



Toward Agricultural Intersectionality? Farm Intergenerational Transfer at the Fringe. A Comparative Analysis of the Urban-Influenced Ontario's Greenbelt, Canada and Toulouse InterSCoT, France

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Peri-urban agriculture can foster the resilience of metropolitan areas through the provision of local food and other multifunctional agricultural amenities and externalities. However, in peri-urban areas, farming is characterized by strong social uncertainties, which slow the intergenerational transfer of farm operations. In this article, we tackle the beliefs that underlie farmers' decision-making to identify planning opportunities that may support farm intergenerational transfers. The design of an institutionalist conceptual framework based on Keynesian uncertainty and Commonsian Futurity aims to analyze farmers' beliefs associated with farm intergenerational transfer dynamics. The dataset of this comparative analysis includes 41 interviews with farmers involved in animal, cash-crop, and horticulture farming in the urban-influenced Ontario's Greenbelt, Canada, and Toulouse InterSCoT, France, during which farmers designed a mental model of their investment decision-making. The results highlight the dominance of a capital-intensive farm model framed by a money-land-market nexus that slows farm structural change. The subsequent access inequalities, which are based on characteristics of farmers and their farm projects, support the idea of the existence of an agricultural intersectionality. The results also highlight the positive role of the institutional context; when farmers' beliefs are well-aligned with the beliefs that shape their institutional environment, the frictions that slow farm structural change in peri-urban areas are moderated by a shared vision of the future.

Keywords: farm transfer, peri-urban agriculture, farmers' beliefs, Keynesian uncertainty, Commonsian Futurity, agricultural intersectionality

INTRODUCTION

The current COVID-19 pandemic has highlighted the severe structural inequalities of the global food system. The exacerbation of the criticality of local food provision has resulted in renewed interests in food access issues and food chain resilience (Hobbs, 2020; Lioutas and Charatsari, 2021; Thilmany et al., 2021). In particular, the interest of city planners in peri-urban

agriculture (Cadieux et al., 2013), as testified by the design of place-based/territorialized agricultural policies (Bonney and Brand, 2014; Bissardon and Boulianne, 2016), the activity of municipal governments on land markets (Jarrige, 2018; Perrin and Nougaredes, 2020), and the formation of networks to support urban-influenced agriculture (e.g., Cities for Agroecology Network, Eurocities, Organic Cities), has been strengthened: peri-urban agriculture is commonly perceived as a lever for designing more sustainable metropolitan areas (Sroka et al., 2021). In a context where the proximity to urban markets results in new opportunities and constraints for peri-urban farmers, who have developed original peri-urban farming systems that are quite specific from a production point of view (Duvernoy et al., 2018; Akimowicz et al., 2020), planning activities may substantially influence farming activities (Butt and Taylor, 2018; Buchan et al., 2019).

In the medium term, food provisioning for metropolitan areas is threatened by farm exit. While the number of farms currently tends to increase in the Global South, the situation is quite different in the Global North where the number of farms has been almost continuously decreasing since the end of World War II (Lowder et al., 2021). In Canada and France, two Global North countries, farm exit was confirmed between the last farm censuses, with a number of farms down by 6% between 2011 and 2016 in Canada (Ministry of Industry, 2017) and by 2% between 2010 and 2016 in France (Agreste, 2020). Paralleling farm exit, one can also note a consolidation of farm size with an average increase of +16 ha in Canada and +7 ha in France during the same time periods. In these two countries, the loss of farm operators, -7% in both cases, and their aging, 55% of farmers were 55 years old or older in Canada while 25% were 60 years old or older in France both in 2016, raises the issue of farm intergenerational transfer.

Farm transfer is indeed a key step for farm trajectories. For instance, the likelihood of transferring farms to identified successors contributes to maintaining farm-investment dynamics that foster the viability of agricultural systems (Akimowicz et al., 2013; Gasselin et al., 2014; Valliant et al., 2019). Interestingly, peri-urban agriculture also demonstrates specificities during the turning point of farm succession and take-over. Inwood and Sharp (2012) showed that, in an environment where farmland access is conflictual and rather constrained, farmers' adaptation strategies do not rely solely on land expansion but also on vertical growth that involves food processing and marketing. Bertoni and Cavicchioli (2016) further noted that a farm's proximity to urban labor markets in more densely populated areas fosters the transmission of horticultural farms due to better returns for farm work as well as the possibility to diversify income sources through off-farm work.

While farm takeover can be considered as an investment based on some rational mental computing (Jorgenson, 1967; Barry et al., 1995), it can also be interpreted as an intentional action based on reasons particular to the decision maker, such as their beliefs. Morais et al. (2017) identified three types of beliefs that influence farmers' decision-making when planning farm takeover: behavioral beliefs associated with farmers' attitudes, normative beliefs associated with farmers' perceived norms, and

control beliefs associated with farmers' perceived behavioral control. Following Peirce's pragmatism, beliefs can be defined as "something that we are aware of; (...) appeases the irritation of doubt; (...) involves the establishment in our nature of a rule of action, or, say for short a habit" (Peirce, 1931–1958, p. 5397). This stance is a foundation for the field of institutional economics, which posits the social embeddedness of economic decisions. Interestingly, the overlap of Morais et al. (2017) three types of beliefs with Scott's (1995) three dimensions of institutions-i.e., cognitive, normative, and regulatory-supports the relevance of adopting an institutionalist stance for this research.

The indeterminacy of belief-based actions contributes to an updating of beliefs-i.e., confirmation or revision-once one experiences the outcomes of an action. However, the decision to take over a farm is a situation that is unlikely to be repeated; in most cases, this is a once-in-a-lifetime decision that implies a career-long commitment. From this perspective, the mechanism through which habits are forged has not taken place yet. In addition to the singularity of the decision to start farming, the peri-urban farming environment is highly uncertain (Bryant and Johnston, 1992; Darly and Torre, 2013). Yet, new farmers are not independent agents who permanently optimize their decisions. Their decisions are framed, instead, by beliefs resulting from their social embeddedness in place, which involves other territorial actors such as other farmers, collective organizations such as cooperatives, and public agencies (Akimowicz and Képhaliacos, 2018; Diendéré et al., 2018; Perrin and Nougaredes, 2020). Therefore, understanding the beliefs that shape both new farmers' decisions to start farming and retiring farmers' decisions to transfer their farm can contribute to better policies supporting farm intergenerational transfers. In this article, we explore the beliefs associated with the event of farm transfer to elicit the articulation of farmers' beliefs.

