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Agrifood system between global and territorial vision – Editorial

The territorial approach to the crisis in the global food system

Bernard Pecqueur[1], Marcello De Rosa[2], Catia Zumpano[3]

[1] *University Grenoble Alpes, CNRS, Sciences Po Grenoble, Pacte, France*
[2] *Department of Economics and Law – University of Cassino and Southern Lazio, Italy*
[3] *CREA – Research Centre for Agricultural Policies and Bioeconomy, Italy*
*Corresponding author. E-mail: mderosa@unicas.it

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Recent trends in the agrifood systems emphasize a renewed "territorial turn", characterized by the dynamics of territorial anchoring in agrifood systems, which identify new paths of rural development. Within a renewed interest in the theories of territorial development, the new place-based trajectories are usually the outcome of the interdependencies among actors, such as producers, consumers, markets and society (Horlings, Marsden, 2014). This process is characterised by a reconfiguration of agricultural and territorial resources, and is usually analysed from two perspectives, or "entry gates":

- the agrifood sector, where differentiation strategies are at stake, through the provision of quality products, shortening of the food supply chain, etc.
- the rural space, which is meant as the space of both production and consumption, which promotes strategies of territorial development based on the provision of a composite basket of food and services (Pecqueur, 2001).

The two entry gates are strongly interconnected and can address paths of rural development, where alternative food networks and modern rurality contribute to sustainable rural development.

The articles of this special issue are set against this background and offer useful insights from both perspectives, sectorial and territorial. The introductory article by Bernard Pecqueur offers an interesting overview about the evolution of territorial approaches as opposed to the agro-industrial paradigm grounded on globalization of agrifood systems. The article discusses the complex relationship between the two approaches and their compatibility. The basic assumption (Gasselin *et al.*, 2020) is that one model is not substitutable for the other. This article suggests that the territorial model, if maintained and reinforced, can contribute to the evolution of the global model towards solutions to the impasses resulting from contemporary crises, notably the climate crisis. The various articles in this issue focus on institutional aspects, particularly policies in very different national contexts

The competitiveness of localized agrifood systems stands on territorial embeddedness, effective interprofessional forms of governance and cooperation networks, as pointed out by Mantino and Forcina, who explore the factor of competitiveness in the tomato supply chain of Spain and Italy. In their article, the authors show how coordination mechanisms within the localized agrifood systems represent a key dimension for competing in a globalised scenario. Networking, social capital and cooperation are key ingredients to empower territorial systems also through dynamics of social innovation, like in the Swiss case of Valposchiavo, presented in the article by Froning and Stotten, where territorial strategies based on the quality food network of organic products boost social innovation and sustainable territorial development.

Coordination mechanisms and collective action are also at the basis of localised modes of food provisioning relying on the growing importance of alternative food networks, like the farmers' markets initiatives. The reconnection perspective, aimed to connect consumers and producers (Fonte, 2008) is confirmed as a winning strategy in the farmers markets of northern Tuscany analysed in the article by Mengoni, Marescotti and Belletti. The provision of not only economic, but also social and environmental outputs is a key aspect that emphasizes the multifunctional role that alternative food networks play in building up new agricultural models based on the provision of tangible and intangible goods, which contribute to building up processes of modern rurality.

Set against this background, the role of policy is essential in boosting trajectories of multifunctional agriculture. The article of Doyon and Klein is coherent with this perspective and aims to address the issue of new territorialized agrifood systems, boosted by a policy initiative realized in Quebec, Canada. The two authors emphasise the close interdependence between the effectiveness of the reinforcing role of policies and the degree to which farmers and the local community are willing to engage in the adoption of measures of support themselves. Actually, as Travnikar and Bertoncelj indicate, this match is also influenced by the adequacy of financial resources. Analysing the adoption of agri-environmental measures in Slovenia, the two authors point out that, although the CAP has had an overall positive impact on the promotion of biodiversity, the level of premiums offered through the agri-environmental measures of the CAP to farmers has not stopped the abandonment of farmland, which is being pressed by tourism, in competition with agricultural production.

Nonetheless, when effective collective action and coordination mechanisms are at stake, a localised agrifood system may represent a valid alternative to build up sustainable agrifood systems at all geographical levels. Actually, the alternativeness of the localised agrifood systems characterise also non-European countries, as shown in the Brazilian case-study. The article written by Cazella, Tecchio, Schneider and Boni offers interesting insights into the importance of cooperation and collective action with the purpose of valorising territorial resources and providing a basket of territorialized goods and services, in the Brazilian municipalities of Crediseara.

In conclusion, a territorial approach to the analysis of agrifood systems still seems able to provide valid solutions to develop sound business models based on multifunctional approaches to the farming activity delivering economic, social and environmental benefits to society.

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Agrifood system between global and territorial vision – Keynote article

Can the territorial food system provide solutions to recurring crises in the global food system?

Bernard Pecqueur

Universitè Grenoble Alpes – CNRS, Sciences Po Grenoble, Pacte, France
E-mail: bernard.pecqueur@univ-grenoble-alpes.fr

Abstract. The issue of food has evolved significantly in recent years throughout Europe, under the pressure of environmental and climate constraints as well as a set of factors related to food dependence and changes in consumption patterns. Short circuit practices, embedded in localized agrifood systems, although in the minority in terms of volumes consumed, are growing rapidly and are a sign of these developments. The recent health crisis has further highlighted the need to think of food as a global system with many variables and multiple interdependencies between these. This article outlines the global food system that has resulted from the modernization of agriculture in Europe and North America, and the powerful movement of globalization on a global scale. It describes the emergence of a territorial food system with characteristics that are distinct from the overall system. Finally, the article explores the alternative nature of the territorial system and its ability to provide solutions to recurring crises in the global food system.

Keywords: global food systems, localized agri-food systems, territorial development, public policy, governance.
JEL codes: Q10, Q20.

HIGHLIGHTS:

- Food systems in agriculture around the world, and particularly in Europe, have evolved towards a globalized system under the pressure of globalization.
- Environmental and climatic crises have highlighted the need for re-territorialization, giving rise to territorialized food systems linked to their national and regional contexts.
- This article examines the compatibility of the two models, their difficult complementarity, and the resulting contradictions for public policy.

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Guest Editor: Marcello De Rosa, Catia Zumpano

Agriculture around the world has long been seen as a slow-moving activity focused on the imperative of feeding people. The "green revolution"[1] initiated in the early 1960s symbolized this effort to modernize agriculture. The objective of this revolution was to make a technological leap to greatly improve productivity. The ideal invoked was to overcome famines, solve the items related to population growth and the nagging question of the galloping urbanization of the Global South, and therefore to triumph over the dark prophecies of Pastor T.R. Malthus (1798) by reversing the divergence between population growth and growth in subsistence. However, the corollary of the success of this dynamic was the creation of an imbalance in the ecological system (massive rural exodus and the phenomenon of "slums" in the megacities of the South, soil erosion, pesticide pollution, etc.). These imbalances have sharply accelerated with the climate crisis and the pressure to decarbonise the world's increasingly tense global food system.

We will therefore seek in this text to highlight the process of building a global food system that results from the modernization of agriculture in Europe and North America in particular, and the powerful movement of globalization on a global scale. We will describe the emergence of a territorial food system with characteristics that are distinct from the overall system. Finally, the article will explore the alternative nature of the territorial system and its ability to provide solutions to recurring crises in the global food system.

