

The contributions of short food supply chains to territorial development: A study of three Quebec territories



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ABSTRACT

Short food supply chains (SFSCs) have undergone significant developments for roughly a decade, spurring the interest of producers, consumers and governments. A thorough review of the literature shows the various economic, social and environmental benefits associated with SFSCs across much of Europe and North America. However, these benefits have generally been analyzed in isolation from each other, with very few studies attempting to characterize them as a whole in a systemic fashion.

This article aims to evaluate the contributions of SFSCs to territorial development in three contrasting Quebec territories. For this, we developed a model that is organized around four dimensions that are interlinked through systemic relations: farmers' welfare, local development, welfare of the community, and environmental protection. For each of these dimensions, we determined criteria and indicators in order to compare, whenever possible, the results obtained in this research with the available provincial data.

Overall, our results show that, when considering the indicators chosen for this research, SFSCs mostly have a positive effect on the three territories targeted by our research. The most positive aspects of these systems are job creation, skills development for farmers, job satisfaction, and the adoption of sustainable agricultural practices. The most neutral elements relate to revenues for farmers engaged in SFSCs, the economic weight of SFSCs within the local economy, the influence of SFSCs on the access to fresh and healthy food, and their effects on social cohesion.

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1. Introduction

The development of short food supply chains (SFSCs) has, in recent years, given rise to a significant body of research, most of which attributes numerous benefits to this type of marketing system. A review of the literature hence suggests that SFSCs have all the qualities to improve the sustainability of the food system. These benefits are often presented as responses to the negative externalities of the conventional food system on rural development, employment or the sustainable management of natural resources (Goodman and Watts, 1997; Altieri, 1998; Trobe et al., 2000; Van Der Ploeg and Renting, 2000; Hendrickson and Heffernan, 2002; Allen et al., 2003; Renting et al., 2003; Maye et al., 2007;

Wiskerke, 2009).

Various examinations of SFSCs benefits have, however, led to nuanced conclusions and even, in some cases, to their questioning. For instance, marketing systems that bring consumers and producers closer together are not free from power relations. Indeed, not all farmers are equal before consumers in these systems, who are generally well-educated and middle class (Hinrichs, 2000; Mundler, 2007). SFSCs are thus more accessible to producers who speak the same language as their consumers and who share similar social, economic and environmental values (Jarosz, 2011). Moreover, the viability of these marketing systems is hardly ensured due to the rather precarious loyalty of a clientele that tends to idealize farming as "repeasantized" (Goodman, 2004). Finally, various studies show that farmers determine their prices based on their estimate of the consumers' willingness to pay (Cooley and Lass, 1998; Tegtmeier and Duffy, 2005; Brown and Miller, 2008; Mundler, 2013). However, this price fixing method does not necessarily lead to an improvement of their remuneration. Several authors even use the term *self-exploitation* to emphasize that these

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prices do not adequately compensate the efforts invested by these farmers into the production, processing and selling of their products (Hinrichs, 2000; Galt, 2013).

A thorough review of the literature, shows a problem of access to data that prevent a comprehensive assessment, both qualitative and quantitative, of the benefits assigned to SFSCs (Sonnino and Marsden, 2006; Martinez et al., 2010; Kneafsey et al., 2013; O'Hara and Pirog, 2013). Most studies on SFSCs are based on case studies that are restricted to a particular region. Moreover, these works are usually dedicated to a particular type of SFSCs from the nine possible types identified by Pretty (2001), with the box scheme¹ being the most studied, followed by farmers markets. In short, findings usually apply only to a specific type of SFSCs in one given context.

Our goal with this research was to build a systemic analysis model of the benefits attributed to SFSCs in order to measure their contribution to territorial development. The model was applied to three contrasting regions in Quebec. In this Canadian province, SFSCs have been proliferating continuously over the past ten years. Identified as promising means to diversify agricultural activities in a recent report on the future of agriculture and agri-food in Quebec (CAAQ, 2008), SFSCs have since then been the subject of support programs of Quebec's Ministry of Agriculture, Fisheries and Food (MAPAQ). SFSCs exist in various modes ranging from farm stands, U-pick farms, box schemes and online sales to farmers' markets, direct sales to supermarkets and food hubs (Colombani-Lachapelle and Pouliot, 2012; Lemay, 2012). According to data from MAPAQ, direct sales—where farmers sell directly to consumers—concern more than one producer out of two for certain products (beekeeping, greenhouse crops, fruits, etc.) but it is also prevalent in larger industries such as maple syrup and table eggs (13% of producers). In total, 3500 (12% of) Quebec producers engage in direct sales, accounting for just over 3% of Quebec's agricultural gross revenues (\$270 million annually). That said, given that SFSCs have only (re)emerged recently, knowledge about them is still fragmented.

The next section presents the analysis model constructed for this research. The subsequent section explains how this model has been operationalized and thus presents the criteria and indicators selected for assessing the contribution of SFSCs to territorial development. The results obtained are then presented in the third section. The article concludes by discussing the implications of these findings for territorial development.

2. Concepts and analysis model

Our definition of SFSCs follows the French school of proximity (Torre and Gilly, 1999; Carrincazeaux et al., 2008; Kebir and Torre, 2013), which considers both relational and geographical proximity. Specifically, these supply chains combine different dimensions: a spatial dimension, aiming toward a geographical rapprochement between consumption and production; a functional dimension, aiming toward the proper delivery of the product from the producer to consumers through the various participants in the system; a dimension of interconnectedness between the actors; and an economic dimension allowing for economically viable market exchanges for the stakeholders (Prally et al., 2014). In other words, if direct sales are part of SFSCs, the latter encompass a larger number of initiatives that capitalize on a relational or spatial

proximity between farmers and consumers, regardless of the number of intermediaries. These marketing channels cannot be clearly separated from more conventional ones, since they interact and farmers view them as complementary and often engage in both simultaneously (Ilbery and Maye, 2005; Sonnino and Marsden, 2006).

Various authors use the classical sustainable development framework, organized around the three pillars of sustainability (economic, social, environmental), in order to examine the benefits of SFSCs (Schönhart et al., 2009; Darrot and Durand, 2010). However, this framework fails to properly link the supposed benefits to the different categories of actors. For example, how might economic sustainability be assessed? By the benefits they provide for farmers or by the low cost paid by consumers? Thus, based on the literature review performed, we constructed a model that classifies the contributions of SFSCs into four interacting dimensions: farmers welfare, local development, welfare of the community, and environmental protection.