The originality of this paper is fourfold. First, it relies on a comparative approach. The survey is conducted in two countries, in Ontario's Greenbelt in Canada and in the Toulouse InterSCoT in France; farm succession is currently a critical issue in both landscapes. Second, this research relies on a field investigation with farmers on their beliefs and habits. The data collection is based on mental modeling which framed a simultaneous semi-structured interview that elicited farmers' beliefs about farm transfer; this allowed for follow-up questions specific to each interviewee's farm trajectory. Third, the purposive sample includes farmers from a wide range of ages, which allows for differentiation between new farmers with a recent farm takeover experience and experienced farmers with a growing concern for transferring their farm. Last but not least, this work relies on a conceptual framework, centered on farmers' beliefs, that attempts to build on Keynesian social uncertainty and Commonsian Futurity, which both frame social actors' decisions; this is an attempt to explore the proximity of these two theoretical stances which may gain depth and consistency from the field of psychology. The following section explores the economic literature to theoretically ground this analysis of farm intergenerational transfer in the field of institutional economics, which emphasizes the social embeddedness of farmers' economic decision-making while allowing intentional decisions to depart

from an internalized pre-existing belief system. The method and data presents the mental mapping method and the original data collected for this research. The results are detailed in the results section which highlights the singularity of peri-urban farming styles, which are framed, on the one hand, by farmers' intentional values and quality of life choices while being constrained, on the other hand, by the organization of both the food supply chain and the territory/place within which they are embedded. This double embeddedness frames an intersectional environment. The existence of a land-money-market nexus drives access constraints, which hinders farm transmission and slows farm structural change. In the discussion of this paper, a discussion of the results is provided before concluding the article.

LITERATURE REVIEW

This literature review aims to present the hypotheses of this research. We rely on a model of decision-making that is framed by Keynes' concept of uncertainty, which considers the psychological dimension of economic decision-makers, as well as Commons' concept of Futurity, which provides an adequate framework for discussing the rationality that animates farmers' decision-making. This tentative theoretical reconciliation, which aligns consistently with previous research based on the theory of planned behavior, is a first step toward further connections.

Navigating Uncertainty

In Patrick and Eisgruber's (1968) behavioral theory of the farm firm, farmers' behaviors are driven by the pursuit of personal goals; farmers specify alternatives to achieve goals and allocate resources according to selected alternatives. However, internal and external factors that are out of decision-makers' control may disrupt this planning. The economic literature often refers to these factors through the concepts of risk and uncertainty. Nowadays, several sources of stress can trigger risks and uncertainties for farmers, especially if they venture into more sustainable ways of farming, as they see it, as "a response to broader agribusiness trends" in line with "their beliefs about ecological health and valuing of resilience" (Bondy and Cole, 2019, p. 115). Indeed, Chavas et al. (2010) accentuated the need for better distinguishing these two concepts in economic analyses applied to agriculture. For Knight (1921, p. 20), risk characterizes a situation in which the outcome of future events can be calculated (measurable risk) whereas uncertainty characterizes a situation in which outcomes cannot be calculated (unmeasurable uncertainty). Additionally, for Keynes (1921), radical uncertainty results from the unpredictable behaviors of emotional agents: each anticipated outcome can be assimilated as a bet where uncertainty is reflected by the degree of credibility of the anticipated outcome.

Farming is, generally speaking, subject to multiple sources of uncertainty due to the unpredictability of adverse climatic events, price variations on the global market, and unforeseeable biological processes, which are all complex phenomena. For instance, Chavas (1994, 2008) analyzed farm production decisions under uncertainty with the introduction of temporal price uncertainty and climatic events. In peri-urban areas,

additional sources of uncertainty complicate farmers' decision-making. Temporary land tenure with short leases are commonly implemented due to urbanization (Léger-Bosch, 2019). Agricultural practices may be regulated to solve potential conflicts with non-farming nearby residents (Owen et al., 2000). Land use zoning may be revised to allow for the development of farmland (Jongeneel et al., 2008). As a result, the uncertainty characterizing the decision to start farming in peri-urban areas is significantly different from other uncertainties in rural areas; in addition to biological, climate, and agricultural price uncertainties, peri-urban farmers also face land access and political uncertainties. These additional sources of social uncertainty may widen the gap between researchers' theoretical deductions (e.g., economic models of farmers' decisions, economic forecasts, normative prescriptions) and field observations of farmers' planning decisions due to an inappropriate conceptualization of time, which does not consider fully farmers' anticipations on which investment decisions rely (Viaggi et al., 2011). In particular, a set of external constraints resulting from the institutional environment within which farmers are embedded appears to inhibit their capacity to engage proactively in transformative decision-making (Del Corso et al., 2015; Akimowicz et al., 2020).

Hypothesis 1: The high level of uncertainty surrounding the decision to start farming slows the intergenerational transfer of farm operations in peri-urban areas.