1. EVOLUTION OF AGRICULTURE IN EUROPE: FROM INDUSTRIAL DISTRICTS TO GLOBAL FOOD SYSTEMS

1.1. From industrial districts (ID) to Food Systems

A notable evolution of productive structures occurred in the 1970s, first in industry and then in agricultural production. This period corresponded to the oil crises but also to a (temporary) plateau in productivity. Clerc *et al.* (1983) identify this moment with the end of triumphant Fordism and the entry into an uncertain moment of long transformation called, for lack of better term, "post Fordism". Italian economists revived the observations made by Marshall at the beginning of the century which referred to the existence of "industrial districts" (Bellandi, 1989; Becattini *et al.*, 2014). At the same time, Porter developed a similar notion, the "cluster" (Porter and Ketels, 2009). The evolution of analyses in agricultural production has run parallel to this. Building on the model of local production systems (Courlet and Pecqueur, 1995), which is an adaptation of the Italian district concept to the French case, Muchnik and Sautier (1998) developed the concept of Localized Agri-Food Systems (LAFS). In Muchnik *et al.* (2008: 513), the authors define a system rooted in society where the production process is embedded in the geography of the place: "research work around the theme of localized agri-food systems, which is located at the crossroads of sectoral and territorial analyses, aims to develop a specific theoretical framework to understand the organization and functioning of a set of economic (production, transformation, restoration…), cultural (educational, festive…), and recreational activities (rural tourism, training, competitions…), related to a specific territory, both materially and symbolically. It is a question of understanding the synergies between these different territorial activities to strengthen the anchoring of local production and the development of specific food products." The concept of the LAFS has been very successful in South America, particularly in Mexico (Torres Salcido *et al.*, 2011), Brazil (Muchnik, 2013), but also in Quebec (Jean, 2006), and Morocco (Zahidi, 2023). The concept of the LAFS presents itself as an extension to agricultural production of the idea of industrial districts, developed in Italy, and then of local production systems and lays the groundwork for the approaches to territorial food systems that we develop here.

At this point, we need to differentiate between "local development" and "territorial development" (Pecqueur B., 1989). The term "local" refers to an analysis of spatial scales, which is important, but is limited to the question of size alone, and concerns sub-national spaces. The term "territorial", on the other hand, takes the notion of development a step further, by introducing the idea that it is the actors involved in the search for solutions to a collective problem who are responsible for its solution.

As Del Biaggio, Koop K. *et al.*, (forthcoming 2024) explain, "English-speaking geographers have for long privileged a rather politico-institutional understanding of territory, related to the state and the notion of sovereignty, thus making it a core-concept for political geography (Cox, 2002)".

The approach of the territory as a social construct is another vision found in Italy, notably with Megnaghi (2020), for whom the "territory is a common good", or Dematteis (1995), Turco (2007). The work of the "Groupe de Recherche sur les Milieux Innovateurs" – GREMI –, Maillat (1995), takes an essentially economic approach

[1] This revolution earned the agronomist and biologist Norman Borlaug the Nobel Peace Prize in 1970. For the United States, the challenge of this revolution was also based on geopolitical considerations. Indeed, during the Cold War, it was a question of feeding the Third World to avoid the risk of these populations falling into communist regimes (Cleaver, 1972).

to local innovation systems. Similarly, the "Grenoble school", with Courlet, Pecqueur (2013) and Vanier (2009), have focused on the analysis of specifically territorial resources.

1.2. From Food Systems to localized agri-food systems (LAFS)

Since the early 2000s, many works on the concept of food systems have appeared in the English-language literature in Great Britain and North America. An important body of literature based on these works has been developed over the past thirty years (Cooke and Morgan, 1994; Lamine and Deverre, 2010; Marsden, 2012; Tansley and Worsley, 2014; Mundler and Laughrea, 2015; Brand, 2015).

Food systems have become globalized. And the links in terms of food between production spaces and consumption spaces have become distended, elongated. Not that the links between cities and rural areas have completely disappeared, but they have developed and diversified very widely. They have also relocated (Feenstra, 1997). Indeed, industrial models, in the face of food crises, demands for proximity, quality, truth, etc., plural responses of "re-connection" between metropolises and their living countryside have also developed, producing products from agriculture that is sustainable (or not), organic (or not), or peasant (or claims to be).

It can therefore be said that the concept of food system has evolved significantly over the past twenty years to adapt to the changing context of the dominant productive model. In the first place, the concept of system has replaced the market as a mode of representation of the supply to populations, accrediting the flow approach as we will see in the following section. Secondly, the systems have integrated scalar differentiation in the sense that they are becoming globalized but also "territorialized" and refocused on the local sphere. This dual movement is not contradictory if we accept that re-territorialization is a form of adaptation to globalization (Campagne and Pecqueur, 2014). Lastly, the final avatar of these systems is that they are called upon to be ecological.

This gradual evolution of food systems tends to show that, faced with the market as a supply regulator, there are more complex "alternative" systems. A dichotomy then arises between the (majority) world of hyper-productivity and the (minority) world of proximity of actors and specificity. We find this binary approach, for example in Lieblein *et al.* (2003) where the appearance of the food system, particularly the urban one, is inseparable from the rise of ecological perils and is presented as a response to or "resilience" in the face of (Schipanski *et al.*, 2016) the dominant system. Van der Ploeg (2014, 2017) distinguishes in particular two models of agriculture that he calls *entrepreneurial agriculture* and *peasant agriculture*. The first refers to a model that is globalized, close to industry, and strongly focused on productivity; the second is based on a process of "relocalisation" that is to say, a regaining of control by the producer of their actions and the integration of environmental constraints. To summarize, the author (Van der Ploeg, 2014: 81) distinguishes between peasant agricultural practices that grant a "primary role to the internalization of nature, co-production and coevolution" and entrepreneurial practices characterized by "disconnection from nature and artificialization".

We successively examine the characteristics of the two models by showing that the "relocalisation" model appears as an alternative search for a solution to the crises and dysfunctions of the entrepreneurial model. We will distinguish the *global food system* to emphasize its essentially macroeconomic dimension on the one hand and the *territorial food system* on the other, insofar as the territorial dimension (and not only the local dimension) is paramount, as discussed in Italy (Belletti *et al.*, 2012).

1.3. Emergence of the global food and production system

In the agricultural world, we can identify some major phases without delving into a long and complex history. France, representative of rural Europe, experienced a "rural civilization" period for several centuries, as analysed by Leroy Ladurie (1972), characterised by relative homogeneity of values and stable practices, punctuated by technical advances (but highly dependent on a very restrictive set of heteronomies, made of climatic hazards, political and military variables, and fluctuating markets in which the producer has little control over prices). Referring to Mendras (1967/1984), he notes that "each village was therefore flanked by a surrounding society (the other villages) and by an encompassing or dominant society (urbanites, feudalists, capitalists, bureaucrats, priests or police)" (p. 1).

The First World War was a break in rural civilization with a haemorrhage of young men that left the countryside empty. Following this slaughter, the period from 1918 to the 1950s was characterized by the "repair" of the agricultural world, a rise in production and yields, a gradual concentration of farms (Gervais *et al.*, 1977). The trend was to refocus on the modernization of productive tools and to increase the dependence of farms on the constraints of the agro-industry for inputs and large-scale distribution for market outlets. This period, which required ever-higher standards of profitability, led to a drastic reduction in the number of operators. Inter-

generational cohabitation gave way to dwellings where nuclear families (couples and children) found themselves more likely to adopt urban practices because of the openness of the rural world to industrial practices. The markets became heavily export oriented.

