Drinking Blue: Uncovering the Environmental Impacts of Quebec's Local Wine Industry

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Supervised Research Project for the Master of Urban Planning at the McGill School of Urban Planning

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August 2022

Abstract

Quebec's nascent local wine industry is growing at an increasingly rapid pace. Among the reasons that account for its popularity, Quebec local wine is commonly presented as an environmentally friendly alternative to market dominant non-local wines. Previous studies, however, have debated the environmental benefits of local production. Within the local food literature, skeptics have argued that the inefficiencies of local food production offset the environmental benefits of proximity. Within the wine industry literature, quantitative studies have shown production and distribution inefficiencies can significantly increase carbon emissions. These questions are of particular concern to urban and regional planners, as a shift towards local food production would lead to considerable changes in urban and rural land uses.

Using a qualitative analysis of stakeholders in Quebec's local wine industry, this study compares stakeholder knowledge with relevant studies on local food and local wine. My findings indicate that Quebec local wine industry stakeholders are biased towards the positive in their views on the environmental impacts of local wine. They also demonstrate that the expansion of local wine in Quebec is linked to the exurbanization of the province's wine regions. I conclude that, contrary to existing beliefs, local wine production in Quebec is more environmentally damaging than non-local wine production, due to specific distribution and production inefficiencies in the province, as well as links to exurbanization.

Résumé de l'étude

Naissante, l'industrie viticole locale du Québec se développe de plus en plus rapidement. Parmi les raisons qui expliquent sa popularité, le vin local québécois est couramment présenté comme une alternative écologique aux vins non locaux qui dominent présentement le marché. Des études antérieures ont toutefois débattu des avantages environnementaux de la production locale. Dans la littérature sur les aliments locaux, les sceptiques ont fait valoir que les inefficacités de la production alimentaire locale compensent les avantages environnementaux de la proximité. Dans la littérature sur l'industrie du vin, des études quantitatives ont montré que les inefficacités de la production et de la distribution peuvent augmenter considérablement les émissions de carbone. Ces questions sont particulièrement préoccupantes pour les urbanistes, car une évolution vers la production alimentaire locale conduirait à des changements considérables dans l'aménagement du territoire.

À l'aide d'une analyse qualitative des intervenants de l'industrie du vin local au Québec, cette étude compare les connaissances des intervenants avec des études pertinentes sur les produits alimentaires et les vins locaux. Mes résultats indiquent que les intervenants de l'industrie du vin local au Québec ont un parti pris positif dans leurs opinions sur les impacts environnementaux du vin local. Ils démontrent également que l'expansion du vin local au Québec est liée à l'exurbanisation des régions viticoles de la province. Je conclus que, contrairement aux croyances existantes, la production de vin local au Québec est plus dommageable pour l'environnement que la production de vin non local, en raison des inefficacités spécifiques de distribution et de production dans la province, ainsi que des liens avec l'exurbanisation.

Table of Contents

Introduction

Buying local food is a growing trend in Quebec, hailed by consumers and decision makers as a sound approach to fighting climate change and spurring sustainable economic development. The COVID-19 crisis has further popularized local buying in the province, with the government leading initiatives such as "Le panier bleu" to encourage local consumption. Within this context, local Quebec wine has benefited from positive media attention. Increasingly, it is presented to consumers as an environmentally friendly option, notably by the province's large-scale wine distributor, the *Société des alcools du Québec* (SAQ, 2020). Demand for local Quebec wine has followed, and production volumes have grown rapidly. Between 2019 and 2021, production volumes grew by 4 to 7% yearly, reaching 3.1 million bottles produced in 158 wineries. This growth is expected to continue over the next three years, with a predicted 32% increase in wine production volumes (CVQ, 2022).

Concurrently, researchers have debated the environmental benefits of buying locally. Amongst other points, they have argued reductions in efficiency offset the environmental benefits of proximity. Wine industry specific environmental impact studies have also raised doubts on the environmental benefits of local wine over non-local wine.

Environmental concerns around local food have particularly important implications for urban and regional planners. Reorienting food production locally would increase demand for peri-urban farmland, especially near large urban centres. The expansion of urban agriculture would increase demand for urban land as well. More wide-reaching challenges for planners relate to the reorienting of global food distribution. Today, large cities' trade and transportation infrastructure serve as the backbone of a globalized food distribution network. Local food growing would reduce the need for internationally-oriented infrastructure and, at the same time, require massive investments in regional distribution networks.

Local food skeptics have shown a plausible response to generalized local eating would be decentralization. As local food must contend with reduced geographies and the productivity benefits that varied landscapes provide, a local food model would likely result in smaller settlements, dispersed around local food productions. This settlement model raises environmental

questions for planners. There is already a well-documented and growing trend towards exurbanization, which has profound environmental implications. Large-scale exurban sprawl puts pressure on local ecosystems, increases carbon emissions, and decreases resource efficiency. Although more research in this area is needed, some studies have suggested there are links between local agriculture and exurbanization, because local productions can serve as consumption activities for amenity-seeking exurbanites. In this regard, planners have a unique perspective which can inform environmental debates on local food.

This study of Quebec's wine industry takes a planning perspective to contribute to these debates on the environmental impacts of local food production. My contribution has two components. Using qualitative interview analysis with 10 wine industry stakeholders, I first outline the misconceptions that exist in the industry, showing where stakeholder claims do not align with the scientific literature. I then continue my interview analysis to highlight the link between Quebec's wine industry growth and the exurbanization of the province's wine regions, as described by the interview participants.

Name of the Informant	Description of the Informant
Producer 1	Small-scale, experienced
Producer 2	Large for Quebec, experienced
Producer 3	Large For Quebec, very experienced
Producer 4	Small-scale, new
Distributor 1	Small-scale
Distributor 2	Very large-scale
Wine Specialist	Specialized in the environmental impacts of wine production, experienced
Wine Bottler	Large for Quebec
Regional Development Agent 1	Economic Development
Regional Development Agent 2	Regional Planning

Methodology

This research uses a qualitative analysis, informed by an in-depth review of discussions in the literature. I begin my literature review by looking at the environmental impacts of our global food system and the rise of the local food movement. I then expand on the debates on local food's environmental impacts. Narrowing my focus, I review similar discussions in the wine industry. Finally, I outline the literature linking local agriculture with land use efficiency and exurbanization.

The literature review allows me to better introduce the themes I gather from interview data. This data was gathered in the summer of 2021, from 10 stakeholders in Quebec's wine industry. During the selection of the interview participants, particular attention was taken to ensure that informants represented a varied sample of actors from the industry: wine producers (4), wine distributors (2) a wine specialist (1), a wine bottler (1), and regional development agents (2) (See table below).

For each stakeholder category, I developed an interview guide, which asked broad questions relating to: environmental impacts, supply chains, economic development, and perceptions of industry trends. Informants were chosen based on variety of production size and regions and were sent an initial email explaining the project. If they agreed to participate, they signed a confidentiality agreement.

The use of qualitative interview analysis presented many advantages for studying Quebec's wine industry. Firstly, the small size of the industry meant that interview participants had a deep understanding of many of the Quebec specific conversations. They often alluded to the importance of informal connections and information sharing. Secondly, the semi-conducted format of the interviews gave the participants a lot of space to voice their motivations, concerns and aspirations which, in turn, allowed me to

better understand the global cultural influences on the industry. With my review of the literature, I was able to demonstrate these biases and show contradictions within the industry. Finally, the qualitative nature of the interviews provided a new lens for which to consider environmental impacts of local wine, which tend to focus on quantitative emissions data. The qualitative lens allowed me to expand the on the connection between local wine production and exurbanization, which informs the literature in planning and food systems.

Literature Review

The Environmental Implications of the Industrial-Food System

The global food system in its current form is responsible for a major proportion of global greenhouse gas emissions. While difficulties in accurately quantifying the extent of the problem remain, estimates of the agricultural industry's impact range between 21 to 37% of total annual emissions greenhouse gas emissions (Mbow et al., 2020). The increasing urgency of the climate crisis has led to agricultural reform proposals aimed at both producers, consumers, and policymakers. While these proposals range from adopting low-carbon diets (IPCC, 2020), to hastening the energy transition (Mally Dean, 2022), they can be more generally grouped as a call to transition away from an industrial agricultural industry, which is highly dependent on carbon emissions. In the words of Michael Pollan, "chemical fertilizers (made from natural gas), pesticides (made from petroleum), farm machinery, modern food processing and packaging and transportation have together transformed a system that in 1940 produced 2.3 calories of food energy for every calorie of fossil-fuel energy it used into one that now takes 10 calories of fossil-fuel energy to produce a single calorie of modern supermarket food." Simply put, "when we eat from the industrial-food system, we are eating oil and spewing greenhouse gases" (Pollan, 2008). This transition away from the industrial-food system has branched into several movements. A non-exhaustive list includes:

(1) The small-scale farming movement, which has advocated for the optimization of land-use and moving away from polluting large-scale operations;

(2) The organic food movement, which has tried to reduce our dependence on monocultures, pesticides and artificial fertilizers;

(3) And the local food movement which has fought against complex international supply chains and distribution networks.

These movements often overlap under the larger umbrella of deindustrializing agriculture.

At the heart of these agricultural reform proposals is an understanding that the climate crisis is so urgent, it does not matter if the transition towards alternative agricultural practices raises the price of food. If anything, these increased food prices are presented as justified, considering the actual environmental cost of producing certain food items. Costing which prioritizes the environment, it is argued, will reduce consumer demand for polluting foods and, therefore, reduce carbon emissions. Pollan expressed this in a New York Times opinion piece addressed to the Obama administration in 2008:

"It will be argued that moving animals off feedlots and back onto farms will raise the price of meat. It probably will — as it should. You will need to make the case that paying the real cost of meat, and therefore eating less of it, is a good thing for our health, for the environment, for our dwindling reserves of fresh water and for the welfare of the animals. Meat and milk production represent the food industry's greatest burden on the environment; a recent U.N. study estimated that the world's livestock alone account for 18 percent of all greenhouse gases, more than all forms of transportation combined" (Pollan, 2008).

This reasoning has caused pushback within the agricultural industry. In the meat and dairy industry in particular, many companies have spent millions actively lobbying against climate action (Lazarus, McDermid & Jacquet, 2021). Even among academics, there is some debate about the blame the agricultural industry carries. One point of contention is that greenhouse gases cannot be easily compared as CO2 equivalents—the way they usually are. While methane, for example, disintegrates from the atmosphere in only 12 years, significant amounts of CO2 remain in the atmosphere for 1000 years. Differences do not end there. Methane disintegrates more quickly, but while in the atmosphere, it causes more warming.

This means that in the short term, reducing methane emissions can quickly lower global temperatures. It also means that methane emissions are less harmful in the long term, as they are more temporary. The difficulty is that, for standardization purposes, the international community generally uses a 100-Global Warming Potential (GWP) to represent these different gases as standardized CO2 equivalent emissions. This averages emissions over 100 years, therefore, distorting the real impact of methane.

This distortion is significant for the agricultural industry, which is responsible for half of global methane emissions. It is also important because the industry emits methane principally through direct production (livestock and crops), whereas CO2 is emitted indirectly through the burning of fossil fuels during the production (tractor fuel) and the transportation of agricultural goods (transportation fuel). As Lynch et al. (2020) observe: "The extremely long-term persistence of CO2, and accumulating behavior that occurs as a result, is fundamental to our understanding of anthropogenic climate change, and is well-agreed upon by physical climate-carbon cycle models (Joos et al., 2013), but is not widely appreciated (Sterner et al., 2019)."

It can be argued, therefore, that CO2 emissions have a separate—if not higher—degree of accountability due to their long-lasting presence in the atmosphere. The agricultural industry remains an important emitter of CO2, particularly due to the highly complex nature of global supply chains and distribution. This research focuses on these agricultural emissions, as part of the larger conversation on the environmental impact of the global industrial-food system.

Food Miles

Coined in the early 1990s by City University London professor Tim Lang, the term "food miles" has come to embody an important environmental critique of the industrial-food system's international supply chains. Food miles, simply put, refer to the miles that need to be travelled before food is found on grocery store shelves. The greater the miles, the logic goes, the larger the environmental impact of a food item, because all industrial distribution methods (freight, truck, plane, boat) burn fossil fuels.