Making Intentional Decisions

For farmers, navigating the uncertainties of peri-urban environments implies, therefore, that decision-making is based on anticipation of the future outcomes of decisions made in the present—i.e., planning. In the field of economics, J.R. Commons' (1934) concept of Futurity grasps the intentionality of farmers' decisions well. As Commons' (1934: 84) puts it, "man lives in the future and acts in the present," which implies that farmers' decision-making is based on anticipations and forecasting while being fallible. Commons coined the concept of Futurity to characterize this proactive behavior that considers "the future time of waiting, risking, purpose, and planning" (ibid. 389). For Commons, decisions are the result of the tension between two forces: a first force that drives farmers to shape their future through exploration and innovation and a second force that makes farmers conform to socially constructed and internalized frameworks (Atkinson, 2009). The latter force results from a socialization process that provides farmers with a form of background knowledge that enables them to navigate the uncertainties of the world (Berger and Luckmann, 1966). As such, farmers' interactions with peer farmers, extension services personnel, other agricultural stakeholders such as representatives of cooperatives and agricultural suppliers, or even with consumers and local residents, all contribute to the formation of farmers' beliefs and attitudes (Morgan, 2011; Labarthe and Laurent, 2013; Darnhofer et al., 2016).

In uncertain environments, farmers rely on imperfect models that help them navigate the complexities of their environment (Billaudot, 2009; Gislain, 2017). These models, which result from

both inherited tacit knowledge internalized during early life stages as well as knowledge accumulated with past experiences that contribute to critical learning, are the foundations for decisions that consider decision-makers' emotions (Padua, 2015). Although often imperfect, these models provide farmers with critical information that can be used as such or transposed to new encountered situations that require creative solutions (Bromley, 2008). These imperfect models help decision-makers to make sense of their environment. In our case, they empower farmers to make decisions even though they may be inaccurate. This critical knowledge refers to Peirce's (1931–1958) beliefs that overcome the doubt triggered by uncertainty when making decisions. In summary, farmers' investment decisions are intentional, prone to trial and error, and socially constructed.

Hypothesis 2: Farmers rely on beliefs that enable them to anticipate the future outcomes of present decisions to decide to take over or transfer farm operations.

The Supporting Role of Territorial Organizations

In Keynes' decision-making process under uncertainty, decisions are influenced by the amount of information collected, agents' cognitive capacities, agents' experience with the issue at stake, and, last but not least, agents' social embeddedness (Postel, 2008). More specifically, in urban-influenced areas, farmers interact with other farmers, traditional farming organizations, and urban actors such as non-farming residents and urban planners. The diversity of worldviews is, unsurprisingly, a potential source of conflicts, which can be solved through the formulation of common projects framed by shared visions of the future (Akimowicz et al., 2020). Therefore, a mesoeconomic approach, which takes into account the integration of farmers' activities into both their territory-understood as place, where coordination is mostly achieved in the political sphere-and the food supply chain-understood as market organizations, where coordination is mostly achieved in the market sphere (Théret, 1994; Rastoin and Ghersi, 2010; Rocamora-Montiel et al., 2014), provides the right scale for such an investigation. For new farmers, the challenge of being situated in such interpretive communities is to solve the tensions that arise from the diverging goals that drive the actions of different stakeholders (Bromley, 2008).

The process of planning can either foster or hinder such an alignment, and therefore underlies either synergies or conflicts among local farmland stakeholders (e.g., farmers, environmentalists, developers, decision-makers, local residents). Although a multifunctional peri-urban agriculture can contribute to the sustainability of metropolitan areas (Torres-Lima et al., 2010), Marsden and Sonnino (2008) noted that ambiguous formal governance structures have hindered the development of a multifunctional farming sector; Benis and Ferrão (2018) observed that urban planning strategies and policies have long missed the integration of peri-urban agriculture. The definition of what is acceptable may "accommodate alternatives to hegemonic systems" (Butt and Taylor, 2018, p. 11), which may, in turn, facilitate the inclusion of alternative place-based peri-urban farming styles which are

significantly different from traditional farms that are typical of the dominant extractive farming model (Allaire and Boyer, 1995; Ngo and Brklacich, 2014). Indeed, following Taylor et al. (2017), planning aims to define a balance between agricultural, environmental, and amenity values. The high technicality of planning often results in the perception that planning is a neutral process (Buchan et al., 2019) whereas Butt and Taylor (2018, p. 2) argue against the perception that planning is a "de-politicized managerial and technical project."

Hypothesis 3: Due to farmers' embeddedness in an institutional environment, the alignment of farmer's and territorial actors' visions of the future may contribute to smoothing farm transfer.

METHOD AND DATA

In this section, we detail the comparative method used to analyze farmers' beliefs about farm transfer, which relies on the interview of 41 farmers between 2015 and 2017 in two peri-urban areas in Canada and France, the design of the cognitive models of their investment decision-making, the transcription of the semi-structured interviews, and the responses to a questionnaire about their farm system.

Method

Dominant in the economic literature is the assumption that economic agents behave rationally through the optimization of utility (Stigler, 1950), even though the limitations of such a stance have long been highlighted (Veblen, 1909). Outside of economics, considering both one's fallible anticipation of outcomes as the root cause of one's decision-making as well as one's embeddedness in a social context is not unusual. In psychology, for instance, the theory of planned behavior stipulates that one's intentions are framed by three types of beliefs about behaviors, norms, and controls, thereby linking one's beliefs to one's behavior (Ajzen, 1991). This theory has since been used in economics; Howley et al. (2015) used this theory to demonstrate farmers' economically 'irrational' land use decision-making. In a similar manner, van Dijk et al. (2016) used the theory to highlight that non-subsidized environmental practices may nonetheless be implemented if in line with farmers' self-identity while being supported, for instance, by cooperatives. As mentioned earlier, the theory was also used by Morais et al. (2017) to analyze farm takeover in Brazil.

These results confirm our intention to frame our analysis with an institutionalist perspective that posits the idiosyncrasy of farmers' decision-making (Wilber and Harrison, 1978). The singularity of farmers' decision-making results from, on the one hand, internalized decision rules that structure farmers' thinking and, on the other hand, a capacity to deviate from these rules to respond to *ad hoc* situations and goals. In short, farmers act on their own volition, acting purposefully to meet particular ends (Bromley, 2008). This perspective, which mixes both micro and macro dynamics, refers to Commons' holindividualism (Chavance, 2012), which has been used for agricultural research on farm decisions (Léger-Bosch et al., 2020; Halewood et al., 2021). Consequently, the methodology relies on a flexible data

collection tool-i.e., semi-structured interviews-that enables the capture of the singularity of farmers' beliefs.