2.1. Farmers welfare

For farmers, the anticipated benefits are both economic and social. Economically, SFSCs would allow for a better redistribution of the value added and they would make farmers less sensitive to market risks, through a reduction in the number of intermediaries, through diversification, and through better control of prices, guaranteeing less asymmetrical relations with customers (Govindasamy et al., 1999; Hardesty and Leff, 2010; Uematsu and Mishra, 2011; Chiffolleau and Prevost, 2013; Richard et al., 2014). Synergy effects and network externalities are another type of economic benefit identified in the literature (Knickel and Renting, 2000; Marsden et al., 2000; Van der Ploeg and Renting, 2004; Beckie et al., 2012).

In social terms, the mentioned benefits are just as numerous. SFSCs would promote social and professional recognition of farmers (Dufour et al., 2010) and even allow for a form of social and professional reintegration for vulnerable or marginalized farmers (Chiffolleau, 2013). They would offer development opportunities to small farms (Feenstra et al., 2003), including through market relations oriented toward fair trade principles (Vogt and Kaiser, 2008). SFSCs are also seen to favor the development of new skills (Dowler et al., 2004), with many authors noting a higher level of education among farmers engaged in this type of food system (Martinez et al., 2010; Aubert, 2013). Finally, other authors highlight the active role played by women farmers (Wells and Gradwell, 2001; Trauger et al., 2010) in the development of SFSCs. From that perspective, SFSCs could be seen as promoting women's independence and professional development, unlike industrial agriculture, which has tended, thus far, to exclude women from agricultural activities (Barthez, 1982; Salmona, 1994). In France, Giraud and Rémy (2013) were able to validate, through a statistical analysis of the agricultural census data, the strong presence of women in marketing-related activities in SFSCs.

2.2. Local development

For this dimension, the dynamics of valorization, development and mobilization of local resources are observed. For local economies, the benefits are linked to the creation of jobs, both wage and family labor (Pretty, 2001; Capt and Dussol, 2004; Saltmarsh et al., 2011), to land use and occupancy by small farms (Martinez et al., 2010), to the revitalization of rural areas (Wiskerke, 2009), and to the promotion of local food production (Brown and Miller, 2008). SFSCs would also stimulate the creation of new farms (Vogt and Kaiser, 2008; Blouin et al., 2009; Dufour et al., 2010), particularly

¹ With this we mean box scheme based on a contract and prepaid subscription: Community Supported Agriculture (CSA) in the United States, Teikei in Japan, Associations pour le Maintien de l'Agriculture Paysanne (AMAP) in France, Agriculture soutenue par la communauté (ASC) in Quebec, etc.

by farm operators who have no family background in agriculture (Ponchelet and Mundler, 1999; Barbieri and Mahoney, 2009; Capt and Wavresky, 2011; Auclair et al., 2015). In fact, studies that correlate the size of the farm, in terms of hectares, to participation in SFSCs show that small farms are more engaged in direct sales than are medium and large farms, both in the United States (Martinez et al., 2010) and in France (Barry, 2012).

Various studies also point to a multiplier effect induced by the fact that the circulation of money remains local in SFSCs. Apart from an input–output (IO) model that measures the theoretical impact of SFSCs on employment, labor income and gross regional products based on pre-existing relationships between sectors of a regional economy (O'Hara and Pirog, 2013; Boys and Hughes, 2013), various works generated original data, through surveys or polls, showing the multiplier effect of some forms of SFSCs on local trade (Lev et al., 2003; Otto and Varner, 2005; Henneberry et al., 2009).

2.3. Welfare of the community

This third dimension differs from local development in that it refers less to the building of local resources than to an *atmosphere*, to borrow the term used by Marshall (1920) to describe the ambience of industrial districts. We are interested here in the rapprochement between farmers and the rest of the population, which many authors call *reconnection* (Lyson, 2004; Parker, 2005; Maye et al., 2007), in citizen mobilization around SFSCs, and in other elements related to food security, health (Saltmarsh et al., 2011; Cohen et al., 2012; Evans et al., 2012) and consumer education (Allen et al., 2003; Alonso, 2010). Various concepts are used in the literature to illustrate the fact that SFSCs foster new relationships between producers and consumers. For instance, embeddedness is a concept mobilized by authors (Hinrichs, 2000; Sage, 2003; Winter, 2003) to illustrate how economic relationships in SFSCs are forged through trust and reciprocity (Parker, 2005; Maréchal, 2008). Other authors use social capital (Sharp and Smith, 2003; Wiskerke, 2009; Chiffolleau and Prevost, 2013) as a concept to highlight how SFSCs foster a sense of community. Social capital is developed through the creation of new networks in local communities engaging both farmers and non-farmers, rural or urban, on new bases. Finally, SFSCs would render quality products (with regard to freshness, traditional character or methods of production) accessible at affordable prices for consumers (Cooley and Lass, 1998; Flaccavento, 2011).

2.4. Environmental protection

This last dimension, thoroughly discussed in the literature, spans various fields. Many authors have argued that SFSCs enable the consumption of seasonal products (Carlsson-Kanyama et al., 2003), reduce food miles (Pirog et al., 2001; Pimentel et al., 2008) and lead to improved agricultural practices due to ongoing interactions with consumers (Gilg and Battershill, 2000; Berger, 2013). The anticipated impacts concern crop biodiversity (Goland and Bauer, 2004; Bressoud, 2009; Björklund et al., 2009; Praly, 2010), landscapes (Dowler et al., 2004; Schönhart et al., 2009), the reduced use of chemical inputs (Aubert, 2013) and the reduction of packaging and waste (Berger, 2013). Several authors further note the relatively high proportion of certified organic farms in SFSCs (Martinez et al., 2010; Barry, 2012; Kneafsey et al., 2013). These findings are not surprising given that organic farming is standard practice in certain marketing systems, such as Teikei in Japan (Amemiya, 2007) or community-supported agriculture (CSA) in North America (Brown and Miller, 2008).

If each dimension was presented separately, one has to keep in mind that they are interdependent and interactive. A number of

observed benefits feed into various virtuous circles. For instance, an increase in agricultural revenues for farmers has impacts on the local economy. Or sustainable agricultural practices may have a positive impact on the well-being of the community, with regard to the quality of the living environment, health or the coexistence of farmers and residents. Fig. 1 shows the four selected dimensions of the model, their respective sub-dimensions and their interaction.