The environmental impacts of "food miles" are indeed significant. Li et al. (2022) recently estimated that food miles are responsible for as much as 19% of the agricultural industry's global emissions—3.5 to 7 times more than previously thought. The reason for this jump is that Li et al.'s study included both embedded input emissions and direct transport related emissions. For example, when looking at red meet produced by China for Chinese consumers, researchers found chemicals were sent from Canada to the United States to grow fruits and vegetables, and to Brazil to grow soybeans. These were then imported to China to be used as feed. The red meat was finally processed in China, using Indonesian and Australian coal, and German machinery. All in all, although the distance travelled from production (in China) to the point of consumption (in China) was relatively short, the food miles embedded in the production inputs meant travel related carbon emissions were still significant. To mitigate the carbon impact of food Li et al. (2022) recommended "a shift towards plant-based foods must be coupled with more locally produced items, mainly in affluent countries," as these countries represent 12.5% of the world population but are responsible for 46% of food mile emissions.

Emergence of the Local Food Movement

Li et al.'s conclusion is the argument that has been made by the local food movement since the early 2000s. The local food movement should be understood within the larger context of reactions against the industrial food movement in the late 1990s and early 2000s, as noted earlier. While a large part of the movement's *raison d'être* is environmental, the movement is also supported by other justifications.

The local food movement's key contribution to environmental reform in the agricultural industry is to give people more power over the "geographic dimensions of [their] food choices" and, therefore, reduce the environmental impact of their food miles (Martinez et al., 2010). Many local food initiatives are also small-scale, organic, and other alternative agriculture initiatives. Alternative agriculture movements are not mutually exclusive, but the local food movement's original contribution to climate change policy is to reduce food miles.

The local food movement's aim to reduce food miles is often communicated with other ideals, like revolution and redistribution. As Sarah Elton writes in *Consumed: Food for a finite Planet*, local food is "about a rupture, a rupture with the social norms of our modern world." She continues, explaining local food is about a "desire to create a new way of feeding ourselves that is fair and just" and "that doesn't have such a high environmental cost" (Elton, 2013).

These revolutionary aspects of the local food movement, however, are complex. While farmers and advocates self-describe themselves as on a mission to revolutionize the industrial-food system, projects rarely reject the philosophical principles of capitalism. The local food movement remains market oriented. Products are marketed and sold for profit, but with an added moral implication that turns farmers into moral economy entrepreneurs. Local food

advocates can be seen as political consumerists, people who "seek to influence political outcomes within the marketplace," a belief that is itself deeply rooted in neoliberal ideology (Kyroglou & Henn, 2020). This interesting back and forth between revolutionary and conforming is well summarized in Brandy Jansen's book *Making Local Food Work*, an in-depth study of local food advocates in Iowa:

"The farmers running those small farms and directly selling their crops to consumers are often portrayed by popular authors and even researchers as renegades railing against the system or poetic intellectuals. Marketing teams at natural food stores display artsy photos of such farmers, prominently featuring the dirt under their fingernails. These depictions suggest to consumers that they can change the face of our food system and economy through their purchases, pausing only briefly to put down their recyclable cup of fair trade coffee. Thus, local food is as much a set of values as it is an economic strategy. And as a result, it is tied to larger social and political ideas about sustainability and community. When marketers and authors show farmers as rebels, those of us who buy their products get to go along for the ride, making agriculture more sustainable, supporting small farms, or standing up to the industrial system. Consumers, without really doing much work on their own, can still claim to be part of the movement. We have focused so much on the farmers who produce and the consumers who purchase that the rest of the system is neglected." (Jansen, 2017)

Local Food Skeptics

Many of the arguments put forward by local food advocates have been debated. Notably, Pierre Desrochers and Hiroko Shimizu highlight some of the movement's blind spots in *The Locavore's Dilemma: In Praise of the 10,000-Mile Diet*. They insist local food advocates should develop a greater appreciation for what the industrial-food system has brought before they decide to tear it down. In their words: "If local food production in earlier eras was so great, why did consumers increasingly favor items from ever more remote locations?" (Desrochers & Shimizu, 2010).

The most fundamental point that Desrochers & Shimizu (2010) bring home is how efficient the modern industrial-food system is. This efficiency has created enormous cost savings for consumers, helping lift billions out of poverty. In 1929, for example, an average American spent 23% of their disposable income on food, compared to 9.4% in 2010. In terms of home food consumption, this proportion was only 6.4% of disposable income in 2010, compared to 40% in some African countries. Adding historical context to this point, Desrochers & Shimizu (2010) cite Adam Smith. When elaborating his theory of comparative advantages, Smith remarked that countries could greatly reduce their costs of production by specialization—by climate, for example—rather than trying to produce everything domestically. Scotland, Smith noted, could grow decent grapes in greenhouses, but at about 30 times the expense of continental grapes. As the authors conclude, Smith's example illustrates that "trade between regions that specialize in products for which they have significant advantages (say, wine or wheat) delivers more food for less money than if producers in both regions tried to grow a range of crops unsuitable to their soil and climate."

The high cost of local food is, in fact, an important and a well-documented tension in farmer's markets and Community Supported Agriculture farms

(CSA). Local markets and CSAs are local distribution systems that allow farmers to charge high enough prices to earn a living, but for low-income consumers, these higher prices are often out of reach. While local food advocates argue this higher cost is normal given Americans now spend less of their income on food than they used to, others have rebutted that Americans also now pay more for housing, transportation, education, and childcare. Many don't have the financial flexibility to pay more for food. These affordability tensions—reinforced by farmers' markets usually being in white, affluent neighbourhoods—lead to a climate of moralistic privilege among local food advocates. This climate, in turn, excludes marginalized groups, including people of colour. When Jansen (2017) reached out to local market managers about why people of colour did not participate in farmer's markets and CSAs, they claimed "people would eat better if they only knew how their food was produced." In other words, they "identified the population as ignorant". The assumption that "local food markets are inherently welcoming," Jansen found, "relieved the managers of the responsibility of reaching out to potential African American consumers."

Local food's inefficiencies not only lead to cost increases (and resulting injustices), but also have enormous environmental implications. From a land-use perspective, countries with well-suited climates for certain types of agriculture will produce more with less resources (energy, water, soil quality) than countries that attempt to produce everything locally. Even more critical of the local food movement's environmental justifications, however, are Desrochers & Shimizu's arguments on transportation efficiency. Citing a study from the United Kingdom's Department for Environment, Food and Rural Affairs, the authors argue that most food miles are generated within local countries. In the United Kingdom's case, as much as 82%. More importantly, 48% of the United Kingdom's food miles were caused by car transportation from

points of sale to points of consumption (i.e. peoples' homes). This very large share of food miles was the result of further inefficiencies: many individual families making numerous trips to grocery stores. In sum, transporting large volumes of food over long distances in one container requires less energy than carrying the same volume over short distances in thousands of cars. These energy savings increase when factoring in transportation modes. Given that maritime transportation is highly energy efficient, the food miles incurred by boats cause less emissions than other transportation forms: "Distance may be important, but in truth the transportation mode is typically a much more significant issue." (Desrochers & Shimizu, 2010).

Desrochers & Shimizu do not elaborate further on transportation modes, but their point relates to the larger debates taking place within the agricultural industry. To what extent is our emissions problem an agricultural problem? This is a question worth asking. First, the importance of CO2 emissions relative to other greenhouse gases (methane, nitrous oxide, etc., for which agriculture is more directly responsible) certainly needs to be considered. Second, we need to do more to highlight the overwhelming source of climate change: fossil fuel combustion. In 2020, the burning of fossil fuels alone was responsible for 73% of total greenhouse gas emissions and, more importantly, 92% of total CO2 emissions. Shockingly, 71% of all global greenhouse gas emissions since 1988 can be traced back to only 100 fossil fuel companies. Moving away from an economic sector view of emissions shows how impactful a transition away from fossil fuels for transportation and energy would be (CDP, 2017; EIA, 2020).

The Wine Industry's Carbon Impacts

The wine industry offers an interesting case study into the larger environmental debates around local food. Wine is a particularly relevant food sector to analyze. Wine has been shown to carry symbolic value through its associations with culture, especially in marketing (Triana, 2019). This might have a compounding effect when combined with the symbolic value of consuming locally. Moreover, much like local food has been criticized for catering to economically and politically privileged consumer groups, research has shown alternative wine trends have taken off in gentrifying areas of metropolitan centres (Delamarre, 2016). As such, it is worth asking: Is local wine more environmentally friendly than non-local wine? Do local production inefficiencies outweigh local environmental benefits?

To answer these questions, I will outline where wine industry specific carbon emissions come from. I will then draw from an environmental impact assessment of local wine to see how local production impacts carbon emissions. Finally, I will conclude with a definite picture on target pathways to reduce wine industry emissions.

Where Do Wine's Carbon Emissions Come From?

Glass wine bottles are the most carbon intensive facet of the wine industry. One recent literature review of 26 carbon footprint studies around the world concluded that "several studies claimed that bottling is the main contributor to carbon emissions by a significant margin". (Pinto da Silva & Esteves da Silva, 2022). This is due to the extremely energy intensive nature of glass bottle production, where the industry norm is still natural gas-powered furnaces. In a carbon footprint study on wine production (not including distribution) in

eighteen French and Spanish wineries, glass bottle production was responsible for 45.6% of total carbon emissions, by far the highest emitter, with tractor fuel the second highest at 10.1%, and electricity production for the winery the third highest at 9.2% of total carbon emissions (Navarro et al., 2017).

Viticulture is another phase of wine production that emits carbon, although emission levels vary enormously. One common finding is that the most important source of emissions is agricultural machinery (diesel fuel). To a lower extent, fertilizers also represent a significant source of emissions. Viticulture's carbon footprint is significantly lowered in wineries that used manual labour instead of machinery. On the other hand, manual labour is not considered a "realistic alternative for most wine producers, due to cost and productivity issues" (Pinto da Silva & Esteves da Silva, 2022). Another variability factor is the volume of production, with larger wineries associated with lower viticultural carbon footprints per bottle (Trombly & Fortier, 2019).

Wine distribution's emissions had the most variability in the carbon footprint studies reviewed by Pinto da Silva & Esteves da Silva (2022). In many cases, distribution was responsible for a negligeable percentage of wine's carbon footprint, but in others, its impact was as large as 30%. In another study on American wine distribution's carbon footprint, Reich-Weiser et al. (2010) concluded that "emissions from transportation may, or may not, be significant depending on the weight of the bottle and the choice of transportation (rail and water freight favored over truck). The weight of glass bottles also had an impact on the bottle making process, as heavier bottles require more energy to make and recycle. Having lighter glass bottles alone reduced wine carbon footprints by 10%, and as much as 40% for 3L boxed wine packaging in a California study (CSWA, 2011).

Does Buying Local Wine Help Reduce Transport Related Carbon Emissions?

As I have noted about local food, studies have shown that the environmental benefits of shorter travel distance are often negated by inefficient transport modes. Point et al.'s (2012) extensive life cycle environmental impact assessment of Nova Scotia's local wine industry provides the data needed to show how essential efficient transport modes are to reducing carbon emissions. 'Local', for the purpose of the study, was defined as being produced and consumed in Nova Scotia.

After compiling data received from Nova Scotian wineries, the researchers determined a representative distribution scenario that included two transportation phases:

(1) Transportation to retail: the local wine travels 400 km (round-trip) in a small truck to reach retail outlets.

(2) Consumer shopping: each bottle travels 5 km (round-trip) by car from the point of sale to the point of consumption.

Of all the Nova Scotia's wine production phases—not just distribution—consumer shopping had the largest life cycle environmental impact. In the researchers' "global warming potential (GWP)" indicator, representing carbon emissions, consumer shopping was responsible for 37.27% of total life cycle impacts, greater than the entire impacts of grape growing and wine making combined. In comparison, transportation to retail was only responsible for 11.46% of life cycle impacts. This led the researchers to conclude that "the environmental benefits of eating locally produced foods are quickly lost if consumers drive even short distances to local markets, let alone to a wine tasting room in the countryside."

Point et al. then considered whether transportation to a non-local retail outlet (outside of Nova Scotia) would significantly increase life-cycle emissions. To do so, they looked at three retail export scenarios: 1800 km to Toronto by commercial truck, 6000 km to Vancouver by commercial truck, and 18 000 km to Perth, Australia by commercial truck and ship. In the Toronto scenario, they found that changes to life-cycle emissions were negligeable—the GWP indicator was in fact reduced by 0.62%. The negligeable difference between the base scenario and Toronto scenario was explained by the efficiency of a commercial truck—as opposed to a small delivery truck—negating the impact of travel distance. In the Vancouver scenario, they found that changes in life cycle emissions were significant, with a 22.36% increase to the GWP indicator. In the Perth scenario, however, changes in life cycle emissions were negative—a reduction of 1.55% for the GWP indicator. These reductions were caused by "the efficiency of ship-based transport on a per-product basis," illustrating the greater importance of efficient transport modes over distance travelled.

