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ABSTRACT

Many researchers, policy makers and food activists view Short Food Supply Chains (SFSC) as levers for improving farm income and the sustainability of farming systems. We conduct a systematic review of the motivations and factors favoring and barriers constraining farmer participation in SFSC as well as the impact on their income. We examined articles published in English and French from January 2000 to September 2021. The analysis includes a total of 146 papers among 2226 scientific articles returned by the literature search from Web of Science (WoS) and Scopus databases. The largest number of publications on these topics have been conducted on the United States (US) and have dramatically increased since 2014. The findings indicate that both economic and non-economic motivations encourage farmers to produce for SFSC with mixed evidence on which is the primary motivation. A set of characteristics of the farmers, farms and the area where the farms are located drive SFSC involvement. However, many constraints hinder the development of SFSC. In addition, even though the majority of studies report that SFSC participation has a positive impact on farmer income, some studies find the opposite result. Based on our results, research gaps are identified and policy suggestions drawn.

Keywords: Literature review, Farmers, Short Food Supply Chains, Motivations, Barriers, Characteristics, Income

JEL codes: Q10, Q12, Q13

1 Introduction

Local food systems (LFS) and short food supply chains (SFSC) have garnered increasing interest from academia and policy-makers in recent decades. The growing concern of consumers with food provenance and quality and the increasing pressure on the value captured by farmers in conventional supply chains have contributed to their emergence (Marsden, Banks, & Bristow, 2000; Renting, Marsden, & Banks, 2003). Their development has been encouraged in the European Union (EU) by the European Agricultural Fund for Rural Development (EAFRD) devoting up to 10% of its expenditures to the promotion of food chain organization (Dwyer et al., 2016). Similarly, the U.S. Department of Agriculture invested over $1 billion to support local food projects between 2009 and 2014 (Vilsack, 2016). A growing number of farmers have chosen to market through SFSC and LFS even though this growth appears to be plateauing in the US (Low et al., 2015). By 2015, 15% of EU farms sold more than half of their production directly to consumers (European Parliamentary Research Service, 2013). In 2012, 7.8% of U.S. farms marketed food locally with 70% of them using only direct marketing channels (Low et al., 2015).

There is no "official" distance below which the term "local" can be used. Most of the time authors refer to a distance of around 10 to 30 miles up to a radius of 100 miles between the point of production and the point of sale (Feldmann & Hamm, 2015). By contrast, the EU has adopted since 2013 a common definition of SFSC, defined as a supply chain including a minimal number of intermediaries (Regulation (EU) No 1305/2013). The dividing line between LFS and SFSC is blurred because SFSC embrace diverse forms overlapping most of the time the local concept, regrouped in the “sales in proximity” category (Aubry & Chiffoleau, 2009). The European literature therefore refers mainly to SFSC owing to the difficulties of defining the “local” concept. In addition, most studies included in this review do not look at SFSC but something more restrictive such as direct marketing (DM) or some component of DM such as community-supported agriculture (CSA) or farmer markets (FM).

The identification of the determinants and motivations driving farmer participation in SFSC is important because of the matured local food environment and the policy interest in using these channels as levers for improving food sustainability. Proponents of these alternative food networks (AFN) argue that they improve farm income through the reduced number of intermediaries, reconnect farmers with consumers and offer better access to fresh and seasonal produce. These AFN also have been associated with more environmentally friendly farming practices and a lower carbon footprint from a reduction of food miles. However, SFSC suffer from numerous obstacles hindering their adoption and performance (Plakias, Demko, & Katchova, 2020; Rucabado-Palomar & Cuéllar-Padilla, 2020). Despite offering a price premium, their positive impact on farm viability has been questioned

because of high costs and labor requirements (Uematsu & Mishra, 2016) . In addition, some studies have called into question their social embeddedness as being the preserve of white, educated and wealthy customers (E. Brown, Dury, & Holdsworth, 2009; Guthman, 2008; Hinrichs, 2000; Hinrichs & Allen, 2008) and their capacity to reduce food carbon footprint due to low sale volumes (Coley, Howard, & Winter, 2011; Edwards-Jones et al., 2008).

To the best of our knowledge, there are two reports and one article that provide a comprehensive overview of SFSC and LFS (Enthoven & Van den Broeck, 2021; Kneafsey et al., 2013; Martinez et al., 2010). Although their work represents a solid contribution to enhanced understanding of SFSC and LFS, they address insufficiently the issue of farmer involvement and do not follow a systematic review protocol (Martinez et al., 2010). In addition, they are mainly focused on defining these systems and providing a broad view of their impacts (Enthoven & Van den Broeck, 2021; Kneafsey et al., 2013). To address these gaps, we conduct a systematic review of the motivations and factors favoring and barriers constraining farmer participation in SFSC as well as the impact on their income. Our systematic review on SFSC is the first exclusively concentrated on farmers which allows a more detailed analysis. This literature review focuses on farmers for three reasons. First, SFSC can provide farmers, in particular smallholders, significant opportunities. Second, the public sector can influence SFSC development through policies (Kneafsey et al., 2013). Finally, a review from the consumer perspective has already been conducted, identifying main factors influencing local food purchases (Feldmann & Hamm, 2015).

The paper is structured as follows. The next section provides a description of the systematic review protocol used, followed by an overview of the studies included in the review. The results section is divided in four parts. The first part examines what motivates farmers to produce for SFSC. The second part analyses the characteristics of the farmers, farms and of the area where the farms are located in determining the farmer marketing choice. The third part addresses the barriers hindering the implementation of SFSC. The fourth part investigates the impact of SFSC on farmer income. In the last section, we draw conclusions from our findings and present recommendations for future research and policy implications.

2 Method

This literature review identifies all the articles investigating the characteristics, motivations and constraints for farmers involved in SFSC, as well as the impact on their income. It is performed by following the checklist of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) (Liberati et al., 2009) (Figure A1). The PRISMA method increases the reliability and transparency of literature reviews by preventing arbitrary decision making during the review

procedure and can be easily replicated. Extensively used in health sciences, it is becoming a recognized standard in many other domains of the scientific research as social sciences. The review protocol containing information of the search terms, databases, eligibility criteria and selection process is presented below.

2.1 Information sources and literature search

The literature review was conducted using Scopus and Web of Science databases that are among the most highly valued databases for this field of interest. We applied a combination of three lists of search terms detailed in Table A1, which explored the article title, abstract and keywords of every published document identified. The list including "Farmer" or "Producer" keywords was mainly used in order to avoid an overflow of unsuitable articles. Additional filters were used in order to limit the search within the social science discipline. The last search was run on September 27th 2021.

2.2 Eligibility criteria

The Population, Intervention, Comparison, Outcomes, and Study (PICOS) design criteria was used to identify both qualitative and quantitative papers (Table A2). All English or French articles published in peer-reviewed journals from January 2000 to September 2021, analysing characteristics, motivations, and constraints for farmers engaged in SFSC participation, as well as the income impact are included. We therefore excluded from this literature review, articles not responding clearly to the four above mentioned objects of research and supply chain characteristics. Studies not conducted in Europe, Northern America or Australia where the specific context could induce different outcomes were also excluded. Finally, literature reviews, theses and dissertations, letters, book chapters, reports, authors' comments, and other grey literature were not taken into account.

2.3 Study selection process

The selection of articles among the 2226 records after removing duplicates between Scopus and Web of Science databases was conducted in three rounds (Figure A1). First, two independent reviewers screened article titles and abstracts on an Excel spreadsheet while disagreements between them were resolved through discussion. During this phase, 1939 records not meeting the eligibility criteria were excluded. Then, eligibility assessment was carried out by the lead author reviewing in detail the full-text of the 287 remaining articles. Among them, 150 records outside the scope of the review, not farmer specific or not conducted in Europe, Northern America or Australia were removed. We finally

added 9 original studies[1] to the 137 articles identified previously, leading to a total of 146 articles included in the literature review (Figure A1).

2.4 Data Collection Process

Content analysis was conducted by extracting for each of the selected articles the following information: authors, year, setting, supply chain characteristics, methodology, sampling, and the key findings with regard to the four aspects of SFSC examined (Appendix B).

3 Results

3.1 Overview of the selected studies

The number of SFSC publications from the producer's perspective has dramatically increased since 2014, reflecting the increasing research interest in this topic. More than 71% of the publications were completed between 2014 and 2021 (*Figure 1*). They have mostly been conducted in the US (49%) and Italy (9%) and France (8%) (*Figure 2*). The larger number of US articles may be explained by the availability of data and because SFSC are further developed in this area.

Most of these publications rely on quantitative methods (59%, n =86), especially those investigating SFSC characteristics and their economic performance (*Figure 1*). Qualitative studies (26%, n = 38) are mostly used to examine motivations and barriers in addition to characteristics for studies relying on mixed method[2] (15%, n =22) (*Table 1*). Qualitative studies are mainly based on in-depth interviews and focus group discussions and are better suited to evaluate farmer motivations and barriers. Quantitative methods include mainly statistical analysis (descriptive statistics, factor analysis, non-parametric test) and statistical modelling (including OLS, probit, quantiles, and logit) (*Table 2*). Regression analysis methods accounting for selection bias (e.g. Heckman model, treatment effect and selectivity approach for the multinomial logit model …) are used to estimate SFSC impact on farmer performance. Selection bias occurs when unobservable factors (e.g. higher education) are correlated with SFSC participation and income. Quantitative methods also include modelling, spatial analysis, accounting analysis (*Table 2*).

[1] These studies were retrieved when reading other ones identified by the PRISMA method and provide an important insight into the topics covered by our literature review. They were not identified through the review procedure mainly for two reasons. They are published in a journal not cover by the Scopus and Web of Science databases or missed a term in one of the three lists of comprehensive search terms detailed in their the article title, abstract or keywords.

[2] Articles based on mixed methods include studies combining quantitative (descriptive statistics, regression analysis methods, …) and qualitative analysis (interviews and focused group discussions)

The number of respondents from quantitative studies varies greatly, ranging from 3 to 1,653,000. By contrast, both mixed and qualitative studies display much lower variability, with their number of respondents not exceeding 169 and 48 respectively. This is due to the fact that they are mainly based on in-depth interviews. Twelve percent of the studies rely on samples that reflect the entire farm population (e.g. studies with samples based on census or representative sample data, Table 3). Table B1, Table B2 and Table B3 provide details about what the comparison is to (general farming population when it is nationally representative or selection criteria for the survey). Representative studies are indicated in bold and italic so that they are distinguished from the studies based on non-representative samples[3].

Figure 1. Percentages of publications by years and methodology

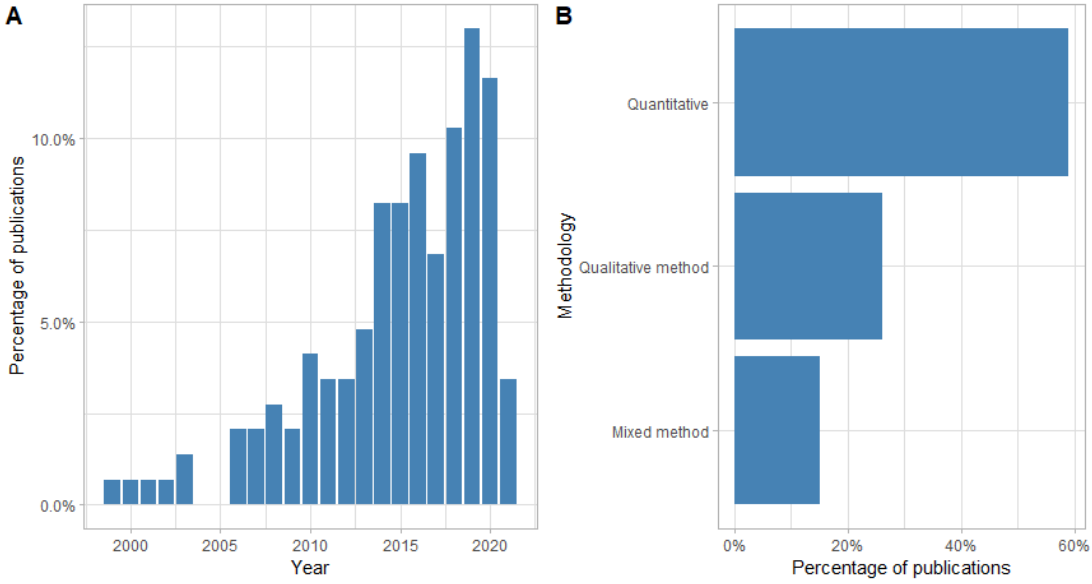

Figure 2. Percentages of publications by country

[3] This convention is used so that the reader can recognize this key study characteristic without having to consult the Appendix tables.

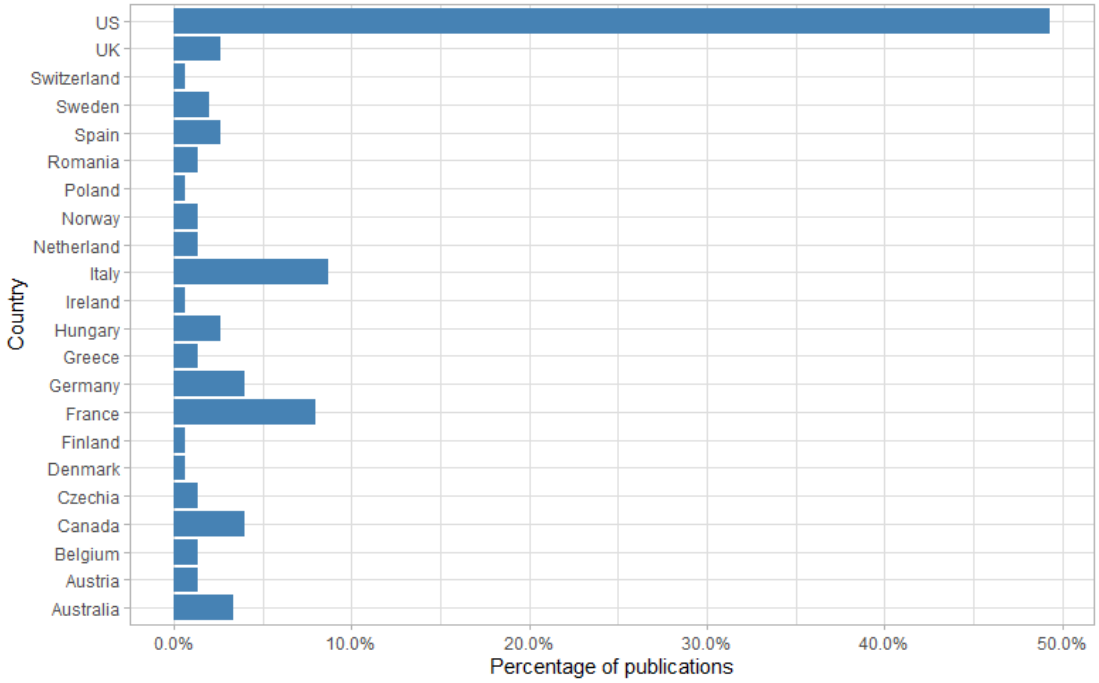

Table 1. Methods used to investigate characteristics, motivations, constraints and performance of farmers involved in SFSC

	Quantitative	Mixed Method	Qualitative
Motivations	18.6%	40.9%	57.9%
Characteristics	45.3%	27.3%	2.6%
Barriers	11.6%	36.4%	57.9%
Economic performance	43%	13.6%	7.9%
	N= 86[4]	N= 22	N= 38

Table 2. Quantitative method used

Statistical analysis	**48.1%**
Descriptive statistics (e.g. means, frequencies, correlation and percentages)	24.5%
Principal Component Analysis	11.8%
Non parametric tests	4.9%
Cluster analysis	6.9%
Spatial analysis	**4.9%**
Accounting analysis	**3.9%**
Modelling (e.g. simulation model, mixed-integer programming model, stochastic modeling)	**3.9%**
Statistical modelling	**39.3%**
Regression (e.g. OLS, logit, probit quantiles) and analysis of variance	32.4%
Regression analysis capturing selection effect (e.g. Heckman selection model, Multinomial endogenous treatment and stochastic Frontier Analysis)	6.9%

[4] The N for each column in this table and the next one is the number of studies of each type. The percentages for the columns reflect more than 100% to reflect that a single study can investigate different topics (e.g. motivations and characteristics) or relies on different quantitative methods (e.g. descriptive statistics and regression analysis).

