCs according to their competences: (i) providing public infrastructures in order to articulate networks connecting the different stakeholders in the agro-food chain, (ii) promoting initiatives aimed at public procurement of local products for canteens, (iii) public aid aimed at promoting local products and direct sale by means of fairs, events and dissemination, (iv) adapting legislation, byelaws and regulations to facilitate the process, (v) reducing taxes and duties levied on occupation of the public highway, (vi) implementing awareness activities

to attract new consumers and to consolidate the commitment of existing consumers to using local agricultural products. Furthermore, public hiring policies are crucial with regard to redefining the relationship between the administrations and food quality, in preventing the definition of quality features from falling under market control [53] and to using institutional consumption as a means of promoting and stabilizing the demand and the overall system of proximity products.

In any case, in relation to the abovementioned challenges, one of the biggest issues to be resolved consists of addressing the lack of associations in the periurban agricultural sector highlighted by the producers' answers. Our study also reveals that no robust connection exists between producers and retailers, despite the fact that the latter ones are familiar with and highly value local products, mainly in the big and small cities. The present research suggests the need to enhance the articulation among stakeholders in the food chain, which would favour more stable demand and a more even distribution of profits among the main economic agents: producers and retailers. Our research also stresses the need to improve the processes of joint planning between the producers and companies of the HORECA channel or in relation to public canteens in order to better relocate the urban food system.

Cooperation among the different stakeholders in responding to the demands and needs of the local urban market ensures supply to more sales points and more people, thus favouring consolidation of the SFSCs [14]. As we have already stated, this also facilitates distribution to clients with a greater demand throughout the year, such as the HORECA and the collective restaurant system, particularly the canteens of schools, hospitals and homes for the elderly [27].

7. Conclusions

Based upon the references, the initial analysis and the results of the interviews, as a principal conclusion we have attempted to summarize a series of useful criteria intended to meet the new urban demands relating to the consumption of local, fresh and seasonal products, which, furthermore, constitute products exhibiting environmental and ecological quality:

- Attenuating the lack of cooperation among the different links of the chain.
- Avoiding the asymmetry of power in the final links of the chain through participation processes between production and the other agents of the chain.
- Responding to the needs of small producers in order to enhance their economic viability and to increase the turnover of SFSCs
- Strengthening direct sales between small farmers and public green procurement, and increasing the stability of SFSCs
- Reducing costs associated with marketing-hiring among different companies in relation to management and logistics.
- Reducing the physical distance between areas of production, transformation and consumption: favouring relocation of urban agro-food systems.
- Increasing the offer—diversity and quantity—of small farmers' products to promote the consumption of local products in the HORECA channel, and in schools, hospitals, care homes, prisons, canteens, etc.
- Increasing opportunities for new periurban producers and transformers in a context of economic crisis, as these are excluded from big distribution.
- Favouring the use of the new technologies to simplify purchase management.
- Developing technological innovations at the service of the SFSCs: Apps, e-commerce platforms capable of increasing demand and supply.
- Developing web platforms presenting a common image capable of connecting all the stakeholders in the local food system.

Among these criteria, participation and legitimization of small periurban producers are essential for strengthening the "alternative" nature of SFSCs, from the perspective of other post-capitalist paradigms such as the Solidarity Economy, in relation to the conventional food economy in terms