3. Methodology and selected fields

For each dimension of our analysis model, we selected various criteria and indicators in order to render the model operational. Two orientations guided this selection. First, where possible, quantifiable indicators were favored in order to compare our data with available statistics collected at the federal (Statistics Canada) or provincial (MAPAQ) level. Secondly, certain indicators, such as energy efficiency and the reduction of packaging, were deliberately excluded since they require the implementation of elaborate and specific methodologies. Table 1 presents the indicators selected for each dimension. The last column presents the sources of our data.

3.1. Data collection and processing methods

The analysis model defined in the previous section was implemented in three territories. Three data collection tools were mobilized: a questionnaire to farmers, qualitative interviews with stakeholders and farmers and a price survey.

A questionnaire was sent to producers meeting the following

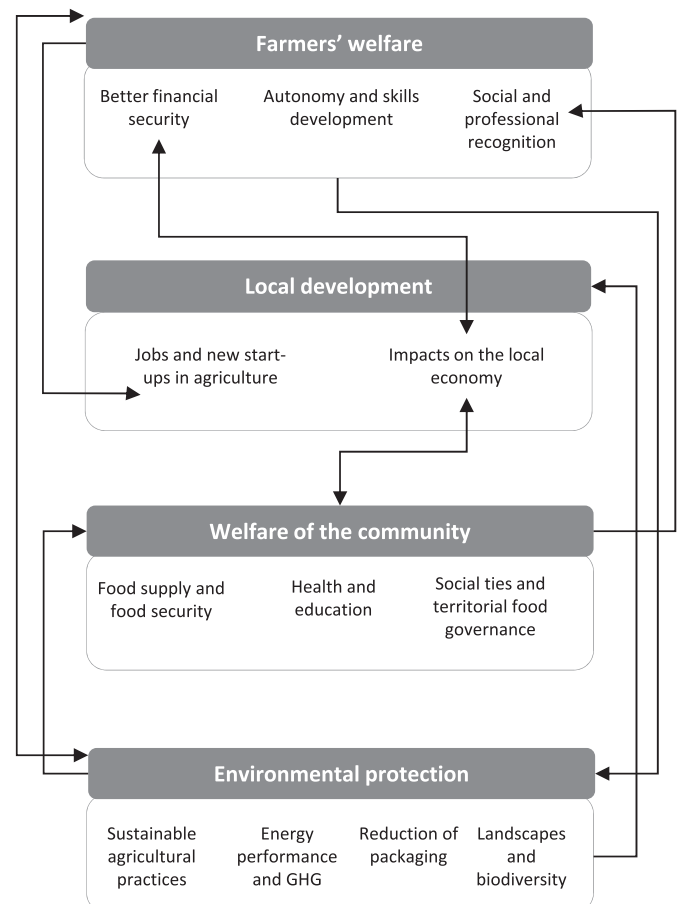


Fig. 1. Analysis model of the contributions of SFSCs to territorial development.

Table 1
Criteria and indicators retained to measure the advantages of SFSCs.

	Criteria	Indicators	Source
Farmers welfare	Financial security	Operating profit margin	Farmer surveys; Available statistical data (StatCan and MAPAQ)
	Job satisfaction	Level of satisfaction for: - fulfillment at work - social recognition of the work - financial recognition of the work	Farmer surveys (Likert scales)
	Competencies	Level of training	Farmer surveys Available statistical data (StatCan)
	Role of female farm operators	Proportion of female farm operators Number of hours worked by women on farms	Farmer surveys; Available statistical data (StatCan)
Local development	Vitality of local economy	Labor on farms Economic weight of SFSCs Existence of tourism routes, labels, and other territorial approaches to valorization.	Farmer surveys; Available statistical data (StatCan) Interviews with stakeholders
	Land use and occupancy	Farm succession, farm history and family background Farm size	Farmer surveys; Available statistical data (MAPAQ)
	Welfare of the community	Education and health Existence of educational activities on farms selling in SFSCs	Farmer surveys; Price surveys; Interviews with stakeholders
Environmental protection	Increased social cohesion	Harmonious coexistence in rural areas between farmers and residents Involvement and citizen mobilization in SFSCs	Farmer surveys; Interviews with stakeholders
	Sustainable agricultural practices	Proportion of organic farms Use of inputs (fertilizers and pesticides) Presence of windbreaks, cover crops and green manures	Farmer surveys; Available statistical data (StatCan)
	Landscape and biodiversity	Agrobiodiversity Size of the plots	Farmer surveys

criteria: i) to sell all or some of their products through SFSCs, ii) to have a valid email address available online, and iii) to be located in the territories of the study ($n = 157$). Since farms engaged in SFSCs are not officially listed in Quebec, our database was built from directories made available online by regional county municipalities (RCMs)² as well as different tourist and agri-food organizations. If its comprehensiveness cannot be guaranteed, we believe all farms for which SFSCs are significant in their business strategy were overall identified. The aim of the questionnaire was to characterize farms selling through SFSCs, to gather the quantitative data necessary for the evaluation of the indicators presented in Table 1, and to provide a demographic portrait of the participants. LimeSurvey was the software used to distribute the questionnaire and compile responses.

The return rate was 38.9% ($n = 61$), which is satisfying considering the literature on response rate for Internet-based surveys (Sheehan, 2001; Shih and Fan, 2008; Sauermann and Roach, 2013). Table 2 presents the main characteristics of our sample. Since this study is intended as qualitative and exploratory and the results are not meant for generalization, the representativeness of our sample is not sought. Nonetheless, a few comments can be made. Farm operators in our sample are younger than the Quebec average which is consistent with the literature (Brown and Miller, 2008; Martinez et al., 2010; Capt and Wawresky, 2011; Aubert, 2013). Our sample also contains a high proportion of vegetable and fruits farms which is not surprising since collective marketing is limited in those industries and studies have generally found a strong presence of those farms in SFSCs (Martinez et al., 2010; Capt and Wawresky, 2011; ADEME, 2012; Aubert, 2013). Finally, our sample has a relatively low number of very small farms and a relatively high proportion of farms with a gross income ranging between \$50,000 and \$100,000. This reflects the modest size, but the professional orientation of the farms from our sample.