Table 3. Percentage of studies representative of the general farming population

	Representativeness
Motivations	0% (n= 0)
Characteristics	28% (n= 17)
Barriers	2.4% (n=1)
Economic performance	12.3% (n= 7)
Total	12% (n=28)

3.2 Farmer motivations

A large number of studies explore consumers' motivations for purchasing local food, valuing better quality, greater trust, local economy support, environmental benefits and animal welfare (Feldmann & Hamm, 2015). Regarding the supply side, farmer motivations often stem from dissatisfaction with conventional channels where farmers struggle to compete due to severe cost-price squeeze and entry barriers and feel they are losing control and autonomy over their business (Albrecht & Smithers, 2018; Beingessner & Fletcher, 2020; Drottberger, Melin, & Lundgren, 2021; Kessari, Joly, Jaouen, & Jaeck, 2020; Newsome, 2020; Tonner & Wilson, 2015).

Table 4 presents a comprehensive list of studies investigating farmer motivations for participating in SFSC depending on whether they are economic, non-economic, or both. Most of the studies agree that both economic and non-economic motivations encourage farmers to produce for SFSC (Table 4, column 1). Producers involved in SFSC are motivated by maximizing their profits or ensuring the economic viability of their farms. They can benefit from higher prices and margins, networking opportunities, payments in advance, low entry barriers and a reduction of economic risk and intermediary costs (Table 4, column 2). Farmers are also driven by social benefits (Table 4, column 3). They seek to offer consumers healthier and higher quality products at fair and steady prices and to educate consumers about food and farming. They value interactions and relationships with consumers based on trust and transparency and support the local community.

Table 4. Farmer motivations for participating in SFSC

Economic and non-economic motivations	**Economic motivations**	**Non-economic motivations**
(Albrecht & Smithers, 2018; Alkon, 2008; Alkon & Vang, 2016; Andreatta & Wickliffe, 2002; Beingessner & Fletcher, 2020; A. B. Bruce, 2019; Cleveland, Müller, Tranovich, Mazaroli, &	(Aggestam, Fleiß, & Posch, 2017; Albrecht & Smithers, 2018; Alkon, 2008; Andreatta & Wickliffe, 2002; Beingessner & Fletcher, 2020; A. B. Bruce, 2019; Cleveland et al., 2014; D. Conner et al., 2012; D. S. Conner	(Albrecht & Smithers, 2018; Alkon & Vang, 2016; Andreatta & Wickliffe, 2002; Åsebø, Jervell, Lieblein, Svennerud, & Francis, 2007; Beingessner & Fletcher, 2020; A. B. Bruce, 2019; Charatsari, Kitsios, Stafyla, Aidonis, & Lioutas, 2018; Cleveland et al., 2014; D. Conner et al., 2012; D. S. Conner et al., 2014;

Hinson, 2014; D. Conner et al., 2012; D. S. Conner, Sevoian, Heiss, & Berlin, 2014; Demartini, Gaviglio, & Pirani, 2017; Drottberger et al., 2021; Fielke & Bardsley, 2013; Fleury, Lev, Brives, Chazoule, & Désolé, 2016; Galt, 2013; Germeten & Hartmann, 2017; Griffin & Frongillo, 2003; Izumi, Wright, & Hamm, 2010; Jarosz, 2011; Kessari et al., 2020; Lea, Phillips, Ward, & Worsley, 2006; Leiper & Clarke-Sather, 2017; Lurie & Brekken, 2019; Matts, Conner, Fisher, Tyler, & Hamm, 2016; Migliore, Caracciolo, Lombardi, Schifani, & Cembalo, 2014; Migliore, Schifani, Romeo, Hashem, & Cembalo, 2015; Montri, Chung, & Behe, 2020; Newsome, 2020; O'Kane & Wijaya, 2015; Oñederra-Aramendi, Begiristain-Zubillaga, & Malagón-Zaldua, 2018; Ross, 2006; Samoggia, Perazzolo, Kocsis, & Del Prete, 2019; Salvatore Tudisca, Di Trapani, Sgroi, Testa, & Giamporcaro, 2014; Wubben, Fondse, & Pascucci, 2013)	et al., 2014; Cox et al., 2008; Demartini et al., 2017; Fielke & Bardsley, 2013; Fleury et al., 2016; Germeten & Hartmann, 2017; Griffin & Frongillo, 2003; Izumi et al., 2010; Kessari et al., 2020; Lea et al., 2006; Leiper & Clarke-Sather, 2017; Migliore et al., 2014, 2015; Montri et al., 2020; Newsome, 2020; Oñederra-Aramendi et al., 2018; Ross, 2006; Samoggia et al., 2019; Sitaker et al., 2020; Szabó & Juhász, 2015; Tonner & Wilson, 2015; Salvatore Tudisca et al., 2014; Visser, Trienekens, & Beek, 2013; Wubben et al., 2013)	Drottberger et al., 2021; Fielke & Bardsley, 2013; Fleury et al., 2016; Galt, 2013; Germeten & Hartmann, 2017; Goszczyński & Wróblewski, 2020; Griffin & Frongillo, 2003; Hvitsand, 2016; Izumi et al., 2010; Jarosz, 2011; Kessari et al., 2020; Leiper & Clarke-Sather, 2017; Lurie & Brekken, 2019; Matts et al., 2016; Migliore et al., 2014, 2015; Montri et al., 2020; Newsome, 2020; O'Kane & Wijaya, 2015; Oñederra-Aramendi et al., 2018; Sage & Goldberger, 2012; Samoggia et al., 2019; Salvatore Tudisca et al., 2014; Wubben et al., 2013)

Non-economic motivations also include the political motivation of supporting alternative agriculture methods and alternative food networks (Alkon, 2008; Beingessner & Fletcher, 2020; Drottberger et al., 2021; Jarosz, 2011; Kessari et al., 2020; Leiper & Clarke-Sather, 2017; Schoolman, Morton, Arbuckle, & Han, 2021), personal and philosophical motivations associated with changing individual life-work balance and doing something more meaningful (A. B. Bruce, 2019; Cleveland et al., 2014; Drottberger et al., 2021; Fleury et al., 2016; Griffin & Frongillo, 2003; Jarosz, 2011; Leiper & Clarke-Sather, 2017; Ngo & Brklacich, 2014; O'Kane & Wijaya, 2015; Ross, 2006), motivations linked to the enjoyment of growing food, meeting and knowing customers (Drottberger et al., 2021; Fielke & Bardsley, 2013; Jarosz, 2011; Montri et al., 2020), and environmental motivations resulting from ecological concerns

encouraging farmers to work in harmony with nature (e.g. reducing pesticides) (Albrecht & Smithers, 2018; Alkon & Vang, 2016; A. B. Bruce, 2019; Cleveland et al., 2014; Drottberger et al., 2021; Fielke & Bardsley, 2013; Fleury et al., 2016; Galt, 2013; Hvitsand, 2016; Jarosz, 2011; Lurie & Brekken, 2019; Migliore et al., 2014, 2015; Newsome, 2020; O'Kane & Wijaya, 2015; Ross, 2006; Sage & Goldberger, 2012; Salvatore Tudisca et al., 2014). In contrast to the literature, Schoolman et al (2021) do not find strong environmental motivations for farmers involved in SFSC.

There is no consensus on the dominant motivations. On the one hand, some studies argue that farmers have opportunistic motivations with price and profit dominating in decision making (Alkon, 2008; Alkon & Vang, 2016; Demartini et al., 2017; Germeten & Hartmann, 2017; Lea et al., 2006; Oñederra-Aramendi et al., 2018; Ross, 2006; Sitaker et al., 2020; Szabó & Juhász, 2015; Salvatore Tudisca et al., 2014; Visser et al., 2013; Wubben et al., 2013). These farmers report benefiting from a monetary value thanks to their relationship with consumers considering embedded social values as part of their utility when they buy local goods (Demartini et al., 2017; Ross, 2006). In contrast , other studies report that farmers are not seeking profit maximization but value mainly connection with consumers for reasons other than economic benefits (Beingessner & Fletcher, 2020; Cleveland et al., 2014; D. Conner et al., 2012; Drottberger et al., 2021; Fielke & Bardsley, 2013; Galt, 2013; Goszczyński & Wróblewski, 2020; Hvitsand, 2016; Jarosz, 2011; Matts et al., 2016; Sage & Goldberger, 2012).

3.3 Determinants of SFSC participation

3.3.1 Farmer characteristics

Farmers engaged in SFSC are relatively more likely to be neo-rural (Darolt, Lamine, BRANDENBURG, & Alencar, 2016; Farmer & Betz, 2016; Mundler & Jean-Gagnon, 2020) and female producers (Ahearn, Liang, & Goetz, 2018; Chen, Saghaian, & Tyler, 2019; Dong, Campbell, & Rabinowitz, 2019; Galt, Christensen, Beckett, & Myles, 2012; Mazzocchi, Corsi, & Ruggeri, 2020; Park, Paudel, & Sene, 2018; Silva, Dong, Mitchell, & Hendrickson, 2015). Only one study reports that male farmers are more likely to be engaged in SFSC (**Rocchi, Randelli, Corsini, & Giampaolo, 2019**). ***Corsi et al.*** (2018) show that the gender effect depends on the type of farming with higher SFSC engagement of female operators in horticulture but not in wine.

SFSC participation increases with the farmer's education level as it requires specific skills and abilities not always directly related to agricultural operations that more educated individuals may be more likely to develop (Andrei, ION, Luminita, Pop, & Marin, 2019; Benedek, Ferto, & Molnár, 2018; Bermond, Guillemin, & Maréchal, 2019; A. Bruce & Som Castellano, 2016; Chen et al., 2019; Farmer & Betz, 2016; Galt et al., 2012; Gilg & Battershill, 2000; Hunt, 2007; Silva et al., 2015; Uematsu & Mishra, 2016). For example, farmers in SFSC display greater management and marketing competencies

(Charatsari, Kitsios, & Lioutas, 2020; Park, Mishra, & Wozniak, 2014; Plakias et al., 2020) and report higher internet use for advertising their products and obtaining key information (**Ahearn et al., 2018**; **Detre, Mark, Mishra, & Adhikari, 2011**; **Park & Lohr, 2010; Park et al.**, 2014, **2018**; **Rocchi et al., 2019**; **Uematsu & Mishra, 2016**). A few studies show a negative effect (Pölling & Mergenthaler, 2017) or non-significant effect of education on SFSC participation except when farmers pursue studies in agriculture (**Rocchi et al., 2019**).

Younger farmers are relatively more inclined to engage in SFSC because of their higher education level and interest in novelty (Benedek et al., 2018; Bermond et al., 2019; A. Bruce & Som Castellano, 2016; Chen et al., 2019; Detre et al., 2011; Dong et al., 2019; Galt et al., 2012; Hunt, 2007; Mundler & Jean-Gagnon, 2020; Mundler & Laughrea, 2016). On the other hand, a few studies report a higher participation of older farmers (Kacz, Hegyi, & Gombkötő, 2019) or a non-significant age effect (**Ahearn et al., 2018**; **Rocchi et al., 2019**; Silva et al., 2015).

Both farming experience and off-farm labor decisions have an inconclusive effect on SFSC participation. Some studies report that farmers with agriculture as primary occupation are more likely to use SFSC (**Dong et al., 2019**; Hunt, 2007; **Uematsu & Mishra, 2016**) while others find the contrary (A. Bruce & Som Castellano, 2016). Likewise, some studies support the conclusion that farming experience increases the odds that a farmer will use SFSC (Benedek et al., 2018; Galt et al., 2012; Plakias et al., 2020; Uematsu & Mishra, 2016) but others reach the opposite conclusion (Kacz et al., 2019; Park & Lohr, 2010) or an insignificant effect (Silva et al., 2015).

3.3.2 Farm characteristics

Most studies find that farms marketing through SFSC are of smaller size (Ahearn et al., 2018; Andrei et al., 2019; Auld, Thilmany, & Jones, 2009; Bermond et al., 2019; A. Bruce & Som Castellano, 2016; S. Corsi & Mazzocchi, 2019; Darolt et al., 2016; Detre et al., 2011; Dong et al., 2019; Farmer & Betz, 2016; Filippini, Lardon, Bonari, & Marraccini, 2018; Galt et al., 2012; Hruška, Konečný, Smutná, & Duží, 2020; Mazzocchi et al., 2020; Mireille, 2009; Park & Lohr, 2010; Park et al., 2014; Plakias et al., 2020; Rocchi et al., 2019; Silva et al., 2015; Timmons & Wang, 2010; Salvatore Tudisca et al., 2014; Uematsu & Mishra, 2016). Many fewer studies report that farms engaged in SFSC are of greater size (Benedek et al., 2018; Mundler & Jean-Gagnon, 2020; Mundler & Laughrea, 2016; Pölling & Mergenthaler, 2017). These four studies are based on surveys where small farms can be underrepresented (as compared to a Census). For example, Mundler and Jean-Gagnon (2020) targeted farmers advertising their participation in SFSC which are mainly large farms with the ability to use advertisement. **Rocchi et al (2019)** argue that the size effect depends on the farming sector with small farms more likely to engage

in SFSC except in permanent crop sectors (e.g. wine, olive. They are also more likely to own their land (Farmer & Betz, 2016; Kacz et al., 2019).

High value crops (vegetables, fruits and tree nuts) and animal products are the most frequently represented types of production in SFSC (Bermond et al., 2019; **Chen et al., 2019; Detre et al., 2011**; **Dong et al., 2019**; Farmer & Betz, 2016; Hruška et al., 2020; Ilbery, Watts, Simpson, Gilg, & Little, 2006; Kacz et al., 2019; Mazzocchi et al., 2020; Plakias et al., 2020; Pölling & Mergenthaler, 2017; **Rocchi et al., 2019**; **Timmons & Wang, 2010; Uematsu & Mishra, 2016**). Horticultural products can be sold as harvested and even though meat, dairy and fruit products require some processing, they are predominantly made up of the primary product from which they originate. Farmers involved in SFSC are more likely to use organic or other environmentally friendly methods (e.g. less pesticides and fertilizers) (Ahearn et al., 2018; Aubert & Enjolras, 2016; Bermond et al., 2019; A. Corsi et al., 2018; S. Corsi & Mazzocchi, 2019; Detre et al., 2011; Filippini, Marraccini, Lardon, & Bonari, 2016; Galt et al., 2012; Gilg & Battershill, 2000; Mazzocchi et al., 2020; Mireille, 2009; Mundler & Jean-Gagnon, 2020; Mundler & Laughrea, 2016; Pépin, Morel, & van der Werf, 2021; Pölling & Mergenthaler, 2017; Rocchi et al., 2019; Schoolman, 2019; Tessier, Bijttebier, Marchand, & Baret, 2021) and more diversified production systems (Ahearn et al., 2018; Benedek et al., 2018; Björklund, Westberg, Geber, Milestad, & Ahnström, 2009; Darolt et al., 2016; Galt et al., 2012; Mireille, 2009). There are fewer studies showing that SFSC rely less on organic (Chen et al., 2019; Filippini et al., 2018; Hruška et al., 2020; Kacz et al., 2019), less intensive (Filippini et al., 2016) or diversified farming systems (Filippini et al., 2018). They argue that organic certification is rather used to reach mainstream supply chains (Filippini et al., 2018) while local demand for organic food is saturated in the US (**Chen et al., 2019**; Schoolman, 2019). Contrary to organic certification, there is no consensus on the effect of origin labels on SFSC participation. Some studies find that origin labels can be better exploited in conventional channels (**Corsi et al., 2018**) while the opposite effect is also reported (Corsi and Mazzocchi, 2019; Filippini et al., 2018).