of local economy, geographical and territorial aspects and of socio-institutional relations [23]. These two aspects strengthen the sustainable character of SFSCs when they present the following three dimensions: economic affordability, social acceptability and environmental efficiency [49]. This framework of Solidarity Economy highlights the new centralities of a territorial and identity-based nature to be considered in agro-food systems, in contrast with the conventional channels. All this implies that SFSCs should represent more than a mere strategy for articulating relations within the local scope; they should also help to restructure the agro-food system as a whole, considering social, cultural, ethical, economic and environmental aspects [54]. These issues are crucial for SFSCs in order to ensure the re-localised and re-territorialised nature of food systems, mainly in areas with a dense biocultural memory such as the Mediterranean landscapes. The notion of re-locating basically refers to the set of practices and strategies seeking to connect consumption with local production in order to reduce the ecological footprint and to support local production [45] (p. 449); however, by re-territorialisation we refer to the recovery of the economic, social and geographical links between food products and rural knowledge, local varieties, local culture, as well as the agrological and climatic conditions of the territories, based upon a growing awareness of healthy food. This involves enhancing the added value and differentiation of foodstuffs based on criteria of socially and politically constructed quality [55,56], as a reaction to the loss of trust in the globalized food system and to the new challenges posed by climate change; it also calls for a commitment to reduce greenhouse gas emissions and to address the current scarcity of petroleum and of other fossil energy resources.

We can finally conclude by stating that SFSC initiatives require on-line structures of a horizontal, participatory and multi-agent nature in order to attenuate shortcomings at the logistic and organizational level, and to constitute a sufficiently robust alternative to the dominant forms of distribution in urban areas (hypermarkets, intermediaries in the agro-food chain). This is to say, the links created horizontally among the farms themselves, and vertically with other agents in the chain, generate new forms of organization of the food system; these will have a direct impact upon the capacity for innovation and will enhance the economic viability of periurban farms.

In summary, processes of co-operation, co-ordination and connection among medium- and small-sized farms based upon complementary initiatives are basic with regard to helping to increase the scaling-up of SFSCs by means of a wide range of organizational forms, including first- and second-degree co-ops, social markets, socially-oriented initiatives, food hubs, etc. In this sense, there is a need for further research into models of innovation based on generating SFSCs and scaling-up from the perspective of the solidarity economy at the urban-regional scale.

Author Contributions: This paper is the result of collaborative teamwork. C.Y.O. in charge of elaborating the methodology and questionnaires, analysed the data, development and drafting of the paper; A.M. analysed the data and development and drafting of the paper; R.M.O. provided constructive suggestions both for the technical aspects and for the manuscript preparation and assisted with the drafting of the text; J.M.L. and R.F.-G. were both responsible for data collection (interviews) and for the manuscript preparation.

Funding: This research was funded by the European Agricultural Fund for Rural Development (EAFRD) and Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente (Ministry of Agriculture, Fisheries, Foodstuffs and the Environment), grant number 72,228.18 Euros, funded 100% by the European Union, in the "Convocatoria 2018 y submedida 16.1 en el marco del Programa Nacional de Desarrollo Rural 2014–2020 (2018 call and sub-measure 16.1 within the framework of National Rural Development Programme 2014–2020)".

Acknowledgments: The authors would like to thank Fundación Agroterritori and Heliconia s.coop.mad for the support provided for the questionnaires and for helping to prepare the diagnosis; we also wish to thank the other team members: Valle del Guadalhorce Grupo de Desarrollo Rural, Union de Uniones de Agricultores y Ganaderos and Guadalhorce Ecológico of the project "Grupo Operativo Supraautonómico: AgroFoodHub: Alimentando personas, gestionando territorios".