Pathways Towards Reducing Wine's Carbon Emissions

Examples from the literature on wine's important carbon emissions sources all point towards increasing production and resource efficiency and transitioning to non-fossil fuel energy sources as the main opportunities for carbon emission reductions. This is in line with the observation I raised about the agricultural industry more broadly. The most impactful efficiency opportunities exist in wine distribution and wine packaging.

For wine distribution, improving last-mile connectivity would be more environmentally impactful than improving retail distribution. Essentially, this means reducing wine consumers' car-dependency. Calls to consume more locally target retail distribution rather

than last-mile connectivity and, therefore, are somewhat misguided. Additionally, consuming local wine that has less efficient retail distribution than non-local wine could be more environmentally harmful than beneficial. In any case, "food miles" are not a good indicator of carbon emissions, as travel distances are often negated by travel mode efficiencies.

For wine packaging, many opportunities exist for efficiency improvements that would greatly reduce carbon emissions. Replacing glass with packaging that uses resources more efficiently (i.e. cardboard boxes) is certainly one way forward. Another option would be push for wine bottle standardization. This would make it easier for recycling, but also for re-use, which would greatly reduce the carbon footprint of glass bottles. In packaging, as in distribution, solutions to increase efficiency call for increased centralization and international cooperation, not decentralization and local production.

Indirect Impacts of Local Food

I have highlighted that efficiency throughout the phases of food production is crucial for reducing agriculture's carbon emissions. Examples taken from wine industry studies highlight the importance of production efficiency which, in fact, outweighs the importance of proximity. The efficiency argument forces a more critical reading of local agriculture's environmental impacts. This analysis, however, needs to be expanded to include indirect impacts of local food and their consequences on the environment. How does local food production change our relationship to the land? What would the effects of changes in land-use be on global carbon emissions? More specifically, how does this inform our understanding of local wine production?

As part of their general contention that local agriculture reduces production efficiency, Desrochers & Shimizu (2010) claim that "what is clear from the available evidence is that the world

envisioned by locavores would have a significantly larger surface area devoted to growing food (and therefore a much more severe impact on the landscape) than a world where farming is practiced in the most suitable production zones." More philosophically, locavorism is "inherently anti-urban," the authors assert, "as it effectively mandates low density settlements distributed over the arable landscape."

While it may be an exaggeration that local food "mandates" low density, Desrochers & Shimizu effectively argue that higher land-use efficiency (production/hectare) is beneficial to the environment. The argument is not a new one. Perhaps the most influential piece on this take is David Owen's *Green Metropolis*, which helped reshape the way planners and environmentalists thought of cities' environmental impacts. Throughout the 19th and 20th centuries, cities were associated to environmental decay. Environmental conservationists worried that growing, polluted, industrial cities would destroy 'nature', and pushed for the creation of natural parks to ensure 'nature' would be preserved. These environmental concerns were also instrumental in the popularity of suburbs. But Owen turned this longstanding belief on its head by popularizing the idea that New York City was a model of environmental responsibility, thanks to resource efficiency: "lacing one and a half million people on a twenty-three-square-mile island sharply reduces their opportunities to be wasteful, enables most of them to get by without owning cars, encourages them to keep their families small, and forces the majority to live in some of the most energy-efficient residential structures in the world: apartment buildings." Sprawl, not urban density, was the most environmentally damaging land-use form (Owen, 2011).

Exurbanization

Aside from reduced yields and, consequently, a need for more agricultural land, does local agriculture really contribute to sprawl? What economic and cultural forces are at play? These questions have not been sufficiently explored in the literature on local food (Alonso, 2013). The planning literature on exurbanization, however, does offer key insights on the links between local agriculture and increased sprawl. Exurbanization describes the process of transition from rural to exurban forms of development. "Exurbias," as they are often called, typically have very low densities. They are found in areas that are peripheral to large urban centres, close enough to be accessible. Most importantly, exurbias can be seen as "urban-connected" rural places, where "some residents choose to live as close to nature and as far away from the city as they can, despite the connection in their daily lives to economic and social spheres in city and suburban centers" (Taylor, 2011).

As exurbia's urban-connected residents' "fuse" with existing rural residents, competing rural capitalisms emerge. On the one hand, rural capitalism is traditionally resource driven —much like industrial farming. This form of capitalism sees land as valuable for what it can provide through the extraction and transformation of raw resources. On the other hand, emerging exurban capitalism is amenity driven. Land is 'consumed' through intangibles such as beauty, aesthetics, status. The product of rising amenity value for exurban areas is rising real-estate values or capital spent on experiences and niche services (Taylor, 2011; Hurley & Taylor, 2016).

In many ways, exurbanization acts a lot like gentrification where, following an area's disinvestment, new migrants bring an in-flow of capital that leads to conflicts (and often displacement) with existing residents and industries. These new

migrants tend to be economically and politically privileged groups that have disproportionately benefited from the increased mobility brought about by improvements in communications technologies. For these exurbanites the construction of a "mythical, harmonious, rural world" provides a direct contrast against the those of "blighted cities and bland suburbs," a contrast that holds enormous "symbolic capital". As these migrants bring in new capital, local industry, government, and other structures "once supporting traditional extraction" may be inclined to take advantage of exurbanization to "transform themselves," and thus "[enable] residents to benefit economically from the natural amenity values of the landscape," but not without tensions over land use taking place (Hinrichs, 1996; Hurley & Taylor, 2016).

Some have called exurban forms "post-suburban," largely because exurban residents reject many of the forms that have come to typify most suburbs: identical houses, paved streets, new massive subdivisions, etc. They seek-out exurbia because it is a more authentic version of an anti-urban form. But 'post-suburban' also hints at similarities that exist between suburban and exurban forms. Exurbias, like suburbia once did, rejects some of cities' constraints (ie. high densities, lack of natural amenities, etc.) while maintaining urban connections for the benefits they offer as centres of capital. From an environmental perspective, this new model is extremely dangerous. The low densities exurbia requires would lead to unprecedented levels of sprawl, far worse than the already problematic sprawl caused by suburbanization. As put by Hinrichs (1996), "it seems that it is not possible to have the 'ideal' of exurban living – 'nature' and pastoral scenery, etc. – without the big box strips and highway corridors endemic to sprawling exurban growth." (Taylor, 2011; Hinrichs, 1996)

The Link Between Exurbanization and Certain Types of Agriculture

Vermont is an early case study of how food production can transition from extractive to consumption capitalisms. As early as the nineteenth century, Vermont began to suffer from agricultural population loss, due to farmers leaving less productive hilltop farms. As part of a strategy to revamp its economy, the state began to promote its rural pastoral New England charm to residents from large American cities on the Eastern Seaboard, leading to many of them purchasing second homes upstate. This promotion of New England authenticity also turned the "Made in Vermont" label into a brand, increasing the value of agricultural production. Herein lies the key to consumption capitalism-oriented agriculture: by increasing the value of a food item through branding, tourism, aesthetic landscapes, etc., agricultural producers can afford to be less productive. (Hinrichs, 1996).

Local food is well positioned to reap added value from its label, due to the extensive media coverage the movement has received internationally. Additionally, local food's tendency to develop close to large urban centres for proximity to consumers means local food farms often open in exurbanizing areas. This allows them to profit from the extra income that amenity seekers look to spend in exurbia. The combination of these factors mean local food production can be of disproportionately high economic value. One Australian study found that agriculture in peri-urban regions generate 25% of the country's gross value of agricultural production, despite representing only 3% of its agricultural land (Houston, 2005). It also suggests that consumers pay more for the food that they consume. Part of this higher price, it can be argued, reflects the added 'experience' that amenity seekers receive from purchasing local food.

Among other local foods, local wine is particularly well-suited to benefit from exurbanization due to its compatibility

with gastronomy and the hospitality industry. Combining different types of amenities in this way creates a recreation ecosystem that increases the attractivity of exurbias. In a study on wine tourism in Australia, wine regions became more attractive to outsiders due to the complementary existence of forests, rivers, olive and fruit groves and aquaculture farms. They found that "the potential exists for local tourism stakeholders to combine these attractions with visitation to wineries and in this process seek to attract visitors" (Alonso & Liu, 2010). Most analyses of local wine production have centred on tourism. This research looks to contribute to the literature on exurbia by highlighting the important dynamics of exurbanization that are at play in Quebec's local wine industry.

Presentation of the Results

The interviews I conducted with 10 Quebec wine industry stakeholders underlined the discrepancy between the informants' general optimism about the industry's environmental impacts, and the negative environmental impacts of the industry's inefficiencies. Much of the local wine industry's optimism seemed impervious to observable contradictions. Informants tended to over-emphasize the benefits of local wine production and downplay its problematic inefficiencies. When inefficiencies were acknowledged by informants, external factors were often blamed. The idea of producing wine in Quebec was never called into question.

The industry's inefficiencies have led to increased production costs. To deal with these costs, I found producers adopted a new business model, which zeroed in on consumption-value revenues or 'experiences,' rather than production-value revenues. This business model increased connections between rural areas and economically privileged urban centres which, in turn, accelerated exurbanization.

Taken together, these themes shed light the environmental impacts of local wine consumption in Quebec and highlight the industry's misunderstanding of the economic and cultural structures that uphold it. I will present them in three categories:

(1) Movements that shape the Quebec local wine industry's environmental optimism;
(2) Quebec local wine industry's unaddressed inefficiencies that cause environmental harm;
(3) How Quebec wine producers' bypassing of inefficiencies contributes to exurbanization.

Movements that Shape the Quebec Local Wine Industry's Environmental Optimism

The informants were all optimistic about the environmental benefits of developing a local wine industry in Quebec. When exploring the reasons for this optimism further, however, I found that informants presented few tangible justifications. They relied on arguments put forward by global movements such as the local food movement or other alternative agriculture movements (small-scale farming, organic farming, regenerative agriculture), but in an oversimplified or incomplete form. Adding to the popularity of the local food movement, cultural nationalism was also identified as a significant bias that made the local food movement more appealing. The influence of these movements overlapped to create a larger narrative of the industry's positive environmental impacts, but the combined distortions meant this narrative had little factual value.

Local Food Movement

One interview excerpt from distributor 1 shows the complexity of the distortions of local food movement arguments. In this case, the informant called attention to the positive environmental impact of reducing food miles when asked about the environmental advantages of buying local wine:

Distributor 1: Parce qu'évidemment, consommer local, ça a plein d'avantages, dont justement, l'empreinte environnementale qu'on va faire là-dessus à cause du transport. Le vignoble québécois, il n'est pas à l'autre côté de l'océan, il est à une heure de char.

Yet, the informant presented an oversimplified understanding of transportation emissions. They neglected to account for travel mode, as well as the embedded transportation emissions in the other phases of production. As their explanation continued, the informant dropped their focus on food miles, to talk about a more nuanced "philosophy of consuming locally". This philosophy, it became clear, was less about reducing travel distance than consuming from a

specific group of producers. This represented another distortion. The informant began with a concrete environmental impact and transitioned to an elusive discussion on values:

Distributor 1: Mais vraiment, ça rentre dans la philosophie de consommer local, de faire faire la promotion des produits d'ici. D'ailleurs, on n'a pas que du vin. Pour avoir un permis d'alcool, il faut toujours avoir un inventaire d'épicerie, donc des produits dit "non-alcooliques". C'est la même chose. On garde nos mêmes valeurs là-dessus. Donc c'est toujours des producteurs qui sont locaux, qui sont sélectionnés très minutieusement.

The informant's "meticulous" selectivity revealed itself to be an important aspect of their environmentalism. As I asked more explicitly about how sustainable development was represented in their mission, they made clear that, while reducing food miles was the first environmental advantage, there were also environmental implications of buying from a select group of local producers:

Distributor 1: Ouais, ouais, ouais. L'avantage premier, c'est vraiment le transport, c'est sûr et certain. Là, on va se le dire après ça. Il n'y a pas d'ajout de sulfites et il n'y a pas d'ajout d'intrants [dans le vin québécois]. Il y a très peu d'utilisation d'engrais chimiques dans le vignoble au Québec parce que c'est des vins qui sont toujours prêts à boire. On a le climat, en fait, pour faire des vins qui sont prêts à boire généralement. Donc l'ajout de sulfites ou d'intrants de produits chimiques supplémentaires n'est pas nécessaire dans la fabrication du vin au Québec. Par contre, la certification biologique est très très dur à aller chercher à cause encore une fois du climat qu'on a. Il y a le gel-dégel. Vraiment, on a toujours des saisons en fait, qui sont incertaines en agriculture, au printemps et à l'automne. Donc, des fois, pour éviter certaines maladies qui sont apportées par le gel-dégel, il faut mettre un engrais chimique. Ce qui fait en sorte que c'est beaucoup plus dur qu'en Europe d'aller chercher une certification bio au Québec. Par contre, tous les vignerons avec qui je travaille sont de culture dite raisonnée C'est à dire que je ne travaille avec aucun vigneron qui va "shooter," comme on dit, mettre des engrais chimiques pour rien. Il y a toujours une pensée. Donc on y va tout le temps là-dessus.