The probability of using SFSC decreases with the use of production contracts (**Ahearn et al., 2018**; Benedek et al., 2018; **Chen et al., 2019; Detre et al., 2011**) and the receipt of direct payments (from the first pillar of the Common Agricultural Policy) **(Ahearn et al., 2018; Rocchi et al., 2019; Uematsu & Mishra, 2016)**. SFSC farmers are more likely to rely on family labor (**Ahearn et al., 2018**; Darolt et al., 2016; Kacz et al., 2019; **Rocchi et al., 2019**; Salvatore Tudisca et al., 2014) and non-agricultural diversification activities (e.g. equestrian activities) **(A. Corsi et al., 2018;** Darolt et al., 2016**; Park et al., 2018; Rocchi et al., 2019**).

3.3.3 Territorial characteristics

SFSC are further developed in wealthier areas with a more highly educated population (Bonanno, Berning, & Etemadnia, 2017; A. Bruce & Som Castellano, 2016; Connolly & Klaiber, 2015; S. Corsi & Mazzocchi, 2019; **Dong et al., 2019**; Hruška et al., 2020; Mazzocchi et al., 2020; **Timmons & Wang, 2010)**. SFSC are mainly shopping places for affluent consumers with greater willingness to pay and skills for accessing fresh and high quality food products. Only one study finds that farmer involvement in SFSC rises with the poverty rate (**Ahearn et al., 2018**). There is mixed evidence on the population age effect, with some studies reporting a positive effect (S. Corsi & Mazzocchi, 2019; Mazzocchi et al., 2020) while others report the contrary (Bonanno et al., 2017; Connolly & Klaiber, 2015).

Urban areas offer better conditions for SFSC development by offering opportunities to reach more consumers with higher purchasing power and skills (**Ahearn et al., 2018**; Bonanno et al., 2017; Connolly & Klaiber, 2015; **A. Corsi et al., 2018; Dong et al., 2019**; Hruška et al., 2020, 2020; Ilbery et al., 2006; Mazzocchi et al., 2020; **Park et al., 2018**; Pölling & Mergenthaler, 2017; **Rocchi et al., 2019**; Timmons & Wang, 2010). However, a few studies report a negative effect of population density due to a lack of available land and the maturity of local markets in many urban areas (S. Corsi & Mazzocchi, 2019; Plakias et al., 2020). Hence, urbanization leads to an increase of SFSC entrants if the initial population is small, where farmland is more available and market opportunities are increasing along with population (Bonanno et al., 2017; Connolly & Klaiber, 2015; S. Corsi & Mazzocchi, 2019).

SFSC participation is higher in places where mainstream supply chains (Bonanno et al., 2017; **Dong et al., 2019**; Mazzocchi et al., 2020) and SFSC (**Ahearn et al., 2018**; Bonanno et al., 2017; Connolly & Klaiber, 2015; **Rocchi et al., 2019**) are further developed but far from market saturation (Bonanno et al., 2017; **Rocchi et al., 2019**).

3.4 Barriers

There are many factors limiting the participation of farmers in SFSC. Farmers engaged in SFSC have difficulties ensuring a consistent supply based on a regular quantity and variety of food products owing to seasonality, consumer expectations and a lack of production diversity and capacity (Abate, 2008; Bateman, Engel, & Meinen, 2014; Eriksen & Sundbo, 2015; Griffin & Frongillo, 2003; Kupke & Page, 2015; Lea et al., 2006; Oberholtzer, Hanson, Brust, Dimitri, & Richman, 2012; O'Donovan, Quinlan, & Barry, 2012; Oglethorpe & Heron, 2013; Plakias et al., 2020; Rikkonen, Kotro, Koistinen, Penttilä, & Kauriinoja, 2013; Thompson et al., 2014). Their production is challenged by weather conditions, crop losses, higher production cost and a lower productivity (Cerrada-Serra, Colombo, Ortiz-Miranda, & Grando, 2018; Fleury et al., 2016; B. B. R. Jablonski & Schmit, 2016; Mundler & Jean-Gagnon, 2020; Plank, Hafner, & Stotten, 2020; Plank et al., 2020).

SFSC are characterized by significant time and labor requirements due to additional tasks (e.g. processing, distribution; marketing and sale) and labor intensive methods of production (e.g. organic/agro-ecological production) (Aubry & Kebir, 2013; **Bermond et al., 2019**; A. Bruce & Som Castellano, 2016; Doernberg, Zasada, Bruszewska, Skoczowski, & Piorr, 2016; Lea et al., 2006; Möllers & Bîrhală, 2014; Mundler & Jean-Gagnon, 2020; Rikkonen et al., 2013; Rucabado-Palomar & Cuéllar-Padilla, 2020; Visser et al., 2013). Farmers have challenges in finding labor and specific skills because agriculture is not appealing and offers low wages (Aubry and Kebir, 2013; Griffin and Frongillo, 2003; Lea et al., 2006; Oglethorpe and Heron, 2013) while they have to rely on extra help (volunteers, family, …) (Bruce and Som Castellano, 2016; Kupke and Page, 2015). In addition, they are also concerned about their lack of experience with entrepreneurship and marketing (Drottberger et al., 2021; Fleury et al., 2016; Lea et al., 2006; Rucabado-Palomar & Cuéllar-Padilla, 2020; Syrovátková, Hrabák, & Spilková, 2014).

Farmers are also constrained from participating in SFSC by the lack of processing, storage and distribution infrastructure or equipment (Braun, Rombach, Häring, & Bitsch, 2018; Cerrada-Serra et al., 2018; Doernberg et al., 2016; Eriksen & Sundbo, 2015; Heiss, Sevoian, Conner, & Berlin, 2015; Mohammad, Yu, Neal, Gibson, & Sirsat, 2020; Plank et al., 2020; Ross, 2006; Rucabado-Palomar & Cuéllar-Padilla, 2020; Thompson et al., 2014; Visser et al., 2013; Yacamán Ochoa, Matarán, Olmo, López, & Fuentes-Guerra, 2019) and a lack of adequate land due to high land prices resulting mainly from urbanization (Abate, 2008; Aubry & Kebir, 2013; Cerrada-Serra et al., 2018; Doernberg et al., 2016; Horst & Gwin, 2018; Ross, 2006). They face financial and capital constraints in starting up or expanding their business including difficulties in accessing credit due to a lack of collateral or getting access to public aid mostly devoted to commodity crop growers (Cerrada-Serra et al., 2018; Doernberg et al., 2016; O'Donovan et al., 2012; Rikkonen et al., 2013; Ross, 2006). In addition, they face logistic barriers linked to the financial cost and time of delivering small quantities over multiple delivery points (Braun et al., 2018; A. Bruce & Som Castellano, 2016; Eriksen & Sundbo, 2015; Jarosz, 2008; Lea et al., 2006; Matts et al., 2016; Milestad, Kummer, & Hirner, 2017; Rikkonen et al., 2013; Rucabado-Palomar & Cuéllar-Padilla, 2020; Yacamán Ochoa et al., 2019).

Farmers who participate in SFSC receive prices that do not always cover their costs due to price sensitive customers (Bateman et al., 2014; D. S. Conner et al., 2014; Fleury et al., 2016; Heiss et al., 2015; Matts et al., 2016; Mundler & Jean-Gagnon, 2020; Oberholtzer et al., 2012; Oglethorpe & Heron, 2013; Paul, 2019). In addition, SFSC have a limited customer base such that farmers are constrained to combine many alternative channels, thereby increasing their workload (A. Bruce & Som Castellano, 2016; Doernberg et al., 2016; Möllers & Bîrhală, 2014; Oglethorpe & Heron, 2013; Paul, 2019; Rikkonen et al., 2013; Rucabado-Palomar & Cuéllar-Padilla, 2020). Low sales volume is the result of a lack of

interest in local food (Baldy, 2019; Kupke & Page, 2015; Lea et al., 2006; Plank et al., 2020; Yacamán Ochoa et al., 2019) and because SFSC are most of the time not based on a "one stop shop" model (Oglethorpe & Heron, 2013).

Farmers who participate in SFSC have to deal with high membership fees required to participate in certain SFSC (e.g. FM) (Griffin & Frongillo, 2003; Kupke & Page, 2015; Oglethorpe & Heron, 2013), institutional issues (e.g. unclear legal and tax situation, legal form of the work, burdensome bureaucracy, etc.), packaging and contract requirements (Bateman et al., 2014; Matts et al., 2016; Plakias et al., 2020), as well as regulatory barriers (e.g. food safety and management standards) with inconsistent guidelines requiring high cost and time for their implementation (Baldy, 2019; Bateman et al., 2014; Kupke & Page, 2015; Laforge, Anderson, & McLachlan, 2017; Mohammad et al., 2020; O'Donovan et al., 2012; Plakias et al., 2020; Rikkonen et al., 2013; Thompson et al., 2014).

Farmers engaged in SFSC struggle to compete with large actors in mainstream supply chains selling similar products at a lower price and not valuing social or environmental goals (Abate, 2008; Baldy, 2019; Cleveland et al., 2014; Fleury et al., 2016; Galt, 2013; Galt, Bradley, Christensen, Kim, & Lobo, 2016; Griffin & Frongillo, 2003; Jarosz, 2008; Paul, 2019). They often find it difficult to cooperate with other farmers because cooperation can be time consuming or because economic interests may be poorly aligned (Eriksen & Sundbo, 2015; Griffin & Frongillo, 2003; O'Donovan et al., 2012; Yacamán Ochoa et al., 2019). They are also constrained by the lack of or inadequate support from organizational structures (e.g. cooperatives) and governments (Baldy, 2019; Cleveland et al., 2014; Drottberger et al., 2021; Laforge et al., 2017; Lea et al., 2006; Ross, 2006; Yacamán Ochoa et al., 2019).

3.5 Economic performance[5]

Most of the studies show that farmers involved in SFSC are more viable or have better economic performance than they would in conventional supply chains. When involved in SFSC, they benefit from a price premium with a lower variability/uncertainty and capture the overall margin by eliminating intermediaries (Alonso Ugaglia, Del'homme, Lemarié-Boutry, & Zahm, 2020; Bauman, Thilmany, & Jablonski, 2018; Brekken et al., 2019; Broderick, Wright, & Kristiansen, 2011; Flores & Villalobos, 2018; Galt, 2013; Galt et al., 2012; Govindasamy, Hossain, & Adelaja, 1999; Govindasamy, Italia, Zurbriggen, & Hossain, 2003; Hu & Shieh, 2015; Hunt, 2007; B. B. R. Jablonski, Bauman, & Thilmany, 2020; Jablonski, Sullins, & Thilmany, 2019; Kim, Curtis, & Yeager, 2014; Morckel, 2018; Morel, Cristobal, & Léger, 2017; Mundler & Jean-Gagnon, 2020; Paul, 2019; Richard, Chevallier, Dellier, & Lagarde, 2014;

[5] The *Agricultural Economics* meta-analysis paper (Chiaverina, Drogué, Jacquet, Lev, & King, 2023) is an extension of this section.

Schmit, Jablonski, & Laughton, 2019; Sroka, Pölling, & Mergenthaler, 2019; S. Tudisca, Trapani, Sgroi, & Testa, 2015; Salvatore Tudisca et al., 2014; Verhaegen & Van Huylenbroeck, 2001).

By contrast, the studies that find a negative impact of SFSC participation on farmer income and sales highlight poor production performance resulting from limited economies of scale (Clark, 2020; Hardesty & Leff, 2010; Hu & Shieh, 2015; **Khanal, Mishra, & Honey, 2018**; Lohr & Park, 2010; Mundler & Laughrea, 2016; **Park, 2015**; Park & Lohr, 2010; **Park et al**., 2014, **2018**; Silva et al., 2015; Uematsu & Mishra, 2016) or a non-significant effect (Bauman, Thilmany, & Jablonski, 2019; Chen et al., 2019). In addition, farmers have limited sales volume and receive low prices not covering their higher production and commercialization costs (e.g. significant labor, packaging and transportation expenses) but also transaction costs (e.g. information, negotiation and control costs). Some argue that farmers also have lower incentives for high profitability because they rely on other sources of income (non-agricultural work) (Mundler & Laughrea, 2016) and display non-economic motivations (Galt, 2013).

SFSC economic performance is also influenced by characteristics of the farmers, farms and the area where the farms are located. Most of the studies show that farmers are more likely to achieve higher economic performance with an increase of their acreage (Bauman et al., 2019; Khanal et al., 2018; Mundler & Jean-Gagnon, 2020; **Park, 2015**; Park & Lohr, 2010; **Park et al.**, 2014, **2018**; Uematsu & Mishra, 2016) and labor force (Bauman et al., 2018; Galt, 2013; Hunt, 2007; Park, 2015; Park & Lohr, 2010; Park et al., 2014, 2018). However, results of two studies show that larger farms are less likely to benefit from the adoption of SFSC (**Ahearn et al., 2018**; Detre et al., 2011). Better economic performance is also obtained by farmers with a higher percentage of leased land (Bauman et al., 2018, 2019; Galt, 2013; Lohr & Park, 2010; Uematsu & Mishra, 2016).

Farmers realize higher returns and sales when producing high-value crops (Bauman et al., 2018, 2019; Detre et al., 2011; Hunt, 2007; Uematsu & Mishra, 2016), as well as engaging in organic or environmental friendly practices that command a price premium (Ahearn et al., 2018; Chen et al., 2019; Detre et al., 2011; Govindasamy et al., 2003; Mundler & Laughrea, 2016; Sroka et al., 2019). A few studies report lower net income from organic production owing to higher production costs (C. Brown et al., 2007; Lohr & Park, 2010). There is mixed evidence on the effect of selling value added-products and increasing the number of varieties grown. More diversified production helps farmers to enhance their sales and to cope with production risks (C. Brown et al., 2007; Chen et al., 2019; **Khanal et al., 2018**), but they also lose benefits from economies of scale (**Ahearn et al., 2018**; Flores & Villalobos, 2018; B. Jablonski, Thilmany, Sullins, & Curtis, 2017). Although retailing value added-products may lead to an increase of farm revenue and help farmers manage risks (Govindasamy et al.,

1999; B. Jablonski et al., 2017), higher costs incurred from requiring more inputs can also result in insufficient or nil margins (Clark, 2020; Govindasamy et al., 2003; Mundler & Jean-Gagnon, 2020).