The Sample

The embeddedness of farmers' decision-making in place drove the decision to conduct a comparative analysis, which enables the discussion of the respective roles of social and environmental contexts within which farmers navigate (Wolters and Steel, 2020). In this research, we compare two regions of a similar size that are under strong urban-influence: the Ontario's Greenbelt in Canada under the urban influence of Metropolitan Toronto and the Toulouse InterSCoT¹ in France under the influence of the city of Toulouse. Both areas are characterized by a variety of farming styles, including cash-crop farms, animal farms, and horticulture farms, while urbanization grows steadily due to demographic growth (Akimowicz et al., 2020). Furthermore, although Toronto is a far more populated metropolitan area than Toulouse, land consumption from which conflicts between farmers and non-farmers may arise remains comparable.

Within each research area, we selected a purposive sample of 21 farmers in Canada (C) and 20 in France (F) to cover the diversity of farming styles in each research area. More details about the characteristics of the farm operations can be found in Akimowicz et al. (2016) for the Canadian sample and in Akimowicz and Képhaliacos (2018) for the French sample. We focused on three main farm types-i.e., cash-crop (CC), animal (A), and horticulture (H) farms-which cover the issues commonly faced by peri-urban farmers. Approximately half of interviewed farmers operated under a sole proprietor legal status while the other half operated under a collective legal status, be it a partnership or a corporation. Cash-crop farmers tend to expand in size to generate scale economies while having both few opportunities to diversify on-farm income and difficulties when moving machinery. Conversely, horticulture farmers tend to have much smaller operations while having more opportunities to diversify on-farm income. On their end, animal farmers are usually confronted with recurrent conflicts due to animal nuisances, such as odors, while having some opportunities to diversify on-farm income. The sample, which reflects most issues encountered by peri-urban farmers, was, therefore, expected to reveal the diversity of beliefs associated with farm transfer.

Data

Beliefs are a tacit form of knowledge that is not directly observable (Del Corso et al., 2014). The data collection tool of mental mapping is commonly used to access tacit knowledge. With mental mapping, researchers can access interviewees' beliefs that frame their worldviews and, therefore, the reasons why interviewees behave the way they do (Carley and Palmquist, 1992; Isaac et al., 2009). Indirectly, the elicitation of these personal beliefs can also reveal the perceived dynamics of a system without necessarily knowing the details underlying its

¹InterSCoT is a French planning policy enacted by a group of municipalities. It aims to increase the cohesiveness of planning at the intermunicipal scale through the definition of a shared strategy for waste management, biodiversity conservation, transportation, and land use planning, among other issues and responsibilities. SCoT stands for Scheme for Territorial Coherence.

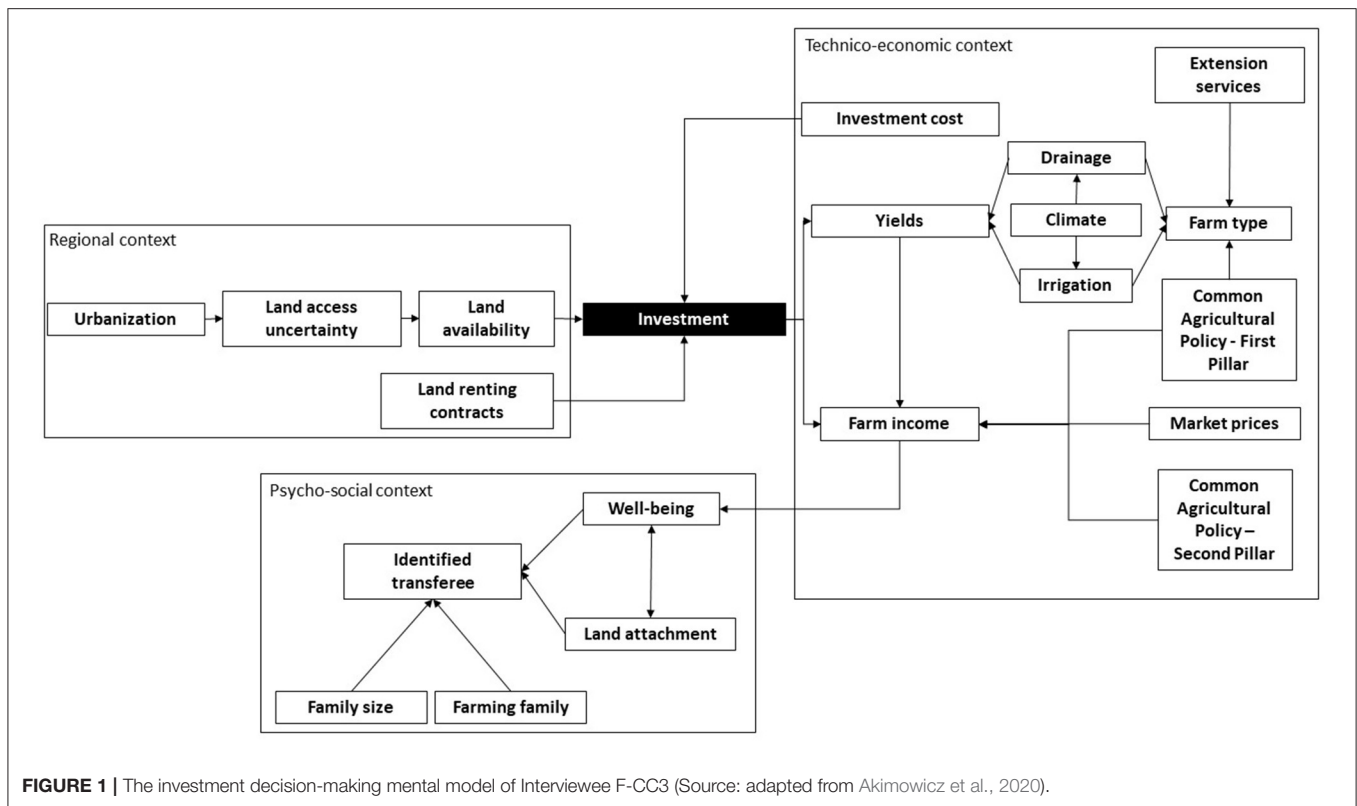
operation (Groumpos, 2010; Jones et al., 2011). Based on a literature review, we selected a set of 37 factors in Canada and 39 factors in France that potentially affect investment decision-making (Appendix 1). The factor labeled *Farm Transfer* was included in both sets and aimed to shed light on the impacts of the existence of an identified family member or non-family new farmer to take over the farm. Although the high-level impacts of this factor have already been discussed in previous publications, this article delves deeper in the dynamics of farm transfer in peri-urban areas.