The data collected are compared with statistics on all Quebec farmers available at the provincial (MAPAQ) and federal level (Statistics Canada). It should be noted that our analysis relies primarily on a qualitative assessment of descriptive statistics for two reasons. First, our sample has a limited scope and shows a strong internal diversity. It is thus difficult to draw definitive results, since our confidence intervals (95%) are generally wide. Second, Statistic Canada and the MAPAQ provide only means or farm distribution for different data collected through the agricultural census (Statistic Canada) and the registration forms (MAPAQ). Their whole databases were not made available. It was thus not possible to conduct analysis of variance which could have strengthened our results. In sum, this study is qualitative and exploratory. The survey results are not definitive, but constitute an interesting step toward a better understanding of SFSCs effects on territories and their assessment. They should not be the subject of generalization.

Semi-structured interviews were also conducted with twelve people (local producers and stakeholders) for each territory ($n = 36$). The interviews with producers helped contextualize the information collected with the questionnaire and allowed for a better understanding of some trends emerging from the data. Farmers were chosen in order to represent diverse products, SFSCs modes, farming systems and farm history. Interviews were also conducted with local stakeholders in order to understand how SFSCs unfolds in each territory and to identify the challenges they face and the effects they have. Various stakeholders were interviewed: elected officials – from municipalities where SFSCs have known a significant growth – as well as agri-food, health/food security and territorial development organizations that are engaged in the development of SFSCs. The selected organizations were regarded as having specific expertise and singular experience relating to SFSCs.

Finally, the price surveys served to assess the issue of economic accessibility to local products. These surveys covered several products and were conducted in grocery stores, on farms and on the online platform of local food hubs.

² RCMs are groupings of municipalities; they are responsible for economic development and regional planning.

Table 2
Main characteristics of our sample.

	Sample	All of Quebec
Average age	47	54
Distribution of farm operators by age		
Less than 35	16%	9%
35–54	54%	44%
More than 55	30%	47%
Average age at which farm operators started farming	32	33.5
Number of years since the farm operator started farming		
Average	15.7	20.3
Less than 5 years	15%	12%
5–20 years	56%	39%
More than 20 years	29%	49%
Distribution of farms by main products		
Vegetables	24.6%	3.7%
Fruits	29.5%	4.5%
Cattle	9.8%	34.6%
Poultry	4.9%	2.9%
Sheep & goat	6.6%	2.6%
Other (beekeeping, maple, diversified, etc.)	24.6%	51.7%
Distribution of farms by gross farm income		
Less than \$50 000	27%	39%
Between \$50 000–\$99 999	31%	12%
Between \$100 000–\$199 999	14%	14%
Between \$200 000–\$499 999	12%	21%
\$ 500,000 and more	16%	14%

Source: Registration forms from 2010, MAPAQ.

3.2. The territories under study

The study was conducted at the level of RCM in order to geographically limit the extent of the study and be able to conduct a thorough assessment of SFSCs in each territory. There are over 80 RCM in Quebec, three were selected in order to conduct the study: Brome-Missisquoi, Lac-Saint-Jean-Est and Lotbinière. They were selected to reflect a diversity of geographical situations (remote, near a major city, gentrified/touristed) as well as the current

deployment of SFSCs in Quebec. Brome-Missisquoi was selected because of its singular traits: it is a popular tourist destination (known for its wine production) and a territory that has undergone a significant gentrification process. Lac-St-Jean-Est was retained because it is a remote rural area where SFSCs are present, but still marginal. Lastly, Lotbinière was selected for its strong farming industry in which SFSCs are a growing proportion and its location near a major city in the province: Quebec City. The main characteristics of the three selected territories are presented in Table 3.

Table 3
The characteristics of the three territories.

RCM	Lac-Saint-Jean-Est	Lotbinière	Brome-Missisquoi
Milieu	Remote rural	Rural close to a major city	Rural, touristed and gentrified
Area (1)	2775 km ²	1663 km ²	1651 km ²
% of the land occupied by the agricultural zone ^a (2)	35.6%	97.8%	79.5%
Population (1)	53,223	31,112	56,934
Average property value of houses (1)	\$161,071	\$179,599	\$251,400
Average income (1)	\$36,315	\$34,925	\$35,281
Average socio-economic development index ^b (3)	−0.75	2.83	3.14
No. of farms (4)	338	770	749
No. of identified farms selling through SFSCs	22	62	106
Annual regional agricultural revenue (in \$M) (4)	96.1	302.4	231
Main agricultural products (4)	Dairy, cattle, fruits (blueberries)	Dairy, crops, beekeeping	Crops, fruit (apples), dairy
Territorial approaches to local resources valorization	<i>Réseau des kiosques à la ferme; Arômes et Saveurs routes</i>	<i>Label Goûtez Lotbinière; Arrêts gourmands routes</i>	<i>Route des vins Brome-Missisquoi; various fairs and events; label Créateur de Saveurs and Le garde-manger du Québec</i>

^a The agricultural zone is a part of the territory where soil and surroundings are protected, under the *Act to preserve agricultural land and agricultural activities*, for agricultural purposes.

^b The socio-economic development index is an index established by Quebec's Ministry of Municipal Affairs, Regions and Land Occupancy (MAMOT) for all Quebec municipalities. It is based on seven socioeconomic variables including demographic indicators, employment and income. Localities showing a value below −5.0 are considered devitalized.

Sources: (1) Institut de la statistique du Québec, Statistical profiles by region and geographical RCMs; (2) CPTAQ, 2014, *Rapport annuel de gestion de la Commission de protection du territoire agricole du Québec 2013–2014*; (3) MAMROT, 2006, *Indice de développement socioéconomique*; (4) MAPAQ, 2010, *Profil 2010 de l'industrie agricole. MRC Lac-Saint-Jean-Est*; MAPAQ, 2010, *Portrait agroalimentaire MRC de Lotbinière*; MAPAQ, 2010, *Portrait agroalimentaire de la MRC de Brome-Missisquoi*.

While all three territories were shown to have various initiatives for promoting local products, the presence, development and deployment of SFSCs are variable, with each territory having its unique characteristics and challenges.

4. Results

In the following section, we will examine the impacts of SFSCs for each dimension of our model: farmers welfare, local development, welfare of the community, and environmental protection. For Section 4.3 comparisons with provincial data were not possible, because most indicators are qualitative and similar provincial data are not currently available. Results in this section are thus mostly based on statements collected during interviews with stakeholders and farmers. For each other dimension, we first present, in a table, the indicators (presented in Table 1) for which comparisons with the Quebec average were possible before discussing more qualitative indicators for which we do not have statistics.