Proximity to urban centers offers farmers higher income by allowing them to reach more affluent customers (Bauman et al., 2018; C. Brown et al., 2007; Govindasamy et al., 1999; **Hochuli & Schmid, 2021**; **B. B. R. Jablonski et al., 2020**; B. Jablonski et al., 2017; **Khanal et al., 2018**; T. M. Schmit & Gómez, 2011; Sroka et al., 2019). Greater use of the Internet for collecting key information (e.g. on market conditions) enables farmers to achieve higher economic performance (Detre et al., 2011; **Khanal et al., 2018; Park et al., 2018; Uematsu & Mishra, 2016**). Marketing through traditional channels alongside SFSC generally improves income and sales (Bauman et al., 2018; Galt, 2013; B. B. R. Jablonski et al., 2020; Kim et al., 2014; Sroka et al., 2019; S. Tudisca et al., 2015). Studies reporting a negative (Govindasamy et al., 2003; Schmit & Gómez, 2011) or a non-significant effect of being involved in both SFSC and LFSC (B. Jablonski et al., 2017) rely on a self-assessment of their business situation. Regarding farmer characteristics, better economic performance is achieved by full time farmers (C. Brown et al., 2007; Chen et al., 2019; Khanal et al., 2018; Park & Lohr, 2010; Park et al., 2014; Schmit & Gómez, 2011; Uematsu & Mishra, 2016) with greater farming experience (**Ahearn et al., 2018; Hunt, 2007;** Park & Lohr, 2010; **Uematsu & Mishra, 2016**). However, Park (2015) finds the opposite effect of full time farming on economic performance. He argues that working off farm can reduce exposure for farmers to market risks and help them to develop their network and human capital for their agricultural operations.

Lastly, SFSC economic performance varies between the different SFSC types. Some report a negative impact only for participating in FM and CSA because they are exposed to higher competition (Galt et al., 2016; Silva et al., 2015; Uematsu & Mishra, 2016). By contrast, others find that CSA achieve highest income because they benefit from lower transport and labor requirement (Jablonski et al., 2019; LeRoux, Schmit, Roth, & Streeter, 2010). Govindasamy et al. (1999) report lowest financial performances for temporal market (e.g. stands) and pick-your-own operations since they are available only for certain periods of the year and for certain seasonal products.

4 Concluding discussion

4.1 Main conclusions

The present literature review supports the following major conclusions.

First, both economic and non-economic motivations as well as a dissatisfaction with conventional channels, encourage farmers to produce for SFSC. However, it is difficult to determine a dominant motivation.

Relative to the broader farm population, younger, female and more educated farmers are more inclined to market through SFSC. Small farmers who grow more diversified high value crops and animal products with more environmental friendly methods (organic or not) are more likely to participate in SFSC. Farms that participate in SFSC rely less on production contracts and, in the E. U., the receipt of CAP direct payments but more on family labor, diversification activities and making use of multiple distribution channels. In addition, opportunities associated with SFSC increase with variables characterizing the farmer contextual environment including population density, income and education level of the population and marketing channel development.

Third, many constraints hinder the development of SFSC. Farmers experience some difficulties during the production phase and struggle to ensure a consistent diversified food supply. They are constrained by high labor requirements, logistic barriers, and inadequate entrepreneurship and marketing skills. They lack processing, storage and distribution equipment, access to adequate land and resources to start up or expand their business. They sometimes receive insufficient prices from a limited customer base and must meet costly regulatory and institutional barriers, membership fees as well as packaging and contract requirements. They often struggle to compete with large actors in mainstream supply chains and receive an inadequate support from organizational structures (e.g. cooperatives) and governments.

Fourth, even though a majority of studies report a positive impact on economic performance associated with SFSC participation, it remains difficult to draw a conclusion on the effect of SFSC on farmer income. SFSC enable farmers to capture a price premium and reduce intermediary costs but suffer from high production, marketing and transaction costs. In addition, the economic impact varies as a function of the SFSC forms and the characteristics of the farmers, farms and the area where the farms are located.

4.2 Recommendations for future research

Although consumer's motivations have been widely investigated, few studies have looked at the farmers' side. The literature has identified economic and social benefits as the most salient motivations for participating in SFSC, but other motivations (e.g. political, personal and environmental) have been less thoroughly addressed. A few studies show that motivations can differ between the various SFSC forms as they provide different entrepreneurial experiences. Farmers prioritizing non-economic motivations will prefer CSA, FTI, intermediated local supply chains (e.g. FH) (Schoolman et al., 2021) and social purchase groups (SPG) (Migliore et al., 2014) to FM and on-farm retailing as they are better adapt to provide benefits to the community (Schoolman et al., 2021). By contrast, FM and on-farm retailing are considered as more "instrumentalist" local food market. Furthermore, opportunistic

farmers prioritize on-farm retailing to FM (Tonner & Wilson, 2015) and display a lower commitment to FM in low income urban areas (Montri et al., 2020). Similarly, we find that FM are more represented in studies in which economic motivations are the main drivers for SFSC participation and CSA in studies showing prevailing social motivations (Table A4). Studies finding non-economic motivations as dominant rely mainly on qualitative methods (interviews and focus group discussion). By contrast, those emphasizing economic motivations are mainly focused on quantitative methods (Table A5). Using mixed methods for investigating farmer motivations and better exploring their link with SFSC types is therefore another avenue for research.

There are cross-country differences with studies conducted in Europe reporting mainly dominant economic motivations as compared to North America (Table A6). In addition, the limited research finding prevailing social motivations in Europe is exclusively in North European countries (Sweden, Norway and Poland). Only one study investigating motivations and 19% of the studies in this review use representative samples. These results call future research to further investigate motivations differences across countries (but also differences in terms of characteristics and economic impact) based on representative samples.

The link between farmer motivations and their characteristics has also received little research attention. Opportunist farmers mainly motivated by profit are more likely to be younger and male farmers (Oñederra-Aramendi et al., 2018), farming full time for their livelihood (A. B. Bruce, 2019; Montri et al., 2020) in specialized farms (Oñederra-Aramendi et al., 2018). Some studies find that small farms which are less competitive, are more inclined to be driven by economic motivations in order to survive (Demartini et al., 2017) while others find the opposite results (Matts et al., 2016). The presence of distinct pathways into SFSC with various farmer and farm profiles linked to different motivations can be studied to better understand the range of motivations. Future research could thus further investigate the boundaries of these distinct pathways and focus on whether or not these motivations are realized and compatible in practice. To the best of our knowledge, only two studies investigate motivation compatibility and they show mixed evidences. Galt (2013) finds that farmers engaged in CSA achieve a lower income because profitability is often not a high priority for them relative to other values. Kessari et al. (2020) conclude that economic and social goals are compatible in FM.

A large number of studies draw conclusions on SFSC determinants from basic descriptive statistics, but most of them focus on only a few characteristics and so may suffer from the omission of important factors. For instance, very little consideration has been given to policy variables from different governance levels, which can be a powerful driver. Only a few studies shed light on the most important characteristics. Farm rather than farmer or territorial characteristics have been, so far, identified as

the most important in explaining farmer engagement in SFSC (A. Corsi et al., 2018; S. Corsi & Mazzocchi, 2019). Farming experience, off-farm labor decisions and the use of origin labels should be further explored because of a lack of consensus on their effect. Similarly, using organic methods is reported as a driver of SFSC participation in most of the studies, but several studies find the opposite result indicating that more research is needed.

In the same way as for motivations, investigating differences in barriers between the various SFSC forms and among distinct geographic areas can be instructive.

Although our results highlight that SFSC participation is not a panacea for farm income issues, future research should examine in greater depth the labor requirements and transaction costs which are difficult to account for. Our results highlight that most studies make use of quantitative methods regarding the SFSC impact on farmer income (*Table 1*) while qualitative analysis can be a valuable resource to provide more detailed results. A few studies using regression analysis methods account for selection bias explained by unobservable factors (e.g. higher education) correlated with SFSC participation and income. Both downward (Park & Lohr, 2010; Park et al., 2014) and upward (Park et al., 2018) bias are reported when selectivity corrections are neglected. By contrast, Lohr and Park (2010) find that the exogeneity assumption is not rejected. Downward bias (upward bias) in the SFSC choice indicates that farmer earnings are overestimated (underestimated) with respect to a randomly chosen producer. Future research should therefore further explore unobservable factors enhancing farmer income through SFSC. The performance of farms differs within SFSC and between farming sectors and market areas. Future research will need to tackle this heterogeneity by further examining the factors – operator, farm, and location characteristics – that explain SFSC farm's returns. Based on our results, there is mixed evidence on the effect of value added-products and increasing the number of varieties grown on farmer income are found. In addition, a few studies show negative effects of organic production on farm income contrary to expectations. Mixed results are also found regarding economic performances of the different SFSC types.

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6 Appendix A

Figure A1. The PRISMA flow diagram

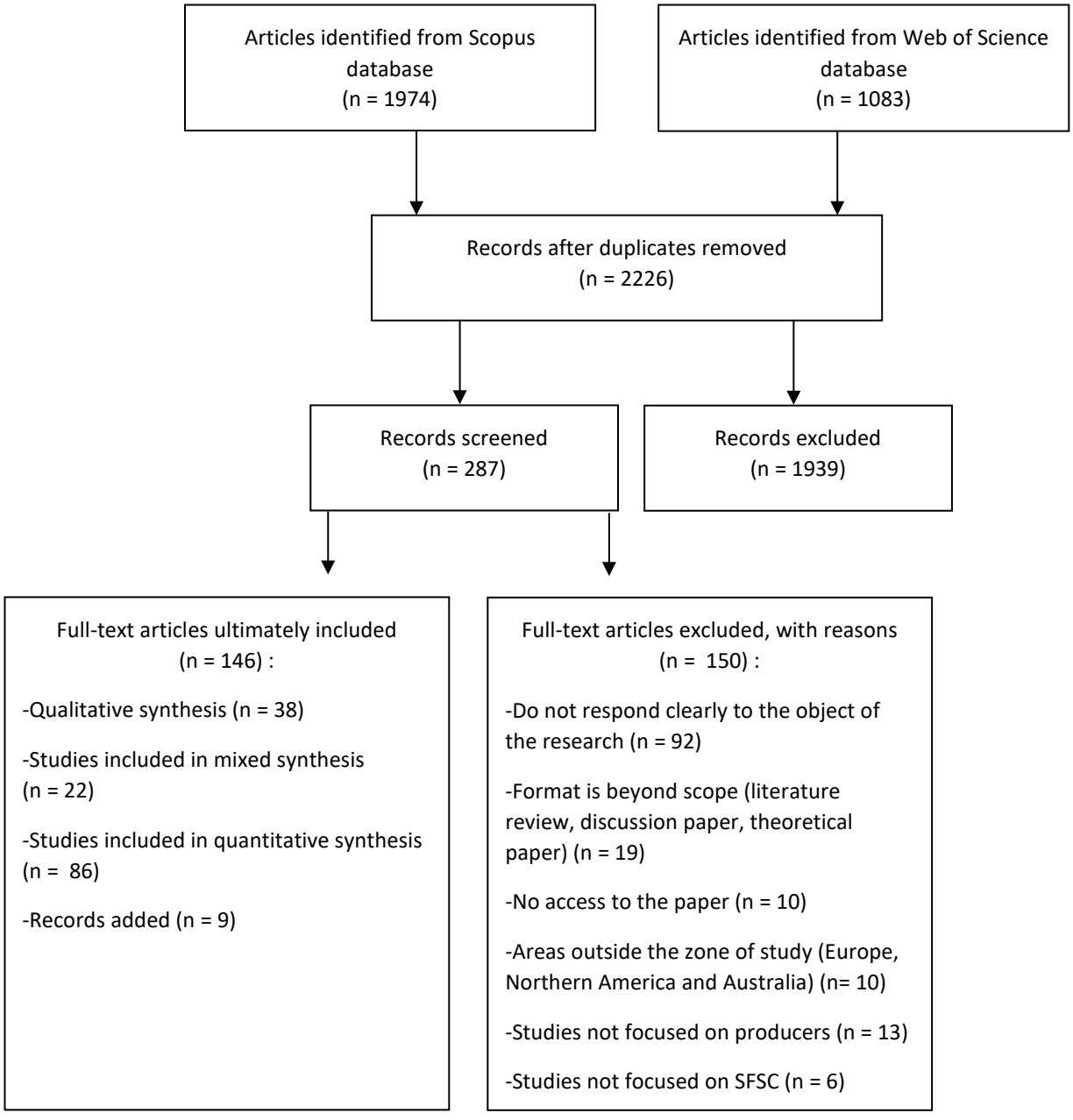

Table A1. **Keywords**

Supply chain keywords	Population keywords	Topic keywords
Local food	Farmer	**Farmer's characteristics:**
Local market	Producer	Feature
Local supply chain		Factor
Alternative food		Characteristic
Short food supply chain		Determinant
Direct marketing		Driver
Direct-to-consumer		Typology
Direct agricultural market		Type
Direct sales		Attribute
Direct selling		
Shortened supply chain		**Farmer's motivations:**
Direct Farm Marketing		Attitude
Community supported agriculture		Motivation
Farmer's market		Expectation
Farm-to-school		Willingness
Farm-to-institution		Incentive
Innovative marketing		Reason
Locally grown		Goal
		Barriers:
		Barrier
		Challenge
		Obstacle
		Constraint
		Difficulties
		Struggle
		Income Impact
		Profit
		Income
		Expenditure
		Earning
		Revenue
		Return
		Financial
		Performance
		Viability
		Wage

Table A2. **The Population, Intervention, Comparison, Outcomes, and Study (PICOS) criteria**.

Parameter	**Inclusion criteria**	**Exclusion criteria**
Population	Farmers	Articles outside the study zone (Europe, Northern America and Australia)
Intervention	Participation in local food system/short food supply chain	
Comparison	Not applicable	Not applicable
Outcomes	Characteristics, motivations, barriers and economic outcomes of farmer's involved in SFSC	Articles not responding clearly to the object of research and to its purpose Articles not targeting SFSC
Study design	Both quantitative and qualitative studies	Literature reviews, theses and dissertations, letters, book chapters, reports, authors' comments and other grey literature

Table A3. Supply chain abbreviations

Supply chain name	**Abbreviation**
Community supported agriculture	CSA
Farmer's market	FM
Farm-to-school	FTS
Farm-to-institution	FTI
Farm-to-Restaurant	FTR
Alternative food system	AFN
Direct marketing	DM
Local food system	LFS
Mid-tier supply chain	MTSC
Value-based supply chain	VBSC
Short food supply chain	SFSC
Solidarity purchase group	SPG
Alternative and local food supply chain	ALFSC
Conventional food supply chain	CFSC
Civic agriculture	CA
Local food hub	LFH

Table A4. SFSC types by prevailing farmer motivations

	FTI, FTS , FTR	FM	CSA	LFH	On-farm selling	U-pick	N
Economic motivation	0,25	0,66	0,33	0	0,33	0,08	20[6]
Non-economic motivation	0,30	0,4	0,60	0,10	0,2	0,1	17

Table A 5. Method used to evaluate prevailing farmer motivations

	Quantitative	Qualitative	Mixed	N
Economic motivation	0.42	0.25	0.33	12
Non-economic motivation	0.18	0.64	0.18	11

Table A6. Prevailing farmer motivation by countries (in percentages)

	Economic Motivations	Non-economic motivations
North America	**41,7**	**63.6**
US	41.7	54.5
Canada	0	9.1
Australia	**0**	**9.1**
Europe	**58,3**	**27.3**
Netherland	16,7	0
Germany	8,3	0
Hungary	8,3	0
Italy	16,7	0
Spain	8,3	0
Sweden	0	9.1
Poland	0	9.1
Norway	0	9.1
Total	**100**	**100**
N	**12**	**11**

[6] The N for each row in this table is the number of studies of each type. The percentages for the rows reflect more than 100% to reflect that a single study can investigate different SFSC types (e.g. FM and CSA).