For this study, investment was defined as a structural investment that is amortized over at least 15 years, such as investment in land, in a combined harvester, in a building such as a stable, or simply starting a farm operation. Although we focused on the structural characteristics of farm operations, the sample included a diversity of activities ranging from annual to perennial crop farming as well as diverse types of animal husbandry, from cattle to turkeys. Such investments affect farm financial status over a long period of time and can be considered as structural investments. In Canada, we further tailored the set of factors as well as their labeling during a focus group with agricultural experts. As a result, the set of indicators used in Canada and France is adapted to the local specificities of each agricultural environment.

Additionally, the mental modeling activity was used as a guide for semi-structured interviews; while farmers designed the mental model of their investment decision-making, interviewers followed-up with questions to understand the meaning associated with each causal relationship created by farmers. This way, the elicitation of farmers' knowledge was directed by farmers and framed by researchers. The constant interaction of both interviewees and interviewers resulted in rich data that included, for each farmer, the mental model of their investment decision-making, the transcription of the interview, and the responses to a questionnaire on the characteristics of the farm. This data was openly coded, which resulted in the identification of three themes: the mitigation of land expansion needs to generate income, the design of farm projects embedded in a family project, and the supportive role of well-aligned territorial organizations. Figure 1 below showcases an example of a mental model collected during the interviews.

RESULTS

The results section explores, first, the fact that farm transfers may be considered as patrimonial transfers; next, attention is paid to the farmers' view that taking over a farm operation implies balancing quality of life with sacrifices. These two sub-sections support the idea that farmers' identities are connected to the activity of farming. The following sub-section confirms that peri-urban farmers constantly attempt to navigate the uncertainties of their productive environment with little flexibility; this constraint, as one can see in the last sub-section, may be lifted when the institutional environment is framed by a shared vision of the future among agricultural stakeholders.



Transferring a Familial Patrimony

For participating heirs, taking over the family farm is most often an obvious choice. Among the family farm heirs, more than 3/4 had taken over the family farm. There is a clear attachment to the farm and farmland, which constitutes a heritage to preserve and pass on. In this regard, farmers' families remain an active support system; while the older generation often maintains some sort of involvement on the farm, especially during work peaks, siblings entitled to inherit land may facilitate farmland access. Interestingly, with the lengthening of life expectancy and the difficulty to plan retirement pensions, one interviewee mentioned considering passing on the farm directly to the grandchildren. This perspective is supported by the frequent mention of absentee owners who rent farmland, a potential impediment for farmers who seek to acquire land and an opportunity for those who provide custom farm work.

"It's not a land attachment; it's an attachment to a family heritage. [...] There's a pond. We go to the pond shore and it feels like being in the middle of Gers. Have you seen the house as well? I'm 7th generation. Of course, there's a visceral attachment." F-CC1

However, taking over the family farm is more than a commitment to preserve a family heritage. Growing up on a farm is also perceived by all interviewees as a unique experience that has led them to love farming and motivated them to start farming. Older farmers often explained that they let their children choose their own careers; while these farmers expect to contribute financially

to the costs of higher education, they also favor the early on-farm involvement of their children. Only 1/10 interviewees openly shared their reluctance to pass on the family farm to their heirs due to the harshness of a farmer's life. In line with this perspective, 6 new farmers mentioned the desire to farm for the quality of life from which they and their family would benefit, while acknowledging the difficulties.

"They grew up with it, so it's part of their lives. [...] Neither of them is able to predict the future and say yes, I want to live in F. [...] We adopted a five-year-old, so he may be the most potential for the farm but he has to learn discipline first". C-CC2

In addition to family heritage and the passion for agriculture, transferring the family farm to the next generation also includes passing on situated/place-based knowledge. While technical knowledge related to dealing with soil and climate conditions were most commonly cited, interviewees also mentioned some sort of social knowledge related to their embeddedness in a community. For instance, the ability to access land appears to be related to farmers' inclusion in local networks where opportunities to acquire farmland are shared. In France, SAFER, a private organization with a public mission to regulate farmland transfers, seems to contribute to the transparency of the farmland market; however, almost all the French farmers interviewed complained about the increased competition for land access among farmers resulting from SAFER action while 5 openly criticized SAFER's decisions in strongly urban-influenced areas

when farmland is left to developers. Additionally, the importance of these networks is highlighted by the commitment of almost 1/4 of interviewees to political or farmers union responsibilities.

"I'm not a farmer's daughter [...]. I'm not a local [...] and one does not trust someone that just settled in. [...] On the other hand, the municipal council of B. helped me a lot [...] since they were looking for new farmers and a municipal councillor came to me." F-A2

Balancing Quality of Life and Sacrifices

Although all the interviewees mentioned the difficulties of a farmer's life, most interviewees also shared that they enjoy their profession since they do something they choose to do and which they like doing. For those, there is nothing comparable to getting up early in the morning or coming home late at night for a job they have always wanted to do. However, all the interviewees also recognized their profession is a true commitment; work hours are more than regulated employees' working time, salary barely reaches minimum wages at least during the first years and most depend on their spouse's income, vacations are rare (only 1 to 2 weeks during off-peak work periods), and their work is commonly criticized by non-farmers. Regardless, for them, farming is a passion, a part of their identity. In this regard, farm intergenerational transfer is often a critical time for modifying farming systems and adapting it to the new farmers' perspectives.