4.1. Farmers welfare

The first economic indicator that we adopted is the average operating profit margin (OPM). This ratio measures the share of the output that can be used to remunerate the family labor and the family capital. In our sample, farms have, on average, an OPM below that of all Quebec farmers, albeit with strong variations between them (see Table 4). This finding differs from the literature since the latter postulates that farms engaged in SFSCs should achieve better incomes through higher value added on products and the elimination of intermediaries (Govindasamy et al., 1999; Hardesty and Leff, 2010; Uematsu and Mishra, 2011). It seems to be the case only for vegetable farming that has an OPM equals to 24% (vs. 13% for all of Quebec). When the average OPM is calculated for different gross farm income brackets (see Table 4), only farms in the first brackets (with gross farm income under \$50 000) perform better than the Quebec average. We thought lower OPM in our sample could be caused by a higher proportion of young farms. But, as Table 4 shows, newer farms in our sample do not, on average, have lower OPM.

A more detailed analysis of our database indicates that six farms

(13%) had a negative OPM, with one reaching over -200% . The majority of these farms were either started by people who made a career change or rely on other sources of income (non-agricultural work). It could be presumed that they have lower incentives for high profitability since they have other revenues to sustain their household and agricultural activities. However, other farmers in our sample have a similar profile and still reach a positive OPM. The status (full time vs. part-time) and professional orientation of farm operators could influence financial results, but don't seem to be a sufficient explanation. In sum, contrarily to what is conveyed in the literature on farms using SFSCs, our sample do not appear to generate more added value than the average Quebec farm. That being said, our sample shows a strong internal diversity making decisive interpretation difficult. Further research is necessary in order to investigate the link between SFSCs, farms characteristics, revenues and added value. Finally, it should be stressed that Quebec's main agricultural products are protected by revenue insurance programs (crops, cattle, etc.) or supply management (milk, eggs, etc.).

Apart from the fact that the farmers claimed, in the survey, that SFSCs allow them to develop various new skills, our data has shown significant differences in terms of levels of education between farmers in SFSCs and the provincial average. The vast majority of farm operators in our sample have a post-secondary education (82%) and over half have a university degree—which differs clearly from the Quebec average (post-secondary education—33% and university degree—13%). This confirms a trend observed in various countries (Brown and Miller, 2008; Martinez et al., 2010; Capt and Wawresky, 2011).

Women are also more present on the farms in our sample, even if they report working slightly fewer hours on average than men: 34 h per week for women against 42 h for men. Their role appears to be much more prominent in activities related to administration and processing, but not distribution. This confirms earlier findings on the proximity between professional and domestic activities (Giraud, 2004; Barthez, 2005). However, our survey does not confirm the predominance of women in activities involving direct contact with customers, which are activities that are frequently associated with the notion of “care” and thus with women on farms (Wells and Gradwell, 2001; Jarosz, 2008; Trauger et al., 2010).

Table 4
Indicators of farmers welfare.

		Sample (n = 61)	All of Quebec
Operating profit margin (OPM) ^a (1)	Average OPM	11.95%	16.91%
	OPM – Gross farm income (GFI) under \$50 000	–7.45%	–8.51%
	OPM – GFI between \$50 000 – \$100 000	12.43%	14.15%
	OPM – GFI over \$100 000	20.99%	22.19%
Level of training (2)	OPM – Less than 5 years since farm operators started farming	41%	n.a.
	OPM – 5–20 years since farm operators started farming	5%	n.a.
	OPM – More than 20 years since farm operators started farming	15%	n.a.
	None	0%	24%
	High School	11%	20%
Role of female farm operators on farms (3)	Professional	7%	23%
	College	30%	20%
	University	52%	13%
	% of female farm operators (1)	41%	26%
Role of female farm operators on farms (3)	>40 h per week (2)	35%	31.6%
	Between 30 and 40 h per week (2)	27.5%	14.6%
	<30 h per week (2)	37.5%	53.8%

^a Statistics Canada defines the OPM as “the ratio of net operating income to operating revenues, measured in percentage. [...] This ratio is calculated by dividing the net operating income by the total operating revenues.”

Sources: (1) Agriculture Taxation Data Program, 2012, compilation done by Statistics Canada subsequent to our request. The data of Statistics Canada represent the OPM; (2) Data obtained from pairing the Census of Agriculture and the National Household Survey, 2011; compilation done by Statistics Canada subsequent to our request; (3) Statistics Canada; Census of Agriculture (2011), compilation done by Statistics Canada subsequent to our request.

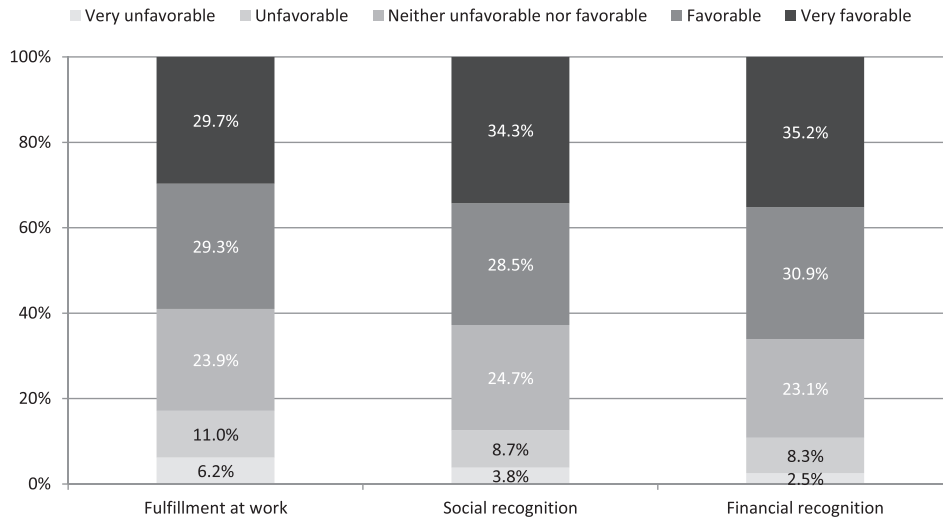


Fig. 2. Job satisfaction level of farmers.

