

Article

How Does Context Contribute to and Constrain the Emergence of Responsible Innovation in Food Systems? Results from a Multiple Case Study

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Abstract: Organizations and practices that contribute to the resolution of major societal challenges are key to achieving a transition towards sustainable and resilient food systems. Previous research identified contextual elements that affect the emergence of organizations and practices with responsibility characteristics, but how this process unfolds remains poorly articulated. Our study thus focuses on how contextual dimensions may contribute to or constrain the emergence of responsibility in food systems. We applied a multiple case study design and conducted 34 semi-structured interviews with 30 organizations in the province of Québec (Canada) and in the state of São Paulo (Brazil). Our across-case analyses clarify how multiple contextual dimensions both contribute to and constrain the emergence of responsibility. More specifically, our findings show that while contextual dimensions shaped by the dominant food system constrain the emergence of responsibility, the same dimensions also contribute to it when they embed responsibility principles. One key contribution of our study is to show that interpersonal relations are an important mediation mechanism that helps to modify contextual elements, so they can contribute to the emergence of responsibility. This study's findings can inform research and policy aiming to design institutional environments that promote a transition towards more responsible food systems.

Keywords: food systems transition; sustainable food system; responsible innovation; short circuit; family farmers; organic production



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1. Introduction

The negative health, environmental, and social externalities that arise from the established food system have been emphasized by a growing body of scientific evidence [1–4]. However, the emergence of initiatives that concurrently address 21st-century societal challenges, including climate change, food security, health inequalities, and community well-being has become more evident in the past years [5,6]. It includes, for instance, organic basket networks, local family farming, and institutions that adhere to local sourcing [5–7]. These organizations and practices embody characteristics of responsible innovation, which preconizes the development of innovations that are sustainable, ethically acceptable, and socially desirable [8–10]. A responsible innovation approach calls for transcending the focus on ‘downstream’ impacts and incorporating ‘upstream’ practices in the innovation process [8,10,11]. Thus, the concept of responsible innovation offers a transformational approach to policy-oriented research on how responsibility can improve the resilience of food systems [5]. Though responsible innovation seeks to support the societal uptake of responsible practices [12], the characteristics of responsibility in food systems have not been clearly conceptualized and the application of this concept to study food systems is still in emergence [5,13].

Perspectives on responsibility in food research differ. For instance, industries may emphasize the adherence to mandatory safety concerns or the adoption of voluntary actions,

such as Corporate Social Responsibility [14]. Responsibility can also refer to the individual's responsibility for their own food choices. This perspective renders the consumer accountable, as there are no “unhealthy foods”, only “unhealthy diets” [15]. The concept of responsibility is also often used to assess the social or environmental consequences of innovations, but it may not look into the development process that has led to the emergence of these particular innovations. In this paper, the concept of responsibility is anchored in the responsible innovation literature. A responsible innovation approach differs from the above-mentioned perspectives because it sheds light on innovation development processes and their outcomes [10].

Therefore, in this study, the emergence of responsibility in food systems is defined as the emergence of organizations or practices that integrate characteristics of responsible innovation both in terms of process and outcomes. Such organizations and practices are crucial to a transition towards sustainable food systems. Even though some of these organizations and practices have taken form in the past decades, they have played a marginal role in the way food systems are currently organized. In this paper, the emergence of responsibility is approached from a transition logic and refers to the ability of such organizations and practices to move towards and eventually occupy a more central position in food systems.

A fundamental requirement for the emergence of responsibility is “a better understanding of the existing networks of responsibility”, which calls for studies that take contextual elements into account [16]. Indeed, for Herrero et al. [17], responsible innovation “must be accompanied by a wide range of social and institutional factors that enable their deployment” because food systems transition is a “systemic process” that should not rely on innovation alone. Therefore, a better understanding of the food systems' transition requires research that sheds light on the connections between innovative organizations and practices and their context [18]. As research on how networks contribute to responsibility across systems is nascent [16], and responsible innovation in food systems is still under construction [13], the contextual elements that affect their emergence remain poorly articulated.

Based on the above observations, a clarification of the role context plays in the emergence of responsibility should approach this process as a systemic phenomenon. Thus, this study aims to generate an empirical understanding of how contextual dimensions interact with responsibility-oriented organizations and practices in food systems by addressing the following research question: How do different contextual dimensions contribute to or constrain the emergence of responsibility in food systems?

Below, we summarize current literature to conceptualize the role of context in food systems. We then describe our methodology, which relied on a multiple case study in the province of Québec (Canada) and in the state of São Paulo (Brazil). Our findings flesh out contextual elements that both enable and constrain the emergence of responsibility in food systems. In the discussion, we further analyze this dual role: while contextual elements shaped by the dominant food system constrain the emergence of responsibility, the same elements can contribute to its emergence when they embed responsibility principles and thus support food systems transition. For example, while established economic and market dynamics constrain the emergence of organizations and practices with responsibility characteristics, dedicated funding and market pressures integrating sustainable concerns contribute to the emergence of responsibility. We conclude with our key contributions to current knowledge, which include a deeper understanding of responsibility in food systems and practical insights for policymakers on ways to consolidate food systems transition.

The role of context in the emergence of responsibility

Context can be defined as “the physical environment in which practice takes place” and, as such, “has boundaries and structures that together shape the environment” [19]. Context is usually considered “in relation to an intervention or object, with which it actively interacts” [20]. In this paper, we conceptualize context as “a set of characteristics and circumstances that consist of active and unique factors” that together may interact, influence,

modify, facilitate, or constrain the emergence of responsibility in food systems [20]. Even though scholars have called for a greater examination of context [21], our literature review did not find studies that specifically analyzed the way contextual elements affect the emergence of responsibility in food systems.