7 Appendix B

Table B1. Research articles based on quantitative approach.

	Author	Year	*Setting*	Supply chain	Farmer sample	Method	Key findings
1	Govindasamy et al.	(1999)	US	DM	Farmer survey (n= 455 with 79% of farms engaged in retailing). Not representative of general farm population (NR)	Logit model	DM utilization, particularly in the urban areas increases the likelihood of a farmer attaining the high income level. Greenhouse utilization, sales of value-added products, providing agrotourism activities and using garden center facilities increase farmer's profitability. Using organic production has an insignificant effect and temporal (e.g. stands) and pick-your-own type operations a negative effect on the likelihood of being in the high income level.
2	Gilg and Battershill.	(2000)	France	DM	Farmer survey (n =123 with 60 farms using direct selling and 63 mainstream supply chains). NR	Descriptive statistics	Farms using direct selling are more actively engaged in environmentally friendly farming practices with a lower usage of agrochemicals and relying more on organic farming practices. They have higher level of education with an experience in the non-agricultural world.
3	Verhaegen and Van Huylenbroeck.	(2001)	Belgium	Innovative marketing channels	Interviews with actors involved in 6 innovative marketing channels (direct selling (2), co-operatives (2) and labelled traditional marketing channels (2)). NR	Cost–benefit analysis	Farmers get higher revenues in all SFSC initiatives due to higher and less uncertain prices, compensating higher costs.
4	Govindasamy et al.	(2003)	US	FM	Farmer survey (n= 36) of farms retailing at FM. NR	Logit model	Older farmers, selling organic products and most of their production in FMs, in the growing stage of their business, are more likely to be satisfied with their profitability. Farm ownership structure and retailing value-added products does not affect farm profitability.
5	Ilbery et al.	(2006)	UK	LFS	Database on 548 producers, processords and/or retailers of local food. NR	Mapping Method	Horticulture (in particular), livestock (dairy and meat) and poultry tend to predominate in the local food activities. Proximity to urban centers and easy access to major roads favor local activities.
6	Åsebø et al.	(2007)	Norway	FM	Farmer survey (n=162) of farms marketing through FM. NR	Descriptive statistics	Producers consider how their food is produced to be significantly more important than where it is produced. They want to describe to customers how they grow their products and to establish a relationship with customers.
7	Brown et al.	(2007)	US	FM	Farmer survey (n= 236) of farms marketing through FM. NR	Ordinary least squares (OLS)	The number of products offered, distance traveled to market and number of weeks at market are positively related to farmer's income. Both part-time and retired producers received a lower

							income and have lower sales. Sales of organic products do not increase their income and sales.
8	Hunt	(2007)	US	FM	Farmer (n=65) and other vendors (n=16) survey of farms marketing through FM. NR	Cluster analysis and probit model	FM farmers are younger with a higher level of education and report farming as their full-time occupation. They report higher incomes than other farmers in Maine, and at least as high than other farmers nationally. Nearly all of them indicate that they have good future prospects on the market. Farmer's income increases with total hours worked (but with diminishing returns), experience and growing nursery or floriculture product types.
9	Mireille.	(2009)	France	SFSC	Farmer survey (n =18 with farms involved in LFSC (1/3), SFSC (1/3) and combining the two marketing channels (1/3). Representative (R)	Descriptive statistics compared to national averages	Farms selling only through LFSCs are specialized in an industrial way with large plots, on a very limited number of vegetables, cropped each year, with a focus on the main standard species in the region. Farms selling only through SFSCs have crop species far more diversified following agro-ecological principles on smaller scales. Farms selling in mixed marketing channels have large surface areas and a diversified production.
10	Hardesty and Leff.	(2010)	US	FM, CSA and wholesale	Farmer interviews (n = 3 with 1 farms engaged in FM, 1 in CSA and 1 in wholesale). NR	Cost and return analysis	Marketing costs are lower in wholesale markets and higher in FM. Higher price obtained by farmers are not pure profit due to significant labor costs associated with the additional activities in DM (e.g. marketing and transport).
11	LeRoux et al.	(2010)	US	FM, CSA, Farm stand and U-pick	Farmer's interviews (n= 4, with farms marketing trough FM (1), CSA (1), Farm stand (1) and U-pick (1). Farmer survey (n= 14) of farms selling local food. NR	Cost and return analysis	CSA is the top performing channel for profit, risk and marketing labor requirements. Wholesale channels ranked in the middle, primarily due to higher labor requirements. FMs have the lowest ranking because of a lack of profitability, higher labor requirement and lower sales volume. Marketing through CSA and wholesale market is the best option.
12	Park and Lohr.	(2010)	US	Local selling	Farmer survey (n=817) of farms selling local food. NR	Ordered probit model, Heckman's method	Farmers with smaller acreage, more experience and using more internet tend to market the largest shares of their output in local markets. Organic producers and part time farmers focusing on local sales tend to achieve lower earned income. Acreage and labor, the number of years as a certified organic producer and the percentage of leased land have a positive effect on income earned.
13	Lohr and Park.	(2010)	US	Local selling	Farmer survey (n= 787) of farms engaged in local selling. NR	Stochastic production frontier models	Organic farmers involved in local sales achieve lower earnings.

14	Timmons and Wang.	(2010)	US	DM	Census of Agriculture (CA) (2007) of farms in the 2,781 US counties. R	OLS model	Growing vegetables in smaller farms, located near cities in wealthy areas with more available land, increase direct food sales.
15	Detre et al.	(2011)	US	DM	ARMS (2002, n =11,303 farms with 3% of the farmers in the sample using DM). R	Probit model	Farmers adopting direct marketing strategy (DMS) are younger, smaller and located near urban areas. They rely more on internet, organic practices and high-value crops. However, they are less likely to participate in production contracts. The production of high-value crops, the access to the internet and using organic method of production in conjunction with the adoption of a DMS increase gross sales. By contrast, large farms, with production contracts, specialized in cash grains have lower sales.
16	Schmit and Gómez.	(2011)	US	FM	Vendor survey in 27 FM (n=103) and market manager survey (n= 21). NR	Multinomial logit specification and ordinary least squares (OLS)	Full-time farmers are much more satisfied with their profit and have higher sales. Those selling in larger (with more vendors) and a limited number of FMs, with higher customer spending and located in areas with shorter average travel distances, are much more satisfied by their profit. Vendors selling arts and crafts, processed foods and beverages, or meat and dairy products are much less satisfied with their level of profitability. Fruits, vegetables, plants and nursery farmers have lower per customer sales, reflecting lower-priced for raw products.
17	Uematsu and Mishra.	(2016)	US	DM	ARMS (2008, n = 4,629 farms). DM strategy includes Roadside stores (n =161), direct sales to local grocery stores, restaurants, or other retailers (n =153), FM (n = 118), Regional distributors (57) and CSA (12). R	Quantile regression	DM adoption has no significant impact on farm income due to additional labor requirement, learning cost, and other fixed costs associated with its adoption. However, direct marketing is a good risk management tool. Marketing through roadside stores, CSA and FM has a negative effect on farm income while farm stores and regional distributors have a positive effect. Diversification, farming as a primary occupation, farm size, farmer's education and experience, loans average interest rate, internet access, government subsidies, farm tenure and growing high value crops or producing dairy products affect positively gross farm income.
18	Conner et al.	(2012)	US	FTS	Survey of farms associated with schools (n = 198). NR	Two-step cluster procedure	Farmers with stronger economic motivations are most likely to adopt distribution practices preferred or required by schools, followed by socially motivated and low engagement farmers. Socially motivated farmers will require more technical assistance to meet the economic realities of school markets.

19	Sage and Goldberger.	(2012)	US	DM	Farmer survey (n=670 with 149 farms engaged in DM). NR	Geographically Weighted Regression	Farmers involvement in direct marketing increases with organic farming practices and civic/green values while it decreases with dairy/livestock product types and market/industrial values (consummer demand, price premium for organic products, input costs).
20	Rikkonen et al.	(2013)	Finland	LFS	Local food enterprise survey (n = 42). NR	Descriptive statistics	The biggest obstacles to supply local food are linked to the lack of time, the legislative requirements, the distance from the market, the seasonality, attracting new customers, financing the business and finding adequate marketing channels and labor.
21	Kim et al.	(2014)	US	FM	Price data were collected, yields were provided by the USDA, cost of production are from various studies, Marketing costs are reported by Utah's growers using a survey	Simulation model	FM offer the highest average return. However, price variability is greater for FM contrary to wholesale markets providing more stable revenues. Marketing 40% of output through FM and 60% through wholesale channels is the most attractive option for risk averse producers, increasing average expected profit and decreasing variation in profit.
22	Park et al.	(2014)	US	DM	ARMS (2008, n = 340 with 10% of the farms in the sample use direct selling). NR	Multinomial logit (MNL) model with selectivity approach	Farmers using only DM report lower sales. Farm operators with a broader portfolio of marketing skills, using more hired labor and acreage and relying less on off-farm income display higher sales in direct marketing.
23	Migliore et al.	(2014)	Italy	FM, Box scheme, DM, SPG	Farmer interviews (n = 103) of farms engaged in CA. NR	Principal Component Analysis and Tobit model	Participation in the various forms of CA is associated to different farming attitudes. Participation in SPG is associated with the attitudes toward direct relationships with consumers and environmental sensitivity. By contrast, farmers participating in FM show the highest propensity toward profit maximization.
24	Syrovátková et al.	(2014)	Czechia	FM	Farm Structure Survey and Survey on Agricultural Production Methods (2010, n = not available). NR	Cartographic analysis	Lack of experience with private entrepreneurship and marketing is the main obstacle to broader involvement of farmers in FM.
25	Tudisca et al.	(2014)	Italy	SFSC (Direct sales, FM, e-commerce, farm shop, SPG and vending machines)	Farmer interviews (n=20) of farms marketing through AFN. NR	Descriptive statistics	More than half of the farmers adopting SFSC reports an improvement of their business economic performance. The main reason that leads farmers to adopt SFSC is to obtain higher farmer income followed by promoting the environmental sustainability of their farm.
26	Migliore et al.	(2015)	Italy	AFN (e.g. FM, box scheme, SPG)	Farmer interviews (n=103 with 51% of the farms engaged in FM, 31% in SPG and 18% in box scheme). NR	Principal composant analysis	There are two types of farmers participating in AFN. One type is oriented toward profit maximization and farm growth. The second type oriented towards satisfying social and environmental needs.

27	Connolly and Klaiber.	(2015)	US	Farm-stand, CSA, U-pick	Farmer database (N=4685) of farms participating in SFSC. NR	Ordered probit regression	An increase in the population size, land value, proportions of female, white and better educated residents lead to further direct-marketing operations. In addition, the number of farmers' markets increases direct-marketing operations while the number of wholesalers has no significant impact.
28	Silva et al.	(2015)	US	CSA, FTI, FTR, wholesale and FM	Farmer survey (n=135 with 60% of the respondents participate in wholesale markets, and less than half market to restaurants or institutions, with 47% using FM and more than 40% using CSA. NR	Multivariate probit model and ordered probit model	More educated farmers are more likely to sell into FM, CSA and restaurants/institutions and less into wholesale markets. Women farmers are more likely to sell through CSA and less into wholesale markets. As farm size increases, farmers are more likely to sell into wholesale market and less in FM. No evidences suggest that farmer age and experience affect market channel choices. Farmers selling into SFSCs tend to be more likely dissatisfied with their profitability while those selling into wholesale markets and restaurants/institutions, are significantly more likely to be dissatisfied with their quality of life. Women are less likely to be satisfied with their profitability and quality of life. Farmers having farm debt or using a bank operating loans are less likely to feel satisfied with their profitability but more likely with their quality of life.
29	Hu and Shieh.	(2015)	US	Direct sales (« deliviery » to consumers, self-establishment of organic store, sales in private farms, market or on streets, production and marketing groups or cooperating with other farmers) Indirect sales (sales to middleman, production and marketing group, delivery companies, supermarket, organic specialty	Farmer interviews (n= 274) of farms participating in direct and indirect sales. NR	Analysis of variance	Organic farmers obtain higher sale growth through direct sales thanks to higher unit prices. Indirect sales provide higher gross profit rate, return on assets and return on sales than direct sales because of higher unit management and marketing costs on direct sales.

				stores, restaurants and others)			
30	Park.	(2015)	US	DM	ARMS (2008-2010, n = 5183 with 646 farms using DM and 4537 not DM). R	Recentered Influence Functions apply on the Unconditional quantile regression model	Involvement in DM is associated with a decrease in farm sales. Farmers who experience growth in off-farm income and expand their acreage and labor utilization are more capable to withstand sales declines.
31	Kupke and Page.	(2015)	Australia	FM	Farmer survey (n=71 with 15.5% involved in DM). NR	Analysis of Variance, Principal components analysis (PCA)	Farmers are constrained by FM bureaucracy (e.g. form filling, volume of regulations), high labor requirement, FM costs (e.g. market rents, costs of outlay, competition), producing regularly enough volume and variety and consumers lack of interest for local food.
32	Tudisca et al.	(2015)	Italy	DM	Farmer survey (n=30) of farms adopting a SFSC strategy. NR	Descriptive statistics	Farmers report an increase of their profitability when using DM in conjunction with traditional channels (due to a lack of local demand).
33	Szabó and Juhász.	(2015)	Hungary	SFSC	Farmer survey (n= 202) of farms engaged in SFSC. NR	Factor, cluster and variance analysis, SERVQUAL model	Farmers participate in SFSC mostly to get higher income.
34	Matts et al.	(2016)	US	FTI	Farmer survey (n = 311) of farms participating in institutional markets. NR	Descriptive statistics	Farmers' motivations are driven largely by social values. Smaller farmers are significantly less likely to report economic factors and see more potential social value in FTI markets. FTI farmers report many challenges including timely payment, low prices, packaging consistency and delivery requirements.
35	Aubert and Enjolras.	(2016)	France	SFSC	CA (n = 71 888 including both farms in SFSC and LFSC). R	Simultaneous Equation Regression	Farms selling through SFSC are more likely to implement environment-friendly practices.
36	Farmer and Betz.	(2016)	US	DM	Farmer survey (n=190 including 40.5% of farms selling directly to consumers and 59.3% to institutions). NR	Logistic regression, Principal component analysis	DM participation increases with the farmer's educational level and decreases with acreage farmed and the family ties with the land. In addition, farmers using direct selling are less concerned with changes in technology, and are less dependent on external financing options. They are however more concerned about how their farming practices affected the environment and are more willing to try new methods.
37	Galt et al.	(2016)	US	CSA	Farmer survey (n= 111) of farms engaged in CSA. NR	Descriptive statistics and correlation analysis	Perceived competition in CSA is negatively correlated with farmer's profitability and satisfaction on various indicators of the social embeddedness. Farmers are therefore more likely to engage in self-exploitation, and worker exploitation.