"Like she [his daughter] has her bakery and J. [his son] is gonna do the goats, and he's actually gonna start bee keeping. So, one thing I see, if there is a business to be added to the farm without taking anymore land... You know what I mean?" C-A4

They also recognized that they have to make permanent sacrifices to maintain the viability of their farm through continuous investment. Although the priority is to invest so as to improve economic results, 15 interviewees mentioned that investment can also simplify farm work (especially cash-croppers who seek a faster turnaround for their large holdings), which they will consider when they can afford it, given the positive impacts on health and family life. Inheriting the family farm is an additional constraint that requires the maintenance of the family property. Only F-H6, who converted to permaculture, openly opposed this perspective; she considers that her main task as a farmer is to maintain soil health through her own hand labor, rather than through the use of heavy machinery. To some extent, F-A2, who mentioned that soil health is a question of organic matter, had a relatively close perspective.

"It [quality of life] is important. Since I've been farming, I've seen that health is fragile. I've tried not to damage it too much. [...] Quality of life is important because if I'm sick, I cannot work. [...] I've changed; I've aged a little; I feel exhausted. Working outside, it damages health a bit." F-H5

Farming constraints are exacerbated in peri-urban areas. The proximity to non-farming residents, who may complain about noise and odors, can complicate farm management activities. Consequently, most interviewees shared that they try to conduct

mechanized tasks, such as tilling, harvesting, and spreading manure and pesticides, during times when this will not bother nearby non-farming residents. Traffic is another issue for interviewees who farm plots that must be accessed through municipal roads that are not designed for the movement of heavy machinery. A clear distinction exists among the three types of farmers interviewed: while the cash-croppers appeared to be the most affected by complaints about practices and the urban environment, the horticulture farmers were the only ones to complain about property trespassing. On their end, animal farmers stood somewhere in the middle; most of them rely on custom farm work for crop production, which both reduces their investment level and potential conflictual relationships.

"Farming last fall was bad. We were farming late at night. We are not looking to antagonize or looking at making the issue worse. But at the same time, we do what we have to do and we are always wondering if somebody is gonna call or say something." C-CC2

Adapting to Uncertainties With Little Flexibility

For all interviewees (except F-V6 and her permaculture farming system that relies on less land), the initial investment is a financial burden that locks the farm on a path from which it is difficult to deviate. One can distinguish the case of farmers' heirs, who usually start with some land and farm equipment, from the case of new farmers, who have to invest in both land and equipment. This initial step is a major constraint for new farmers who commit most of their financial resources, which leaves them vulnerable to adverse events. In France, only cash-croppers sometimes invest in crop insurance (while crop insurance is commonly adopted in Canada) and, those who had, had criticized the damage evaluation criteria. New cash-croppers also rarely have the opportunity to store their first harvest due to cashflow constraints. For other farmers, the lack of insurance is barely compensated by fewer cashflow constraints due to less seasonal production.

"In any case, we have to invest regularly in order to renew the equipment at the end of its life. So, we don't have much choice. [...] Over these last few years, commodity prices have been really on the low end, and investments are all the more difficult." F-CC3

Strong differences exist across farm types. On the one hand, cash-croppers invested with confidence seeking investment opportunities and still invest when necessary. They also invested without overly considering credit rates, especially when investment was land related. On the other hand, horticulture farmers are more cautious when investing and shared that they have more difficulties with banks in obtaining credit lines. However, horticulture farmers are also the most creative in accessing funding. For instance, C-V7 relied on community support via a sort of crowd funding to invest in a farm in exchange for opening the farm on the week-ends for community activities. F-A2 benefited from the support of the municipal council to access land next to her farm in exchange for maintenance. Last but not least, economic support from the rest

of the family, especially partners, may also be key at this stage of the farm transfer for those with little equity.

“We’ve been married 26 years and he’s always done that [working off the farm in winter]. And it’s always given us the extras; like, it’s given us our fifth wheel or bonus pool when we have one. If we needed a new washroom or dryer, the off-farm income would cover that, the extras.” C-V1

Institutional Lock-In

Overall, participants described a situation where new farmers, overall, face three difficulties when defining their agricultural projects: access to land, credit, and market. In peri-urban areas, access to land is conflictual due to strong competition among farmers and also with non-farming stakeholders. Participants who farm land in flood zones or in ecological reserves sounded more confident about the future viability of the farm. On the other hand, participants who farm land that is vulnerable to development are more cautious, especially those with smaller farms who rent land and can neither afford to lose plots nor buy any. On their end, larger landlords commonly shared that the sale of a piece of land for development may help overcome unforeseen adverse events or fund their retirement pension. While the mission of SAFER is well-recognized and solicited among participants, complaints were raised due to an increasing number of land-allocation decisions that did not meet their expectations as urban influences increase. Planning policies, such as Ontario’s Greenbelt, are also raising concerns about potential changes.

“I’ve heard there’s a lot of pressure from the development community on the [Provincial] Government to change [Ontario’s Greenbelt border] and with the review I don’t know if that’s gonna ... they say they are not gonna make it smaller but you never know.” C-A1

Access to credit is another issue for new farmers. Those farmers with capital-intensive farming systems appear more easily supported by banks and other economic stakeholders when investing. Both the experiences of F-H4, who grows tomatoes hydroponically in digitally-controlled greenhouses, had no major difficulty in accessing credit and land, and the experiences of F-CC4, who included intensive vegetable production on his farm as he had issues in accessing land because he had started cash-cropping on a smaller than average farm according to SAFER standards, tend to support this perspective. Despite sunk costs, access to credit seems more influenced by available collateral, especially land, than by the expected profitability of the farm operation. In this context, French cash-croppers seem to benefit from an additional advantage over smaller farmers due to the financial support of the Common Agricultural Policy, which, in this perspective, may be understood as a rent that pays for the investment.