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Comisión Europea. *El futuro de los Alimentos y de la Agricultura*; Comunicación de la Comisión al Parlamento Europeo, Al Consejo, Al Comité Económico y Social Europeo y Al Comité de las Regiones; Comisión Europea: Bruselas, Belgium, 2017.
2. Mata, R. Agricultura periurbana y estrategias agroalimentarias en las ciudades y áreas metropolitanas españolas. Viejos problemas, nuevos proyectos. In *Cultura Territorial e Innovación Social. ¿Hacia un nuevo Modelo Metropolitano en Europa del Sur?* Baron, N., Romero, J., Eds.; Universitat de València: Valencia, Spain, 2018; Volume 3, pp. 369–390.
3. Sanz Sanz, E.; Napoléone, C.; Hubert, B. Peri-urban farmland characterisation: A methodological proposal for urban planning. In *Sustainable Urban Agriculture and Food Planning*; Routledge: Oxon, UK, 2016; pp. 73–89.
4. Yacamán Ochoa, C. Estudio territorial y paisajístico de la agricultura periurbana en la región metropolitana de Madrid: Análisis de casos y propuestas de ordenación y gestión. Ph.D. Thesis, Universidad Autónoma de Madrid, Dpto. de Geografía, Madrid, Spain, 2017.
5. Ilbery, B.; Maye, D. Food supply chains and sustainability: Evidence from specialist food producers in the Scottish/English borders. *Land Use Policy* **2005**, *2*, 331–344. [[CrossRef](#)]
6. Poole, R.; Clarke, G.; Clarke, D. Growth, concentration and regulation in European food retailing. *Eur. Urban Reg. Stud.* **2002**, *9*, 167–177. [[CrossRef](#)]
7. Mauleón, J.R. Crisis agropecuaria, globalización y alternativas campesinas. Los canales cortos de comercialización alimentaria como alternativa de los pequeños agricultores ante la globalización: El caso español. In Proceedings of the XXIII Congreso de la Asociación Latino Americana de Sociología, Comisión de Trabajo 21, Antigua, Guatemala, 29 October–2 November 2001.
8. Matarán, A. Participación social en la protección activa de los espacios agrarios periurbanos: Un estado de la cuestión. *Boletín de la Asociación de Geógrafos Españoles* **2013**. [[CrossRef](#)]
9. Yacamán Ochoa, C. Agricultura Periurbana: Revisión Crítica de los riesgos y desafíos en la actual agenda política de las interacciones agro-urbanas. In *Biblio 3W*; Universidad de Barcelona: Barcelona, Spain, 2018; Volume XXIII, No. 1.237; Available online: <http://www.ub.es/geocrit/b3w-1237.pdf> (accessed on 23 September 2018).
10. Sonnino, R.; Marsden, T. Beyond the divide: Rethinking relationships between alternative and conventional food networks in Europe. *J. Econ. Geogr.* **2006**, *6*, 181–199. [[CrossRef](#)]
11. Chiffolleau, Y. From politics to co-operation: The dynamics of embeddedness in alternative food supply chains. *Sociologia Ruralis* **2009**, *49*, 218–235. [[CrossRef](#)]
12. Aubry, C.; Kebir, L. Shortening food supply chains: A means for maintaining agriculture close to urban areas? The case of the French metropolitan area of Paris. *Food Policy* **2013**, *41*, 85–93. [[CrossRef](#)]
13. Rosset, P.; Altieri, M. Llevar a escala la agroecología. In *Agroecología. Ciencia y Política*; Rosset, P., Altieri, M., Eds.; Icaria Editorial: Barcelona, Spain, 2018; Volume 3, pp. 153–180, ISBN 978-84-9888-850-8.
14. Sevilla-Guzmán, E.; Soler Montiel, M.; Gallar Hernández, D.; Vara Sánchez, I.; Calle Collado, A. *Canales cortos de comercialización alimentaria en Andalucía*; Fundación Pública Andaluza Centro de Estudios Andaluces, Consejería de la Presidencia e Igualdad, Junta de Andalucía: Sevilla, Spain, 2012.
15. Lyson, T.A.; Green, J. The Agricultural Marketscape: A Framework for Sustaining Agriculture and Communities in the Northeast. *J. Sustain. Agric.* **1999**, *15*, 133–150. [[CrossRef](#)]
16. Parker, G. *Sustainable Food? Teikkei, Co-Operatives and Food Citizenship in Japan and the UK*; Working Papers In Real Estate & Planning 11/05; University of Reading: Reading, UK, 2005.
17. Marsden, T.; Banks, J.; Bristow, G. Food supply chain approaches: Exploring their role in rural development. *Sociologia Ruralis* **2000**, *40*, 424–438. [[CrossRef](#)]
18. Renting, H.; Marsden, T.K.; Banks, J. Understanding alternative food networks: Exploring the role of short food supply chains in rural development. *Environ. Plan.* **2003**, *35*, 393–411. [[CrossRef](#)]
19. Soler, M.; Calle, A. Rearticulando desde la alimentación: Canales cortos de comercialización en Andalucía. In *Patrimonio Cultural en la Nueva Ruralidad Andaluza*; Serie PH Cuadernos del IAPH; Consejería de Cultura, Junta de Andalucía, Instituto Andaluz del Patrimonio Histórico: Sevilla, Spain, 2010; No. 27; pp. 259–283.
20. Whatmore, S.; Stassart, P.; Renting, H. What's alternative about alternative food networks? *Environ. Plan.* **2003**, *A35*, 389–391. [[CrossRef](#)]