The literature highlights some of the contextual elements that are relevant to what we define in this paper as characteristics of responsibility in food systems, but they do not analyze this specific phenomenon. For instance, public pressure on businesses' social and environmental responsibilities was found to be the main reason why private organizations engage in societal challenges, such as fighting hunger [22]. Similarly, social pressure, along with legislation and financial incentives, contribute to making food industries more willing to develop products that are responsive to societal needs [23,24]. For example, legislation in Brazil requires that at least 30% of the funding for the national school meals program be used to purchase food from family farmers [25]. Mckitterick et al. [26] studied the role of institutional networks in supporting rural innovation in Northern Ireland and found that even though institutional support provided benefits to producers, it is "the relationships with informal network actors [...] that primarily lead to knowledge exchange and innovation". Jones and Hills [27] assessed the role of a national sustainable food program in the United Kingdom in influencing food governance, policy, and practice in urban areas and found that multiple projects successfully emerged. For Abdullah et al. [28], technological and policy support leveraged indoor and vertical farming as a way to improve food self-sufficiency in Kuwait.

The literature also examines constraining contextual elements. Covello and Iatridis [29] observed that a lack of resources, including labor and money, limited the integration of responsible innovation in small- and medium-sized food enterprises in London. Prag and Henriksen [30] analyzed the possibility of a transition from animal-based to plant-based food production in Denmark and concluded that it requires "large-scale transformations at every level, from policymaking down to the individual farmer". The authors point to the need to "discourage large investments in technologies [...] that are resulting in technological and financial lock-ins." Dias et al. [31] argued that urban agriculture in Brazil is constrained by a lack of funding, conservative policies, and the difficulty of bringing actors together [31]. Similarly, the IPES-Food report suggests that the emergence of agroecological food systems in West Africa is constrained by several factors, including investments mostly supporting export-oriented commodity production, difficult access to land and water, weak policy support, pressure on prices due to oversupply (as producers are forced to sell simultaneously), misaligned governance, lack of training and support and isolation of the initiatives [32].

Table 1 summarizes the aforementioned studies that point to a diversity of contextual elements that may either contribute to or constrain the emergence of responsibility in food systems. Building on this nascent body of knowledge and recognizing that a multiple case study design "can greatly strengthen the study's usefulness for other settings" [33], we aim to empirically flesh out this phenomenon by examining systematically how it unfolds in two food systems.

Table 1. Contextual food system dimensions identified in the literature that may contribute to or constrain the emergence of responsibility.

Contextual Element	Contributes to	Constrains	Reference
Access to market	X		[17,34]
Adapted infrastructure	X		[17,34]
Conservative policies; misaligned policies		X	[31,32]
Dedicated funding	X		[34]
Economic incentives	X		[23,24,34]
Horizontal and vertical networks; alliances	X		[26,31,34]
Government support; supportive legislations and regulations; favorable governance	X		[13,17,23,25,31,34]
Incompatible resources		X	[29,32]
Knowledge, skills and training; capacity building and values	X		[17,26,34]
Low levels of cooperation; isolated initiatives		X	[25–27]
Misaligned funding		X	[31,32]
Research, technology and innovation	X		[34]
Societal awareness; favorable consumer behavior	X		[22,23,34]

2. Materials and Methods

2.1. Study Design

A qualitative methodology is well suited for studying contextual dimensions because it “elicits multiple constructed realities” and can delve into “complexities and processes” [33]. A multiple case study design also makes it possible to study a phenomenon in-depth and in its real-world context [35]. A purposive sampling approach whereby information-rich cases are selected strategically and deliberately was put forward. Information-rich cases “are those from which we can learn a great deal about the central issues under consideration” [36]. We analyze the phenomenon of interest in two geographical regions to increase the robustness of our findings: the province of Québec (Canada) and the state of São Paulo (Brazil). Food production, processing, and distribution together account for 6.5% of the Gross Domestic Product (GDP) in Québec [37]. The dynamics of this food system follow the logic of industrialized food systems, with food processing and distribution being the most economically important stages, followed by the production stage [37]. Québec has experienced the rise of food system innovations over the past years [38,39], making it pertinent to achieve this study’s goal.

São Paulo is a major food producer and its most economically important supply chains are export-oriented. The São Paulo food system is characterized by a strong presence of agri-food complexes represented by coordinated chains composed of large processing companies [40]. The activities of food production, processing and distribution represent about 12% of the state’s GDP [41]. São Paulo’s food system is also centered on processing and distribution rather than on production, thus reflecting the industrial profile of this food system [42,43]. Like in Québec, there are emerging food system innovations in São Paulo that make it a relevant region for this study.

Therefore, these two regions are rich cases to achieve the aim of this paper and generate findings that can account for and clarify different contextual dynamics.

2.2. Data Collection

We selected food system organizations engaged in innovative practices and those that integrate responsibility characteristics. Because the literature specific to food systems is still scarce, our selection criteria relied on a framework that was rigorously developed and validated to assess responsible innovation in health [11]. In this study, we define

innovation following this framework's concept of innovativeness, which refers to "solving a problem in a novel way, combining novel components, materials or social interventions, or new processes of production, distribution, commercialization or delivery" [44]. Silva et al. [44] argue that innovativeness should be considered within the context of the use of the innovation. Using the responsibility characteristics of this framework that were the most pertinent to our study's aim (business model; eco-responsibility; ethical, legal, and social issues; inequalities; and responsiveness), we searched for food system organizations that were involved in local or organic production or supply, that paid attention to animal welfare and/or that applied socially-oriented business models (e.g., addressing unemployment, gender, solidarity economy, etc.). To increase diversity while documenting each case in a systematic fashion, two diversification criteria were applied: the organization's role in the food system and the level of its activities. We made sure to cover the following roles: production; processing; distribution; training or certifications; networking or exchange; public power or advocacy; and institutional consumption. We also recruited in each case organizations operating at three levels: the micro level, for activities within the range of a city; the meso level for activities throughout multiple cities; and the macro level for activities across the state or the province.

Overall, 20 organizations in Québec were contacted and 5 did not answer our invitation. In São Paulo, 25 organizations were contacted, 8 did not answer our invitation and 2 refused to participate. Thus, for each case, we recruited 15 organizations and conducted 17 semi-structured interviews (for a total of 30 organizations and 34 interviews). All interviews were conducted online or in-person and were recorded and transcribed verbatim with the consent of participants. Table 2 summarizes the innovative practices of our final sample.

Table 2. An overview of the innovative practices of the organizations recruited in the study.