Job satisfaction of producers in SFSCs was assessed, in this study, according to a framework borrowed from Serge Paugam (2000) and adopted by Dufour et al. (2010) in a study concerning farmers operating in SFSCs. The framework revolves around three dimensions: fulfillment at work (*homo faber*), social recognition of the work (*homo sociologicus*) and financial recognition of the work (*homo economicus*). For each dimension, a series of items (27 in total) were presented to the producer. The latter had to indicate, on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), his or her agreement with various statements related to the benefits or drawbacks of SFSCs. Fig. 2 shows a summary of the responses for the three dimensions explored.

Producers from our sample are mostly satisfied with their work and the recognition which selling in SFSCs provides them. The proportion of producers having an unfavorable perception of SFSCs was in all cases lower than 18%. However, that proportion appears to be slightly higher for the aspect “fulfillment at work,” especially when it came to the workload required by SFSCs and the farm management which is more complex in these systems.

These results confirm those of other works that highlighted the cognitive load associated with the complex work organization induced by SFSCs as well as the additional constraints they impose on farmers (Blanchemanche, 1999; Dedieu et al., 1999). On the other hand, farmers showed themselves to be much more positive about autonomy, the ability to innovate and the new learning opportunities which SFSCs afford them. The strong appreciation displayed for the financial recognition shows that the farmers in our sample widely agreed on the financial security provided by SFSCs, be it due to better market risk management (price control), revenue or more equitable trade relations.

4.2. Local development

The contribution of farms operating in SFSCs appears quite significant in terms of local employment: they create on average four full-time jobs per farm against two and a half for the Quebec average (see Table 5). Our findings are consistent with what was established in other countries (Capt and Dussol, 2004; Martinez

Table 5
Local development indicators.

		Sample (n = 61)	All of Quebec
Labor on farms (1)	Number of farm operators measured in full-time equivalent (FTE)	2.06	1.49
	Number of farm employees measured in FTE	1.97	0.98
	Total FTE	4.02	2.47
Weight of SFSCs in the economy (2)	Proportion of farm employees (paid agricultural labor) living in the RCM year-round	49%	n.a.
	Portion of the production sold locally	37.4%	n.a.
	Portion of the total gross farm receipts	2.16%	n.a.
Farm history (3)	Portion of household food expenditures	2.96%	n.a.
	Farm bought internally from a family member	23%	59%
	Farm bought from a third party	7%	8%
Family background (3)	Establishment of a new farm	70%	33%
	Parents are farmers	38%	74%
Farm succession (3)	No intention to transfer the farm	24.5%	24%
	Intention to transfer the farm	24.5%	47%
	Does not know	51%	29%
Farm size (4)	Land in crops (ha)	43.8 ha	67 ha

Source: (1) Compilation of tables CANSIM 004–0241, 004–0236 and 004–0200 of the 2011 Census of Agriculture of Statistics Canada. (2) Table CANSIM 004–0233 of the 2011 Census of Agriculture of Statistics Canada for the gross agricultural receipts by RCM; Table CANSIM 203–0028 of the 2011 Survey of Household Expenditures of Statistics Canada as well as Catalogue no. 98-313-XCB2011022 of the 2011 Census of Population of Statistics Canada to calculate the portion of food expenditures. (3) Young farmers Census 2011, compiled by MAPAQ and registration forms from 2010, MAPAQ. (4) Registration forms from 2010, MAPAQ. Methodological note (1): Statistics Canada collects the number of weeks worked. We hypothesized that this referred to full-time work, which can lead to slightly overestimating the average number of FTEs. As for the farm operators, the total number of farmers was divided by the total number of farms. Here as well we assumed that all operators worked full time, which may also lead to overestimating the average number of FTEs. The same method was applied to our sample in terms of the number of operators.

et al., 2010). If we relate farm labor to the cultivated area, as Saltmarsh et al. (2011) have done, we get, for farms selling mainly in SFSCs, 0.75 FTE per cultivated hectare against 0.19 for farms engaged primarily in conventional food chains. Of course, these data are also indicative of lower labor productivity on farms engaged in SFSCs which is consistent with the literature (Mundler et al., 2008; Galt, 2013).

By contrast, their contribution to the overall agricultural production in their territory appears rather marginal, namely 2.16% of total gross farm receipts and 2.96% of the household food expenditures³ Nevertheless, at a qualitative level, 81% of the producers in our sample consider that SFSCs contribute more to a revitalization of rural areas than do conventional marketing systems.

In all three territories under study, territorial initiatives, such as routes and labels, were developed by local stakeholders in order to capitalize on local resources (see examples in Table 3). Interviewed stakeholders have emphasized the positive effect of these initiatives, and more broadly of farms engaged in SFSCs, on the attractiveness of their territory for new residents and for tourism. Agritourism is in fact a growing tourist attraction in all three territories studied, while more important in Brome-Missisquoi with the Wine Route. Stakeholders also consider that SFSCs and territorial initiatives capitalizing on them encourage visitors and local residents to engage with the countryside in new ways and to visit farms and villages where they would not have gone to otherwise.

In terms of land use and occupancy, the data collected on the backgrounds of farm operators confirm what has been observed in other contexts (Ponchelet and Mundler, 1999; Barbieri and Mahoney, 2009; Saltmarsch et al., 2011; Capt and Wawresky, 2011): farmers in our sample enjoyed social mobility (non-farmer parents) and have, for the most part, started their business on their own. The reasons are structural: SFSCs allow farmers to start small and grow slowly, that attracts those without a family background or experience in agriculture and with limited capital. By contrast, conventional farms are much costlier to start, explaining the existence of a certain “family advantage” (Blanc and Perrier-Cornet, 1999), especially in Quebec, where a supply-management system⁴ calls for considerable startup costs (Cantin et al., 2014).

However, uncertainty is prevailing as to the succession of farms operating in SFSCs. Most farm operators in our sample (51%) still do not know whether they will eventually transfer their farm (against 29% for all of Quebec). This may be attributed to the relative youth of our sample (47 years on average see Table 2) and to the fact that some of these farms are hinged to a personal life project that is difficult to transfer.

The last indicator refers to an oft-made assumption in the literature that SFSCs allow small-scale farming to sustain itself and thrive (Feenstra et al., 2003; Martinez et al., 2010; Barry, 2012). When comparing the average cultivated area of farms, we find that farms using SFSCs are smaller than the Quebec average. In interviews, there was a shared perception that these farms were indeed smaller but that they nevertheless had a great impact on land occupancy and use—again confirming results of previous

studies (Mundler and Ruiz, 2015). Moreover, the diversity of farms engaged in SFSCs, in terms of size and type of production, appears as a positive element in the rural and agricultural landscape where farms are continuously specializing, consolidating and growing.