21. MolláDescals, A.; Sánchez Pérez, M. Análisis de los cambios en los canales de comercialización de productos agroalimentarios. *Estudios AgroSociales y Pesqueros*, n° 186, 2000, 39–73. Available online: https://ageconsearch.umn.edu/record/164944/files/pdf_reeap_r186_02.pdf (accessed on 3 April 2019).
22. Aubry, C.; Kebir, L.; Pasquier, C. *Short Supply Chains in Periurban Zones: A Way to Maintain Rurality Near the City? Some Examples Taken in the Ile de France Region*; Rurality near the City: Leuven, Belgium, 2008.
23. Yacamán Ochoa, C. Sistemas Alimentarios Locales en Espacios Agrarios Periurbanos: Estudio de caso del Parque Agrario de Fuenlabrada. Comunidad de Madrid. In *Construyendo Coñecemento Agroecológico. Cambiando os Modelos de Consumo para Construir Sistemas Agroalimentarios Sustentables*; Simón, X., Copena, D., Pérez, D., Eds.; Grupo de Investigación en Economía Ecológica, Agroecología e Historia, Universidad de Vigo: Vigo, Spain, 2016; pp. 364–379, ISBN 978-84-617-5720-6.
24. Yacamán Ochoa, C.; Matarán Ruiz, A.; López Medina, J.M.; Fuentes-Guerra Soldevilla, R. *AgrofoodHub: Alimentando personas, gestionando territorios*; Informe de Innovación; Grupos Operativos Supraautonómicos, Programa Nacional de Desarrollo Rural 2014-2020: Madrid, Spain; Fondo Europeo Agrícola de Desarrollo Rural-FEADER, Unión Europea: Madrid, Spain; Ministerio de Agricultura y Pesca: Madrid, Spain; Alimentación y Medio Ambiente: Madrid, Spain, 2018.
25. Michelini, J.J.; Méndez, R.; Abad, L. Movilización social y alternativas alimentarias en áreas urbanas. Los grupos de consumo agroecológico en Madrid. *Ciudad y Territorio Estudios Territoriales* **2017**, *194*, 679–698.
26. Soares, P.; Martínez-Milan, M.A.; Caballero, P.; Vives-Cases, C.; Davó-Blanes, M.C. Alimentos de producción local en los comedores escolares de España. *Gac. Sanit.* **2017**, *31*, 446–471. Available online: http://scielo.isciii.es/scielo.php?pid=S0213-91112017000600466&script=sci_arttext&tlng=en (accessed on 20 September 2018). [CrossRef] [PubMed]
27. Soares, P.; Martínez-Milan, M.A.; Davó-Blanes, C. Compra de alimentos de proximidad en los comedores escolares de Andalucía, Canarias y Principado de Asturias. *Gac. Sanit.* **2017**, *31*, 446–452. [CrossRef]
28. Barham, J.; Tropp, D.; Enterline, K.; Farbman, J.; Fisk, J.; Kiraly, S. *Regional Food Hub Resource Guide*; U.S. Department of Agriculture, Agricultural Marketing Service: Washington, DC, USA, 2012.