“One has to fight. It is exhausting in the long run. One thinks of starting a business, a farm operation and they [bankers] are missing

the point. They see figures, sit in their office. They never came to the farm. If there was a relationship, they would understand.” F-V3

Last but not least, market access also appears as a source of rigidity when starting a farm operation in peri-urban areas. All participants have developed activities that enable them to capture more added-value; while some explore niche markets (e.g., corn for popcorn, organic farming, seed farming), on-farm income diversification such as processing (e.g., ice-creams, soups) and agri-tourism (e.g., agricultural training, farm visits), others rely on off-farm incomes. One out of 10 shared that they are considering moving to less urban-influenced areas where investment and production costs are lower. Indeed, market prices are not sensitive to production conditions. While these *ad-hoc* solutions currently enable participants to cover their production costs, it is unclear whether the multiplication of similar farm projects and the integration of niche markets will guarantee that farmers can cover their production costs in the future.

“That’s why we do farmers’ markets. That’s why I do my grass-fed beef [...] All the things that we’ve added are for getting a better price for your product. So, like the grass-fed beef, you know, I can charge what a fancy butcher shop would charge, because it’s very local.” C-A3

DISCUSSION

The results validate the three hypotheses that framed this research study. First, the high level of uncertainty surrounding the decision to start farming slows down the intergenerational transfer of farm operations in peri-urban areas. More specifically, the difficulty to generate a decent income, reimburse debts, and plan for retirement without selling farmland for development lengthens the career of current farmers and discourages new farmers to start farming. Moreover, a trend toward an assessment of farmers’ solvability through the assessment of collateral rather than farm profitability seems to exacerbate this dynamic. In other words, the current unfair ability to access land, money, and market shape farmers’ investment decisions. Second, farmers rely on beliefs that enable them to anticipate the future outcomes of present decisions in order to decide to take over or transfer farm operations. To begin farming is indeed a decision framed by past experiences and values that shape the entire life of new farmers. For them, farm projects are one part of a way of life that reflects their identity and impacts their mental health (Bondy and Cole, 2020); the restrictions that affect the implementation of farm projects may partly explain the shortage of agricultural vocations. Third, farmers are embedded in an institutional environment that may be more supportive of farm transfer through well-aligned regional and farmers’ goals. More specifically, farm projects are framed by beliefs that tend to align, more or less, with the beliefs of organizations in charge of facilitating access to land, credit, and market: the better the alignment, the easier the process to take over a farm. A rigid institutional environment characterized by a poor alignment of farmers’ and regional organizations’ beliefs further slows the adaptation of food systems to changing territorial conditions.

There is thus a planning opportunity to design food systems that are more inclusive of new farmers' projects and agricultural systems (Macdonald et al., 2020; Hammelman et al., 2021).

These farm transmission dynamics appear to be slowed by an institutional framework where land access, credit access, and market access are tightly intertwined, and are prone to heterogeneous and unequal access given farm and farmers characteristics. In the French Toulouse InterSCoT, these three aspects of a farm project are controlled by a set of organizations that have long been involved in the governance of the farming sector-e.g., the SAFER, the Crédit Agricole, the supply chains, and the Agricultural Chamber (Akimowicz and Képhaliacos, 2018). Their proximity has resulted in the emergence of habits, materialized through, for instance, a farm viability evaluation tool that poorly grasps the complexity of farm systems based on non-agricultural income diversification strategies, which are contested nowadays. In Ontario's Greenbelt, the absence of any SAFER-like agency has been counter-balanced by zoning policies and regulations, which have sometimes also contributed to slowing farm structural adjustment (Akimowicz et al., 2016). The emergence of new public and collective stakeholders may contribute to unlocking this land-money-market nexus that currently contributes to maintaining the dominant model of capital-intensive agriculture described by Allaire and Boyer (1995). This dominant model, which has thrived under the above-mentioned nexus (Figure 2 below), appears to foster unequal access to land, money, and market. These results align well, for instance, with Erwin's et al. (Erwin et al., 2021) findings that the utilization of the intersectionality framework helps to understand power relationships that frame the agricultural sector. In this perspective, results first confirm that traditional factors of intersectionality, such as gender and age, foster prejudice when assessing the credibility of new farmers' farm projects. Further, farmers tend to be discriminated against based on the characteristics of their farm project, such as the farm type of their agricultural project, available equity, land ownership, and worldviews framing agricultural practices, as well as social characteristics such as whether one has inherited a farm operation. These factors, which operate as exclusionary characteristics that prevent some farm projects to take shape, may be interpreted as factors of an agricultural intersectionality (Crenshaw, 1991). The intervention of community stakeholders-e.g., public agencies, collective organizations such as cooperatives, and associations-may contribute to alleviating farmers' access constraints to land, money, and market, and may foster the design of more inclusive food systems. Interestingly, farmers can play an active role in designing this supportive institutional environment (Ngo and Brklacich, 2014).

Finally, the theoretical framework, based on institutional economics, used in this research provides a relevant framework to analyze cognitive phenomena that frame economic decisions. In this research, we focused on the role of beliefs, which provide a background knowledge that farmers can use to navigate the uncertainties of their environment. This choice was adapted to the peri-urban farming context where land access issues resulting from landlords' decisions to rent out or sell farmland