This explanation emphasized the informant's reliance on relationships for building trust with wine producers, one that superseded their faith in organic certifications. This observation might explain the informant's biased analysis of food miles, which overemphasised travel distance between production and

distribution and left out embedded and last-mile emissions. More importantly, the informant's relationship with producers shaped their view of wine's environmental impact, which focused entirely on the winegrowing production phase, representing another oversimplification:

Distributor 1: Puis, la nouvelle génération de vignerons au Québec et la plus ancienne génération aussi a pris le pas, c'est des agriculteurs très tournés justement vers la protection de l'environnement. C'est une valeur qui est très bien reflété sur le vignoble québécois et donc ça, ça se fait sentir. Il n'y a pas de vignerons qui va "shooter", qui va mettre des engrais chimiques pour rien. Parce que la consommation de vins au Québec se fait au Québec. On n'a pas un gros volume de production. Tout ce qui est vendu, en fait, millésime après millésimes, la grosse majorité des cuvées sont capables de trouver preneur. Donc, ça ne sert vraiment à rien de mettre des intrants ou quoi que ce soit. On est vraiment tourné vers un respect de la nature le plus possible. Et les vignerons, s'y affichent fièrement. C'est une tendance qu'on voit.

At this point in our conversation, the influence of other alternative agriculture movements became clearer. In addition to local production, the informant praised small-scale wineries and reduced productivity, which permit producers to use fewer pesticides. This, from the informant's perspective, represented a net environmental benefit. However, their logic was incomplete, as they overstressed highly visible wine growing impacts (pesticides, ecosystems, soil), to the detriment of environmental considerations in the other phases of local wine production.

Alternative Agriculture Movement

The focus on wine growing was common among the producers interviewed as well. Specifically, they emphasized impacts on soils and ecosystems over carbon emissions. In the interview with producer 1, for example, the informant jumped from discussing the carbon footprint of wine production to focusing on regenerative agriculture, neglecting more carbon intensive aspects of production:

Producer 1: Les empreintes écologiques, là c'est tricky. L'empreinte écologique globale, c'est l'affaire la plus dure au monde à calculer. J'ai déjà fait un exercice avec mon patron pour essayer de le faire pour l'agriculture urbaine de proximité pis wow. Les données disponibles sont rares. C'est dur de faire fitter tout ensemble, mais on voit quand même quand on se force à faire l'exercice. On réalise à quel point il nous manque des morceaux de robot, justement, pis. Et là, dans la viticulture, my god, on ne pense pas à ça, on ne parle pas de ça. Je me rappelle, la première fois que j'ai participé à la conférence [anonyme], qui est extraordinaire. Elle s'est intéressée vraiment à ça. Puis, je posais des questions sur l'agriculture régénératrice il y a quatre ans, puis tout le monde me regardait, genre, c'est quoi ça? Et là, ça commence, ça commence. Mais même encore, quand j'en parle à des vignerons qui sont game, et qui ont quand même des bonnes connaissances, sont comme c'est quoi déjà qu'il faut faire? Ils sont mêlés et ce n'est pas clair parce qu'il n'y a pas beaucoup de livres là-dessus. Le premier livre sur la viticulture régénératrice, c'est [anonyme] qui va l'écrire, qui est en train de l'écrire. Puis, quand ça ça va sortir, wow, ça va être malade. Mais entre-temps, il n'y a rien. Il y a un "void" total. Puis ceux qui le font et qui réussissent, c'est ceux qui font vraiment de la polyculture. Mais après, mes collègues vignerons vont dire: mais là c'est plus un vignoble ça. Mais la définition même de la monoculture... Pi tu sais j'ai déjà travaillé sur [anonyme], sur un mur d'hydroponie de fraises, puis on se trouvait dont smart de dire on va mettre des fraises, ça va être malade visuellement. Et à un moment donné la maladie a poignée sur une section, puis là pow. Puis là, les années après, on faisait un mur de fraises, un mur de fines herbes, un mur de fraises, un mur de fines herbes. On n'a jamais eu ce problème-là. Donc on s'est rendu compte que ok, même en hydroponie, la monoculture ce n'est vraiment pas une bonne idée. C'est compliqué pour rien. Mais, c'est vrai que ça affecte le rendement. C'est ça le problème. Ça affecte le rendement.

The informant's final remark on yield was not an environmental concern, but a financial one. In fact, none of the producers mentioned the environmental advantages of higher yields. The emphasis on soil impacts and ecosystems may be indicative of alternative agriculture movements' calls to reduce ecosystem impacts. This discourse was certainly noticeable in producer 4's disdain for industrial monocultures:

Producer 4: Ben écoute, je me dis que ma réponse là-dessus va évoluer dans le temps. Mais après une saison, j'oserais dire qu'il ne faut pas se leurrer, la vigne est monoculture. Cela dit, on est

entouré, nous ici dans le centre du Québec, on est entouré de monocultures. En face de chez moi ils font du soya. Sinon, des fois, ils font juste du fourrage pour nourrir les animaux. Il y a du maïs aussi. C'est en conventionnel. C'est le genre de pratiques qui a vraiment un gros impact sur les écosystèmes. Je pense que même si un vignoble est une monoculture, s'il y a des pratiques bio en place, ce n'est pas du tout la même chose, donc j'oserais croire qu'on a un impact vraiment incomparable avec ce genre de cultures-là.

It would seem understandable that producers focus on winegrowing and winemaking impacts when, as in an industrial agriculture model, these are the production phases they control. The issue, however, is that alternative agriculture producers argue for more control over the entire supply chain for environmental reasons. Quebec wineries are small-scale producers, but also retailers and distributors. This gives them more power to reduce winegrowing emissions, but also more responsibility to tackle emissions in the other phases of wine production. This responsibility was often ignored by producers, who continued to focus on winemaking impacts. In this example, producer 4 boasted that greater control over commercialisation gave them more freedom to have lower yields and grow organic wine, but neglected to consider how small-scale commercialisation affected carbon emissions, resulting in another oversimplification:

Producer 4: Je pense aussi que c'est plus facile pour nous de mettre en place des pratiques bio et je m'explique là-dessus dans le sens que pour un producteur en conventionnel, il y réfléchit toujours à un rendement à l'hectare. Qui si de faire le switch au bio, il y a un stress derrière ça de perdre son rendement hectare pour vraiment que ça soit que le prix de vente prenne en considération cette perte de rendement là-dessus. Parce que finalement, lui ce qui dicte souvent ses agissements, c'est son portefeuille. Nous ce qui nous sort de ça c'est que on est autant producteurs de la matière que transformateurs. C'est nous qui commercialisons notre propre produit. Donc d'avoir une matière première qui est travailler de façon écoresponsable puis, en qualité, ça fait qu'après ça nous on transforme quelque chose de vraiment meilleure qualité. On a moins besoin de jeter le laid, ce qui est moins beau. Pis après ça, quand on commercialise, c'est beaucoup plus facile de le faire parce que nos produits sont bons. Donc on vit dans un autre

dynamique que le producteur de soya qui va juste vendre à un gros transformateur de soya. Tu vas lui vendre tes 10 tonnes, mais tu vends ça à quelqu'un qui en achète 1000 tonnes dans l'année. Donc il va te "bargainer" bas et tout ça. Nous on n'est pas dans cette dynamique là parce qu'on a le contrôle sur chacune des étapes. Ça nous encourage en tout cas et ça facilite la chose, d'opter pour le bio, parce que c'est à notre avantage de le faire. Puis après ça, ça nous permet de vendre nos vins plus chers et on va travailler avec un produit d'une meilleure qualité.

The informant ended with an important economic advantage of alternative agriculture wine productions: the option to sell bottles at a higher price. That the informant included this calculation in their business model indicates the influence of local and alternative food messaging on Quebec's consumers. Today, many consumers are willing to pay more for local, small-scale, organic wine. In the interview with distributor 2, this consumer trend was explicitly tied to the global movement local food movement:

Distributor 2: Puis le consommateur, tu regardes un peu partout dans le monde, tout ce qui est plus local fonctionne bien. Donc c'est go go, go on roule la machine donnez-moi en du vin et pis on va en vendre.

The arguments of these different global movements were often combined by informants, but again in oversimplified forms. In doing so, informants distorted arguments to the point that tangible concerns (i.e. transportation emissions, tractor fuel use, pesticide and fertilizer emissions) were reduced to opposing values and beliefs. The dialectic that emerged fed into the justification of their mission, as they could position themselves as 'good' actors. In one example of this, producer 2 pitted wealthy, large-scale, export-oriented, industrial farming operations, against their own small-scale, local, organic winemaking. While local food concerns stood out in this case, the wealth and size of the industrial operations supported the producer's position, convincingly delegitimizing industrial farmers without

concrete evidence of environmental harm:

Producer 2: Mais la parcelle qu'on a, qu'on est en train de développer de 17 hectares dont je parlais, celle-là est dans la municipalité qui est la plus agricole de toute la MRC et c'est les fermes. C'étaient des fermes, historiquement, des grandes cultures, des grosses grosses fermes avec du bétail, des grandes cultures, du foin. Et présentement, ces terres-là sont utilisées justement pour faire du foin. Il y a des fermiers qui ont beaucoup de moyens, des grosses familles qui sont en train de s'approprier ces terres-là, qui sont très belles, et qui font du foin pour le vendre en Floride à des gens qui ont des chevaux et qui n'ont pas la [capacité d'en produire]. Bref, il y a un enjeu, selon nous. C'est horrible de penser que nos terres agricoles sont utilisées pour faire du foin pour des chevaux en Floride et au Texas et ailleurs. Donc pour moi, si quelqu'un disait j'achète cette terre là et je plante des vignes plutôt que de la laisser à un producteur de foin. Je serais super contente parce qu'au moins on ramène la production à quelque chose qui va nous servir et qu'on peut consommer. Ça va nous servir à nous, pas à des gens d'ailleurs. Donc j'aurais tendance à croire que ce serait bien d'avoir plus de vignobles. Je pense qu'on a assez d'espace pour que ça ne soit pas comme on raserait tout et on mettrait que des vignes. Il y a quand même beaucoup beaucoup de maisons sur le bord du lac [anonyme], si on pense à ma parcelle, qui ferait qu'on aurait quand même de la diversité. Pis ça coûte cher implanter un vignoble, donc ce n'est pas comme si on le ferait rapidement et facilement. Ça serait, je pense, bien choisi donc. Moi, j'ai confiance que s'il y a une intention de communauté d'augmenter la superficie en vignes, qu'on peut y arriver de façon écologique et surtout évidemment de vignobles sont en bio. Mais pourquoi pas? C'est comme l'appellation Cava ont décidés que tous leurs vignobles allaient être biologique s'ils veulent continuer à s'appeler ça des Cavas... Et ils travaillent en groupe pour y arriver. Donc je pense que le travail de groupe peut nous permettre d'arriver à quelque chose de très sensé. C'est mieux ça que de laisser aller des prairies, des belles prairies pour faire du foin pour la Floride. Mais il faut le faire de façon concertée. Il ne faut pas que ça soit des gens qui ont bien de l'argent, qui arrivent et qui agissent sans parler aux autres et sans avoir une vue d'ensemble du territoire.

Cultural Nationalism

The excerpt above was also an insight into the way local wine is used as a justification for ulterior nationalistic sentiments. In this case, the informant insisted that local wine will "serve us," not "people from elsewhere." The vague

"us" referred to a national community more than a geographic one.

Cultural nationalism serves as a bias that can push consumers towards the environmental arguments buying local. Another example of this was observed in the explanation given by distributor 1 when asked about the general advantages of developing Quebec's wine industry:

Distributor 1: Mais après ça, je pense qu'on traite le vin du Québec un petit peu de la même façon qu'on traiterait justement la musique, la littérature, l'art. L'alimentation en général, les restaurants, il y a plus une table à Montréal qui va acheter son porc à l'étranger ou quoi que ce soit. On est vraiment dans le consommer local parce qu'on a une fierté de ça. Puis, il y a une empreinte écologique, encore une fois, qui revient. Donc, les vins du Québec c'est parfait pour ça.