38	Mundler and Laughrea.	(2016)	Canada	SFSC	Farmer survey (n=32) of farms engaged in SFSC. NR	Descriptive statistics compared to national averages	SFSC farmers are younger, more likely to have started their own farm, practice more certified organic agriculture on larger acreages. SFSC farmers have an operating profit margin (OPM) below that of all Quebec farmers, albeit strong variations between them. Organic farmers in SFSC have higher OPM than all Quebec farmers.
39	Rosalia Filippini et al.	(2016)	Italy	SFSC	Farmer interviews (n=55) of periurban farms. NR	Non-parametric tests	Farms exclusively in CFSC generally have higher land use intensity, but this is not the case for all the indicator values. Farm structure and individual farmers' characteristics are less related to market orientation.
40	Jablonski and Schmit.	(2016)	US	LFS	Two data sample based on farmer's interview (n=130 and n= 30) of farms with direct selling + ARMS (2008–2011) with 64 local farmers and 429 non local farmers representative of New York city. NR	Descriptive statistics	Expenditures are greatest on labor and other variable expense (hand tools, supplies, farm shop power equipment expense) due to the additional supply chain functions assumed by local food system participants.
41	Germeten and Hartmann	(2017)	Germany	School fruit scheme (farm-to-school)	School supplier survey (n=99 including 36 agricultural enterprises and farm shops). NR	Principal component analysis, Multivariate regression and ordered logit analyses	Motivations are multidimensional. Financial and entrepreneurial (competitive success) are the most important factors determining suppliers' intensity of participation. Non-economic determinants include the buyer–supplier relationship and the promotion of child nutrition.
42	Aggestam et al.	(2017)	Sweden	SFSC	Farmer survey (n=338) and interviews (n = 6) of farms engaged in SFSC. NR	Factor analyses, OLS regression	Positive attitude (e.g. increasing profits) is considered as the most important driver for the farmers' intention in scaling-up their SFSC business.
43	Demartini et al.	(2017)	Italy	SFSC (FM, CSA and farm shop)	Farmer questionnaire (n=150) of farms engaged in SFSC. NR	Principal component analysis	Motivations for farmers to participate in SFSCs are mainly opportunistic even though they display social values.
44	Bonanno et al.	(2017)	US	FMs	CA (2007), data on farmer's market location are collected (1,833 zip codes). NR	Ordered probit and spatial ordered probit	An increase in the population may help the establishment of more FM if the initial population is small. Areas with younger, more highly educated individuals, smaller households but with a higher number of children support FM development. Complementary services such as grocery stores and drawing from a larger potential pool of farmers also enhance the location of FM. By contrast, the absence of farms and limitations in finding adequate space for establishing the market itself (i.e., housing density effects) constraint the development of FM.

45	Jablonski et al.	(2017)	US	DM	Farmer survey (n=100) with 63 engaged in DM. NR	Ordered probit model	Increasing the number of varieties grown affects negatively the income of farmers involved in DM. By contrast, being located in more urban areas, increasing the length of the production season and diversifying activities (e.g. selling fruits and value-added fruit products or adding services) increase farm profitability.
46	Morel et al.	(2017)	France	DM	Farmer interviews (n= 20) of farms engaged in DM. NR	Stochastic Modeling	Organic micro farms using direct selling could be economically viable depending on the level of income and workload accepted by farmers. Low-cost investment strategies based on self-built equipment and second-hand materials led to lower viability by increasing workload. The 9-months marketing strategy led to higher viability than the 12-months marketing strategy due to higher labor productivity in the former.
47	Pölling and Mergenthaler.	(2017)	Germany	DM	Farmer survey (n=123) with 39 engaged in DM. NR	Logistic regression	Larger farms conducting organic farming, high-value crop production or livestock breeding, located near cities, headed by higher educated farmers are more likely to implement direct sale arrangements.
48	Flores and Villalobos.	(2018)	US	DM	Yields used are from the litterature, the percentage of the total yield harvested through time and farmers, market prices are collected, data on precipitation and temperature are collected from weather stations	Mixed-integer programming model	Differences in net profits between Albuquerque, Phoenix and Yuna regions can be attributed to the difference in planting and harvesting magnitudes. In addition, the use of protective, yield-increasing technologies (greenhouse) and the concentration on more selected product varieties can increase the estimated yearly profitability of local production.
49	Benedek et al.	(2018)	Hungary	FM	Farmer survey (n=156) of farms engaged in FM and conventional markets. NR	Non parametric test and maximun likelihood estimation	FM farmers are younger and more educated. They have less farming experience and are less likely to have future plans in terms of investments and contracts with their chosen markets. In addition, they have bigger farm and more diversified productions.
50	Oñederra-Aramendi et al.	(2018)	Spain	FM	Representative interviews (n = 10), and farmer survey (n=176) of farms engaged in FM. NR	Cluster Analysis	Farmers motivations are economical, but non-economic reasons exist such as social and cultural heritage. Motivations are related to the personal characteristics of each individual, such as gender and age.
51	Ahearn et al.	(2018)	US	DM	ARMS (2009-2012, n = 36,517 with 3560 farms in DM).R	Two-stage Heckman approach	New entrant farmers having a spouse, with a woman as principal operator and a high speed internet are more likely to use DM while farmer's age has a non-significant effect. Farms growing organically more products are more likely to use DM. Large farms with a production or marketing contract and receiving government payments are less incline to market through DM.

							Farmers in or adjacent to a metropolitan county, in places with more FM and with a higher poverty rate, increase the likelihood of marketing through direct channels although the acres of fruits and vegetables production per capita in a county reduces this likelihood. Factors affecting gross cash farm income (GCFI), affect differently returns on farm assets (ROA, long-term financial outcomes). Being young and well-educated is positively related to GCFI while education level has a negative impact on ROA and age a non-significant effect. Being a beginning farmer is negatively related to GCFI but positively to ROA. Farm size and the number of worker's hours on the farm are positively related to GCFI although they have a negative impact on ROA. Participating in contracting and government programs and production diversification are positively associated with GCFI but negatively to ROA. Engaging in organic production does not have a significant impact on the GCFI but a positive impact on the ROA.
52	Bauman et al.	(2018)	US	DM	ARMS (2013, n= 17 474 farms with 1,013 selling local food). R	Descriptive statistics	Participation in direct and intermediated markets may allow farms of any scale of sales to be financially viable (ROA) but with a significant heterogeneity. Producers using different channels are not significantly different for the majority of the profit's quartiles. However, direct-to-consumer marketers among the top performing quartile have significantly lower ROA than the top performers using intermediated markets or both types of channels. Fruits and vegetables producers report the highest returns among the highest performing producers. Farms located in metro counties significantly outperform those in areas farther from populated centers. Farmers in the top quartile are the less indebted suggesting that leverage is detrimental to returns.
53	Park et al.	(2018)	US	DM	ARMS (2008-2010, n = 5,959 farmers with 234 farms using only direct to consumers, 157 using only direct to retailers and 180 using both direct to retailers and consumers). R	Multinomial treatment effect model	Female farmers located near the cities, using more internet and non-farm activities (e.g. agri-tourism activities) are the more likely to choose DM strategies. Direct to consumers only and both direct-to-consumers and retailers are associated with a decrease in farm sales. DM farmers using internet, more labor and expanding their acreage are able to limit the amount of sales decline. By contrast, DM female farmers face larger sales declines compared to male farmers while farm experience does not have a positive effect on sales.

54	Charatsari et al.	(2018)	Greece	SFSC	Farmer survey (n = 144) of farm more or less willing to enter SFSC. NR	Binary statistics and hierarchical regression analysis	Willingness to participate in SFSC is higher in individuals who display increased levels of citizenship behavior, who feel accepted in intra-community collaboration networks and enjoy a sense of closeness to other community members. By contrast, self-perceived lack of communication and collaboration competencies diminishes this willingness.
55	Corsi et al.	(2018)	Italy	On and off-farm direct sales	CA (58 304 farms) with 14% of farms selling directly on-farm and 8.1% off-farm. R	Probit model	Male and younger farmers, more educated, are more interested in direct selling, though this is not true for all types of farming. For example, male operators are more likely to engage in direct sales, when they grow grapes, while the opposite holds for horticulture. Mixed forms of farming, diversification activities and organic farming are more conductive to DM. By contrast, quality signals like protected designation of origin (PDO) or protected Geographical Indications (PGI) have a negative effect on direct sales. Farms in hilly or mountainous areas and higher population density within short distance to the farm make direct sales more likely. The proximity to commercial poles affect positively but to a minor degree off-fam sales.
56	Filippini et al.	(2018)	Italy	LFS	Farmer survey (n=51) of peri urban farms. NR	Principal component analysis	Cattle farms are more connected to LFS and to origin labels, contrary to dairy farms, as well as, production involving cereals, industrial crops and vegetables. Larger farms with a wider range of products are less involved in LFS. The farms most connected to LFS rely more on origin than organic labels.
57	Khanal et al.	(2018)	US	DM	ARMS survey (2012, n = 18,728 farmers) with 5.4% using direct selling. R	Unconditional quantile regression	Organic farmers using direct-selling have lower sales and income because the prices they receive are not enough to offset their significant labor transportation and packaging costs. Larger farming operations benefit the most of participating in certified organic food production. Male operators, having marketing contract and access to internet with a lower distance to the market have higher income and sales. The effect of farm diversification is positive for the 25th and 35th quantile of sales, however, it is negative for the 50th and higher quantiles, indicating that smaller farms may benefit from farm diversification while larger farms may benefit more from specialization.
58	Morckel.	(2018)	US	FM	Farmer survey (n= 45) of farms engaged in FM. NR	Descriptive statistics	Relocating farmer's market to the city's core improved farmer's profitability and their satisfaction. In addition, the spending patterns vary by day of the week (higher the Saturday than the weekday) and season (higher in the summer).

59	Andrei et al.	(2019)	Romania	SFSC	Farmer survey (n= 140) of farms engaged in SFSC. NR	Correlations between variables	SFSC participation is determined by the type of activity, the size of the farm (smaller) and the farmer level of education (more educated).
60	Dong et al.	(2019)	US	CSA	CA (2007 and 2012, n= 4587 CSA farms) and the US Census Bureau (2005 and 2010). R	Tobit model	Small-scale farms primarily engaged in growing vegetables, melons, fruits and tree nut crops, and headed by younger and women operators whose primary occupation is farming, tend more to market products though CSA. The share of farms marketing through CSA is highly correlated with high-income households with more females, less seniors and less children.
61	Yacamán Ochoa et al.	(2019)	Spain	SFSC	Farmer survey (n= 90) of peri urban farms. NR	Descriptive statistics	Farmer's involvement in SFSC is challenged by distribution costs, lack of interest from citizens in local food products, lack of organizational and physical structures, and associations in the periurban agricultural sector. In addition, large farms have difficulties to involve in SFSC due to their specialization and the lower amount of subsidies to change their business model.
62	Samoggia et al.	(2019)	US and Hungary (HU)	CSA	CSA farmer interviews from the US (n = 35) and HU (n=14). NR	Principal component analysis, and multiple multivariate linear regressions	Non-monetary benefits are the essential backbone of CSA farming, but the monetary benefits are to be ensured for CSA long-term perspective.
63	Schoolman.	(2019)	US	DM	US Census of Agriculture (1997 to 2012, between 2867 and 3118 farms using direct marketing over this period). NR	Two-way fixed effects model	The growth in local food systems in the US (measured as an increase in the total value of direct market sales) is strongly associated with declines in spending on agricultural chemicals even though the magnitude of this relationship dwindled over the next 15 years.
64	Schmit et al.	(2019)	US	DM	Farmer sample (n= 67 with 47 farms using DM). NR	Means difference tests	Average sales, expenses, and margins per acre are not statistically different when comparing farmers with a majority of sales through FM and farmers with less or equal to 50% of farm sales from FM. Farmers selling exclusively through their own retail farm stores have strong sale performances with respect to farmers selling mostly through FM but no net margin differences are found. Farmers selling on-farm have higher total expenses, average sales per acre and net margin than farmers selling exclusively through intermediated market channels.
65	Bermond et al.	(2019)	France	SFSC	CA (2010, 516 152 farms using both SFSC and LFSC). R	Descriptive statistics and Principal component analysis	A greater participation in organic SFSC is linked to a smaller size of farms and a focus on plant and animal products. Farmers involved in organic SFSC are relatively younger and more educated. Farms in transition toward organic production and involved in SFSC deal with a higher labor intensity.

66	Bauman et al.	(2019)	US	Direct-to-consumer and local sales from on-farm store, u-pick, roadside stands, CSAs and FM; local retail outlet such as a restaurant or grocery store; Regional distributor such as food hub; Local institutions such as school or hospital	ARMS (2013-2014, n= 44 536 with 2624 farms selling local food). R	Stochastic profit frontier model	Scale has the largest influence on efficiency (defined as the ratio of the observed profit of an individual producer to the maximum observed profit) although the choice of marketing channel does not significantly affect it. Management of variable expenses (not including labor), production enterprise specialty (fruits and vegetables) and land ownership (the proportion of land leased) also influence positively producer financial efficiency.
67	Lurie and Brekken.	(2019)	US	LFSC	Producer survey (n= 153) of farms selling local food. NR	Descriptive statistics	Local producers are mainly motivated by economic, social, and environmental concerns related to their communities.
68	Brekken et al.	(2019)	US	Values-Based Supply Chain (VBSC) and DM	Farmer survey (n= 182) of farms engaged in VBSC. NR	TOA-MD Simulation	Results indicate that average total net economic impacts from VBSC participation are positive, but less than half of participants have a net economic benefit from participation. VBSC gains depend on the relative prices and costs of the marketing channel options. First, VBSC participation is unlikely to provide higher farm net returns in cases where farms have direct marketing options with higher prices offered. VBSC participation provides higher net returns when farms' alternative options fall in the conventional wholesale category by providing higher prices for similar cost of participation.
69	Chen et al.	(2019)	US	DM	ARMS (2012, n= 14960 with 7.17% of farms adopting DM). R	Bivariate binary choice model	Farmers' adoption of organic farming reduces the probability of adopting DM, whereas DM does not have a significant effect on organic farming adoption. In addition, there is a peer effect for farmers' adoption of organic farming and direct marketing. Cash grain farms are less likely to adopt either organic farming or DM

							whereas high-value crop farms are more likely to adopt both practices. Dairy farms are less likely to choose DM while other animal farms are less likely to choose organic production. The use of a production contract or marketing decrease the probability of DM adoption. Young and female farmers are more likely to adopt both practices. Farmers' probability of choosing either method decreases first and then increases as the education level increases.
70	Corsi et al.	(2019)	Italy	DM	CA (2010, n = 1 544 of farms using DM). NR	Ordinary Least Squares (OLS)	The number of small, organic and PDO farms are drivers of participation in direct sales. The average income and age of the population affect positively the participation of farmers in direct sales while the population density affects it negatively.
71	Jablonski et al.	(2019)	US	CSA, FM, farm stands	Farmer survey (n= 42 with 37 farms using DM). NR	Descriptive statistics	CSA have the highest marketing profit margin, followed by farm stands, FM, and other direct markets. CSA farmers have the lowest transport and labor requirement compared to all direct market channels. However, other DM strategies and farm stands performed better than CSA in terms of sales and marketing profit per hour of labor. In addition, weekly gross revenue is less for CSA than FM and farm stands due to the relatively smaller size of their farms.
72	Kacz et al.	(2019)	Hungary	CSA	Farmer survey (n=32) of CSA farms. NR	Descriptive statistics	Farmer's involved in CSA are relatively old, operating their farm since a long time, working mostly either on animal or plant products on their own land. Their employment of external labor is low and rely more on family members while most of the farmers use conventional methods of production rather than organic.
73	Rocchi et al.	(2019)	Italy	DM	CA (about 1,653,000 farms with 270,579 farms using DM). R	Likelihood ratio test	Farms using information technology and non-agricultural activities, adopting organic farming, growing all product types except field crops, managed by men, with a larger share of family labor are more likely to use direct-selling. Farmer's age and education do not affect direct-selling decision while education has a positive impact when related only to agricultural studies. Small farms are more likely to choose direct selling except in perennial crop sectors (e.g. wine, olive) where larger farms have a higher probability. Population density increases the adoption of direct selling contrary to the presence of touristic activities and subsidies from the second pillar of the CAP at the municipality level. The presence of FM provides incentive to direct selling at a certain mass level contrary to SPGS with a positive impact for a small number of them.