Case	Participant	Innovative Practices
QC	QC-1	"Meals-on-wheels" to prepare and deliver food notably to seniors or people with reduced mobility or independence; gleaned from local farms to supply a collective kitchen
	QC-2	Network to improve local organic growers' access to resources and markets. Construction of low-cost machinery and tools adapted to organic farms, and promotion of community-supported agriculture by linking producers with local consumers
	QC-3	Implementation of local and organic food supply and room food service in a healthcare facility
	QC-4	Development of a sustainability plan that prioritizes local and organic food supply for the university
	QC-5	Development and implementation of programs to increase the presence of local and organic food in schools and healthcare facilities
	QC-6	Production of local honey; establishment of a partnership with a healthcare facility to become their direct honey supplier
	QC-7	Design, installation, and management of urban organic farms
	QC-8	Installation and management of gardens and urban agriculture projects; installation of an urban farm on the rooftop of a retail store
	QC-9	Development and implementation of public policy programs that encourage institutions to buy local food products
	QC-10	Group bulk purchases of eco-responsible non-perishable food in bulk
	QC-11	Production of organic fruits and vegetables; creation of a free service kiosk to sell to consumers
	QC-12	Ensuring strong regional leadership on food issues by mobilizing stakeholders, advising decision-makers, and supporting structuring initiatives
	QC-13	Preparation and delivery of meals made with local products for people with reduced mobility; urban and peri-urban farms that supply the preparation of meals and the delivery of weekly fresh food baskets
	QC-14	Installation and management of mobile and fixed public markets to sell local fresh food in low-income or food desert areas
	QC-15	Providing support to municipalities to strengthen their local food systems, including conferences, training, tools, strategic meetings, and advocacy

Table 2. *Cont.*

Case	Participant	Innovative Practices
SP	SP-1	Development of an “urban harvest” project that collects fresh food and carries out educational and awareness-raising actions among stakeholders, including charities, donors, transportation companies, universities, volunteers, supporters, and service providers
	SP-2	Installation and management of frugal urban farms in low-income areas to generate jobs and supply fresh produce in these regions
	SP-3	Gathering small farmers’ cooperatives to improve the marketing of their agricultural production and coordinate interests, such as food supply for school meals
	SP-4	Development of workshops and courses to transform people’s relationship with food, including programs about responsible food practices to employees and the community
	SP-5	Creation of an online platform that aggregates institutional purchase calls and sends them to local family farmers
	SP-6	Implementation of the Community Supported Agriculture model
	SP-7	Lunch boxes made with locally produced organic food and prepared by women living in low-income areas; development of a digital app to connect actors and sell the lunch boxes to consumers
	SP-8	Production of organic food and commercialization through Community Supported Agriculture
	SP-9	Implementation of socio-environmental certifications for agricultural products; development of sustainable food supply chains; coordination of eco-responsible interests among actors with conflicting perspectives
	SP-10	Marketing of organic food at prices that vary according to consumers’ capacity to pay
	SP-11	Production of agricultural inputs for sustainable agriculture; production, processing, and distribution of eco-responsible food products, especially chicken without antibiotics
	SP-12	Marketing of organic food through a network of independent entrepreneurs
	SP-13	Development and implementation of programs to increase the supply from family farmers and organic agriculture in school meals following federal and municipal laws; contribution to the development of a municipal law that preconizes the supply of organic food to school meals
	SP-14	Development of a technology package that allows the use of regenerative practices in large-scale agricultural production; development of agroforestry production systems
	SP-15	Establishment of an agroecological network of women farmers in Quilombos

2.3. Data Analysis

To generate a rich and encompassing understanding of how contextual dimensions contribute to and constrain the emergence of responsibility, we performed an across-case analysis to identify the most significant patterns. As such, we did not compare how contextual elements unfolded within the two cases. We used the qualitative data analysis software Dedoose™ to code interview transcripts. The coding scheme was developed and iteratively refined by both authors. Our analytical strategy combined a deductive and an inductive approach. The deductive approach was supported by the Sustainable Food Systems framework of the High-Level Panel of Experts on Food Security and Nutrition, which provides an overview of the different components of a food system, including elements that influence its evolution [45]. We adapted seven categories of this framework to support the deductive coding of our empirical material (Figure 1). It contains most of the contextual elements found in our literature review (Table 1), which reinforces its theoretical relevance.

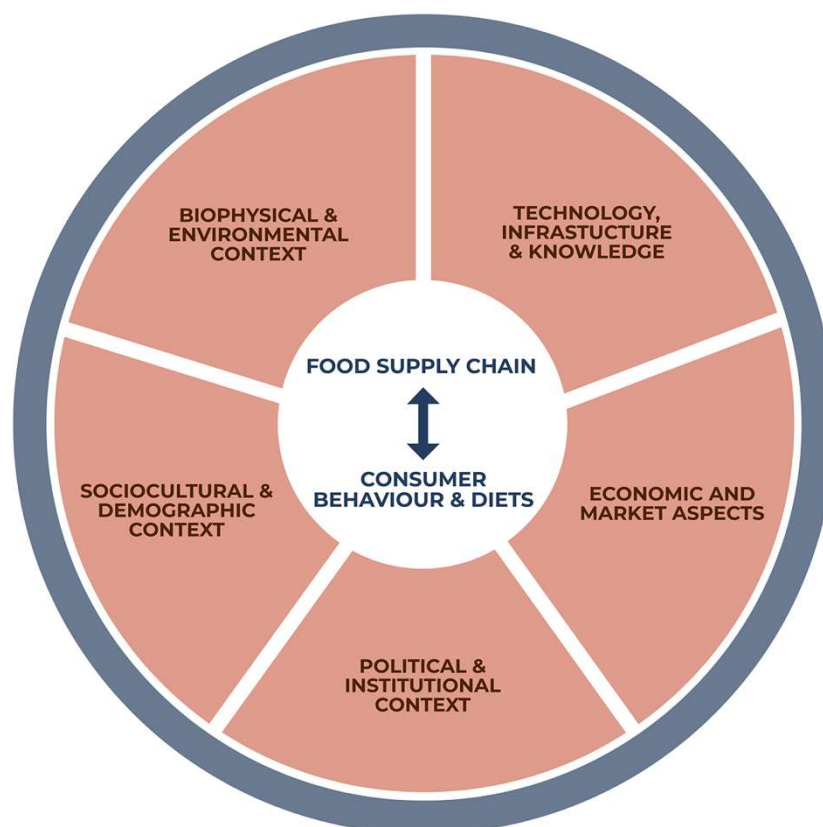


Figure 1. Contextual categories of the food system that informed the deductive coding strategy. Adapted from HLPE [45].