During developments over half a century, sometimes rapid and brutal, we see the emergence of a productive and food agricultural model that dominates global agriculture and whose main characteristics can be identified.

a) Modernization and the search for productivity

First, in the middle of the twentieth century, European agriculture began a process of modernization that profoundly changed the structures of the rural world. At the level of the European Union, this agricultural process is based on the Common Agricultural Policy (CAP) set up in 1962. The phenomenon has taken on a particular magnitude in the French case. As sociologists Hervieu and Purseigle (2009) recall, "[t]here were about 16 million people earning their living in agriculture at the beginning of the 20th century, mainly on farms of less than 10 ha (more than 85% of structures). This represented more than 40% of the French population. At the end of the war, horses were the majority, numbering 1,800,000 and tractors still few, about 100,000. Twenty years later, there were 1,200,000 tractors and 600,000 horses" and "the agricultural consolidation [led] to the disappearance of 835,000 kilometres of slopes and hedges, mainly in the northern half of France, between 1945 and 1985. In the mid-1970s, land consolidation reached its peak with nearly 500,000 ha of land consolidated per year". This effort to adjust structures and techniques is a constant concern in the fight against food insecurity. In this regard, OECD Secretary-General Mathias Cormann recalled that "investments in innovation, new productivity gains and lower carbon emissions are needed to lay the foundations for food security, financial capacity, and long-term sustainability"[2]. It confirms that productivity gains are a founding characteristic of this model, which implies the need to reduce production costs and improve margins to increase revenues. Agriculture must "intensify, specialize, mechanize" (Hervieu and Purseigle, 2009).

b) Globalization

Globalization is the corollary of modernization and productivity. However, contrary to what one might think, this trajectory of the agricultural world is not made homogeneous by the process of globalization. In fact, the opposite is true since this global process feeds and even accentuates the plurality of agricultural realities and models of production and food consumption. Globalization involves all agriculture in the same competitive game, accentuating inequalities according to the competitive performance of one country (or region) compared to the others. In a competitive world, only the best performing agriculture in terms of yield and productivity can remain competitive, which creates a handicap for agriculture in a less favourable context (such as mountain agriculture, dry areas, or areas where soil quality is poor or in decline, etc.). This brings us to the limits of globalization. These limits are growing with geopolitical crises that accentuate the dependencies of nations on an increasingly internationalized food supply.

c) Financial and technological dependence on agribusiness

Agricultural production, in the case of global food systems, is increasingly characterized by the integration of functions, in particular a value chain that links production, processing, distribution and consumption, inserted in globalization. The margin of autonomy is then very low for producers who depend closely on input suppliers and upstream suppliers of agricultural machinery and downstream processors and distributors to consumption outlets. The productive system is itself framed by a financial and banking system that keeps farmers in a spiral of debt. As François Partant wrote in 1988, "Agriculture has been the supporting function of industrial development" (cited by Atelier Paysan, 2021: 13). Van der Ploeg (2014) illustrates the food dependency system installed by this model and the notion of agri-food empire by using the example of the Parmalat group. He distinguishes three levels in the system: the infrastructure (logistics, production, technologies, etc.) constitute level 1; the flows of products and services constitute level 2; and level 3 is the "empire" and concerns the control function. In the case of the Italian group Parmalat, the holding company "Parmalat finanziaria" (Franzini G., 2004) plays this role. The characteristic of this level 3 is not to attribute anything to anyone. "It doesn't produce any additional value. It only means control and appropriation" (Van der Ploeg, 2014: 37). This situation is reminiscent of that of "trusts" in the fields of transportation and oil production in the twentieth century economy in the United States. The monopoly situation then jeopardized the free play of competition and therefore the fluidity of the system and necessitated the establishment of anti-trust laws.

d) Structural changes

In Europe, the phenomenon is the same although mitigated. The average farm size in the EU-28 increased

[2] OECD/FAO (2023), *OECD-FAO Agricultural Outlook 2023-2032*, OECD Publishing, Paris, https://doi.org/10.1787/08801ab7-en.

between 2010 and 2013 from 14.4 hectares to 16.1 hectares. This resulted in an 11.5% drop in the number of farms and a 0.7% drop in agricultural area[3]. Regarding labour, over the period 2007-2013, the overall change in the EU agricultural labour force consisted of a decrease of 2.3 million work units, equivalent to a decrease of 19.8%. Finally, in parallel with the decrease in the amount of work and the number of farmers, we can observe a significant increase in the average size of farms.

According to the Eurostat 2022 report, "agriculture in the EU is broadly divided into three distinct groups: i) subsistence agriculture, oriented towards growing most foodstuffs to feed farmers and their families, ii) small- and medium-sized farms, which are usually family businesses; and iii) large agricultural enterprises. Approximately half (54%) of the standard production generated by agriculture in the EU came from farms in France (17%), Germany (13%), Italy (12% in 2013). Although Romania had about a third of EU farms, they accounted for only 3.4% of its standard production".

These structural disparities show that the modernist model that we call the global food system concerns only a part of the agricultural world located in the northern hemisphere and as regards Europe, rather in the west than in the east.

2. THE CRISIS OF GLOBAL FOOD SYSTEMS AND EMERGENCE OF TERRITORIAL FOOD SYSTEMS

The collapse of the Parmalat group in 2003 (Ferrarini G., Giudici P., 2005) appeared as a first crisis signal for the dominant productive model that enshrines the contradictions of a system moving towards monopoly. A new phase has begun in recent years under the pressure of successive crises. The climate crisis, by changing the material conditions of production, requires a resizing of production modes based on the intensification and growth of inputs. The crisis of globalization evokes new problems of dependence on imports and price control, but also on the world of agribusiness.

The central phenomenon that can be observed is a detachment of the farmer from the living space of their ecosystem in favour of an abstraction of links with invisible and distant actors. In other words, it can be said that the farmer is turned towards his plot but turns his back on the territory on the local society that surrounds him. Magnaghi (2022) analyses it as a deterritorialization that he defines as "a break in the co-evolutionary process between human settlement and nature that characterizes the periods of crisis of a civilization when it loses control of the factors of its own reproduction" (p. 52). The farmer's territory is a living system that must be renewed.

2.1. The ecological and climate crisis and globalisation and its consequences for farms

The COVID 19 epidemic crystallized several latent crises that have strongly impacted agricultural production, among other things. The climate crisis appears to be the significant "mother crisis" of the current period. The first alarms are more than half a century old (Meadows *et al*., 1972). This crisis has accelerated in recent years by focusing on carbon production and its effects on global warming. Many books and articles written on the subject converge on the same question about the medium-term viability of the dominant model based essentially on the sole purpose of productivity gains. Cultivation (and breeding) methods must therefore change drastically in the face of costs and the negative impact of inputs and technologies on the environment.

As a result, a second harmful effect is added to the environmental issue: the dependency effect. At the international level, productive specialization exposes entire regions or even nations to sudden supply disruptions, as we have seen during the Russia-Ukraine conflict. But the effect is even denser at the infra-territorial and local level. Injunctions to productivity gains formulated by the public authorities in exchange for financial aid and loans led to "multiple health issues: occupational accidents, illnesses, depression, suicides; as early as 1965, these health issues, in particular mental health, were already looming in the foothills and mountain areas" (Salmona, 1994). These effects, the consequences of changes in the productive sphere, primarily affect the spheres of intimacy and socialization. Another dependence factor, perfectly parallel to the risk of depression, is dependence on the agro-industrial complex. In a recent collective work, the Atelier Paysan (2021)[4] exposes the extent of independence accentuated by crisis situations. The title of the first chapter states: "industrial agriculture: *a mechanical monster that confiscated the land from humans*" (p. 19). The authors make a rather radical diagnosis that can be debated but which posits: "[t]his agriculture does not feed

[3] Sources: EUROSTAT, Annual activity report 2022.

[4] L'Atelier Paysan is a cooperative (SCIC SA) that supports farmers in the design and manufacture of machinery and buildings adapted to peasant agroecology. The cooperative writes on its website: "By re-engaging producers in the technical choices concerning the tools used in farms, we collectively rediscover a technical sovereignty, an autonomy through the reappropriation of knowledge and know-how" (https://www.latelierpaysan.org).

the population: despite decades of downward pressure on production costs, the food thus produced is both over-abundant and beyond the reach of the poorest" (p. 53).