National culturalism towards wine plausibly makes it more difficult to criticize the industry's environmental record, or to imply it is not environmentally desirable to produce wine in Quebec. For example, the Wine Specialist I interviewed seemed to find it difficult to criticize the industry, even if they agreed the industry had issues it needed to work through. When I suggested whether it would be preferable for the province to focus on liquor or beer production, the informant answered with intangible justifications, such as their "admiration" for producers' "passion" and "courage":

Wine specialist: C'est sûr que produire des spiritueux, d'ici et de la bière c'est beaucoup plus facile. Mais je pense que ça prend énormément de courage pour faire ce qu'on fait au Québec. Moi j'ai énormément d'admiration pour les producteurs québécois. Ça prend... c'est capoté ce qu'ils font. Il faut qu'ils soient passionnés là. J'ai énormément d'admiration, mais je pense que, on nous a démontré qu'on pouvait réussir. Mais ce n'est pas facile.

Quebec Local Wine Industry's Unaddressed Inefficiencies that Cause Environmental Harm

The stakeholders interviewed commented on an array of inefficiencies in Quebec's wine industry. These can be grouped into two interrelated categories: distribution inefficiencies and production inefficiencies. It was not always clear that stakeholders saw the environmental implications of the inefficiencies they noted. More commonly, inefficiencies created business difficulties for stakeholders, as reduced productivity increased costs and/or labour. There were instances where stakeholders raised more explicit environmental concerns regarding inefficiencies, which resulted in two common reactions. At times, stakeholders paid little attention to the environmental concerns they raised, as they felt environmental benefits of local wine growing outweighed negative impacts anyway. At other times, stakeholders worked to mitigate the inefficiencies, yet blamed factors over which they had no control as the underlying causes. In no case did stakeholders raise inefficiencies as a major or inherent environmental problem. At no point did inefficiencies lead stakeholders to question the overall environmental benefits of growing wine locally.

Distribution Inefficiencies

The interviews showed that distribution in Quebec's wine industry happens in one of three ways: on-site sales and direct customer deliveries, distribution through small-scale retailers or restaurants, and deliveries through the province's large-scale retailer.

On-site sales are a popular distribution method for wineries that offer visits, tastings and other agrotourism activities, as they required few human and financial capital investments. For the producers interviewed who used on-site sales, these usually represented about 25% of total sales volume. This distribution method is

the least efficient and most carbon intensive because it requires consumers to travel long distances by car, a fact that was acknowledged by some producers in the interviews. However, producers were either not aware or discounted the scale of environmental harm that car travel represented. Producer 3, for example, felt the environmental impacts of selling wine on-site were offset by the benefits of producing wine locally:

Producer 3: Quand mes collègues partent à Montréal, à la SAQ, donc je n'exporte pas et tout, je veux me donner bonne conscience en disant ça. Je pense qu'on fait partie de l'achat local, donc je n'exporte pas, je ne vends pas à des étrangers, je vends au Québec, j'exporte au Québec la plupart de mes produits. Je vends quand même 25 % de mes produits à la ferme. Alors c'est vrai que les gens viennent en voiture chez nous. Je me donne bonne conscience là-dessus, mais ce n'est pas scientifique nos affaires, nous les vignerons. Mais c'est sûr que par rapport à l'exemple que je donnais tantôt, la bouteille d'Afrique du Sud, je me donne bonne conscience. Ma bouteille elle n'a pas fait la moitié du globe pour venir ici dans le panier du consommateur.

Direct customer deliveries represent another inefficient distribution method. Purchases take place online, but producers might request that clients pick up their bottles at the winery. Producer 4 saw this measure as necessary due to their own resource limitations, notably labour. Their suggested improvement was to establish pick-up points in Montreal, although that would only marginally increase efficiency as weekly volumes would remain small. The informant made clear that they did not take responsibility for distribution inefficiencies, as their job was "to take care of the vines". This showed an incoherence between the lack of accountability for distribution emissions on one hand, and the advocating of more control over commercialisation for environmental reasons—i.e., more flexibility to grow less productive, organic wine—on the other:

Producer 4 : Oui, parce que ça vaut la peine, parce qu'un restaurant va prendre plus qu'une caisse, alors qu'un consommateur, non. Donc le consommateur on va l'inviter à venir chercher sa caisse lui-même ici, ça va minimiser nous notre temps. Surtout en fait, nous c'est une question de temps.

Researcher : Donc, vous ne livrez pas? Comme si je veux, moi, à Montréal, acheter une caisse, vous ne livrez pas?

Producer 4 : Ben non. On va peut-être réfléchir à une possibilité de faire un point de collecte pendant un après-midi, à tel endroit. On va peut-être, mais on ne peut pas faire une livraison porte à porte parce que c'est nous-mêmes qui devons la faire donc on va passer des journées en camion à faire de la livraison. Puis nous, notre métier, c'est de s'occuper de la vigne. Si on pouvait travailler avec un genre de FedEx et charger les frais d'expédition aux clients, dire "regarde, tu ne veux pas venir chercher ta caisse ici? Il n'y a aucun problème. Paye 9.50 et ça va couvrir les frais FedEx pour l'avoir chez toi. Nous, ça me ferait plaisir de gérer FedEx de notre bord.

The suggestion to transport wine through postal service would not increase environmental efficiency. It seemed instead to be a subtle criticism of the province's strict licensing requirements on wine transportation. This was a common complaint among local producers. Strict licensing in the province ensures producers are the only ones allowed to transport wine, forcing them to conduct their own distribution. Some interviewees mentioned attempts to increase distribution efficiency by circumvent some of Quebec's stricter licensing requirements, all the while respecting the letter of the law. For example, some restaurants—to whom producers are allowed to distribute—act as de facto distributors, as they go on to resell the wine they buy to other restaurants. This represents one example of a creative grey area that allows for some distribution centralization.

Another larger and more formal central distribution option available to Quebec producers is to sell through the SAQ, the province's large-scale distributor. This distribution option has the lowest carbon impact, as the SAQ's volume and infrastructure maximizes efficiency in ways producers cannot emulate. Producer 4, who made this observation, felt producers should be allowed to group their distribution together to reap the benefits of increased efficiency. Rather than question their own inability to go through the SAQ's distribution network,

they blamed a factor over which they had not control—the law's lack of flexibility:

Producer 4: Au niveau mettons du transport pour la commercialisation, il faut tout qu'on livre nous-mêmes. Donc ça va être de louer un camion, qui sont souvent quand même assez polluant, pour remplir ça de nos caisses de cartons pis aller faire beaucoup de kilométrage. Parce qu'on ne peut pas faire du porte à porte d'un entrepôt à un autre entrepôt. On ne passe pas par le réseau de la SAQ. Le réseau de la SAQ, a quand même une certaine efficacité. Si on passait par leur réseau à eux, c'est sûr que tu sais, il y a un genre de gros "truck" qui viendrait chercher quelque chose dans notre coin, mais aussi d'autres affaires de notre coin, pour aller dispatcher ça dans un spot à entrepôt de Montréal. Puis après ça, dans l'entrepôt, ça irait par zone à Montréal donc il y a quelque chose au niveau de l'empreinte carbone, puis d'utilisation de carburant qui est vraiment plus efficace. Nous, comme on doit faire ça nous même, du porte à porte puis tout ça, on ne peut pas non plus... Ça serait cool aussi de s'affilier avec d'autres producteurs du Québec parce que souvent on a les mêmes clients. Donc si c'était possible de partager ces coûts-là, mais ça ce n'est pas possible aux yeux de la loi non plus.

Some local producers did opt to go through the SAQ's distribution network. Distributor 2 was intent on pointing out that their organization was the largest client of Quebec wines:

Distributor 2: On est le plus gros client de vin du Québec. Il n'y en a pas un, car à lui seul 30 %-35% des ventes. L'année passée, on était à 50 % de croissance dans les vins du Québec. C'est gros et on en veut encore plus. Nous autres, on va grossir à la rapidité que l'industrie est capable de grossir.

Yet, the SAQ's market share remains a small percentage of the province's production, and a fraction of the market share it has for the distribution of non-local wines. Distributor 1 insinuated this underrepresentation of Quebec wines was caused by the lower productivity of most wineries:

Distributor 1: En fait, il y a 180 vignobles commerciaux au Québec. Là-dessus, on en a cinq ou six-là qui sont capables de se permettre d'être sur les produits courants de la SAQ.

Producer 4 made this link to productivity clearer. They claimed it was often difficult for producers to sell through the SAQ because of the organization's high mark-ups. These made Quebec wines more expensive for consumers. In this example,

the informant had decided to avoid selling through the SAQ altogether:

Producer 4: On ne vendra pas à la SAQ parce que la SAQ pour te trouver sur leurs tablettes à 25 $ il faut que tu leur vendes ta bouteille pour 13 ou 14$. Donc tu vas vendre à la SAQ quand tu as des gros volumes et que tu n'es pas sûr de vendre l'entièreté de ta production toi-même. Donc nous, on va se concentrer sur 50 % de notre vente directement aux restaurateurs. Et l'autre 50% va se faire aux consommateurs.

But as I asked for more details, it became obvious the root problem with distributing through the SAQ is not mark-ups. Simply, Quebec wines are more expensive to produce than imported wines. As the SAQ's mark-ups are the same across the board, Quebec wines have trouble competing in the same retail outlets as less expensive foreign wines:

Producer 4: Je ne sais pas si c'est parce qu'elle ne montre pas beaucoup de flexibilité aux producteurs locaux, mais la SAQ elle a son calculateur et c'est un calculateur qui gère les coûts de transport et de taxes à tel endroit, tel endroit. Un espèce de long truc qui finalement, tu rentres ton prix à treize piastres et il ressort de la machine à un autre prix. La même logique qui fonctionne avec quand tu veux importer un produit d'ailleurs. Le produit départ cher en France à 8 €, il va atterrir sur tablette à 35 $. C'est un peu la même logique qu'il applique ici. Sauf que finalement, ici, ça devient assez gourmand. Donc tu te dis, si je suis capable de tout vendre moi-même, je vais le faire.

Production Inefficiencies

Quebec local wine producers' struggle to sell through the SAQ is indicative of the scale and complexity of productivity's impacts on the environment. Reduced productivity at one end of the wine production supply chain can lead to inefficiencies at later phases, which themselves have environmental impacts. In the case of Quebec's local wine industry, local wine production inefficiencies have this effect. By increasing the cost of producing wine, production inefficiencies encourage smaller distribution networks and their accompanying environmental inefficiencies. In addition, stakeholder interviews demonstrated that these

inefficiencies also have direct environmental impacts.

Several stakeholders mentioned that Quebec suffered from having a wine industry ecosystem that was too small to support the needs of wine producers. As with distribution, they treated these inefficiencies as external factors they had no control over, and never saw this problem as inherent to small-scale, local production.

Due to the small size of the local wine industry's ecosystem, Quebec producers explained that they source their wine production equipment from foreign markets, where wine industries are large enough to support efficient productions. This upset producer 2 from an environmental perspective, as it went against their philosophy of consuming locally. At the same time, the informant also took no direct blame for their approach, as they felt "they had no choice" in the matter:

Producer 2: Je dirais mettons si on prend le Québec, on est vraiment tout petits comme vignobles, donc on n'a pas d'industries qui nous fournissent à l'interne. On n'a pas le choix d'aller à l'externe. Donc, que ce soit pour les bouteilles, ben peut-être les bouteilles dans le cas des vins tranquilles, il y a quand même certaines verreries qui peuvent fournir des bouteilles. Mais moi je ne peux pas. Ensuite, les bouchons, évidemment, c'est à l'externe. L'équipement aussi, il faut penser à ça. Tout l'équipement de vinification, ça, ça ne se fait pas au Québec. Ça ne se fait même pas au Canada ou aux États-Unis. Ça vient d'Europe parce que c'est là qu'il y a une grosse demande. Donc toute pièces d'équipement doit être importée. C'est vraiment de l'équipement spécialisé. Ensuite, au niveau agricole, avec des tracteurs, des choses comme ça, oui. Les tracteurs, c'est fait en Amérique du Nord, puis tant mieux. Mais tout l'équipement spécialisé de la vigne, que ce soit effeuilleuse, rogneuse, épampreuse, désherbeur, ça, c'est tout de l'équipement qui a été vraiment développé en Europe. Puis, il n'y a personne au Québec qui, des distributeurs oui, mais pas des développeurs. Donc tout ça, tout notre équipement vient d'ailleurs. On est vraiment très, très dépendants.