29. Méndez Gutiérrez del Valle, R.; Monteserín Abella, O. Redes alimentarias alternativas en grandes ciudades: Los mercados de productores agrarios en Madrid. *Cuadernos Geográficos* **2017**, *56*, 193–216. Available online: <http://www.redalyc.org/articulo.oa?id=17150675009> (accessed on 20 September 2018).
30. Facilitating Alternative Agro-Food Networks (FAAN). *Facilitating Alternative Agro-Food Networks (AAFNs): Stakeholder Perspectives on Research Needs*; Final Report; Community Research and Development Information Service (CORDIS), Comisión Europea: Graz, Austria, 2010.
31. Mauleón, J.R. Mercados de agricultores en Spain: Diagnóstico y propuesta de actuación. *AGER Revista de Estudios Sobre Despoblación y Desarrollo Rural* **2012**, *13*, 53–82, e-ISSN 2340-012.
32. Ministerio de Agricultura Alimentación y Medio Ambiente (MAAM). *Canales Cortos de Comercialización en el Sector Agroalimentario*; MAAM: Madrid, Spain, 2013.
33. Sánchez Hernández, J.L. Redes alimentarias alternativas: Concepto, tipología y adecuación a la realidad española. *Boletín de la Asociación de Geógrafos Españoles*, No. 49, 2009, 185–207. Available online: <https://dialnet.unirioja.es/descarga/articulo/3093879/1.pdf> (accessed on 8 April 2019).
34. Simón, X.S.; Damián, C.; Rodrigo, L. Construyendo alternativas agroecológicas al sistema agroalimentario global: Acción y reacción en el estado español. *Revista de Economía Crítica* **2010**, *10*, 138–175.
35. Segarra, D. Madrid y Barcelona, dos modelos urbanos contrapuestos. *El País*. 30 July 2001. Available online: https://elpais.com/diario/2001/07/30/catalunya/996455247_850215.html (accessed on 18 September 2018).
36. Vicente, J. Cataluña como red de sistemas urbanos. Entre la tradición y la utopía. In *Una Nueva Cultura del Territorio*; Tarroja, A., Camagni, R., Eds.; Diputació de Barcelona: Barcelona, Spain, 2006; pp. 655–661, ISBN 9788498030808.
37. Mata Olmo, R.; Yacamán Ochoa, C. Gobernanza para una agricultura viva en un paisaje periurbano de calidad. Estudios de caso en la huerta metropolitana de Madrid. In *Análisis Espacial y Representación Geográfica: Innovación y Aplicación*; De la Riva, J., Ibarra, P., Montorio, R., Eds.; Universidad de Zaragoza-AGE: Zaragoza, Spain, 2015; pp. 275–288, ISBN 978-84-92522-95-8.
38. Pomés, J. *L'agricultura i els sindicats pagesos de Malgrat. Una panoràmica del món agrari des de finals del s. XIX fins a l'actualitat*; Ajuntament de Malgrat de Mar- La Comarcal Edicions: Argentona, Spain, 2007.