2.2. A Territorial Food System: Towards Territorial Governance

a) Relocalisation as a first step

Family farming is a traditional first response to defend peasant agriculture that does not have access to a sufficient level of competitiveness to follow the global food model. This is obvious in the countries of the South, but it can also be seen in the North in the least favoured regions.

More than a third of the world's food production is provided by farms of less than two hectares, managed by members of the same family**.** This is the direct legacy of a household-scale, labour-based livelihood model that has largely prevailed since the advent of agriculture several millennia ago. Today, small agricultural units still represent 80% of companies in the sector and are predominant in the countries of the Global South[5]. They make it possible to organize agriculture, forestry, fishing, pastoral production and aquaculture, managed and operated by a family and mainly dependent on their work, women and men included. In this model, the family and the farm are linked; they co-evolve and combine economic roles. It is these small units that are the focus of FAO's Decade of Family Farming initiatives. Family farming is a first step that only concerns production and distribution in local markets. Long devoted to a food activity, or even to self-sufficiency, small family farms have often integrated commercial farming approaches in recent years with innovations in marketing (producers' houses, short circuits). At the same time, initiatives to support peasant agriculture such as AMAP (Associations for the Promotion of Peasant Agriculture) are developing (Mundler, 2009). The "relocalisation" project proposed by Van der Ploeg (2014) is intended to extend to all the functions of the global food system and is presented as an alternative to transition to the dominant food system. The message is simple: it is no longer just a question of overcoming the lack of competitiveness of Southern agriculture, but of re-appropriation of work by peasant farmers by obtaining new margins of autonomy.

b) Re-territorialisation as a second step

The processes of territorial construction by the actors as a solution, at least partially, to the current impasses of the productivist system, stem from our point of view rather from the reconstruction *of a link that has broken between farmers and their territory* in the sense of their surrounding environment and not from a simple physical support for production activity. Thus, if we accept that the territory built by the actors constitutes an environment that forms a system, the variables that constitute it form *a coherent ecosystem*. It is this coherence that has disappeared with "deterritorialization", and which will serve as the basis for the emerging territorial food system.

With the disappearance or at least the weakening of the rural village, farmers have become a minority in their social environment where the constraints of the urban population have increased. Think of the competition between land uses for farming versus play and recreational spaces or the influence of second homes which excessively increases the purchase price of housing for permanent residents, etc. The sphere of intimacy is also the sphere of housing. Finally, the productive sphere is also degraded because agricultural production is increasingly heteronymous depending on agricultural machinery (see the position of the Atelier Paysan, 2021) but also on globalization which leads to a lack of control of market prices.

In this situation, we can speak of a need for "re-territorialization" as a partial but necessary solution to the effects of crises. For Horling and Marsden's paper (2014), "the reconnection between specific foods and specific places is a form of re-territorialisation which attempts to reverse the intrinsically aspatial order of globalised production. (…) Re-territorialisation is an important dimension of what major development agencies such as Organisation for economic cooperation and development (OECD) postulate as the "New Rural paradigm" (NRP) in Europe (p.2)". The search for *coherence* calls into question the aims of the development of production solely in terms of productivity. This coherence corresponds to a reconnection of the places of intimacy, production and sociability, not only in terms of metric proximity but also of world unity or "metabolism" (Barles, 2017; Buclet and Donsimoni, 2020). This concept, which has recently been used in the literature on territorial development, combines ecological and economic development issues. It clearly illustrates the notion of a territorial system essentially consisting of links that are strengthened and allow all actors to interact. Restoring the metabolism of territories by re-weaving the links between the three spheres shows what the purpose of territorial development could be. In other words, the aims of production have evolved towards a globalization of trade and a race to productivity that has disrupted the balance of the articulations between the three spheres

[5] Source: CIRAD May 2023, https//wwwcirad.fr.

(intimacy, sociability and production) and broken the direct relationship between production and consumption for a given population. The need, due to crises, to rethink the relationship with resources opens a way for territorial food systems.

c) Characteristics of the territorial food system

The food system is therefore defined in the first instance by a combination of flows constituting a food chain around the five functions: production, processing, distribution, consumption and recycling. Such a system is open to its spatial environment (urban core, peri-urban, market garden periphery or cereals, etc.). We can talk about *territorial anchoring*. Anchoring can be defined as the set of specific variables involved in qualifying the functioning of the territorial system of a territory that distinguishes it from another. This spatial environment brings the specificity of the system through its geography, history, culture, etc.

Secondly, specificity compensates for any lack of productivity. The case of products labelled by Europe (PDO in particular) is very illustrative of this ability to create new territorial resources that find their market through their superior quality rather than through price competitiveness (Cerdan and Fournier, 2007).

Thirdly, if the global system is based on productivity, its output is composed of a profit, while the territorial food system, which is based on specificity, produces an income actively built by the actors (Mollard, 2021). This annuity can be described as "territorial quality annuity" (Mollard and Pecqueur, 2007).

The fourth component of a territorial food ecosystem is a set of actors whose complexity has increased over historical and cultural developments. *Governance territorial* (Ternaux and Pecqueur, 2008) which the coordination of actors depends on *becomes* the specificities of the place. We are therefore not talking about the given territory, which would be a small pre-cut region, but the territory built by the actors. The latter are consumers (see Slow Food experience in Northern Italy), cultural associations, etc.

CONCLUSIVE DISCUSSION: AN IMPOSSIBLE HYBRIDIZATION OF THE TWO MODELS?

This opposition between the two types of productive order where either productivity or quality/specificity dominates is present in the literature, especially since the emergence of a clear perception of the limits of radical agricultural productivism. Morgan (2009) distinguished on the one hand "the conventional food system of the agro-industrial and agro-tertiary stage (productivist agriculture, concentrated sector where food is deterritorialised) and [on the other hand] an emerging, alternative food system (with smaller companies, localized markets, ecological, ethical agriculture, where food is re-territorialized)" (cited by C. Brand, 2015: 86). However, the models do not coexist in a totally separate way. Industrial production knows how to integrate quality and specific production lives under the constraint of productivity as soon as it goes to market. This is why it does not seem obvious to say that the specificity model can be described as an "alternative" or substitute for the productivity model. However, we can hypothesize a hybridization of the two models which refers to a phenomenon of re-embedding, in the sense of Polanyi (1944), of the economy in society. This is the sense of re-territorialisation that can be observed in these systems that become eco-systems insofar as they refer to a spatial reality that is drawn on a geographical, economic and cultural coherence.

Regarding the relationship between the two food systems and their possible ability to converge, our text leads us to nuance the idea that the territorial system would be an alternative to the global food system or a transition to a post-carbon overshoot of the global food system.

a) A coexistence of the two models

First, the territorial model is justified by the possibility for non-competitive agriculture to maintain an activity and anchor populations through family farming practices that must therefore be preserved not only as a heritage from the past, but also as valuable tools for adapting in future to sometimes difficult production conditions. New resources based on quality specific to each territory and therefore respectful of the environment. These resources demonstrate unprecedented value creation.

It cannot therefore be said that one model replaces another or can do so in the short or medium term. What we observe is a coexistence of the two models sometimes even within the same farm. We observed this during surveys conducted on farms in the Drôme (France) in the early 2000s (Hirczak, Pecqueur and Mollard, 2004). Indeed, we have observed the coexistence on many farms of both a production of PDO olive oil whose prices are set by the local cooperative (the producers are "price makers") and a production of apricots whose prices are set on the market located in Rotterdam (the producers are then "price takers").

b) Which public policy balances the two models?

Public policy differs greatly from country to country, and between liberal and interventionist doctrines.