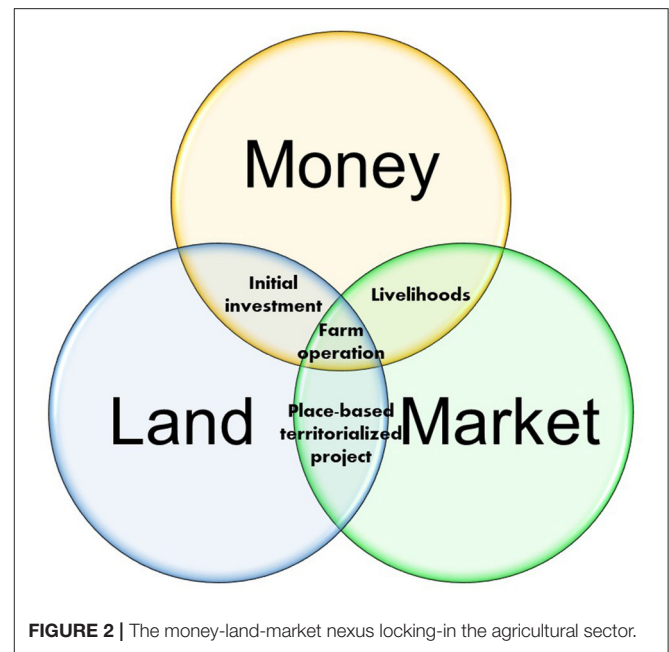


FIGURE 2 | The money-land-market nexus locking-in the agricultural sector.

threatens farming, while political decision-making may result in regulation revisions that can impact farming practices. This social uncertainty, resulting from social actors' interactions, opens the door for a deeper investigation of psychological phenomena in economic analyses, such as Keynes' Animal Spirits (Dostaller and Maris, 2009), which may shed light on the rationality that underlies the practices implemented by the nexus stakeholders.

This research is based on 41 interviews selected to represent the diversity of situations when making structural investments. Three types of farm operations were selected, namely cash-crop, animal, and horticulture farms. Future investigations could pay more attention to other farm types that tend to develop in peri-urban areas, such as horse farms and bee yards. These results could also be refined by the adoption of a more dynamic view that would better take into account innovation and its impact on profits (Menna and Walsh, 2020). The analysis of farm intergenerational transfers may also benefit from deeper attention to collective legal statuses, especially corporate statuses (Purseigle et al., 2017). Indeed, the consolidation of large individually-owned farm operations is problematic when passing on farm operations due to high initial investment costs for new farmers. In France, this often leads SAFER to dismantle large holdings and arbitrate between farmers who are interested in acquiring land, which, as we have seen, can lead to misunderstandings between stakeholders. On the other hand, collective legal statuses may be supportive of farm transfer processes through shared ownership of farm operations. However, these legal statuses may require additional regulations since farm share transactions are currently poorly regulated, which may result in land grabbing risks and a loss of sovereignty on land use issues. This also raises the issue of the involvement of other actors in land access and farm transmission, such as public agencies, collective organizations such as cooperatives,

and associations. In this regard, Canadian land trusts (Bunce and Aslam, 2016) and the French association *Terre de Liens* (Lombard and Baysse-Lainé, 2019) are examples of initiatives that may rejuvenate farm transmission dynamics.

CONCLUSION

The results show that farmers rely on internalized beliefs to navigate the uncertainties of their production; these beliefs contribute to planning their investment decisions, especially when starting farming. The results highlight the positive role of the institutional context when farmers' beliefs and the beliefs shaping their institutional environment, including their family, their professional community, and the surrounding stakeholders such as agricultural organizations, public agencies, and residents of the area, are well-aligned and result in a shared vision of the future in line with Cadieux et al. (2013). The specialization of farm operations has led to the emergence of a variety of agricultural visions, where encounters may overlap to some extent and result in conflicts. While most farmers advocate for the coexistence of diverse agricultural visions, the existence of an institutional environment that regulates access to land, money, and market in favor of the dominant capital-intensive model of agriculture, described by Allaire and Boyer (1995), is detrimental for those new farmers who attempt to design farming systems that match their values. In this research, new farmers are generally driven by an ambition to design alternative, more sustainable farm projects, which do not align necessarily with the dominant capital-intensive farming model; these farmers share the feeling of being excluded. Meeting a certain quality of life requirement is a common issue for participants who highlighted the need for social relationships, be they with other farmers, or with consumers and tourists coming to the farm.

Farm intergenerational transfer and the lack of new farmers ready to take over farm operations are not only economic issues but also social issues. The inequalities framing the farm start process are detrimental to the renewal of farmers, especially those with more sustainable farm projects that can foster healthier societies (Duru and Le Bras, 2020). The intersectional barriers that have been highlighted in this research deserve more attention. In particular, the private ownership of farm assets restricts the farm start process and impacts, as well, collective organizations such as cooperatives where equipment is shared (e.g., French CUMA). There is a political space

for the implementation of transformative solutions stemming from participatory processes (Cadieux et al., 2013; Calvário and Kallis, 2017; Anderson et al., 2020). The leadership of local stakeholders-public agencies, collective organizations such as cooperatives, and citizen associations-is key for the design of more flexible governance. Their initiatives to facilitate farmers' access to land, money, and markets can contribute to improving farmers' autonomous decision-making, increase their ability to embrace the future, and foster the transition toward more inclusive food systems respectful of the global health.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors according to the ethics requirements applicable to the MARSUPIA Project.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the University of Guelph Research Ethics Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MA led the research and authored the manuscript. KL, CK, and HC supervised the research and co-authored the article. All authors contributed to the article and approved the submitted version.

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APPENDIX

Appendix 1 | Classification of factors used for the mental modeling activities.

Category	Factors
Economic	Availability of labor, availability of land, commodity/produce prices, credit rating, custom farm work, farm income, farm size, food safety and traceability, input prices, interest rates, investment cost, land access uncertainty, land renting contracts, liquidity available, local planning documents, off-farm income, price volatility/uncertainty, share of rented land
Social	Family members in agriculture, family size, farm owner age, intergenerational transfer of the farm, land attachment, quality of life, support from local community
Environmental	Climate, perception of climate change, soil type, urbanization
Technical	Drainage, farm type, on-farm value adding (e.g., processing, value adding), technical support, yields
Ontario's Greenbelt specific	Greenbelt, subsidies and Ag programs
Toulouse InterSCoT specific	CAP–first pillar, CAP–second pillar, Green Crown, irrigation, SAFER

Source: Akimowicz et al. (2020).