Distributor 1 reiterated that importing foreign made production equipment increased production costs in Quebec. At the same time, locally made equipment was usually even more expensive. Showing a certain degree of incoherence, the informant put no blame on Quebec

producers, arguing that they could not be expected to pay more for local products, as they were already coping with the increased costs of growing wine locally:

Distributor 1: Mais après ça, il y a une question de coût aussi. Si on a un fabricant de bouteilles qui arrive au Québec, il va la charger sa quille. Tandis que là quand on a un produit qui vient de l'étranger, je ne cacherai pas que c'est moins cher. Et justement tout l'équipement pour faire du vin au Québec et très, très cher parce qu'on n'a pas vraiment de distributeur de cet équipement là, au Québec. La grande majorité de l'équipement viticole provient d'Europe ou des États-Unis. Donc, déjà là, avoir tout l'équipement coûte cher. Donc c'est sûr que si les vignerons sont capables de sauver à gauche et à droite... Oui, c'est une bouteille qui n'est pas faite au Québec, mais elle est certifiée écologique et il y a quelque chose qu'on fait quand même attention à ce niveau-là. Mais s'il y a une entreprise qui arrive au Québec et qui souffle du verre et qui est capable d'égaler les produits de l'Asie, c'est sûr qu'il va être méga populaire et que tout le monde va travailler avec lui. Ça, on ne se pose même pas la question. Il y en a certains, il y en a qui soufflent un petit peu de bouteilles. Je sais que [anonyme], leur dernier jus, même la bouteille a été faite au Québec... Mais ils l'ont payé leur bouteille. Après ça, c'est le consommateur qui paye au final. Puis, déjà que les vins du Québec ne sont pas super bon marché non plus, justement à cause des coûts d'équipement et compagnie. Donc, il y a plusieurs choses à avoir là-dessus. Mais après ça, je suis totalement d'accord que s'il y a un producteur au Québec de bouteilles, de liège, etc. qui est capable d'égaler les produits et les coûts de l'Asie, c'est sûr que tout le vignoble québécois va travailler avec cette personne-là. Bonne idée de business!

Producer 4 expressed that the absence of a large wine industry ecosystem also reduced the choice of foreign production materials they had access to at an affordable price. This reduced competition could force producers to use less environmentally friendly materials and equipment:

Producer 4: Après ça, des matériaux qu'on utilise, on n'a pas été encore à travers ce processus-là, mais nous on va acheter des bouteilles de vin, et des bouchons de liège les plus écologiques possibles, mais on est quand même, on va faire avec l'offre qu'il y a ici. Quand tu es en Europe, mettons, c'est cool, t'as plein de choix. Mais au Québec, si tu ne veux pas que ça coûte une méchante fortune, tu vas faire un peu affaire avec les fournisseurs qui sont déjà établis ici, puis eux ils ont peut-être des options un peu limitées donc tu fais avec ce qu'il y a dans le secteur.

Producers also voiced many difficulties with sourcing local labour. Again, they felt this was a reality they had no choice

but to contend with. Producer 3, without mentioning the environmental cost of transporting workers by plane every year, highlighted the difficulty of finding locals willing to work at their vineyard:

Producer 3: Il n'y a pas un Québécois qui veut passer un mois et demi, ni une semaine avec une pioche dans les mains à piocher. C'est aussi une de nos réalités. Donc ça, c'est sûr. Donc, quand on a quatre travailleurs étrangers qui passent cet été dans les vignes, parce que c'est ça, plus personne ne veut le faire. Par contre, pour les vendanges, je touche du bois. Ça a toujours été le cas et je pense va encore durer quelques années. Je l'espère car il y en a moins qu'avant. Mais il y a encore quand même plusieurs Québécois qui vont faire par exemple les cerises en Colombie-Britannique ou d'autres qui vont planter des arbres pour le gouvernement. Et la majorité de notre équipe est faite de ces gens-là qui, pendant sept ou huit mois, font toutes sortes de cultures de récolte des fraises, des framboises et tout. Et on arrive donc pour l'instant, j'arrive à garder cette main d'œuvre locale pour ma grosse période des vendanges qui dure quand même 5 à 6 semaines.

As with the other international inputs of local wine production in Quebec, the interviews showed the reliance on foreign workers is not well-known to local consumers. Producer 1's description called attention to the incoherence of arguing for local production while relying on hidden non-local inputs:

Producer 1: Ça n'a pas un impact économique parce que ces gens-là, c'est normal, ils viennent pour ramasser de l'argent. Ils sont payés au salaire minimum. Ils sont logés. On paye la moitié de leur billet d'avion. Ils viennent pour empiler du cash. Ils vont sortir, peut-être une fois prendre une bière, mais honnêtement, ce n'est pas vraiment... Ils vont manger sobrement. Ils vont se faire une bouffe entre eux. De temps en temps, ils vont se voir entre les vignobles. Mais, c'est comme si... C'est ça qui est un peu dommage. C'est pour ça que les Québécois ne le savent pas. C'est que ces gens-là, on ne les voit jamais. On ne les voit pas au dépanneur tant que ça. Ils sont très très low profile. Par contre, quand ils ne sont pas là, là t'en entends parler. Là le vigneron et tout le monde est comme: "My god, comment qu'on va faire?

How Quebec Wine Producers' Bypassing of Inefficiencies Contributes to Exurbanization

A New Business Model

The increased costs of inefficient Quebec wine production have constrained producers to develop new revenue

sources to remain profitable. In conducting interviews with stakeholders, I found producers increased revenues by adopting a new business model—one that relies less on production and more on consumption. This model de-emphasizes yield, as revenues transition towards consumer experiences. This business model, as was explained by producer 1, works well with low-yield, high consumption-value products, like those offered by local, organic, and small-scale wineries:

Producer 1: C'est ça. Mais moi j'ai envie de dire, ce que je suis en train de vendre au patron de [notre vignoble] en ce moment, c'est: Le rendement, on va le calculer différemment. Parce que lui c'est un homme d'affaires et je respecte ça. Dans le sens que lui il a une famille à faire vivre et tout. Je ne peux pas dire : "Oui, mais ça va être beau; tu vas gagner ton ciel; tu vas être plus blanc que blanc." Tu ne peux pas, tu ne peux pas. Tu ne peux pas dire oui mais l'humanité va te remercier là. Tu ne peux pas utiliser des arguments de même. Dans le fond, il faut que ça reste business. Pis il y a quand même des critères économiques qui peuvent embarquer, comme par exemple, la rentabilité. Je lui ai dit : "Si on devient un espace unique et une vitrine inspirante, on peut faire des visites; on peut faire des cours en ligne; on peut créer une plateforme; on peut la traduire en 52 langues." J'ai rencontré Jean-Martin Fortier. Son cours "Le jardinier Maraîcher," c'est rendu traduit dans 52 langues. C'est là qu'il fait son cash. Ce n'est pas sur l'exploitation de sa petite parcelle. J'essaye de lui amener que non, non, si on est hot, si on fait les choses suffisamment bien, justement, et qu'on est un plus, les first movers. Mais ma foi, il y a de l'argent à faire là. C'est ça que je m'efforce... Puis, j'en suis convaincu, j'en suis persuadé là.

The Quebec producers interviewed used two variations of this model, sometimes simultaneously. In the first variation, producers created a unique wine that targeted a niche market. These wines mixed tangible (i.e., taste) and intangible (i.e., small-scale, local, marketing) qualities to attract well-off, urban consumers looking to buy social capital. The consumption value in these cases was captured by selling wine bottles at premium prices. Producer 1 explained how this has recently come about:

Producer 1: Mais en fait, les vignobles hot, leur gros gros volume de vente, c'est la ville. [Nous], là ça dépend. [Le propriétaire de mon vignoble] il y a deux façons parce qu'il fait ses dégustations. Il passe du vin au vignoble, mais des gens qui repartent avec des bouteilles dans une journée de vente, il vend beaucoup plus dans les fines

boutiques de Montréal, mais ça, ça vient de changer. Dans le sens que ce n'était pas vrai il y a deux ans. Il y a deux ans, le set-up était complètement différent. [Nous], il y avait un produit de listel à la SAQ et tous les autres étaient au vignoble. Et il n'y avait aucune autre façon de les trouver. Donc là les gens, oui, il y avait des gens qui faisaient la route des vins et qui revenaient avec des caisses de vin dans leurs chars. Mais là, en ce moment, on se rend compte que les meilleurs vins ne sont plus au vignoble. Dans le sens qu'ils partent direct. Parce que, il y a des pre-release, il y a comme une folie qui s'est installée sur le vin. Non mais c'est vrai. Il y a des line-up dehors. Tu appelles et t'es comme, comptoir [anonyme], réserve-moi en trois, cache-les en dessous du comptoir, je te jure que je vais être là demain. C'est la guerre là. Ça fait qu'il n'y a plus personne qui va au vignoble parce qu'on le sait... Ben moins. Il y a toujours les personnes... Les urbains ils ont compris que c'est en ville que c'est là que tu trouves les cuvées hots, dans les petites boutiques et il faut que tu connaisses du monde. Il faut suivre les bonnes pages Instagram pour être au courant de quand ça sort. Parce qu'il faut que tu sois, vite, puis au vignoble, c'est ça les cuvées hot, on ne les vend pas en ce moment au vignoble.

The second variation focused on consumption-value that was monetized through other experience-oriented products—mainly agrotourism. By attracting people to visit wineries, producers could offer lucrative services such as wine tours, wine tastings and wine workshops. In this model, tourism could also facilitate distribution by selling wine on-site. The added value of tourism could also serve as a marketing tool to justify higher bottle prices as well, as explained by producer 3:

Producer 3: D'abord, c'est quelque chose qu'on aime faire. Ça fait partie de l'ADN de l'entreprise, mais c'est aussi notre outil de communication. C'est la chance qu'on a par rapport à tous ces millions de bouteilles qui sont sur les tablettes. Mais nous, on a la chance de pouvoir physiquement expliquer l'histoire qu'il y a derrière une bouteille. C'est comme ça que s'est fait [chez nous]. Dès les premiers jours de vente, on en a reçu du monde à la propriété, on n'a jamais arrêté. Quand on fait des études de succès au Québec et de nos échecs, collectivement, donc en tant qu'association et tout, et qu'on me challenge là-dessus, "oui mais tu es dans beaucoup de restaurants". Ça ne s'est pas fait du jour au lendemain, mais je le fais grâce à l'accueil et à la propriété. Et la SAQ, je ne dis pas que j'ai reçu les 6000 employés de la SAQ à [notre vignoble], mais on en reçoit qui sont en vacances, qui passent dans la région qu'on reçoit. Les restaurants, pareil, on se croise à la propriété et donc le c'est qu'ils gardent un bon souvenir de

leur visite et qu'ils deviennent des ambassadeurs. Des sommeliers, on en reçoit et on leur montre de façon très transparente ce qu'on fait, donc pareil quand ils retournent dans le restaurant ça devient un peu des ambassadeurs. Donc c'est un outil de communication pour moi fondamental, fondamental. Et on a bâti une entreprise là-dessus sur cette communication directement et encore une fois, du producteur au consommateur ou à la courroie de transmission qu'est le sommelier, qu'est l'employé de la SAQ sur le plancher. Je n'ai pas eu d'autre stratégie que de recevoir le monde à la propriété et on continue. Et en plus c'est un bon carburant parce que sans prétention, on a vraiment de bons commentaires, donc ça c'est de l'oxygène. On reçoit des petits courriels de ces temps-ci le matin. On ouvre nos courriels, puis: "Ah on est passé hier et on voulait vous remercier." Donc c'est aussi du carburant très positif.

How the Two Model Variations Affect Exurbanization

Both these model variations led to increased urban-rural connections, which in turn affected exurbanization. In the first model, products marketing themselves as local, small productions necessarily turned towards consumers in neighbouring urban centres. This resulted, according to producer 1, in local regions gaining visibility in those urban centres most likely to exurbanize them:

Producer 1: Il y a une tendance...Quand je vais à Québec, dans les restaurants sur le menu je suis comme "Ah! La Seigneurie de [anonyme], [anonyme]..." Ce que je dis, c'est qu'à Québec, il y a ceux de l'île d'Orléans sur le menu. Quand je suis à Montréal, c'est rare qu'il y ait ceux de l'île d'Orléans. Donc quand même, il y a le côté régional qui ressort. Et après les grands... Mais [nous], on a maintenant des points de distribution à Québec, mais c'est sûr que ce n'est pas le même volume du tout.

In this model, the heightened urban-rural links were most pronounced among wine industry stakeholders and other wine industry boosters (restaurants, small wine specialty stores, wine enthusiasts). This could be attributed to the importance of interpersonal connections in a small industry targeting niche markets, an observation that was raised by producer 1:

Producer 1: C'est que dans l'industrie, tout le monde, il y a des amis partout. Ça fonctionne vraiment comme ça. Est-ce que le sommelier du [restaurant], c'est ton meilleur chum, ben chances are le [restaurant] va toujours avoir de ton vin.