We refer to the Common Agricultural Policy (CAP) implemented in Europe, the interest of which lies in the elaboration of a supra-national policy that applies to agricultures that are structurally very different (Chatellier *et al.*, 2020). The CAP's two pillars provide support for both models (global and territorial).

The first pillar clearly supports the global food system and the needs of agro-industry, while the second pillar is based on the characteristics of the territorial food system. These two systems cannot be combined, as they contradict each other, and put European agricultural policy in tension between the imperatives of productivity and competitiveness on the one hand, and the need for re-territorialization and respect for environmental constraints on the other. This contradiction was evident at recent farmers' demonstrations across Europe, where concessions made to producers (notably on pesticide use) could only be achieved at the expense of measures to protect the environment. Public policy is reduced to a delicate balancing act between two hardly compatible orientations.

c) A difficult hybridization whose key is in the hands of the consumer

One would be tempted to think of a possible hybridization as the practices of the two models are mixed. But there is a form of mutual exclusion between the two systems through rules and standards, as shown by the differences in pricing following the reference system. This observation can be made in the case of citrus fruits in the Valencia region of Spain (Gallego-Bono, 2007), where we note the weight of the standards resulting from the global standardization model, which is not very compatible with the specific products from the territories. The two worlds have little contact, but the territorial productive food system is organized to resist uniformity and maintain a diversity that is metaphorically comparable to biological diversity, and that alone is capable of fighting against the total standardization that would grind the food system to a halt.

In terms of regional planning, the idea of territorial coherence is reflected in an emerging concept, particularly in the French-language literature (Barles *et al.*, 2017; Petit, 2021): territorial metabolism. It is a question of considering all the flows circulating on a territory and integrating the flows of sociability into the production conditions. We draw the tentative conclusion that it is impossible to change a global food system without changing the social consensus. The evolution of consumer behaviour choices and new hierarchies in their consumption patterns seems to be a prerequisite to initiating a hybridization where the territorial food system could have a subversive effect on the global food system.

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Agrifood system between global and territorial vision – Research article

The governance of transitions in agri-food systems: evidence from the processing tomato supply chains in Spain and Italy

Francesco Mantino, Barbara Forcina*

CREA – Research Centre for Agricultural Policies and Bioeconomy, Italy
*Corresponding author. E-mail: barbara.forcina@crea.gov.it

Abstract. The paper aims to analyse the functioning of territorial agri-food chains through an institutional lens. The approach tries to explore the influence of endogenous and exogenous factors on the capacity to respond to complex transition challenges. Our working hypothesis is that agri-food supply chains are embedded in the territory they belong to, economic performances and market competitiveness are strongly influenced by a combination of organisational capabilities and good governance solutions. These topics are developed by examining the innovative socioeconomic features of two of the largest world and European supply chains: the processing tomato supply chains of Northern Italy and Extremadura (Spain), both representing most of the processed tomato national production, governed by an overarching organisation gathering producers and processing firms on a parity basis, characterised by an innovative path developed to face the changing conditions of policies and markets. The paper shows how governance capabilities and their implications on the competitiveness and chain's performance need to be explored by combining qualitative and quantitative analysis and indicators.

Keywords: localised agri-food systems, supply chains, governance, indicators.
JEL codes: O13, Q18, R11.

HIGHLIGHTS

- Territorial differences affect economic and governance models, which in turn influence agri-food chains capacity to address sustainability challenges and remain competitive.
- Indicators of the processing tomato supply chain in Northern Italy and Extremadura confirmed that systemic responses, cooperation networks and collaborative forms of governance are crucial to support mechanisms of adaptation to external changes.
- Inter-branch organisations ensure cooperation, price stability and better conditions for primary producers.

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1. INTRODUCTION

This paper focuses on the role played by local governance in the competitiveness of localised and highly specialised agri-food supply chains. Its original contribution consists in understanding of the influence exerted by endogenous and exogenous factors on the capacity to respond to transition challenges. These topics are developed by investigating the socioeconomic features of the processing tomato supply chain, with a specific focus on the areas of Northern Italy and Extremadura (Spain).

Firstly, in 2022 Italy was the second world producer of processed tomato after California, and the biggest supply chain in Europe. In the same year, Spain was, instead, the fourth world producer and second European one, and Italy's main competitor on European and world markets. Secondly, the Northern Italian supply chain accounts for over half of the Italian production. It is distinguished by a long, successful, and innovative organisational and technological path in an attempt to adapt to changing conditions in policies and markets. It is therefore interesting to compare these developments with those in Extremadura, which accounts for 80% of the Spanish processed tomato. Moreover, in both Italy and Spain, processing tomato represents a strategic crop not only for the high relevance of production and processing, but also for vertical and horizontal supply chain relations. Finally, in both Northern Italy and Extremadura, the processed tomato system is characterized by geographical proximity, distinctive governance patterns, consolidated relationships between producers and processing industries, historical local roots and identity.

The paper aims to understand how economic and governance models influence the capacity of agri-food supply chains to address current sustainability challenges and remain competitive. Our working hypothesis is that agri-food supply chains are embedded in the territory they belong to and that supply chain governance models affect the efficiency and resilience of the supply chain.

This study particularly focuses on the following research questions:

1. What are the differences between the two territorialized agri-food chains in terms of competitiveness factors?
2. How do supply chain organisation and governance arrangements affect their capability to compete?
3. How are socioeconomic and environmental transitions impacting the two areas, and which responses are they providing?

The study is developed in three sections. The first one (section 2) briefly reviews some of the most important strands of literature dealing with the agri-food supply chain. This section examines the theoretical framework suitable for considering the role of local governance in the Localized Agri-Food Systems (LAFS). The following section (section 3) describes the methodology followed in this study and deepens the understanding of the territorial and socioeconomic features of territorial supply chains. Section 4 explores the functioning of the processing tomato sector of the two major European players (Italy and Spain) and compares the specialised areas of Northern Italy and Extremadura in terms of supply chain structure and organization, power distribution along the supply chain and competitiveness factors. Finally, section 5 aims to analyse how the different governance arrangements within and beyond the two supply chains can influence the capability of responding to the relevant transition challenges in the two areas.

2. THEORETICAL FRAMEWORK

Agri-food systems are complex entities affected by local and spatial conditions, human behaviour, attitudes and decisions. They involve multiple distinct stages and different interrelated markets, actors and governance systems (Sexton, 2013), and are increasingly characterized by differentiated and quality-driven activities and products (Saitone, Sexton, 2010). In turn, higher transaction costs entail higher and more explicit coordination in the chain to codify products, enhance trust and reputation, and lower opportunism.

The combination of different activities of firms and economic agents finds expression in complex organisational systems, the supply chains, belonging to a broad category called hybrid institutions (Carbone, 2017), that is entities performing tasks that cannot be undertaken by markets or by the firms on their own (Ketchen, Guinipero, 2004).

In the streams of literature concerning supply chains, the concept of Localised Agri-Food Systems (LAFS) has gained relevance. LAFS can be a useful methodological framework to study the tomato supply chains. Initially, the concept of LAFS was strongly focused on the production system and interactions among firms within a given territory: this can explain why it was strongly influenced by the concept of cluster, adopted by Porter (1990, 2009) to define the spatial proximity of many production units and their reciprocal relationships. Spatial proximity, specialisation of territorial systems and their complex interplay were also at the centre of studies on the new economic geography in Krugman (1995), on the one side, and in the Italian school of

local development driven by Becattini's works, focusing on the concept of Marshallian industrial district (Becattini *et al.*, 2009), on the other. LAFS emerged in the mid-1990s as a concept referring to geographical concentrations of specialised farms, food-processing units, distribution networks, and private and public entities in a determined place. LAFS also appeared in the French literature, but as SYAL, or Systèmes agro-alimentaires localisés. Three distinctive features characterise LAFS: (a) place, (b) social relationships, and (c) institutions. The specificity of LAFS is in the spatial features of products, people, institutions and social relations that are embedded in food production. Place is considered in its widest meaning as used in the French school, that is the "terroir". Social relationships relate to trust and cooperation among actors. Institutions include all private and public agents promoting actions regulated by formal and informal rules. CIRAD-SAR (1996: 5) defines LAFS as follows: "*production and service organizations (agricultural and agri-food production units, marketing, services and gastronomic enterprises, etc.) linked by their characteristics and operational ways to a specific territory. The environment, products, people and their institutions, know-how, feeding behaviour and relationships networks combine within a territory to produce a type of agricultural and food organization in a given spatial scale*".