74	Sroka et al.	(2019)	Germany	DM	Farmer survey (n=199 with 56 using DM). NR	Classification and regression trees	Elements of successful strategies (in terms of business situation, development perspectives and succession) include tourism services and DM. Probability of achieving high success increases also with organic production. However, the success of these strategies is mainly dependent upon farms' location. The closer a farm is located to highly urbanized areas, the higher the probability of achieving success. Farm's size is an important factor of success for farms without adjustment strategies, in less populated areas, relying mainly on economies of scale.
75	Charatsari et al.	(2020)	Greece	SFSC	Farmer questionnaire (n= 106 with 33 participating in SFSC). NR	Descriptive and inferential statistics	Perceived competencies are more important in predicting willingness to participate in SFSCs than citizenship behavior. The potential economic benefits of participation do not contribute to the variance in willingness to participate in SFSC.
76	Clark.	(2020)	US	On-farm selling	Case study on one farm. NR	Cost and return analysis	On-farm store costs are still greater than income after the six-year period following the store opening. The farm store lacks economy of scale to offset high production costs (labor and material costs) and has a low sale volume. High-cost is driven by the increasing importance of ready-to-eat prepared foods requiring more inputs and providing insufficient margins for covering costs of operations. In addition, raising prices to account for more expensive inputs is a challenge due to low income of household.
77	Hruška et al.	(2020)	Czechia	AFN (CSA, on farm sales - farm shops, farm-based hospitality, pick-your-own; off farm sales - FM, sales to retailers, farm direct deliveries, veg boxes)	Four state databases of AFN farms in 2014 (n = 38) and five in 2018 (n = 55). NR	Descriptive statistics and spatial analysis	Small farms located in urban or rural-urban areas growing animal, plant or mixed production have a greater potential for integrating AFN. Most of the farm use only one distribution channel (mainly farm shop).
78	Jablonski et al.	(2020)	US	SFSC (FM, roadside stands, and u-pick), Intermediated channels (direct to restaurants, institutions, or to regional aggregators)	USDA ARMS (2013–16 , n = 78,559 farms) of farms selling local or non-local food. R Samples include 73,191 (positive labor expenditure) and 26,694 (positive wage) producers without local sales	Descriptive statistics	Producers with local sales have significantly higher wage compared to those without, especially for operations with intermediated-only or intermediated and direct sales, as opposed to direct-only sales. Wages are higher for local food producers in more urban locations.

					and 3,899 (positive labor expenditure) and 1,569 (positive wage) producers with local food sales		
79	Mazzocchi et al.	(2020)	Italy	DM	CA (2010, n = 1522 municipalities). NR	Ordinary Least Square model (OLS)	Farmer's involvement in SFSC is more important in municipalities with higher income, older populations, bigger retailers and lower in municipalities with a larger number of rural areas. Farmer's involvement increases when farms are smaller, organic, managed by women and producing vegetables or animal products.
80	Mohammad et al.	(2020)	US	FM	Manager survey (n= 38) and vendor survey (n=85) in FM. NR	Analysis of variance (ANOVA) and OLS regression	There is a gap between farmer's food safety knowledge and their implementation due to a lack of proper facilities and equipment, a lack of specific food safety guidelines for FM, the food standard implementation costs and the lack of benefits to their business (e.g. low amount of sales).
81	Mundler and Jean-Gagnon.	(2020)	Canada	SFSC	Farmer survey (n=32) of farms involved in SFSC. NR	Descriptive statistics compared to national averages	There is not a marketing channel with higher net revenue suggesting that economic performance depend more on how farmers organize their work and control marketing costs than on the types of distribution channels they use. SFSC farmers have a lower productivity when carrying out production-related tasks, but it is often compensated by higher productivity in downstream activities (processing and marketing). Farmer's net earnings are often low when compared to the amount of effort involved. They deal with labor-intensive work conditions and struggle to get markups offsetting incurred costs.
82	Plakias et al.	(2020)	US	DM	Farmer survey (n= 24,907 farms with a 57.5% response rate) of farms using DM. NR	Logit models	Although farms of all sizes use direct selling, the ones using only DM are smaller and produce mainly vegetables, fruits, nuts, livestock and animal products. Beginning farmers are more likely to sell directly to consumers and retail channels while more experience in direct selling increases the likelihood to sell trough intermediates in the long run.
83	Tessier et al.	(2021)	Belgium	DM	Farmer interviews (n=36 with 14 using DM). NR	Archetypal Analysis	Farmers involved in direct marketing adopt low-input, low-capital, but knowledge intensive farming model embedded within alternative commercial and social networks, seeking to become autonomous from regime institutions.

84	Pépin et al.	(2021)	France	SFSC	Farmer survey (n= 165 with 99 selling for the local markets). NR	Factor analysis of mixed data	Agroecological practices are more likely to be supported by SFSC.
85	Hochuli et al.	(2021)	Switzerland	DM	Agroscope annually surveys (n = 3500 dairy farms with 1019 using DM). R	Descriptive statistics and non-parametric test	Farms with agritourist activities achieve the best results in terms of income and labor productivity in comparison with the direct marketing and specialization groups of farms. Dairy farms with a DM strategy have similar incomes compared to farms with milk specialization. However, they perform significantly worse than those with the specialization strategy in terms of labor productivity. DM farms in high altitude have lower incomes due to the naturally more difficult production conditions but also the lack of proximity to markets with a higher population density.
86	Schoolman et al.	(2021)	US	SFSC (On-farm sales, FM, FTI, FTR, CSA, FH)	Farmer survey (n=698 with 80% of the farms using SFSC). NR	Logistic regression models	Farmers who prioritize civic engagement and community institutions are more incline to use CSA, FTI and intermediaries (e.g. FH). By contrast, civic motivations are not important for selling at FM and on farm shops. Local farmers display a lower sense of environmental responsibility but also less importance to productivist considerations when making farming decisions.

Table B2. Research articles based on a mixed method approach.

	Author	Year	*Setting*	Supply chain	Farmer's sample	Method	Key findings
1	Ross.	(2006)	US	SFSC (e.g. FMs, restaurants/local institutions, on-farm retail, pick your own, CSA)	Farmer interviews (n=31 with 87% selling directly to consumers). NR	Descriptive statistics	Farmers using SFSC are mainly driven by making a profit. Major barriers are a lack of farmland, difficulties to obtain start-up financing, lack of processing facilities, training, technical assistance and access to government farm credit programs.
2	Abate	(2008)	US	FM, CSA, FTI and FTR	Farmer survey (n =100 with 27% selling at FM, 15% in CSA, 47% at farm retail and roadside stand). NR	Descriptive statistics and interviews	Farmers involved in SFSC are constrained by a lack of farmland, diversify and year-round supply due to seasonality and suffer from competition with conventional channels.
3	Aubry and Kebir.	(2013)	France	On-farm selling, FM, pick-your-own farms, box scheme (e.g. AMAP), online sales, and direct deliveries to restaurants, canteens and supermarkets	Interviews with decision-makers (n= 8) and farmers engaged in SFSC (n= 62). NR	Descriptive statistics and interviews	Farmers tend to combine different types of supply chain, rather than specializing in only one. Farmers involved in SFSC face constraints such as a lack of land due to urbanization and high land price, a lack of labor (agriculture is not attractive) and the weakness of producers' collective organization supporting SFSC.
4	Auld et al.	(2009)	US	DM	Farmer survey (n=15) of farms selling local food. NR	Descriptive statistics and interviews	Small farms tend to produce a small crop volume, pushing them to primarily sell their produce directly to consumers in order to maximize profits.
5	Björklund et al.	(2009)	Sweden	FM, farmer's own markets, direct to local grocery stores, CSA, schools and restaurant and/or direct-to-consumers through internet	Farmer interviews (n= 6) of farms selling local food. NR	Descriptive statistics, and interviews	Farmers interacting directly with consumers have more diversified productions.

6	Oberholtzer et al.	(2012)	US	FTS	Farmer survey (n =120) of farms engaged in FTS. NR	Descriptive statistics and interviews	Farmers meet several barriers when supplying schools such as getting certification, low price, having a contact with school, school timing and distribution challenges (e.g., delivery to several different schools).
7	Galt et al.	(2012)	US	CSA	Farmer interviews (n=54) of farms engaged in CSA. NR	Statistic descriptives	CSA farmers are younger, well educated, relatively new in agriculture relying on off-farm jobs and include greater proportion of women than Californian and US agriculture. Farms are smaller, growing a large number of crops, relying mainly on agroecological methods with diverse land tenure arrangements. Regarding profitability, 54% of the respondents indicate that their CSA is profitable, 32% broke even and 15% operate at a loss.
8	Fielke and Bardsley.	(2013)	Australia	FM	Farmer survey (n= 41) of farms engaged in FM. NR	Non parametric techniques	Consumer feedback, community values and fun are the most important reasons for selling at FM indicating that benefits of FM to producers are primarily social.
9	Oglethorpe and Heron.	(2013)	UK	LFSC	Questionnaires, workshops and interviews (n= 23 food businesses involved in LFSC including producers, retailers, processors). NR	Questionnaire,work shop and interviews	Local farmers face constraints due to the scale and the nature of products (e.g. perishability, small production); financial aspects (e.g. unrealistic price offered, membership fees, low customer base); additional operational time requirements (e.g. : a lack of access to a “one stop shop”); institutional factors (e.g. difficulties to supply institution due to guaranteeing supply); supply chain relationships (face to face interaction can become a constraints when the retailer’s team change); skills (e.g. difficulties to find skilled artisan) and certification, policy and regulatory factors (accreditation are more complex and onerous).
10	Wubben et al.	(2013)	Netherland	Farm shop, FM, Farm-to-restaurant, CSA, box scheme, broker)	Farmer interviews (n= 19) of farms involved in SFSC. NR	Descriptive statistics and interviews	Most of the SFSC farmers are motivated by increasing their profit. Producer-support and producer-consumer interaction are also reported as motivations.

11	Galt.	(2013)	US	CSA	Farmer interviews (n= 54) of farms engaged in CSA. NR	OLS model and interviews	Farmers' motivations are diverse, but tend toward moderate instrumentalism, such that earning an income is often not a high priority relative to other values. Even though the profit rate of some CSA farms is higher than for other market channels, for most CSA their return is very small or nonexistent. Most CSA farmers undervalue their own work in monetary terms resulting in self-exploitation. Farmer's social embeddedness enhances the farmer's sense of obligation to members to his economic detriment. Older farmers, with more workers, accessing land at below market-value and combining different channels achieve higher income.
12	Thompson et al.	(2014)	US	SFSC (FM, grocery stores, CSA, internet, FTR, distributors)	Farmer survey (n=18 with 16 farms selling in FM, 2 in grocery stores,3 in CSA, 1 on interned, 2 selling in restaurants and 6 selling to produce distributors). NR	Descriptive statistics and Focus group discussion	Farmers meet challenges to supply schools including a lack of information (e.g. about what products schools want) and access to value-added facilities, costly government regulation (e.g. safety norms), and difficulties to guarantee a consistent supply of food.
13	Richard et al.	(2014)	France	SFSC	Farmer survey (n = 507) of farms engaged in SFSC. NR	Descriptive statistics and interviews	Farmers in SFSC have an higher income and productivity despite their lower production level and land use.
14	Alkon and Vang.	(2016)	US	FM	Farmer interviews (n= 27) of farms engaged in FM. NR	Descriptive statistics and interviews	Farmers report access to profit as the primary motivation for attending FM though they are also interested in freshness, health, sustainability and community.

15	Darolt et al.	(2016)	France and Brazil	SFSC (producer's market, collective points of sale, consumer's association, home boxes, independent organic shops, shops belonging to consumers and producers cooperatives, distribution network, farm shops, restaurant, virtual shop)	Technical visits in different SFSCs (n = 40) Interviews with farmers (n = 7) and specialists of institutions working with organic agriculture (n=7).NR	Technical visits and interviews	SFSC involve mainly family farms managed by neo-rural producers working in small sites and offering more diversified products. A diversification in terms of the activities in the farm (leisure, accommodation, educational programs, …) is also observed.
16	Filipini et al.	(2016)	Italy	ALFSCs	Farmer interviews (n=55 with 10% of farms selling exclusively to SFSC and 47% to LFSC, 43% mixed both marketing channels). NR	Non-parametric test and interviews	Farmers involved in ALFSC have different strategies. Those with a passive strategy use their professional or personal bonds to commercialize a small share of their production in ALFSC. Those with an opportunistic strategy try to maximize their profits by marketing through both conventional food chains (CFC) already developed by their family and to take advantage from new local channels. Farmers with active strategy sell all of their production through ALFSC in order to benefit from more independence over product quality, destination and in farm management. Differences between farmers using passive and active strategies are mainly related to innovation's indicator in the production suggesting certain adaptation made by farmers. Opportunistic strategy farmers rely more on social and commercial networks when selling products in ALFSC. They provide more efforts to diversify their products and show greater entrepreneurship and dynamism (in terms of number of food chains and products). Grain and crops are specifically devoted to CFC for farmers using both passive and opportunistic strategies.
17	Hvitsand.	(2016)	Norway	CSA	CSA stakeholder interviews (n= 5). NR	Descriptive statistics and interviews	Norwegian CSA producers are motivated by a desire of a production and food system that safeguards aspects of environment, justice, health, participation and communication.

18	Laforge et al.	(2017)	US and Canada	DM	Interviews with farmers and ranchers (n= 51) and questionnaire to farmers (n = 169) engaged in DM. NR	Descriptive statistics and interviews	Farmers in DM have to face inconsistent enforcement of food safety regulation (unaffordable, time consuming, inconsistent, not adapted to small farmers) and a lack or inadequate government support (under-resourced, bureaucratic and adapted to export-oriented producers).
19	Leiper and Clarke-Sather.	(2017)	US	FM	Farmer interviews (n= 17) of farms engaged in FM. NR	Descriptive statistics and interviews	Social motivations exist in tandem with economic motivations but also personal, philosophical, or political motivations.
20	Albrecht and Smithers.	(2018)	Canada	FM, CSA, specialty stores, pre-order delivered or picked up, on-farm delivered or picked up	Farmer interviews (n = 17) of farms engaged in SFSC. NR	Descriptive statistics and interviews	Farmer's motivations stem from dissatisfaction with conventional farming systems. Motivations are rooted in self-interest, with farmers seeking more profitable and autonomous business opportunities. However, producers value also trust, reconnection with consumers while looking for playing an educational role.
21	Horst and Gwin.	(2018)	US	DM	Interviews with key informants (n=15), hosted three group discussions (n=25), and a survey of direct farmers (n=33). NR	Interviews, group discussion meetings and descriptive statistics	Land access is a challenge for direct farmers due to rising land prices relative to their incomes, a lack of appropriate land, and insecure leasing terms.
22	Sitaker et al.	(2020)	US	CSA and Farm Fresh Food Box (FFB)	FFB Farmer interviews (n=9) and retailer's interviews (n=12). NR	Descriptive statistics and interviews	The primary motivation to FFP participation is to address direct-to-consumer market saturation, expand their customer base and moving to a VBSC at a larger scale.

Table B3. Research articles based on a qualitative approach.