To support our inductive coding strategy, which is key for empirically fleshing out how potentially under-theorized contextual elements interact, we performed first-order and second-order analyses [46]. This led to the identification of an eighth contextual category emerging from participants' descriptions. In the next section, our findings describe all eight contextual dimensions, illustrated with participant quotes translated from French to English or from Portuguese to English when needed. Organizations are anonymized to maintain confidentiality. We use uppercase letters to designate the region, numbers to designate the organizations and uppercase letters to designate interviewees (e.g., SP-1A for organization 1 and interviewee A in São Paulo). Additional evidence for the findings can be found in the Supplementary Material of this paper.

3. Results

3.1. Biophysical and Environmental Context

Even though the biophysical and environmental context has been mostly shaped by dominant food system practices, it contributes to the emergence of responsibility when it serves as a trigger for the creation of responsibility-oriented organizations. For instance, the creation of SP-9 resulted from a cycle of deforestation that took place in the 80 s and initiated a debate about the conservation of tropical forests, and sustainable development in general (SP-9A). Similarly, environmental goals can be used as guidelines for the integration of responsible practices. After developing their first “sustainability plan”, QC-4A expects that “only 28% of the food” they buy will be “animal-based food”. Conversely, the negative biophysical and environmental consequences of the dominant food system also constrain the emergence of responsibility. For QC-6A, local honey production is compromised because “in Quebec, there are many monoculture fields” and this “diminishes floral resources. [...] A bee, to be healthy, must have between 12 and 15 different kinds of pollen in its diet. So, when you have bees and there are only corn fields around [...], they can get sick,

are weakened". The presence of conventional agriculture constrains the production of organic honey because "a bee can [pollinize] 5 km" and "if you are in the South Shore of Montreal [the largest urban center]", "it's impossible that within 5 km everyone is organic" (QC-6A). For SP-3A, implementing "regenerative agriculture" is hard because agricultural properties are currently "very dependent on 'agrotoxics' [...] ecologically speaking" and, as a consequence, "the properties are totally unbalanced ecologically".

3.2. Technology, Infrastructure, and Knowledge

Technology, infrastructure, and knowledge are contextual enablers in both small and large ways. The adoption of a "simple 4-column notebook" to record food products "consumed, exchanged, sold and donated" helped women farmers from Vale do Ribeira better keep track of their production, which increased their autonomy and brought "several reflections on how the production of women farmers is diverse" (SP-15A). QC-14A noted that "there were a lot of [fresh products] losses, because [...] there was no cold room" in public markets. He thus invested in infrastructure and installed a cold room that saved "two hours of logistics per market", which allowed them to reduce the losses from "20% to 5%" (QC-14A).

Participants described how the integration of responsibility benefitted from knowledge availability. Being in contact with another organization with a similar structure was important to the creation of SP-10 because it relied on this other organization's experience (SP-10A). QC-6A did not have "enough knowledge" to create an organization but discovered "a new course" that helped him to obtain "all the information" to "understand and manage the hives" (QC-6A). Gathering knowledge from successful models in alternative agriculture and social business was important to the creation of SP-7 because its model is an adaptation of the Community Supported Agriculture (CSA) and "an inspiration in terms of business [...] from the Riverford farm". The team put together this model "based on the Yunus theory" (SP-7A). To encourage institutions to increase their share of local food supply, QC-5 relied on "the final definition [about what is a local food] of *Aliments du Québec* [a not-for-profit organization that promotes agri-food products from Québec]" because it was "clear" (QC-5A). SP-4 was created when the Brazilian Food Guide was published and the founder "used it as a basis" for the organization's work. In addition, support from an experienced mentor gave SP-4A "all the foundation, all the security" and this was essential: "To be a woman entrepreneur is very hard, you don't think you're capable [...] and having someone who says: 'you're capable' [...] is fundamental for things to happen" (SP-4A). The best way to develop SP-14's business model, which includes regenerative agriculture technology to support large-scale production, was to "couple it with the huge knowledge that a grower already has." As a result, "one ends up complementing the other" because "the person already [...] knows a lot about the specific crop" (SP-14A).

Technology, infrastructure, and knowledge constrain the emergence of responsibility in different ways. SP-10A pointed out that "when you set up [...] an internal management system [...], what is available on the market is always within the same parameters: you buy for X, sell for X plus profit [...] and nobody needs to know how much is X, nor how much is the profit, nor how much is the tax, nor how much is anything". However, SP-10 needed software to "show who the producer is, what you are paying, how much you are paying in taxes, how much you are paying in contribution" (SP-10A). For SP-11A, organic corn and soybeans production is limited because "companies do not see organic as a consumer market for large tractors, agricultural machinery, harvesters" and offer machines that "compact and kill the organic soil". Maladapted infrastructure constrains the emergence of responsible practices: SP-4 wished to do rooftop agriculture, but "the buildings are not prepared for this." Likewise, QC-8A argued that the production of vegetables "doesn't necessarily apply to all [roofs]".

3.3. Economic and Market Aspects

Though economic and market aspects are mostly perceived as obstacles by our participants, dedicated funding and market pressures contributed to the emergence of responsibility. QC-1 “obtained 50,000 dollars” from a financial institution devoted to sustainable local economic development for “the implementation of a social integration pathway” (QC-1A). SP-7A “raised money from angel investment”, which enabled SP-7 to relocate to São Paulo and eventually scale their activities. Another contributor is the market pressure for food products that integrate responsibility principles. For SP-9A, “there is an international demand for sugar and ethanol without slave labor, without child labor, without deforestation. Orange juice with fewer agrochemicals, oranges that do not come from irresponsible practices”. This market demand for being “more responsible, more sustainable” puts pressure on actors (SP-9A).