The subsequent debate on LAFS (Muchnik *et al.*, 2008; Perrier-Cornet, 2009; Resquier-Desjardin, 2010) clarified that LAFS differ from the notion of clusters in three respects (Pecqueur, 2013; quoting Muchnick, 2002): a) the creation of externalities related to the density of firms located in a place, and the proximity between actors; b) the presence of skills, work relations, and the know-how of individuals and companies which are founded on a common history and transmitted in collective knowledge, practices, rules and representations; c) the methods of regulation, based on a collective organisation as specific resource of the system, and a source of stabilisation and reproduction. Another relevant difference is the relationship within the territory underpinning LAFS, compared to the concept of *Système Productif Localisé* (SPL) and Industrial District (ID) of the French literature (Courlet, 2008). In SPLs and IDs, the concentration of economic activities in a relatively small area is emphasized. Conversely, in LAFS, Resquier-Desjardins (2010: 14) says that: "*the notion of geographic concentration, because of the dispersion inherent to rural territories, must be relativised: the spatial boundaries of the SYAL can be wide and sometimes concern an entire region, or simply some micro-areas in a region, constituting an archipelago territory […]. Moreover, if the link to rurality contributes to defining the relationship with the territory, the territory belonging to SYAL is not necessarily exclusively rural: the cities may be part of the territory of a SYAL and play a pivotal role […]*".

Relaxing the geographic concentration is particularly relevant for the two processing tomato supply chains examined in this study, both widespread in a very large territory and not relying on specificities linked to PDOs or GPIs, but on other types of production sustainability-related qualifications.

Governance of the supply chain has always been at the centre of the research on localised systems, notably under the LAFS conceptual category. Governance is deemed crucial to pursue strategies for competitiveness, resource sustainability and conservation over time. Definitions of governance in the literature concerning the localised systems imply different components: a) the notion of territorial resources involved in the governance process; b) the objectives/outputs of governance; c) the coordination of relevant actors; d) the multiple levels involved.

Regarding the notion of territorial resources, it is common to consider the concerned "territory" as a broad "source of resources" (Muchnik *et al.*, 2008), where different resources are included (social, cultural, natural, etc.). Other authors prefer to distinguish generic resources and specific assets for the concerned system (e.g. soil, quality characteristics, specific skills and know-how, geographic identity, etc.) (Perriet-Cornet, 2009; Pecqueur, 2013). Torres Salcido, Muchnik (2012) refer to "*a collective action on appropriation and building of tangible and intangible territorial heritage*".

Governance implies the achievement of different objectives. Some authors point out the value appropriation of territorial resources and the well-being associated with their valorisation (Torres Salcido, Muchnick, 2012). Objectives also include promoting production and consumption that are less harmful to natural and cultural diversity.

The coordination of different collective actors is a crucial component of the concept of governance. Muchnik *et al.* (2008) identify governance with methods and rules allowing more stable coordination of individual and collective actors. Torres Salcido, Muchnick (2012) put more emphasis on the role of governance mechanisms within the LAFS, defining an ideal type of LAFS as "*an agri-food system (production/transformation/services) in a specific territory in which actors try to set up coordination and collaboration processes in partnership terms, with internal management and regulation but with strong ties to public managers and companies*". Besides coordination, Pecqueur (2003) points out governance as a dynamic process leading to mediation of inter-

ests ("institutional compromise") between public and economic actors (farmers, processors, service providers and marketing operators). It is particularly relevant where actors with very different powers and often conflicting strategies compete to distribute the value-added achieved at the local level. Power relations within the supply chain can differ according to the sector and the capacity to control the production specificities and assets of the chain. According to Perrier-Cornet (2009), the stability of LAFS over time strongly depends on a minimum power balance among the actors managing the territorial assets and their capacities to activate these assets. The presence of Producers Organisations (POs) favours the increase of the value added of productions of their associates and permits the collective representation of farmers' interests. Producers, in fact, are in competition with each other but are also in a weak position relative to the food industry and commercial operators. However, as POs may also harbour inefficiencies (especially in the absence of direct commercialization), a fairer supply chain would require the presence of Inter-Branch Organisations (IBOs) to coordinate the different actors/steps by facilitating the dialogue and promoting good practices and market transparency.

Like in the case of Local Action Groups for the LEADER and Operational Groups for the European Innovation Partnerships (EIP-AGRI), "intermediate local bodies" play a relevant role in brokering initiatives for the rural population and policy delivery. We hypothesize that IBOs can play a similar role by ensuring coordination of the supply chain actors and relations with other territorial actors.

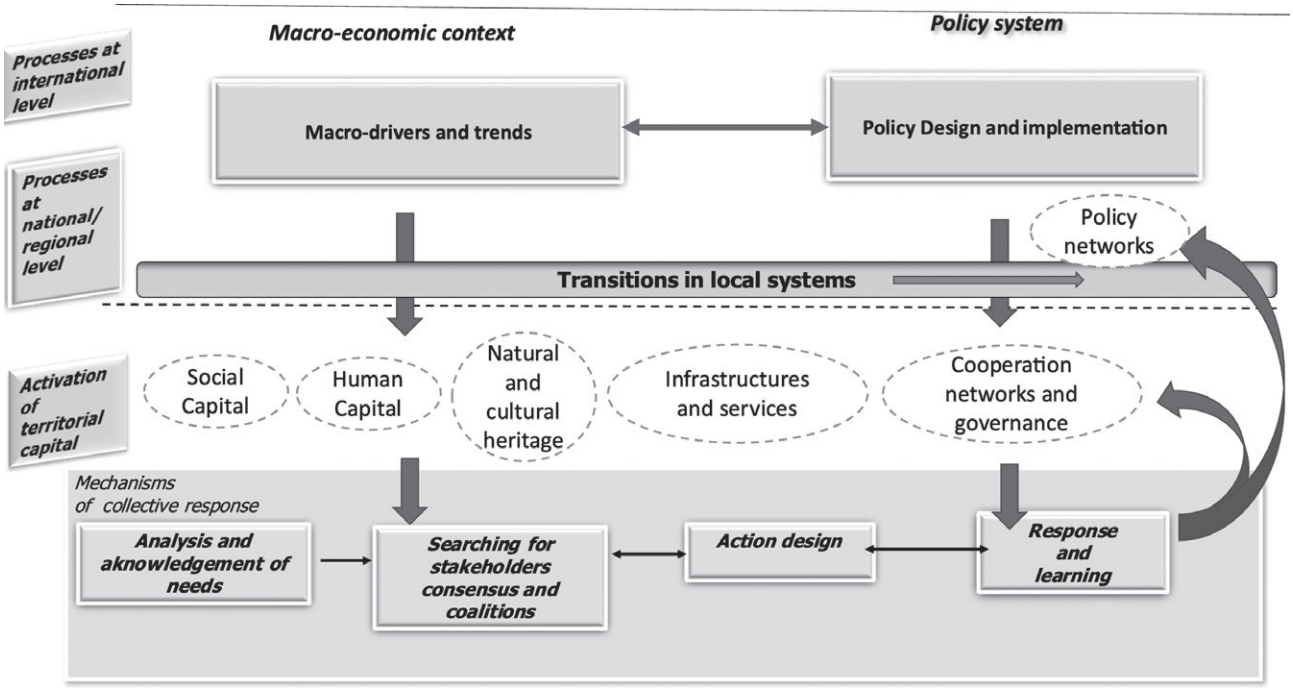
The notion of governance also involves considering the broader relations of the supply chain within the territory (territorial governance). Territorial governance is receiving progressively more attention due to the increasingly multifunctional nature of agri-food chains and the linkages of the supply chains with other sectors, natural resources, infrastructures and population activities (Muchnik *et al*., 2008; Pecqueur, 2003). It means that supply chain activities can have positive and negative relations with municipal/regional authorities, research and training institutions, civic associations, regional development agencies, institutions regulating access to labour markets, etc. Good networks with all these agents can benefit, developing a sustainable and competitive supply chain. Moreover, analysing local tiers always leads us to discover the importance of multi-level relationships and the role of external networks (with regional/national institutions, other areas, etc.) (Mantino, 2021).