C'est vraiment comme ça que ça marche. C'est vraiment comme ça que ça marche. Et c'est qui qui est venu pour nous aider pour les vendanges? Telle personne, il y avait une fille. La propriétaire des [anonyme] à Laval. Elle est venue souvent au Vignoble, donc sa boutique à Laval a quasiment toujours des beaux jus. Puis là, il y a plein de restaurateurs qui nous appellent ou des propriétaires de boutique qui disent: "Je vois que sur le compte Instagram de madame [anonyme], il y a tout le temps des bouteilles de beaux jus, mais nous on n'en a pas et ça fait longtemps qu'on les demande." Là, il faut qu'on leur explique: "Ouais, mais c'est parce que [anonyme] est venu faire les vendanges pendant deux semaines." Ça aussi ça joue. Ah ben non, c'est vrai, c'est ça qui est arrivé. C'est très émotif aussi, mais on sait aussi, si c'est quelqu'un qui est bien gentil, qui a le coeur sur la main, mais que les vins ne sortent pas, qu'il n'y a pas de business, mais ce n'est pas bon non plus. C'est tout ça qui se mélange. Mais les vignerons savent exactement où sont leurs bouteilles, don't worry.

These wine industry stakeholders might themselves become exurbanites—a reality reinforced by the need to maintain strong connections to urban institutions (restaurants & boutique retailers) to be profitable. Producer 4, for example, noted the difference between their urban-informed environmental views and those of local rural residents—a typical exurban description:

Producer 4: Mais il est vrai que les gens ont une vision un peu romantique du vin et pas du tout celle de la production de soya ou de maïs. Je n'ai jamais entendu personne dire j'aimerais ça vivre à côté d'un champ de maïs. Je trouve ça assez beau. Alors qu'un vignoble, c'est bucolique, qu'il y a des gens qui vont aller en France par la Route des vins. Donc de voir ça ici, c'est sûr qu'ils accueillent ça de façon favorable. Sauf que, j'ai l'impression que, c'est mon éditorial à moi, mais j'ai l'impression que l'environnement est un sujet beaucoup plus qui touche beaucoup plus les villes que les régions. Parce qu'ici, c'est que même quand tu vas aller faire des courses, il faut que tu prennes ton char. Tu fais venir tout le temps des affaires par amazone finalement. Donc, tu encourages beaucoup l'usage de la voiture. L'usage à la voiture ici est absolument... Je ne pourrais pas vivre sans voiture, ce n'est pas plus compliqué que ça. Ça serait littéralement impossible. Et même si je ne faisais pas de vin, en fait. Même comme simple citoyen qui a un travail, il n'y en a pas d'autre transports ici. Puis l'épicerie la plus proche est à dix minutes en voiture, donc probablement 1 h 15 à pied. Ça, c'est des trucs qui, moi qui arrive avec mon bagage urbain, je le sais, j'avais des convictions écologiques et tout ça. Ici, je veux dire… Moi, je fais partie du groupe Facebook de la vie à [anonyme], le village où je suis. Quand la ville a annoncé qu'elle allait

collecter le bac noir—le bac à ordures—aux deux semaines et alterner avec le recyclage, les gens chialaient parce que "voyons, ça va se mettre à puer là-dedans." Alors que personne dans les commentaires Facebook ne semblait entamer une réflexion sur la quantité de déchets qu'il produisait à la semaine. C'est ça. Dans la collecte de matières résiduelles, puis de ne pas acheter de plastique et d'être dans le zéro déchet, c'est quelque chose de très urbain. C'est quelque chose qu'à date je n'ai pas du tout croisé en région.

The second model variation plausibly created larger pressures on exurbanization because of its emphasis on tourism. This was noticed by the regional development agents interviewed, who saw it as a promising source of economic development. Regional Development Agent 2 also alluded to pressures on local ecosystems, typical of exurbanizing areas:

Regional Development Agent 2: La première année du plan d'action du PDZA, on avait un genre de kiosque, la MRC, parce qu'on venait de lancer notre répertoire qu'on appelle agro-sensoriel, qui est tout l'agroalimentaire de la MRC. On avait fait faire des plans avec la localisation de tous les producteurs et les produits qu'ils offraient et tout ça. Puis, on donnait ça aux gens. Ce qu'on s'est rendu compte, c'est que c'était tous des touristes qui venaient pour les vendanges. Oui, il y avait des gens de Sherbrooke... C'est du tourisme aussi, mais moins loin. Mais on avait des gens de partout là. Moi, j'ai croisé deux collègues de MRC qui font mon travail, mais une qui venait de la Rive-Nord de Montréal, qui venaient aux vendanges. Donc l'événement est important, mais le tourisme, oui, ça attire du monde. Ils viennent de sortir aux nouvelles, aujourd'hui même, qu'il y a des problèmes même avec l'apport de tourisme avec le marais de la rivière aux [anonyme], où il y a trop de monde qui y vont et il y a une pression au niveau du milieu humide. Ça c'est l'envers de la médaille. Quand t'es trop populaire ce n'est pas mieux non plus, mais bref. Ça l'a toujours été puis là les gens ne sortent plus donc ça en fait encore beaucoup plus qui viennent. Puis comme je te dis, au niveau aménagement du territoire, avec le PDZA, on lance la mise à jour du plan d'action. Puis oui, c'est de faire en sorte d'aider ce développement-là. Puis au niveau du développement économique, avec l'embauche d'un agent agro, ça va juste encore aller en augmentant. Puis bon, justement, les vignobles, je pense, s'insèrent dans cette vision là que la MRC a comme type d'agriculture qu'on aimerait avoir.

Producer 3 interviewed summarized the process of exurbanization that took shape in the decades since they began their wine production. In their description, they underlined the importance of

creating a wine region with the help of other vineyards, to boost tourism. These vineyards would then associate with restaurants, art galleries, antique dealers, etc. to create an ecosystem of consumption activities that catered to exurbanites.

Producer 3: Et la région s'est développée, entre autres, grâce à cette thématique de route des vins. Sur une route des vins, tu as des restaurants, des galeries d'art, des antiquaires et donc tu amènes du trafic dans une région. Et du coup, nos écoles ne sont plus mises en danger, ce qui a été le cas il y a quelques années on voulait fermer nos écoles, nos bureaux de poste et ainsi de suite. On voit même arriver, la pandémie a accélérée un peu ça, mais un retour à la campagne. Il y a beaucoup de couples qui démarrent des projets à la campagne. Et je parle de projets agricoles, par exemple, depuis quelques années. Et Dieu sait si le monde agricole a été sceptique à ça. Mais le monde agricole est connu pour être réticent aux changements. On a vu des jeunes arriver, perçus comme des granos et des granolas, et qui se sont mis à faire de la culture maraîchère biologique. Et il y en a de plus en plus. Et tout ce manque de matière première dans ces fameux paniers, c'était un exemple parmi tant d'autres. Et c'est beaucoup de jeunes couples qui reviennent s'installer sur des petits lots ou des petites terres et qui font entre autres donc ces cultures maraîchères bio et bon. Donc encore une fois, c'est un exemple parmi tant d'autres. Je vis ça un retour actuellement pour la campagne et moi ça m'est cher parce qu'encore une fois [anonyme] c'est une belle région. C'est un phénomène qui se passe dans différentes régions mais où les valeurs changent et tout. Donc encore une fois, pour un gars qui a toujours été élevé à la campagne, je suis fier de ça, de voir que ça bouge à la campagne et que l'urbain et le citadin depuis plusieurs années, il veut savoir ce qu'il mange; Il veut savoir ce qu'il boit. À nous, les agriculteurs, de participer à cette éducation. Et c'est ça l'œnotourisme, c'est de recevoir du monde à la propriété et de leur expliquer l'histoire de la bouteille. Et les gens redemandent. Dans leurs verres, ils veulent savoir ce qu'ils ont. Donc en tout cas, moi c'est ce qui m'anime énormément et c'est tout un tournant. Donc, le Québec ne sera jamais un gros producteur de vin en termes de volume. On rêve, mais on rêve, on rêve. Du moins, on espère qu'on arrivera un jour, mais j'espère que je le verrai de mon vivant, mais qu'un jour le Québec puisse produire 5% de sa consommation. On parlerait de 10 millions de bouteilles. J'espère le voir. J'espère voir ça un jour. Ça aurait des impacts économiques énormes dans nos régions.

Producer 3 also mentioned some of the conflicts that took place during the exurbanization period they described. Their description typified the contending land-use visions of exurbanizing areas,

with production-oriented farmers—represented by the *Union des Producteurs Agricoles* (UPA)—clashing with consumption-oriented farmers—the local wine producer:

Producer 3: Toujours parallèlement à ça, de la complexité avec la loi du zonage agricole, avec le syndicat agricole qui est l'UPA, qui était contre le fait d'amener des touristes à la campagne à l'époque et qui était un secteur agricole où justement, on concevait l'agriculture comme un agriculteur qui ne devait œuvrer que dans le secteur primaire et bon. Et le temps nous a donné raison, c'est qu'aujourd'hui il y a de plus en plus d'agriculteurs qui transforment la matière première pour justement aller chercher une plus-value. Donc les mentalités ont changé, mais à l'époque, on avait toujours l'UPA contre nous dans les dossiers. On avait besoin de leur appui. Le monde agricole n'est pas ouvert à recevoir du tourisme à la campagne, donc c'est une bataille parallèle qu'on a dû mener.

How Regional Development Agents Support the Exurbanization of Wine Regions

The regional development agents interviewed communicated the economic potential of creating a consumption ecosystem. They felt local wine was particularly advantageous, making the link with attracting consumers who enjoy what is "gourmand". They also expressed how easily local wine could be paired with other consumption activities, as in this example from Regional Development Agent 1:

Regional Development Agent 1: Ce que tu dois regarder après, c'est que si une route des vins attire gens qui après consomment autre chose...que ce soit une autre activité ou un hébergement ou un restaurant. Il faut regarder l'ensemble. Je pense que c'est un tout parce que ça dépend aussi de ton type de clientèle. Est-ce que tu veux te priver d'une clientèle qui aime tout ce qui est le gourmand? De plus en plus en plus on peut...on a fait une émission de télé il y a deux ou trois semaines, puis c'était du vélo de montagne, puis c'était comme ok, après ta journée de vélo, je vais, Ou est-ce que tu t'arrêtes? On est dans une émission, mais quand même on veut montrer aux gens, inspirer les gens qui viennent faire du vélo de montagne. Qu'est-ce que tu veux faire? Où est-ce que tu t'arrêtes après? Puis finalement, au début, on n'était pas certain, mais on a dit pourquoi pas dans un vignoble? Puis, les gens qui étaient là, c'était des gens qui faisait du vélo de montagne pis ils ne trouvaient pas ça négatif. Il faut juste qu'on leur fasse penser puis les inspirer à ce moment-là.

Further than their direct economic benefits, I found that wineries were encouraged by regional development agents due to their aesthetic appeal. Regional Development Agent 2 confided they wished wine landscapes would develop in their region:

Regional Development Agent 2: Mais moi, personnellement, suite à ce que j'ai vécu dans tout le montage du PDZA, les consultations qu'on a fait et tout ça, puis comme j'ai dit là au niveau paysager, j'ai toujours dit que de chaque côté du lac, des beaux vignobles ça serait "wonderful". Ça serait des beaux secteurs.

Regional Development Agent 1 explained the importance of beautiful landscapes in increasing a region's attractivity:

Regional Development Agent 1: La première raison qu'un client, un visiteur, va faire une route touristique, toutes routes touristiques confondus, c'est pour ses paysages. Donc, est ce que les paysages ont un apport économique important? Je dirais que oui. On parle beaucoup de protection des paysages et oui c'est ça, mais la protection des paysages, c'est pour que nous, les résidents, on puisse continuer à pouvoir en profiter, soyons honnêtes, mais la conservation de ces paysages aussi c'est un avantage au niveau, comme d'une route touristique. Pourquoi des gens viennent faire du vélo? Ils vont aimer faire du vélo maintenant du côté ouest de la région, où est-ce que c'est plus agricole…Parce que tu vois les montagnes au loin, parce que tu as tous ces étendus-là de terre... c'est beau. Tu vas voir des granges... c'est tout ça qui fait notre... Oui, les paysages pour moi sont importants au niveau d'environnement, pas juste parce qu'on a besoin de besoin d'arbres et d'herbes et de flore pour vivre... Mais je pense, ça fait partie de notre attraction de région aussi.