One of the explanations for economic and market dynamics being perceived mostly as constrainers is that, while the values shared by actors who integrate responsible practices differ from those of the dominant food system, responsibility-oriented organizations still operate “in a capitalist market” (QC-7A) where dominant food practices tend to prevail. QC-15 faces challenges “to bring food industry actors to collaborate to improve the resilience of local food systems” because they “don’t see this as being part of their mission”, yet their contribution is “essential” (QC-15A). For QC-2A, retailers “who buy their vegetables at the Central Market, which are imported vegetables, [...] don’t really know where they come from”, create a difficult competition because they end up being next to them even if they “offer products from small, local, organic farms”. For QC-11A, “if you talk to the big guys, the big producers, they’re aiming for export, always. [...]. It’s more advantageous in terms of price”. SP-3A explained that if you “go along the conventional market” logic, “the banana has to be big and shiny”, while for them, quality is related to “the way the fruit was produced, how it was made, what was applied to the fruit”. However, they are “excluded” from the market “anyway” because “there is no standard” (SP-3A). SP-5A argued that “the economy of scale pushes people out” of the market “naturally”, making it difficult for small growers to resist. In his opinion, “the only way for small producers” is to operate in a “cooperative or a big agro-system”, otherwise they tend to “disappear” (SP-5A). SP-10A mentioned the limited financial capacity to rent a place in São Paulo because it is “very expensive and the degree of guarantee required is unreal” (SP-10A). QC-3A was “trying to bring about changes” and asked other hospitals: “why don’t we put in a bid through our purchasing group to get sustainable tuna?” However, the others declined because institutions pay for the “cheapest” food products (QC-3A). Finally, though there is growing consumer interest in responsible food products, “there is a large portion of the population that cannot afford” to make these food choices “even if they wanted to” because they simply “don’t have the [financial] means” (QC-12A).

3.4. Political and Institutional Context

Public programs and legislations that promote responsibility and create protective niches contribute to the emergence of responsibility. QC-12 emerged from “a mobilization led by the Regional Council of Elected Officials [...] that wanted a network of people who work in food in Montreal” (QC-12A). Likewise, SP-2 started as a result of a “public program of the municipal government” (SP-2A). QC-8 was able to build an urban farm on the rooftop of a grocery store because “the mayor of the borough [...] had this vision” and required the installation of green rooftops on buildings (QC-8A). QC-13’s founders “had identified a need in their community” and applied to “a federal program” to create an organization that would “employ young people to deliver meals to seniors” (QC-13A). SP-15 emerged thanks to a “policy of public technical assistance” that the federal government launched for organizations that “work with women farmers” (SP-15A). QC-1 was preparing an application to a public program for organizations that “produce fruits and vegetables [...] and that would give 75% of its production to a food security organization,” which aligns with their mission. The Brazilian federal law requiring that “at least 30% of all federal

resources passed to states and municipalities be used to purchase directly from family farmers for the school meals program” gave more stability to family farms (SP-13A). QC-7, which has a not-for-profit legal structure and for which there is rarely, if ever, any funding from the Ministry of Agriculture, “jumped in” when such an opportunity arose, “got the grant” and developed a training program with a regional college. SP-2 obtained “a lot of sponsorship” in the beginning, which was fundamental for creating the organization.

Regulations poorly adapted to responsibility principles were perceived as constrainers. Though QC-5 works to increase the share of local supply in institutions, food distributors are not required to indicate the origin of the products they offer; people who receive “an order list and see ‘carrots’ [...] are going to look for what’s the best price available right now. So, if it’s carrots from Quebec, then, it’s carrots from Quebec” they receive, but carrots have “the same code all year long”, which means that the distributor “can’t tell you if the carrots come from Turkey or from Quebec” (QC-5A). Legislation that “helps companies wanting to donate food” would help SP-1 because supermarkets “are afraid to donate” and throw the food away since “it is cheaper and easier to trash it than to make a donation” (SP-1A). The main challenge faced by SP-9 “is the Brazilian government” because of its “environmental and social setbacks that go against everything” they “have been building in the past 25 years” (SP-9A). The recent dismantling of the National Council for Food Security and Nutrition (CONSEA) by the Bolsonaro government is a “very serious” threat to family farmers’ public supply and to “the main pillar of the social participation structure in the food security scheme” (SP-13A). For QC-15A, “a societal vision to act in a systemic way” is still missing from the different ministries, and the need to “rally” all actors becomes more acute as “everyone is pursuing his or her own objectives”. In SP-5B’s view, “civil servants are very alienated, in the sense of being subject to alienation” when it comes to public policies: they usually “receive public policy guidelines that are often full of intentions, and very few tools to make them feasible.” Furthermore, whenever there is a leadership change, they wonder “well, what will come this time?” Sometimes, good initiatives are simply “buried alive” because “those who come after don’t think it deserves to continue living” or manifest a stronger opposition as these initiatives become “more structured, more efficient” (SP-5B).

3.5. Sociocultural and Demographic Context

Our results show that positive attitudes from civil society in favor of a food systems transition contribute to the emergence of responsibility. There “is a will to go further and faster in environmental issues” because “people are more informed” (QC-8A). QC-1 is the result of community concertation, “mainly women who asked themselves: ‘what can we do in our community, in terms of health...in terms of development?’” (QC-1A). To SP-13A, social participation plays a “fundamental role” when it comes to food because “it touches on very basic things of the human being”. The integration of organic products from family farms in school meals in São Paulo comes from “a demand from São Paulo’s civil society since the 90s” (SP-13A). After a federal law was passed, resistance from the São Paulo City Hall was strong and it proved “very hard to get the managers down from their horses regarding the school food policy towards family agriculture” but “civil society came along and said: ‘are you kidding me? [...] It’s a federal law, you need to respect it’” (SP-13A).