4.3. The welfare of the community

Although health and food security are strongly linked to agriculture in the United States, initiatives tracing links between them in Quebec are still limited. Nonetheless, in all three territories of this study, a number of stakeholders are making increasing efforts to integrate agriculture in their endeavor to alleviate food insecurity and improve the health and nutrition in their community. Various briefs submitted by community health and action organizations to the *Commission sur l'avenir de l'agriculture et de l'agro-alimentaire québécois* (CAAAQ, 2008) also express this increasing desire to link agriculture to their mission (Mundler and Ruiz, 2015).

All three territories have initiatives that aim at improving the access of disadvantaged populations to SFSCs, showing that these marketing systems are increasingly recognized by health and food security stakeholders as potential means to solve food insecurity. However, for these initiatives to develop, stakeholders pointed toward three main issues that must be addressed: physical accessibility, affordability, and accessibility to knowledge with regard to good nutritional practices and the preparation of meals from fresh products. Incidentally, these same issues have likewise been identified in the literature (Colasanti et al., 2010; Singleton et al., 2015).

Physical accessibility to products in SFSCs is an issue since it generally requires getting to farm stands, which tend to be spread out widely across a territory. Farmers markets and food hubs are thus seen as means to improve physical accessibility to local food in rural communities. To assess affordability, we conducted price surveys for ten products, which mainly confirm findings from the literature about prices in SFSCs (Cooley and Lass, 1998; Brown and Miller, 2008; Flaccavento, 2011; McQuirt et al., 2011; Mundler, 2013). The latter are globally not higher than prices in conventional stores when comparing products of the same quality. Finally, there is the issue of the lack of the means and knowledge required to process and conserve local products, which are often sold in greater quantities, particularly those distributed in box schemes. There is therefore a risk of waste. All three territories have community kitchens that are working on remedying this problem and on enabling households to develop the necessary skills.

Farmers, in turn, promote a large number of educational activities. Three quarters of them offer farm visits, one third conduct tastings and more than half participates in festivals, fairs or shows and distribute informative flyers or recipes to their clientele. Some 86% agree with the idea that, compared to conventional supply chains, SFSCs contribute more to the education of consumers with regard to the taste, freshness and quality of food.

Our second criterion concerns social cohesion. It is based on notions of coexistence, trust and a rapprochement between producers and consumer-citizens. It remains a concept that is difficult to grasp yet that is very present in the literature on SFSCs (Pretty, 2001; Renting et al., 2003; Brown and Miller, 2008; Saltmarsh et al., 2011). The contribution of SFSCs to this criterion is therefore based, in this research, primarily on the perceptions expressed by the stakeholders in the interviews.

It should first be emphasized that the supposed benefits of SFSCs with regard to social cohesion is hardly recognized by the stakeholders. When asked about it, interviewees were barely able to identify the contribution of their actions and SFSCs to this dimension. At most, they noted that SFSCs allow for occasions for farmers and non-farmers to meet. As SFSCs are still in their early stages, it seems that they did not yet see what SFSCs can contribute,

³ To calculate the weight of SFSCs in household food expenditures and total gross farm receipts, the portion of the production sold locally (in the RCM) for each farm of the sample was multiplied by its gross farm income. The amounts obtained for each farm were added up and multiplied by the percentage they represent regarding the total number of farms selling through SFSCs identified by the MAPAQ. The total contribution was then reported on total gross farm receipts and on total household food expenditure. The average food expenditure of households in Quebec, in 2011, was \$7483 and the average household was composed of 2.3 people (Statistics Canada, CANSIM Table 203–0028). Thus, the average food expenditure was \$3253 per person. This number was multiplied by the population of each RCM.

⁴ In Canada, dairy cattle, eggs, chicken and turkey farms must acquire quotas.

in concrete terms, to the establishment of social bonds. They also felt that consumers may be in a better position to answer this question.

The issue of harmonious coexistence between farmers and other rural residents was an important one in Quebec in the 1990s, particularly in conflicts revolving around hog farms (INSPQ, 2009). Today this issue seems to have disappeared, with no stakeholders considering coexistence to be a problem. One exception is the RCM of Brome-Missisquoi, where the farmers operating in SFSCs mentioned conflicts that arose with an influx of new residents (neo-rurals) who, seeking the tranquility of the countryside, complain about the noise, dust and odors generated by farming operations. Nevertheless, these same residents constitute a clientele likely to embrace local food production (Guimond and Simard, 2008) and who can therefore be expected to welcome the presence of producers who distribute within the area. This attitude is reminiscent of discussions in the literature on the asymmetric relations in which farmers may find themselves faced with consumers who have high expectations of an idealized agriculture (Goodman, 2004).

Overall, the sense of belonging and the strengthening of social ties allowed by SFSCs are not really recognized in the three territories studied. The stakeholders are not yet in the position to assess their own impact on local cohesion, with the exception of a few collective initiatives (farmers markets, food hubs, fairs, etc.) that integrate producers and citizens.

4.4. Environmental protection

In terms of environmental protection, the majority of producers interviewed as part of this research pursue various environmentally friendly practices (see Table 6). The high proportion of certified organic farmers partly explains these results, since these producers generally adopt practices that are sustainable. This echoes trends observed in Europe (Kneafsey et al., 2013) and the United States (Martinez et al., 2010). That said, the proportion of farmers developing various sustainable practices by far exceeds that of farmers who are certified organic.

When considering expenditures on pesticides and fertilizers, our sample of fruit growers ($n = 18$) stands apart by the fact that their expenditures resemble that of the Quebec average. It is worth noting that only 2 out of 18 fruit growers are certified organic (a proportion that is 10 out of 15 for vegetable producers).

For our second criterion—the contribution of SFSCs to landscape diversity and biodiversity—no database exists that would allow for comparisons on a wider scale. Their contribution to these aspects is still hardly covered in the literature and remains a major methodological challenge (Russell and Hedberg, 2015). That said, the literature on landscapes in agricultural settings identifies various

elements contributing to the maintenance and quality of landscapes: presence of trees, crop diversity, number and size of the plots, presence of farm buildings, lack of fallow or unused land, natural environment and openness to the landscape (Holloway et al., 2006; Ruiz and Domon, 2012; Fahrig et al., 2015).