When I asked why wine landscapes were more appealing than other landscape types, Regional Development Agent 2 mentioned the short height of vines, which made space for beautiful views:

Regional Development Agent 2: Premièrement la vue. Ça amènera une autre vision du tour du lac. Mais il y a toute la préservation aussi des percées visuelles qu'on a. C'est quand même une culture qui n'est pas très haute, donc on est quand même capable de garder la vue qu'on a, donc ça ferait en sorte de garder ces endroits-là visuellement intéressant. Puis je pense qu'on le voit avec [anonyme], ça serait facile de de continuer le chemin, peut-être même dans la région. S'il y en avait un peu partout, on pourrait s'associer ensemble et ça pourrait faire de quoi d'encore plus gros là.

The same sentiment on views was also expressed in the interview with Regional Development Agent 1:

Regional Development Agent 1: Il y a certains types de paysages, dont la vigne, où ça devient intéressant parce que ça permet de voir au loin, ça ne cache pas, ça donne des points de vue finalement. Parce que c'est sûr que mettons quand tu viens à [anonyme], où il y a un dénivelé et quand tu es à un certain niveau sur la route... Tu vois la vallée de [anonyme], si ça serait tous des arbres qui ont 100 pieds de haut, ça serait intéressant mais ça serait une forêt. Tandis que là, on voit les granges, le paysage, on peut voir des gens qui travaillent. Donc, moi, je pense qu'il y a des avantages.

Yet, in the broadest sense, the appeal of wine and wine landscapes among stakeholders can probably not be justified with tangible considerations. Throughout the interviews, wine was tied to emotions, to culture, to social capital. Wine, like music, has an appeal that cannot not be easily defined, as was expressed by the Wine Specialist:

Wine Specialist: Ben le vin c'est... En fait, moi, mon parcours avant le vin, c'était la musique. Donc, j'ai fait un bac en trompette classique. Et donc, comment dire, avec la trompette, c'était un peu la même chose. Tu réuni les gens, ça uni les gens. La musique, c'est un partage. C'est un partage entre les musiciens qui sont sur scène, avec les gens qui l'écoutent. Et peu importe la langue, la culture, les gens sont capables de communiquer. Pis le c'est un peu ça. Tu mets une bouteille de vin sur la table, tu peux avoir des gens qui se connaissent à peine, qui ne se connaissent pas, qui parlent plein de langues. Mais on va être capable quand même de communiquer d'une certaine façon. Ça uni les gens, ça délie les langues, c'est rempli de culture, c'est rempli d'histoires. Au même titre que lorsqu'on écoute une musique de quelqu'un, quelqu'un l'a écrit, a écrit une histoire, une musique, puis après nous, quand on l'écoute, on fait notre propre histoire autour de ça. Le vin c'est un peu la même chose. Le vigneron a créé un vin, puis après, la personne qui le déguste, crée un nouveau moment autour de ça. Donc c'est ce qui m'a intéressé du vin. C'était beaucoup, les mêmes raisons qui m'ont amené vers la musique, en fait.

Discussion

Clarifying the Environmental Impacts of Quebec's Local Wine Industry

The interview data I have presented indicates Quebec's wine industry stakeholders have a positive view of local wine production. Many of the benefits they raised are environmental:

- Reducing the impacts of wine growing on soil quality by adopting a small-scale production model;
- Reducing the use of pesticides and of their negative impacts on communities and ecosystems;
- Reducing the prevalence of monocultures in Quebec's rural landscapes, which could increase biodiversity and improve ecosystem resiliency.

Stakeholders also raised many benefits that are unrelated to the environment, most notably:

- Fostering national pride and identity;
- Attracting economic investments and opportunities to rural areas;
- Revitalizing rural communities—from community services to social & leisure activities;
- Educating consumers about the origins of their food.

While these benefits are important, stakeholders were not always cognizant, or at least, not sufficiently critical, of some of the industry's negative environmental externalities. By cross analyzing the existing international scientific literature on wine industry emissions with the interview data I have gathered, it becomes evident that many of the environmental benefits of local wine production in Quebec are offset by the negative environmental externalities

of inefficient wine distribution and production. In effect, this means Quebec's local wine industry has a high carbon footprint compared to wine industries in other regions. This finding should be relevant to local food movement debates globally.

The distribution of Quebec wine appears to be the most environmentally damaging aspect of production. As is shown in the interview data, some wineries sell 25% to 50% of their productions on-site. The scientific literature suggests that would make transportation the largest contributor to carbon emissions for these on-site wine sales, by a large margin. Distribution to small-scale retailers is also an important emitter. Of the wineries interviewed, the highest proportion of wines sold through the SAQ's efficient distribution network was 25% of total production volume. Of the 158 wineries in Quebec, only a handful are regularly featured in the SAQ's stores.

These observations reveal that, from the environmental perspective that I analyzed, there is a bias towards the positive in Quebec's wine industry. Such a bias brings to light the importance of better communicating wine industry emissions research to Quebec wine industry stakeholders. Many Quebec wine industry stakeholders might be shocked to find that travel distance related emissions reductions are heavily offset by inefficient distribution modes, for example.

These findings also need to be communicated to government policymakers. Many Quebec wine industry inefficiencies continue to be exacerbated by government policy. As was raised by the producers I interviewed, policies enforcing decentralized distribution have been in place for decades. Others are more recent. The 2016 adoption of law 88, for example, allowed small retailers to sell Quebec wines, but it was enforced in such a matter as to practically ensure distribution inefficiencies.

Simultaneously, producers and distributors should take a collaborative approach to policy and take accountability for the emissions their smaller productions emit.

Consumers should also be wary of the environmental greenwashing of local Quebec wine. The interview data in this research shows that both the SAQ and small-scale distributors at times engage in greenwashing. As I write this article, the SAQ still advertises on their website: "Drink local for the environment or for pleasure? At the SAQ, the two aren't mutually exclusive! While it's true that drinking local is better for the environment, the success of local products isn't an accident: their great quality and variety have won Quebecers' hearts" (SAQ, 2022).

Seeing the Bigger Picture of Environmental Impacts

This study accentuates the complexity of calculating the environmental impacts of local agricultural production. Production inputs and decentralized distributions vary for each winery, making it difficult for well-intentioned producers to understand the impacts of their own wine. Qualitative data has allowed me to show connections and trends in the wine industry, where hard data was lacking. Without quantifying emissions for each winery, I have highlighted the sectors of Quebec's wine industry that seem the most environmentally damaging. I have also shown how inefficiencies in one phase of wine production can have environmental repercussions in the other phases.

Both findings demonstrate the need for a larger body to study the environmental impacts of wine in Quebec. This is not a challenge that Quebec wine producers have the resources to face on their own. Facing this challenge would take a government led initiative, one with the mandate to tackle the broadness and complexity of wine industry emissions.

The broadness of the local wine industry's environmental impacts extends to land-use debates as well. Using qualitative analysis, I have shown the cultural and economic connections between local wine growing and exurbanization. Due to efficiency limitations and the need to remain profitable, Quebec's local wine producers have adopted a business model that emphasizes consumption-value over production-value. By selling an 'experience,' Quebec producers have catered to exurbanites looking for high amenity regions. Regional development agents seem to have played a crucial role in supporting this development. While regional agents at times mentioned some of the environmental impacts of exurbanization, they were not concerned by the global range of environmental concerns relating to sprawl, as they focused on economic development in their regions.

By conveying the relationship between local wine growing and exurbanization, I have drawn attention to the land use impacts of the local food movement more generally. The environmental debates on food-systems that I outlined at the beginning of this article focus on agricultural resource constraints. Land-use, as land is a resource, is one of these constraints. Efficient use of agricultural land ensures more land can be preserved for ecological uses. Alternatively, the overuse of agriculture land degrades soils and harms local ecosystems. Tying local food to exurbanization, however, expands the scope of these debates. I have shown that 'experiencing' local food and supporting local producers can be seen as part of an exurban lifestyle choice. This means the land use impacts of local food are not limited to agricultural resource constraints. Local food influences other land uses that related to exurban sprawl: settlement density, residential typologies, transportation infrastructure, etc. These are environmental planning questions. The link between local wine and exurbanization, I conclude, makes evident that local food is a planning issue. Environmental policies targeting the local wine industry in Quebec should, therefore, be elaborated in collaboration with local and regional planners—amongst other stakeholders—and include environmental reflections on exurbanization.

On the Need for More Coherent Policy on Local Wine in Quebec

Maintaining an Emphasis on Efficiency

The interview results showcase the demand for a more holistic policy approach to Quebec's wine industry. Environmental policies should target environmental improvements that maintain agricultural, industrial and distribution efficiency as a key aim. Efficiency maximizes the use of resources, which is generally an environmental good.

Wine industry policies will likely always remain prone to important cultural biases. As I remarked in the stakeholder interviews, cultural nationalism is one bias that I have noted. Other passions and intangible justifications also seem to influence Quebec wine industry stakeholders, but more research is needed to elaborate on them.

One area in which Quebec might rapidly reduce the environmental footprint of wine consumption is in bottling. As is noted in the literature on global wine industry emissions, glass bottle production is responsible for the largest share of production emissions due to the use of natural gas furnaces. From a comparative advantage standpoint, Quebec is exceptionally well-suited to reduce these emissions, as it has an abundant supply of hydroelectric energy. Buying wine in glass bottles made in Quebec would likely reap a larger environmental benefit than buying wine grown in Quebec. It should be noted that reducing emissions in glass bottle production does not obsolete the need for other efficiency improvements in packaging such as recycling, re-use or the use of alternative packaging.

Developing a More Informed Pathway to Economic Growth in Rural Areas

In terms of regional economic policy, the results hint at the economic hardships that many of Quebec's rural areas have faced due to deindustrialization. It is understandable that regional economic development agents have looked to exurbanization as a pathway to revitalization and growth. Nonetheless, exurbanization on a national and global level would entail sprawl that is environmentally untenable. Upper-tier governments should do more to support the development of regional centres to encourage denser and more sustainable settlement patterns.

While there may be fewer economic and environmental reasons to develop a wine industry in Quebec, there may be social or other benefits. If that is deemed to be the case, these regional investments could support the development of a local wine industry with more intentional coordination on the key environmental issues raised in this research: improving wine distribution efficiency, improving production efficiency, and reducing sprawl. This would greatly enhance the environmental outlook of Quebec's wine industry. Examples of regional investments that would target these environmental issues include, but are not limited to:

- Reducing regional dependence on car transportation by developing an efficient regional transportation network.
- Working with local wine producers to improve labour issues, for example through permanent immigration.
- Reducing tariffs on imported wine production equipment.

Transitioning to Renewable Energy

The broadest observation that stems from these results is one that is part of any discussion on food systems. Many of the environmental impacts raised in these interviews derive from the burning of fossil fuels. Aside from the more fundamental economic and resource implications of supply chain efficiencies, transitioning all energy sources to renewables would dramatically reduce many environmental impacts, especially the climate change related impacts of Quebec wine. However, an approach that focuses solely on energy transition would not improve other environmentally problematic issues relating to sprawl and resource efficiency.

Conclusion

This study has used a qualitative analysis to reveal existing misinformation in Quebec's wine industry. It has shown that industry stakeholders are currently biased towards the positive on the environmental impacts of producing local wine. Due to this bias, stakeholders tend to overstate the environmental benefits of wine production and understate some of its negative environmental impacts. This study also demonstrates there is a link between Quebec's local wine industry and exurbanization. This link is not often considered when thinking about local wine's impacts, but should be due to exurbanization's serious environmental repercussions.

These findings have implications for those researching industrial-food systems and the local food movement, as many findings relating to Quebec's local wine industry could also be applied to other local food productions. They confirm exurbanization, which has major environmental impacts, can be connected to the local food movement. Finally, these findings demonstrate that the Quebec local wine is more environmentally damaging than more efficiently distributed and produced non-local wine.

Acknowledgements

This project would not have been possible without Dr. Richard Shearmur and Dr. David Doloreux. Starting in the summer of 2021, Richard and David provided me with the necessary funding and support to navigate Quebec's local wine industry and conduct interviews with stakeholders. Their guidance throughout the interview process helped me target key data and oriented the direction of my research.

I am particularly grateful to my supervisor, Dr. Richard Shearmur, who gave me feedback throughout the entirety of the project—from interview notes, to project outlines, to draft comments. Richard's patience and flexibility calmed my many anxieties and gave me the strength to keep working, even if I could not see the light at the end of the tunnel. Thank you!

I also wish to highlight the education I received at the School of Urban Planning. The planning concepts that informed my analysis in this research are the result of many stimulating classes, taught by great professors.

Finally, I would like to thank all the amazing students I met at the School of Urban Planning. Our 2020-2022 cohort took on the challenge of an arduous program during a pandemic that left the world exhausted. Against all odds, we thrived. I would not have been able to remain motivated to complete this supervised research project without the inspiration I received from my peers.

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