Public opinion evolved in favor of responsible practices but challenges remain. For QC-9A, the “whole eco-responsible aspect” still lacks clarity. Responsible projects are also “limited by the fact that there is only a small percentage of the population” that is aware of the practices they are “trying to put forward” (QC-2A). Finding people to participate in SP-6’s network was difficult in the beginning because it was something new and people would say: “this works in Germany; Brazilians want to take advantage of everything; this won’t work here” (SP-6A).

3.6. Consumer Behavior and Diets

In parallel to sociocultural and demographic changes, consumers' interest in responsible practices in food systems has also increased. SP-2A observed that "middle and upper-middle-class" consumers want to know whether they are giving money "to a company that uses local labor, manages the land well, doesn't use pesticides, generates jobs and income". Consumers' willingness to access sustainable food products led to the creation of QC-10: "three roommates were tired of paying too much for over-packaged organic food and wanted to order in larger quantities...to get better prices and create less waste." They chose to "create a buying group and invite people they know to order with [them]. And the response was great [...], it grew very, very fast" (QC-10A).

Established consumer behavior practices are mostly described as constrainters when the social or environmental value of responsible food products is not fully understood. "People have to believe in it" because, "from an economic point of view, we end up offering things that are more expensive and for which the added value is not necessarily understood by the majority" (QC-2A). Conflicting views about the concept of food quality are also constraining. Sometimes "people criticize the quality of a product, without knowing about it" (SP-8A). For instance, "in this season, a tangerine may not look as good as it would in another season, but it's good inside, you can eat it and you'll see that it's good" (SP-8A). QC-10A realized that "there were people who placed one or two orders and did not return afterwards" and this was in part due to "the time it takes" to pack their orders. SP-6A observed that "a lot of people stopped" participating, saying: "look, we think everything is wonderful, but we don't have time to cook at home [...], with the rush in our daily lives, we prefer to have lunch somewhere where the food is ready".

3.7. Food Supply Chain

Responsibility-oriented organizations and practices may require new kinds of suppliers or new ways to evolve within an existing supply chain, which may explain why we found more evidence of this contextual element as a constraint. Nevertheless, exceptions were found. For instance, the creation of a network of women farmers was essential to SP-15 because, together, they were able to "guarantee a higher [volume] freight", which gave them a "sense of freedom" and capacity to sell larger quantities and more diversified products to a variety of buyers. Organizing "collective marketing" with other growers helped QC-11 to keep the volumes and quality high because if they do not "have a product one week, another producer brings it." To supply public markets directly from growers, QC-14A created a "supply mutual" to "share the cost of a human resource" and "a truck" along with three other public markets.

Multiple constraining effects of the supply chain were observed. QC-3C could "find suppliers" of local cheese but they may not "have the volume" or format needed and, if a large block of cheese needs to be cut into smaller pieces it means "an employee has to cut it" and "that's a lot of time". QC-5A realized that institutional supply from small growers requires "adjustments" at different levels, for example, "carrots are washed, but not pre-peeled". QC-10's "dream was to do direct trade" but they still "did business" with "major distributors" and found it hard to know who produced certain products (QC-10A). Despite the Brazilian legislation requesting public institutions to buy from family farmers, a misaligned supply chain explained why "there were many calls for a bid where nobody showed up or those who did were not qualified" (SP-5B). QC-15A recognized that, to many growers, pesticides are "an essential work tool" and "they are afraid that they will be required to use zero pesticides overnight", which would "completely undermine" their "business model". For SP-14A, the production of organic poultry was limited because "there was no organic food for these birds". SP-12A realized "it is very difficult to find" a diversity of "organic fruits, vegetables, and greens" to compose their food baskets in São Paulo. As aptly summarized by SP-7A, "the main challenge is to put to work a complex system that doesn't exist yet." The complexity of the dominant food chain is much greater,

“but it’s already working, it’s already there. It has been built over hundreds of years. So, it’s very challenging to build a chain from scratch” (SP-7A).

3.8. Interpersonal Relations

From our inductive analysis, we found that interpersonal relations were an important mediation mechanism that helped to eventually turn contextual dimensions initially perceived as constrainers into enablers. This was observed through all the contextual dimensions, except for the biophysical and environmental context. SP-3 “realized that where there is a lot of competition”, nobody “stands out.” They thus started to “have collective meetings and coordinate interests”, which helped them to implement responsible market dynamics, including cooperative sales (SP-3A). To QC-11A, even though there are market opportunities for organic and small farmers to supply restaurants or institutions, “farmers may embark in projects” where “the owner wants” to introduce innovative practices, “but the cook doesn’t.” Yet, “you need to have a good relationship with the kitchen, with the knife and the cutting board. If they love you, you’ll pass on a lot of vegetables. That’s the key” (QC-11A). QC-4A recognized the impact of the university as a consumer but thinks that if other universities worked in collaboration, they would have a bigger impact on the food supply chain. Therefore, she was building relationships to “get all the universities to really start tracking their purchasing”, hoping that “together” they will be able to “identify the gaps” and “put pressure on the distributors or the producers” (QC-4A). SP-6 started because parents participating in a local school wanted to change their food consumption practices but couldn’t find sustainable food products in their region. Building a relationship with a person who knew about Community Supported Agriculture (CSA) practices was essential as they “asked if he could come” to “talk to the interested parents” (SP-6A). QC-1 emerged out of civil society mobilization, but it was created by “people who came from elsewhere” and had to manage conflicts with local organizations that felt threatened by the newcomers (QC-1A). In SP-15A’s view, the Vale do Ribeira territory is “a little worn out” “because a lot of people had already been there and said a lot of things and left.” As they faced social resistance, “building trust with women farmers and also listening to them” were essential to the introduction of responsible practices. SP-11A had a good relationship inside the organization and felt trusted to develop innovative technology and infrastructure regarding chicken breeding without antibiotics. To QC-9A, raising the awareness of top-level managers within the institution was essential to the development of public policies that integrate responsibility characteristics.