Cooperation networks and collaborative forms of governance represent crucial adaptation mechanisms to external changes. In recent research funded within the Horizon Europe framework project RUSTIK (Rural Sustainability through Integration of Knowledge for Improved Policy Process), Mantino *et al.* (2023) reviewed a series of studies exploring how local systems have different capacities to respond to shocks, risks and opportunities. The policy system can influence transition processes in different ways: by defining a set of goals (i.e., environmental goals to be reached by a certain period), and/or implementing regulations, incentives and advice/information campaigns which aim to facilitate and enable transition possibilities and pathways, etc. Likewise, local systems have different capacities to comply with and use policy transition goals, incentives and regulatory tools. In our approach, the main hypothesis of research is that LAFS are able to face the relevant transitions through the capability of setting up better contractual relations within the supply chain and between the actors of the supply chain and other territorial actors.

Figure 1 illustrates the theoretical framework followed in this study. The focus is on mechanisms of response to challenges and opportunities for transitions. In particular, the analysis tried to distinguish between individual responses provided by single actors (like processed tomato industries) and collective responses by coalitions of actors. In this regard, this analysis focuses on those institutions that have the capacity to mediate between contrasting interests. Collective responses, in this methodological approach, seek to activate what Camagni, Capello (2013) call "territorial capital": "*In a general but compact definition, territorial capital may be seen as the set of localised assets – natural, human, artificial, organizational, relational and cognitive – that constitute the competitive potential of a given territory*" (p. 1387).

In this stage of the research, given the complexity of disentangling all the territorial capital components, the investigation of collective responses focused on the analysis of how local actors found new governance arrangements and activate their policy networks to face the transition challenges. The construction process of these collective responses, as described in Section 4, was not achieved in a short period but has taken place over a long time, strongly influenced by the evolution of the Common Agricultural Policy. However, the response mechanism requires the mediation of interests and the creation of new coalitions among stakeholders with different functions along the supply chain and the consequent setting up of governance arrangements ensuring an improvement of the general well-being.

Figure 1. Mechanisms of response at territorial level to the transition challenges and opportunities: a theoretical framework.



Source: rearranged by authors from Mantino *et al.*, 2023.

3. MATERIALS AND METHODS: DATA COLLECTION AND GENERAL CHARACTERISATION OF SUPPLY CHAINS

To respond to the research questions, this study envisaged an extensive collection of information about the supply chains' internal structure and their attitudes and capabilities to respond to transition challenges. In the period 2011-2022 competitiveness and resilience of agri-food systems have been profoundly challenged by climate change and international instability (in 2020-2022, mainly related to the COVID-19 pandemic). Data collection concerned: a) the structure of processed tomato production; b) the degree of differentiation of tomato production; c) the volume and composition of exports towards European and international markets; d) the supply chain organisation (importance of cooperation, types of economic operators at the different levels, types of contracts, relationship with markets).

Information is not always available from current institutional sources and had to be collected through an extensive analysis of different sources at the international level (i.e., World Processing Tomato Congress, Tomato News, etc.), national and local (Ministry of Agriculture, Regional Statistics, organisations representative of the supply chain, current publications, websites of tomato industries, etc.). More specific information has been gathered in the two areas (Northern Italy and Extremadura), notably by organisations representative of the supply chain (Inter-Branch Organization for Processed Tomato of Northern Italy, and Centro Tecnòlogico Nacional Agroalimentario Extremadura – CTAEX and Mesa del Tomate for Extremadura). This information has been complemented by interviews with relevant local stakeholders aiming to gain insights into current strategies/projects addressed to the main transition challenges.

Following a preliminary desk analysis, online semi-structured interviews with local experts have been organised on the following topics: a) the organisation of the supply chain; b) the role of bodies responsible for management of inter-branch relationships; c) number of operators in each supply chain and their juridical nature (private/cooperative); d) formal and informal relations of cooperation/collaboration within the supply chain and in the broader territory; e) current and future strategies/projects regarding research, knowledge exchange and markets, which have been promoted by collective actions in the single supply chain.

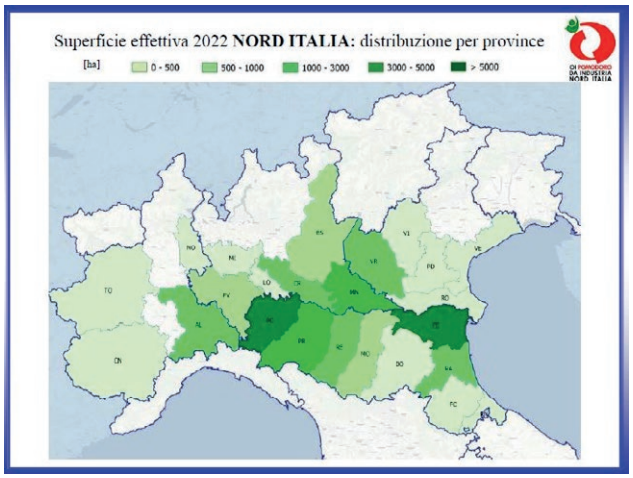
Information regarding the IBO of Northern Italy has been collected within the framework of the Horizon Europe research project RUSTIK. Regarding Extremadura, data have been gathered through a complementary desk analysis and interviews to achieve comparable infor-

mation as far as possible. Data collection required a parallel work of harmonisation to ensure robust comparability of indicators. Nevertheless, harmonisation sometimes turned out to be unfeasible because of huge differences in available basic information and databases at the national/regional level. Triangulation between official data sources, specific data at the local level and interviews allowed reasonable comparisons to be made, indispensable for the purpose of this work, though often not completely exhaustive. Limitations in analysing data come from the granularity of information needed to make comparisons at the local/territorial level. LAFS often cannot be identified within the current administrative units (region/province), and this requires that researchers collect direct information on the ground or use available information at the lower level of granularity (LAU, municipal). These limitations hold true, particularly for economic data (production and export/import).

The supply chain of Northern Italy covers four regions (Emilia-Romagna, Lombardy, Piedmont and Veneto) (Figure 2), about 38,000 hectares (average 2020-2022) under tomato production, 2,000 producers and 21 processing firms, almost 3 million tons of tomato processed in paste (concentrate), pulps and puree representing 58% of the country's processed tomato and 25% of the European production. Although the production area is quite large (Figure 2), there is a concentration in the Emilia-Romagna region, notably in the provinces of Piacenza, Parma and Ferrara.