39. Badosa, R. *Evolució de l'agricultura de la comarca del Maresme en els darrers cent anys. Dossiers Agraris*; num. 16; Institut Català d'Estudis Agraris (ICEA): Barcelo, Spain, 2013; pp. 201–209. Available online: <https://www.raco.cat/index.php/DossiersAgraris/article/view/286473> (accessed on 18 September 2018). [CrossRef]
40. Generalitat de Catalunya. *Estadísticas del Departament d'Agricultura, Ramaderia, Pesca i Alimentació*. 2017. Available online: <http://agricultura.gencat.cat/ca/departament/estadistiques/agricultura/estadistiques-definitives-conreus/> (accessed on 18 September 2018).
41. Naredo, J.M.; García, R. *Estudio Sobre la Ocupación de Suelo por usos Urbano-Industriales, Aplicado a la Comunidad de Madrid, Informe Final*; Convenio de colaboración: Universidad Politécnica de Madrid Ministerio de Medio Ambiente; Ministerio de Medio Ambiente y Medio Rural y Marino: Madrid, Spain, 2008.
42. Ministerio de Agricultura, Ganadería, Pesca y Alimentación (MAGPA). *Encuesta de superficie y rendimiento de cultivo*; MAGPA: Madrid, Spain, 2017.
43. Cerrada-Serra, P.; Colombo, L.; Ortiz-Miranda, D.; Grando, S. Access to agricultural land in peri-urban spaces: Social mobilization and institutional frameworks in Rome and Valencia. *Food Security* **2018**, *10*, 1325–1336. [CrossRef]
44. Zasada, I. Multifunctional peri-urban areas—A Review of societal demands and agricultural provision of goods and services. *Land Use Policy* **2011**, *28*, 639–648. [CrossRef]
45. Sanz Sanz, E.; Yacamán Ochoa, C.; Mata Olmo, R. Sistemas agroalimentarios. Apropiación del territorio a través de la alimentación. Los ejemplos de Madrid y Aviñón. In *Cultura Territorial e Innovación Social. ¿Hacia un Nuevo Modelo Metropolitano en Europa del Sur?* Baron, N., Romero, J., Eds.; Universitat de València: Valencia, Spain, 2018; pp. 453–476, ISBN 978-84-9134-290-8.
46. EIP-AGRI. *EIP Focus Group Innovative Short Final Report Food Supply Chain Management*; EIP-AGRI: Brussels, Belgium, 2015.
47. Sonnino, R. Quality food, public procurement, and sustainable development: The school meal revolution in Rome. *Environ. Plan.* **2009**, *A 42*, 425–440. [CrossRef]
48. Todorovic, V.; Maslarić, M.; Bojic, S.; Jokic, M.; Mirčetić, D.; Nikolicic, S. Solutions for More Sustainable Distribution in the Short Food Supply Chains. *Sustainability* **2018**, *10*, 3481. [CrossRef]
49. Berti, G.; Mulligan, C. Competitiveness of small farms and innovative food supply chains: The role of foodhubs in creating sustainable regional and local food systems. *Sustainability* **2016**, *8*, 616. [CrossRef]
50. Cleveland, D.A.; Müller, N.M.; Tranovich, A.C.; Mazaroli, D.N.; Hinson, K. Local food hubs for alternative food systems: A case study from Santa Barbara County, California. *J. Rural Stud.* **2014**, *35*, 26–36. [CrossRef]
51. Palacios-Argüello, J.; Morganti, E.; Gonzalez-Feliu, L. Food hub: Una alternativa para alimentar las ciudades de manera sostenible. *Revista Transporte y Territorio* **2017**, *17*, 10–33. Available online: <http://www.redalyc.org/articulo.oa?id=333053372002> (accessed on 10 September 2018).
52. Mata Olmo, R.; Yacamán Ochoa, C. El paisaje de la agricultura periurbana en proceso de patrimonialización. El caso de la huerta de Fuenlabrada en el área metropolitana de Madrid. In *Paisajes Patrimoniales de España*; Molinero, F., Tort, J., Eds.; MAPAMA-UAM: Madrid, Spain, 1998; Tomo III; pp. 1356–1375.
53. Mastronardi, L.; Marino, D.; Cavallo, A.; Giannelli, A. Exploring the role of farmers in short food supply chains: The case of Italy. *Int. Food Agribus. Manag. Rev.* **2015**, *18*, 109–130.
54. Facilitating Alternative Agro-Food Networks (FAAN). *Local Food Systems in Europe. Case Studies from Five Countries and What They Imply for Policy and Practice*; IFZ: Graz, Austria, 2010; ISBN 978-3-9502678-2-2.
55. Ilbery, B.; Kneafsey, M. Producer constructions of quality in regional speciality food production: A case study from south west England. *J. Rural Stud.* **2000**, *16*, 217–230. [CrossRef]
56. Mansfield, B. Spatializing globalization: A “geography of quality” in the seafood industry. *Econ. Geogr.* **2003**, *79*, 1–16. [CrossRef]