4. Discussion

4.1. Context Both Contributes to and Constrains the Emergence of Responsibility in Food Systems

Table 3 summarizes our key findings, stressing how the eight contextual dimensions we empirically fleshed out both contribute to and constrain the emergence of responsibility in food systems. Our findings bring more depth to recent research conducted by scholars with an interest in responsible innovation in food systems. They also articulate into a more systematic and coherent whole contextual elements that, so far, have been signposted in various studies that did not analyze their relationships, how they contribute to or constrain the emergence of responsibility as well as their role in the food systems transition.

Table 3. Summary of the study’s findings: the influence of eight contextual elements over the emergence of responsible practices and organizations in the food system.

Contextual Dimension	How It Contributes	How It Constrains
Biophysical and environmental context	Call for the creation of organizations addressing environmental issues and for the establishment of eco-responsible guidelines	The longstanding or site-specific effects of the dominant food system’s biophysical and environmental consequences
Technology, infrastructure, and knowledge	Support the needs of responsible organizations and practices	Difficulty to perform the required actions due to lack of materials, technology, or knowledge
Economic and market aspects	<ul style="list-style-type: none"> - Market pressures to implement responsible practices - Funding dedicated to the integration of responsible practices 	Responsible organizations and practices need to work within economic and market dynamics from the dominant food system
Political and institutional context	<ul style="list-style-type: none"> - Political will and vision of a transition towards responsible food systems - Public policies that promote the purchase of local and organic food in institutions - Public programs that support the emergence of responsible organizations and practices 	<ul style="list-style-type: none"> - Regulations shaped by the dominant food system - Conservative political views promoting a social and environmental setback - Limited capacity for change in public administration bodies
Sociocultural and demographic context	Favorable change in public opinion towards responsibility in food systems	<ul style="list-style-type: none"> - Limited awareness and lack of consensus regarding responsible food practices - Societal resistance to innovative food practices
Consumer behavior and diets	Increasing consumers’ interest in sustainable food practices	<ul style="list-style-type: none"> - Consumers’ limited understanding - Attitudes towards prices - Capacity to pay for the products - Behavior changes required by responsible food practices
Food supply chain	Collaboration with other actors facing similar challenges	The need to create an entirely novel supply chain
Interpersonal relations	Mediation mechanism that can turn contextual constrainers into enablers	

One key contribution of our study is to empirically show the more complex ways in which “context can bring about contrary effects” [47] in the emergence of responsible innovation in food systems. As illustrated in Figure 2 and summarized below, seven contextual categories were both contributors and constrainers.

First, our findings highlighted that if biophysical and environmental elements can contribute to the emergence of responsibility when they serve as triggers or goals, the deleterious biophysical and environmental consequences of the dominant food system constrain the ability to integrate responsibility characteristics. Because our findings account for two regions with different biophysical and environmental characteristics, they reinforce the importance of linking responsibility in food systems to the domestic impacts of dominant food practices.

Second, while technology, infrastructure, and knowledge meeting the needs of responsible initiatives enable their emergence, these elements have been shaped by the dominant food system and, as a result, they hinder the integration of responsibility characteristics. This adds to research highlighting the need for a transformation of innovation systems to enable the development of innovations that can positively impact food systems [17,34].

Third, adding to previous studies indicating that access to the market, economic incentives, and dedicated funding contribute to the emergence of responsibility [17,23,24,34], our results show in greater depth how prevalent economic and market dynamics inhibit responsible food practices.

Fourth, several scholars have pointed to the contribution of government support, supportive regulations, and favorable governance to the emergence of responsibility [23–25,28,30,31,34]. Others have highlighted that conservative or maladjusted political scenarios encourage the maintenance of the status quo [31,32]. Our findings add to this literature by empirically showing in a single study the dual role of the political and institutional context in the emergence of responsibility in food systems.

Fifth, in addition to the observations of Crosta et al. [22], Shnayder et al. [23], and Steiner et al. [34] about the enabling role of societal awareness and favorable consumer behavior, our study stresses how, even though public opinion has evolved positively, the lack of awareness, consensus, trust, and financial means restrains the integration of responsibility in food systems. As our participants pointed out, changing consumer behavior is a challenge, especially when there is an economic trade-off involved or when changes in consumers' routines are required [48].

Sixth, our study emphasizes how current supply chain dynamics constrain the emergence of responsibility. This complements research on the constraining role of incompatible resources in the implementation of responsible innovation [29]. Our findings regarding the enabling role of collaboration among actors to fill supply chain gaps also add to previous studies showing the contribution of networks comprised of individuals and organizations in the integration of responsibility characteristics [26,31,34].

Finally, our findings indicate that interpersonal relations are an important mediation mechanism in most of the contextual elements analyzed because they help transform constrainters into enablers in a deliberate way. For Latour [47], "every context is composed of individuals who do or do not decide to connect the fate of a project with the fate of the small or large ambitions they represent". Likewise, our findings underscore that context is composed of actors who, by exercising their agency, can make it favorable or hostile to the emergence of responsibility in food systems.

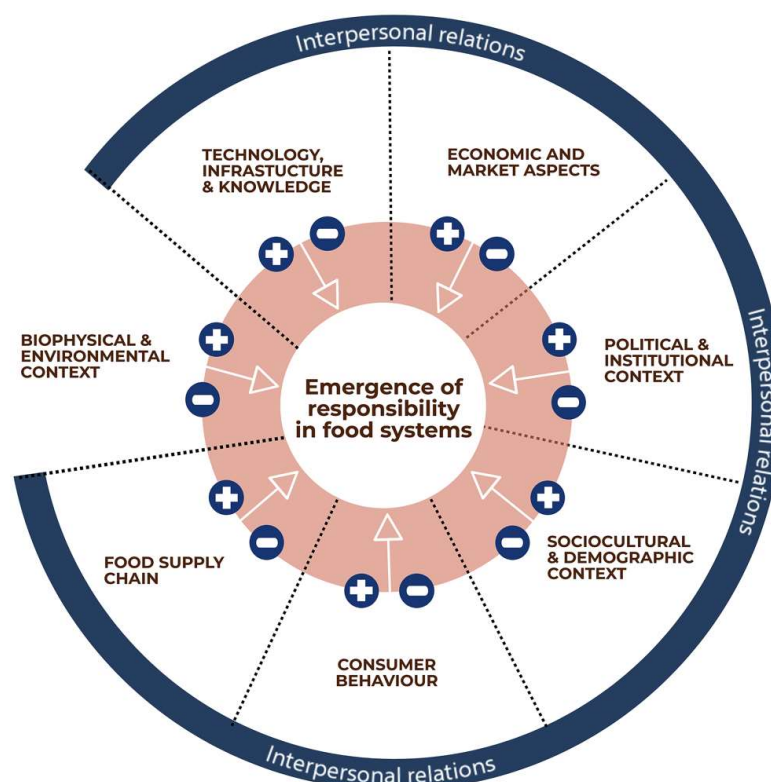


Figure 2. The mediating role of interpersonal relations over the contextual dimensions that both contribute to and constrain the emergence of responsibility in food systems.