Our surveys show that the presence of windbreaks is higher in the farms constituting our sample than for all of Quebec (see Table 6). In addition, the interviews have shown that, among the newly settled farmers, half had taken over a farm that was abandoned and whose land was fallow. The farms in our sample cultivate on average 13 parcels ranging in size from 0.08 ha to 110 ha. One quarter of the farms have no parcel of land that is greater than 3 ha. All of these could be indicators of the contribution of farms engaged in SFSCs to landscape conservation.

In terms of cultivated biodiversity, 69% of the interviewed farmers say that selling in the SFSCs incites them to grow more varieties than selling in the mainstream system. These statements result in a high number of species and varieties cultivated by gardeners (30 species on average) and arborists (7 species on average).

5. Conclusion

This study aimed to assess the effects of SFSCs on territories. If no definitive conclusions can be drawn, our findings constitute a step toward a better understanding of the contributions of SFSCs to territorial development and of how to assess them. If some indicators stand out (job on farm, OPM, environmental practices, female farm operators, farm succession/start-up), further examinations are needed in order to identify what is an actual effect of SFSCs and what is specific to our sample. The available data at the provincial level and the quality of our sample prevented such examination.

To sum up, our results show that, when considering the indicators chosen for this research, SFSCs mostly have a positive effect on the three territories targeted by our research. The most positive elements concern the skill and capacity building of farmers, the satisfaction they express about the social and financial recognition permitted by these systems, the creation of jobs on farms, their environmental practices and the implementation of educational activities on farms. The most neutral elements, or for which significant differences appear within the sample, concern the revenues of farmers and the economic weight of SFSCs in the local economy. Indeed, SFSCs do not necessarily lead to increased added value on farms. Several factors appear to influence the economic results of those farms. Further research is however necessary in order to better understand the economic and financial effect of SFSCs on farms engaged in these systems. Room for improvement also exists with regard to the physical accessibility of products to low-income households.

Table 6
Environmental protection indicators.

		Sample (n = 61)	All of Quebec
Sustainable agricultural practices	Certified organic farming (1)	27.8%	3.5%
	Presence of windbreaks (2)	66%	23%
	Green manure (2)	56%	12%
	Winter cover crops (2)	35%	4%
Expenditures on fertilizers (per ha in CAD\$) (3)	Vegetable producers	\$195	\$503
	Fruit growers	\$177	\$174
	Meat and dairy producers	\$19	\$115
Expenditures on pesticides (per ha in CAD\$) (3)	Vegetable producers	\$217	\$350
	Fruit growers	\$376	\$309
	Meat and dairy producers	\$4.11	\$41

Source: 2011 Census of Agriculture, Statistics Canada: (1) Tables 004–0211, (2) Tables 004–0200 and 004–0211, (3) compilation done by Statistics Canada subsequent to our request.

Our results also deviate from the findings in the literature with regard to the strengthening of the social cohesion enabled by SFSCs. This benefit, often expressed in terms of social capital or embeddedness (Hendrickson and Heffernan, 2002; Renting et al., 2003; Sage, 2003; Sharp and Smith, 2003; Brown and Miller, 2008; Saltmarsh et al., 2011), appears to receive scant recognition by the stakeholders in the three territories. Different assumptions could be made about the relative disinterest in the issue of social cohesion from stakeholders and farmers interviewed in our study compared with general findings in the literature. The first is that we have not met SFSCs consumers, who are may be the most sensitive about it. Authors that have reported a high impact of SFSCs on social cohesion have mostly interviewed consumers (Hendrickson and Heffernan, 2002; Sharp and Smith, 2003; Winter, 2003; Saltmarsh et al., 2011). Besides, in a study conducted by Smithers et al. (2005) on agriculture–community linkages, they found that producers tend to underestimate their impact within their local community. The second assumption is that the relationship established between farmers and consumers remains, ultimately, a business relation that does not differ that much from relationships that may be established between market participants in mainstream systems. This thesis is defended by Hinrichs (2000) who has worked on tensions in SFSCs between embeddedness and social capital, on the one hand, and marketness and instrumentalism, on the other. Finally, the third assumption is that, given the relative novelty of the various initiatives in SFSCs that we identified, their impacts can still be rather vague and hardly perceptible by the stakeholders.

Moreover, indicators, such as food miles and greenhouse gas emission, were not tested in this study since they require specific and heavy methodologies in order to produce relevant results. However, the literature on those indicators has obtained controversial results which may taint the globally positive picture obtained in this study. Some studies conclude that the energy balance of SFSCs is adversely affected by suboptimal distribution structures and logistics (Schlich and Fleissner, 2005; Edwards-Jones, 2008; Mariola, 2008), while others maintain that the previous methodologies are biased and that SFSCs, by reducing food miles and the number of intermediaries, can reduce energy consumption and costs associated with them (Blanke and Burdick, 2005; Jungbluth and Demmeler, 2005; Pretty et al., 2005; Pimentel et al., 2008; Mundler and Rumpus, 2012).

Other questions also remain unanswered in this study. The first concerns the territories under study. While we selected them to reflect a variety of situations, we did not notice any significant differences between the territories with regard to our selected criteria and indicators. While we cannot make a statement as to the statistical representativeness of these three territories for all of Quebec, we believe that the various benefits of SFSCs revealed by our results could thus be found in all other territories as well. The second question concerns the comparison between local and mainstream systems about job satisfaction. If we were to interview farmers selling exclusively in mainstream systems, would we get different results? In other words, it can be difficult to distinguish what is proper to SFSCs and what does not apply to other forms of marketing in agriculture, especially since very few farmers sell their products exclusively in SFSCs.

Finally, future studies would benefit from more systematic collection of relevant data at the provincial and national level. In Quebec, the MAPAQ registration forms, while compiling some useful information, fail to inquire about very important elements such as farm labor. Statistics Canada, for its part, collects no information about sales practices on farms. The collection of such data from all farmers would allow researchers to correlate different variables (e.g., revenues, farm size, jobs and farming practices) with

marketing practices. Furthermore, a better availability of these provincial data would prove useful to complement the knowledge provided by the various essentially monographic studies that we analyzed. Considering that public policies are increasingly considering SFSCs as a tool for territorial development (Marsden et al., 2000; Renting et al., 2003; Goodman, 2004; Van der Ploeg and Renting, 2004), food security and healthy living (Vallianatos et al., 2004; Quandt et al., 2013; Sage et al., 2013; Sadler, 2016), a more detailed and robust knowledge of their effects is essential.

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