	Author	Year	*Setting*	Supply chain	Farmer sample	Method	Key findings
1	Andreatta and Wickliffe.	(2002)	US	FM	Farmer interviews (n=38) and focus groups (n = 31) of farms selling in FM. NR	In-depth interviews and focus groups	Farmers value FM both because they could get a better price than elsewhere and have interactions with consumers.
2	Griffin and Frongillo.	(2003)	US	FM	Farmer interviews (n= 14) of farms engaged in FM. NR	Interviews	Farmer's involvement in FM is a result of economic and social motivations. FM are viewed as attractive venues due to profitability and convenience, but also a place to socialize with customers and other vendors, in addition to receiving positive feedbacks on their produce. FM participation is challenged by the competition from large corporate farms and supermarkets, difficulties in finding and hiring labor, and managing high input costs, keeping up with changing customer tastes, farmer's uncooperativeness and increasing stall fees.
3	Lea et al.	(2006)	US	CSA	Farmer interviews (n=12) of farms engaged in CSA. NR	Interviews	Main benefits perceived by farmers are financial (e.g. obtaining a fair price) followed by the establishment of a reliable market and the ability to plan production accurately. CSA farmers deal with several concerns such as sharing the risk with consumers, the ability of members to perform the job, the seasonality, the logistics, the lack of government support and the time required for administrative and bookkeeping tasks.
4	Alkon.	(2008)	US	FM	Interviews with farmer market managers, vendors and regular customers (n = 35). NR	Observations and interviews	While farmers argue that their economic and sustainable priorities are compatible, they sometimes sacrifice the latter to maintain the former in order to sustain their livelihoods.
5	Jarosz.	(2008)	US	CSA and FM	Interviews with wholesalers (n = 1), farm suppliers (n = 2), farmers (n = 9), farmers' market managers (n = 3), food cooperative workers and executives (n = 3), food bank managers (n = 1), and representatives of nongovernmental organizations (n= 3). NR	Interviews	Farmers in DM face difficulties in sustaining their livelihood due to a lack of time to load, unload, display and sell their products in addition to the time dedicated to the production and the competition from the industrial production selling similar products at a lower price.
6	Cox et al.	(2008 b)	UK	CSA	Interviews of farmer and manager engaged in CSA (n = 25). NR	Interviews	The only goal of the farmers is simply to make organic produce available to local people without increasing food miles. There are no social goals contrary to the motivations of CSA producers found in much of the literature.

7	Izumi et al.	(2010)	US	FTS	Farmer interviews (n=7) of farms engaged in FTS. NR	Interviews	Farmers sold their products to schools with the view to diversify their marketing strategies and to contribute to social benefits.
8	Milestad et al.	(2017)	Austria	Box scheme	Farmer interviews (n= 19) of farms engaged in local organic box Scheme. NR	Interviews and focus group discussion	Box scheme farmers value flexibility and not written and long term bidding contract. They perceived box scheme growth as undermining their relationship with them due to a loss of flexibility and spontaneity while the growth process faces logistical barriers in distributing products from high number of suppliers.
9	Broderick et al.	(2011)	Australia	Farm-to-restaurant, supermarket and food service distributors, FM, home delivery	Farmer interviews (n=6) of farms engaged in SFSC. NR	Interviews	Producer-driven marketing of branded meat improves their income by avoiding the variability in farm-gate prices experienced in the mainstream channels, capturing the marketing margin, gaining a premium, as well as, controlling various commercialization costs and negotiation costs.
10	Jarosz.	(2011)	US	CSA	Farmer interview (n=11) of farms engaged in CSA. NR	Interviews	CSA farmer's motivations are not primarily economic but encompass social relations, a land care ethic, changing their life-work in order to do something more meaningful, feeding people with food of good quality, seeing and knowing their customers with an educational commitment toward them and offering an alternative to commodified food.
11	O'Donovan et al.	(2012)	Ireland	FTS	Consultation with FTS farmer (n=15) and practitioners (n=18). NR	in-depth consultation process	Farmers meet regulatory (e.g. compliance cost), financial (e.g. costs, credit facilities and terms of payment), operational (e.g. purchasing, ordering, integration of processes and procedures) and quality and refinement issues (variety, quality). They emphasize the lack of unity between food stakeholders and challenges in moving towards co-operation rather than competition.
12	Visser et al.	(2013)	Netherland	LFS	Farmer interview (n = 5) of farms selling local food products. NR	Interviews	Farmer's involvement in LFS is motivated by getting higher prices. They are mainly constrained by a lack of time and distribution infrastructures increasing costs.
13	Bateman et al.	(2014)	US	FTS	Farmer interviews (n=10) of farms engaged in FTS programs. NR	Interviews	Farmers supplying canteens deal with constraints related to seasonality and planning ahead, lack of fair price and meeting processing, packaging, quality, quantity, and food safety requirements set by schools.
14	Cleveland et al.	(2014)	US	LFH	Interviews with key actors selling local food (owner/manager n = 5, managers n= 3, farmers n= 6). NR	Interviews	Farmers choose local food hub (FH) even though it means not maximizing their profits in order to achieve their social goals of selling their food locally. They value the personal relationship they have with the FH owners and the idea of supporting their local food system. Fundamental challenge of local hubs is how to be economically viable within a system dominated by the goal of economic profit, while working for social and environmental goals that the mainstream channel doesn't value.
15	Conner et al.	(2014)	US	FTI, FTS	Interviews with FTI actors (farmers n = 5, distributors n=3, food hub n=2). NR	Interviews	Farmers value health, relationships, education and community and express concerns about receiving adequate prices for their produce even if they emphasize that price is not the main motivator.

16	Ngo and Brklacich.	(Ngo and Brklacich, 2014)	Canada	LFS	Farmer interviews (n = 9, NR) of farms selling local food. NR	Interviews	Farmers look for significant changes in their lives to ‘‘re-connect to context—to the soil, to work (labor), to history, or to place and create a sense of community through the production of food”.
17	Möllers and Bîrhală.	(2014)	Romania	CSA	Farmer interview (n=3) of farms participating in CSA. NR	Interviews and observations	Farmer’s CSA participation is associated to an intensification of farm work while farmers report a lack of demand for local food products.
18	Heiss et al.	(2015)	US	FTI	Interviews with 19 supply chains actors involved in FTI (farmers (n=5), distributor (n=3), food hubs (n=2), institutional buyers (n=9)).NR	Interviews	The lack of infrastructures, positive relationships with buyers (e.g. to maintain sales and circumvent regulations) and the farm’s viability (obtaining a price covering costs) are key factors that enable and constrain farmers in supplying FTI.
19	Tonner and Wilson.	(2015)	UK	FM and on-farm retailing	Farmer interviews (n= 14) of farms engaged in SFSC. NR	Interviews	Farmers are motivated initially by a dissatisfaction with traditional agri-food systems meaning that diversification is not necessarily motivated by entrepreneurial objectives. Once the need for diversification is unlocked, farmers face an entrepreneurial choice. Those with push motivations (such as risk reduction) choose non-entrepreneurial diversification in the form of FM, while those with pull motivations (such as business growth) exhibit characteristics of entrepreneurship and engage in entrepreneurial diversification in the form of on-farm retailing.
20	O’Kane and Wijaya	(2015)	Australia	FM	Farmer interviews (n=6) of farms engaged in SFSC. NR	Interviews	The main motivations to sell food at FM include producing food in ways that are consonant with farmer’s philosophies and values ; enjoying interacting with their customers and receiving direct feedbacks; educating shoppers about alternative meanings of food quality; selling their products to a better price and growing food in an environmentally responsible way.
21	Doernberg et al.	(2016)	Germany	CSA	Interviews of CSA farmers (n= 4) and workshops from 6 CSA initiatives with farmers or participating consumers. NR	Interviews and workshops	CSA farmers deal with several constraints related to a lack of processing capacity, access to arable land and continually increasing land rents, high labor input requirement, financing difficulties, lack of consumers, unclear legal and tax situation, loss of identity and consumer’s trusts following an involvement of alternative food producers in long supply chains.
22	Fleury et al.	(2016)	France and US	MTSC and VBFSC	Participant interviews in three MTSC s (France) and three VBFSC (US). NR	Interviews	Farmers are motivated by economic considerations to create new alternative because the mainstream channels do not provide acceptable economic returns. Their motivations also include social, ethical, and environmental values. Their participation is constrained by finding a trade-off between affordable consumer prices and fair price for farmers, higher production cost related to moderate size of these supply chains, difficulties in developing additional skills and the

							competition from actors in mainstream supply chains (requiring differentiation from these competitors).
23	Bruce and Som Castellano.	(2016)	US	FM, CSA, FTR and Farmer's cooperative	Farmer interviews (n=31) of farms engaged in SFSC. NR	Interviews compared to national averages	Farmers involved in AFN are younger, more educated and operate on smaller acreage. They are constrained by a lack of demand for local food. They rely mainly on older equipment and machinery, better suited to alternative production systems and their smaller scale. Their viability is endangered by a high labor requirement such that farmers must support their farm with non-farm income and by volunteering their time.
24	Eriksen and Sundbo.	(2015)	Denmark	LFS	Interviews in three local food networks (n =7). NR	Interviews	The development of local food networks is constrained by the shortfall of key intermediaries (e.g. abattoirs), the distance from the market, social aspects (e.g. conflicts, different economic interest, …), service/delivery features (non regular availability, limited supply) and the scaling up process which can endanger the alliance between food and place.
25	Braun et al.	(2018)	Germany	FM, box scheme, CSA, on-farm-selling and FTS	Interviews with SFSC farmers (n=5), wholesalers (n=3) and caterers buying local food (n=6). NR	Interviews	Organic farmers involved in DM and FTS deal with logistic barriers (e.g. transport time) and a lack of organic processing facilities while canteens depend heavily on preprocessed food.
26	Cerrada-Serra et al.	(2018)	Spain and Italy	CSA, box scheme, DM	Interviews in Valencia with SFSC producers (n=9), representatives of public bodies (n=5), consumers (n=4), social organizations (n=2) and professional Experts (n=2) Interviews in Rome with 14 SFSC producers, representatives of public bodies, technicians; NGOs and farmers' leaders. NR	Interviews and observations	Farmers involved in AFN deal with many challenges such as a limited land access due to urban development, a limited access to water, financial and capital constraints and organizational and technical problems.
27	Bruce et al.	(2019)	US	FM, CSA, FTR, farmer's cooperative	Farmer interviews (n=30) of farms engaged in AFN. NR	Interviews	Three types of famers involve in SFSC are identified. First, beginning farmers entering in agriculture as second career, relying on personal or family wealth, saving and non-farm income. Second, farmers leaving agriculture to pursue higher education and finally return later. They are more likely to inherit land but also social and professional networks on which they can rely on. The two first categories of farmers rely on non-farm income and have no family or complex connection to agriculture. They value health and environmental benefits, perceive farming as a meaningful vocation and lifestyle goal and are looking to change the food system by educating consumers and promoting new practices. Third, full-time farmers from several generations who enter in alternative agriculture by transitioning their farms from conventional to organic production

							systems. They are looking to ensure the economic viability of their farms while they value health concerns to avoid handling the pesticides and protect their kids from exposure.
28	Paul.	(2019)	US	CSA	Farmer interviews (n=16) of farms engaged in CSA. NR	Interviews	CSA can help farmers in earning a higher farm income and reduce risks, but average income earned on the farm is far from providing a living wage pushing farmers to work off the farm to get extra-income. Competition and low market price are the two main concerns of farmers in addition to a low level of sales.
29	Baldy.	(2019)	Germany	LFS	Interviews of local actors (n=26 including 3 farmers). NR	Interviews	LFS development is constrained by hygiene regulation, competition with discount structures, the lack of agency from local politicians and local councils, a lack of interest from the population.
30	Beingessner and Fletcher.	(2020)	Canada	CSA, FM, on-farm-selling), corporate marketing mechanisms and different arrangements (e.g., U-pick)	Farmer interview (n = 31 with 12 use DM, 12 rely on corporate marketing mechanisms, 4 are engaged in both, and others have different arrangements (e.g., U-pick berries) and focus group (n = 2). NR	Focus group discussions and interviews	Main motivations for localization are political and social, and stem from a critique of the dominant neoliberal agri-food system which goes against the idea that farmers are mainly motivated by economic factors.
31	Goszczyński and Wróblewski.	(2020)	Poland	AFN (e.g. urban open-air market, CSA and FM)	Local producer and consumer interviews (n=43). NR	In-depth interviews	Farmers seek to recreate a specific folk version of rural idyll and ensure individual safety of consumers and producers suggesting that non-economic motivations dominate.
32	Kessari et al.	(2020)	France	Collective farmer shops	Interviews with shop representatives, network leader and networks managers (n=16). NR	Interviews	The group with the best economic performance have the goal to educate urban consumers to choose the right product. Contrary to expectations, the group with the lowest economic performance have also the lowest social performance. The two last groups of farmers focus mainly on social and political goals (supporting an alternative system to foster social change and countering the conventional system) and achieve good and increasing economic performance.
33	Montri et al.	(2020)	US	FM	Farmer interviews (n=27) of farms engaged in FM. NR	Interviews	FM participation is motivated by farming as a primary livelihood strategy, a new business opportunity, a recreation, and a social mission. Farmers who joined FM in deprived areas to support their livelihoods are the most likely to drop out of these markets. Farmers who used the FM to explore a new business opportunity are less likely to drop out and those who farmed for recreation or for a social mission are most loyal and do not drop out.
34	Newsome.	(2020)	Australia	DM	Interviews of female producers engaged in DM (n=36). NR	Interviews	Female producers are seeking alternatives to hegemonic agriculture to resist the pressures of the cost-price squeeze and mitigate its negative environmental and social impacts.
35	Plank et al.	(2020)	Austria	CSA	Interviews (n=11) in 5 CSA. NR	Interviews	CSA farmers deal with institutional constraints (no consensus on the CSA's legal form, legal organization of the work, inadequate grant application) ; social constraints (targeting only the upper and middle-class, the risk- sharing principle

							is not always applied, low consumers involvement) and material constraints (bad weather conditions, storage requirement, …)
36	Rucabado-Palomar and Cuéllar-Padilla.	(2020)	Spain	FM, on-farm-shop, online shop, home delivery, consumer groups, farming cooperatives, chain store, supermarket chains, restaurants)	Farmer interviews (n= 10) of farms e engaged in SFSC. NR	Interviews	SFSC farmers met logistical issues, lack of adequate resources, skills and time to take additional roles. The flexibility required at command planning can cause uncertainty and be risky. In addition, multichannel strategies need to be developed due to the lack of demand in SFSC increasing workload for the small producers.
37	Alonso Ugaglia et al.	(2020)	France	SFSC	Farmer interviews (n=48) of farms engaged in SFSC. NR	Interviews	Farmers report an improvement of their economic viability by selling through SFSC but generating an increase in the labor requirement.
38	Drottberger et al.	(2021)	Sweden	CSA, FM, Online marketplace, FTR, and on-farm shops)	Farmer interview (n=14) of farms e engaged in SFSC. NR	Interviews	Farmers are motivated by various personal, social, environmental, and economic factors. However, making money is secondary but necessary to their other goals: doing something they enjoy, opposing the globalized food system, being environmentally sustainable, raising awareness among consumers. Farmers lack business management, communication and practical skills and do not receive suitable financial support.

8 Appendix C

Appendix C. 1. Data used for the description of the articles

See See Selected_studies.xlsx, available on request from Pierre Chiaverina (pierre.chiaverina@inrae.fr)

Appendix C. 2. R code used for descriptive statistics

See Selected_studies_do_file.R , available on request from Pierre Chiaverina (pierre.chiaverina@inrae.fr)