Another contribution of our study is to provide a model (Figure 2) that illustrates the mediating role of interpersonal relations over six of the seven contextual dimensions. This model draws attention to why food systems transformation requires the design of favorable institutional environments aiming to pursue a common goal. For instance, while public policies that support the recovery of ecosystems can make the biophysical context less hostile to responsible food practices, it is also necessary to simultaneously address other contextual elements to more fully enable the emergence of responsible practices

and organizations. In addition, the model highlights the risk of letting current contextual dimensions further undermine the development of responsible food systems if these dimensions mainly serve to reinforce the path established over the years by dominant food system practices. Overall, our model can inform both research and policy that promote the design of institutional environments [49] that deliberately create protective niches [50] to spur “innovative systemic changes” and make food systems a “powerful driving force” towards achieving the Sustainable Development Goals [51].

Policy Implications

Food systems transition is “a powerful lever to enhance social justice, ecosystems restoration and protection, human health and well-being across the globe” [52]. Such a transition cannot gain traction without a clear comprehension of the contextual elements affecting the emergence of responsible innovation. Our research can inform policymakers about ways to engage contextual dimensions to favor the emergence of responsibility. This can be achieved through financing programs that support the integration of responsibility characteristics or policies that fully value the social, economic, and environmental advantages of the food products from responsible organizations. Regulations aiming to either reduce or economically account for the negative biophysical and environmental consequences of the dominant food system could increase institutional alignment with responsible food production. In addition, research programs to promote the development of technology, infrastructure, and knowledge focused on the needs of responsibility-oriented organizations and practices could help turn these constraining contextual elements into enablers. Additionally, promoting social awareness and building consensus regarding responsible food practices, and reducing barriers that limit the production and access to such products, especially socioeconomic barriers, can make the context more favorable to the emergence of responsible innovation in food systems.

4.2. Further Research

This study analyzed the contextual elements influencing the emergence of responsibility in food systems. Contextual elements established by the dominant food system have been shown to limit this process. This is expected since these elements tend to reinforce the modus operandi established in the past and reinforced by feedback loops and ‘lock-ins’ that keep the industrial food system firmly in place [4]. Even though our study shows examples of contextual elements that contribute to the emergence of responsibility, scaling up this process and, therefore, promoting a deeper food systems transition will require the transformation of the entire innovation system [16,17,34].

An important topic to be addressed in further research is to understand how to bypass locked-in constraining contextual elements. The literature on path dependence can inform such analyses. It describes a lock-in as “the entry of a system into a trapping region” [53], or a “hard-to-escape situation” [54]. Path-dependent systems may lead to “places everyone would wish to have been able to avoid” [53]. Though it’s always possible to “reopen the lock” [55], this requires some external force that alters the underlying structures and the coordination of interests [53]. The IPES-Food report stresses that breaking current lock-ins requires strengthening emerging opportunities to empower multiple “agents of change” [4]. Further research could thus examine how breaking out of the locked-in path may result from contextual actions taking into account the potential of responsible food system innovations to address current societal challenges [56].

Although understanding the role of context in the emergence of responsibility-oriented organizations and practices is key to research on food systems transition, attention should also be paid to the context of appropriation of novel practices [50]. Further research could tap on our findings to analyze how the categories we fleshed out shape the institutionalization of responsible innovation in food systems. Building on Figure 2, scholars could clarify how the various contextual elements may work in opposition or in synergy in food systems

transition. Lastly, comparative analyses within and across countries remain an important area for further research.

4.3. Limitations of the Study

The case study is an empirical research method that allows studying a phenomenon in-depth and in its real context [35]. It is, therefore, well suited to achieve the purpose of this research. However, case study research has pitfalls that can reduce the scientific rigor and credibility of the approach [57]. To increase rigor, we selected numerous and highly knowledgeable informants with diverse perspectives of the phenomena and invited them to validate emerging findings [58]. The coding strategy was developed and refined by the two coauthors and other research team members criticized our findings and shared many insights that helped to increase the internal validity of the research.

Even though we followed rigorous methodological standards, our study is not without limitations. One important limitation lies with the lack of consensus regarding what responsible innovation in food systems is and what it is not. Our data collection was thus structured by adapting a framework from the health domain, which may have led us to miss relevant organizations. Another limitation is linked to the large number of organizations in each case. Though this can be seen as a strength that increases the robustness of the findings, we could not describe case-specific dynamics due to the large volume of data.

5. Conclusions

In this study, we opened the ‘black box’ of how contexts shape the emergence of responsible innovation in food systems by detailing their multiple underlying categories and their dual influence. Our study articulated into a whole what has remained so far, a series of disparate observations about the role of context in food systems transition. Beyond showing that contextual dimensions inherited from the dominant food system limit a transition toward a more responsible food system, the model derived from this study can inform research on why food systems transformation requires building institutional environments that protect responsible organizations and practices. Our study provides empirical flesh to the argument that responsible innovation should not be conceptualized as resulting from the virtuous motivations, efforts, and ability of individuals because the whole food system is involved. Thus, we stress the importance of creating a more favorable context of emergence. To conclude, our study reinforces the power of the actor’s agency to deliberately shape contextual elements. Henceforth, practices aimed at addressing food-related societal challenges can produce contextual elements more suitable to the emergence of responsible innovations and, therefore, favorable to food systems transition.

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