The supply chain of Extremadura is more geographically limited since it covers two provinces (Badajoz and Caceres) (Figure 3), with 60% of total production concentrated in six municipalities. It accounts for about 22,000 hectares under tomato (average 2020-2022), about 1,000 producers and 14 companies processing 1.9 million tons of tomato (62% of the Spanish tomato production).

Figure 2. The processed tomato production area in Northern Italy (hectares, 2022).



Source: Inter-Branch Organisation for Processed Tomato of Northern Italy.

4. ANALYSIS OF THE SUPPLY CHAINS

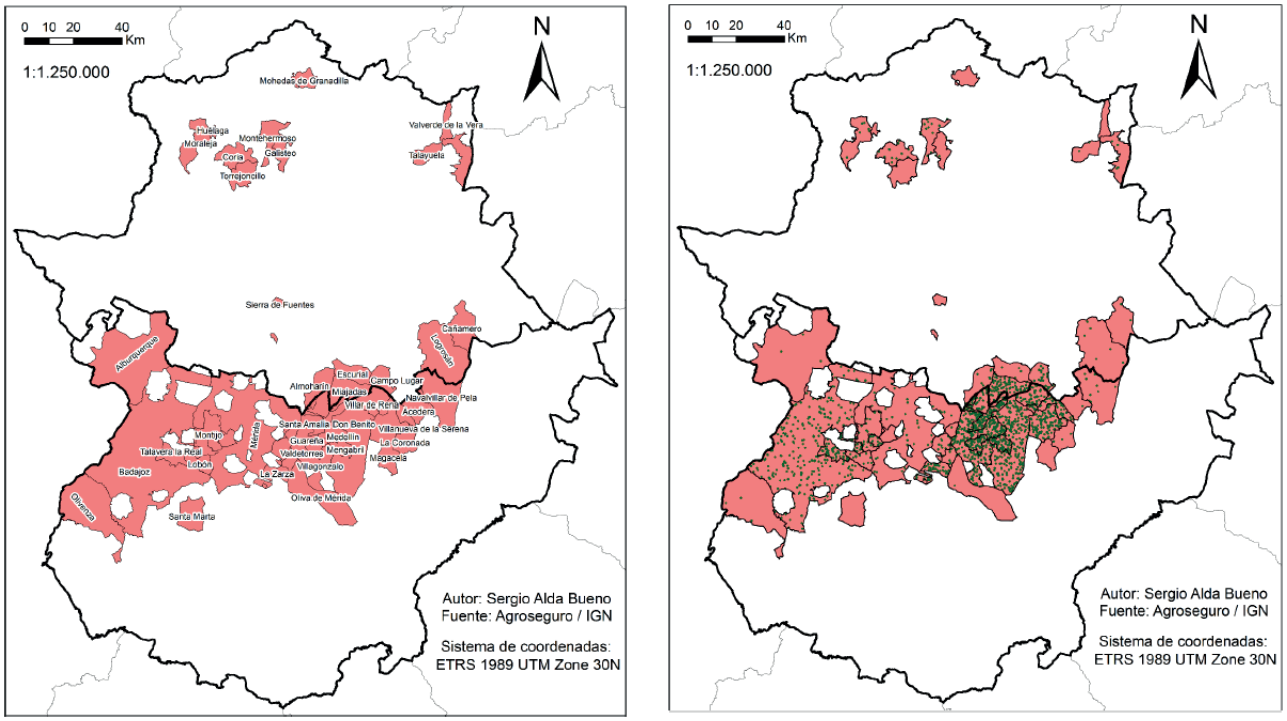
This section aims to respond to the first two questions concerning the differences between the two territorialised agri-food chains and the supply chain's organisation and governance arrangements effects on their capability to compete.

4.1. The evolution of organisational forms of the processing tomato supply chain: the cases of Northern Italy and Extremadura.

The evolution of supply chains in the two areas is quite diverse, but with some relevant common features. The origins of the Northern-Italian supply chain can be traced back to the beginning of twentieth century, thanks to the development of agronomic practices and technologies, the birth of the first processing company in 1906 (in 1912 they became ten) and the creation of a widespread farm advisory system (implemented by farm advisors grouped in associations called *Comizi agrari* – Agrarian Committees – and *Cattedre ambulanti* – Itinerant Professorships). Technological innovation in the tomato district has been substantially promoted and supported by two Experimental Farms ("Vittorio Tadini" set up in the area of Piacenza in 1928 and "Stuard" operating in the area of Parma since 1847) and the Experimental Station for the Food Preservation Industry (SSICA) established in Parma in 1922. The organisation of the tomato district (see section 4.2) has grown in the direction of LAFS, fostered by factors like geographical proximity, sense of ownership, common interests, shared values and rules, exchange of information and knowledge, etc. (Canali, 2012; Giacomini, Mancini, 2012; Arfini *et al.*, 2007). The local development process has involved the broader industrial system since a parallel growth of the processing machinery industry has taken place, allowing better conservation of the nutritional and healthy qualitative features of preserved tomato (Sandei *et al.*, 2022). The birth of the Experimental Station was promoted at that time by industrial companies to enhance the quality of tomato production in the context of rising demand from national markets.

The supply chain in Extremadura has more recent origins. The first processing tomato companies were set

Figure 3. The processed tomato production area in Extremadura: municipalities (left) and relative distribution of surface and production by municipality (right) (2020).



Source: Alda Bueno S. (2021) (pp. 37-39).

up in the early 1970s and grew thanks to several factors. The region had been previously well-equipped with water reservoirs and irrigation infrastructures. Tomato production developed in the Guadiana River Basin in the 1960s thanks to abundant water resources, so that the irrigated area reached about 110,000 hectares. Tomato could also benefit from the favourable dry and warm climate of the area and increasing European demand. Access to the European Community in 1986 and external investments from multinational firms triggered the growth of the tomato industry (Universidad de Extremadura, 1987). The development of the supply chain has been even more significant in the last two decades thanks to substantial private investments and continuous CAP support.

CAP's role gave impetus to the supply chain in both areas. Both Italian and Spanish literature point out this role in three different turning points.

The first turning point, called "*growth through production expansion*", was initiated in 1978 by the creation of the support regime for the processed tomato (Commission Regulation No 1515/78[1]), envisaging a payment per ton of fresh tomato delivered to the processing industry, and a minimum price set by the European Commission (EC). This system was based on contracts between primary producers and processors, to bring about market stability for a certain period and income stability for producers.

In the second turning point, the EC revised this system since huge market imbalances were increasingly generated by production surpluses. In this period, called "*growth through production rationalisation*", the EC set country production quotas (Council Regulations No 2200/96 and No 2201/96 concerning the Fruit and Vegetables Common Market Organisation[2]) at the processing industry level and delivered EU price support only to those industries stipulating contracts with Producer Organisations, which became the direct beneficiaries of

[1] European Commission (1978). Commission Regulation (EEC) No 1515/78 of 30 June 1978 fixing for the 1978/79 marketing year the amount of production aid for tomato concentrates, peeled tomatoes, tomato juice, peaches in syrup and prunes and the minimum price paid to producers, ELI: https://data.europa.eu/eli/reg/1978/1515/oj.

[2] European Council (1996). Council Regulation (EC) No 2200/96 of 28 October 1996 on the common organisation of the market in fruit and vegetables. ELI: https://data.europa.eu/eli/reg/1996/2200/oj; European Council (1996). Council Regulation (EC) No 2201/96 of 28 October 1996 on the common organization of the markets in processed fruit and vegetable products. ELI: https://data.europa.eu/eli/reg/1996/2201/oj.

support. This new regime gave further impetus to the diffusion of POs, concentration of industrial installations and increasing productive capacity of the remaining industries.

The third turning point ("*growth through better governance*"), was shaped by the Fruit and Vegetables Common Market Organisation (CMO) reform and the decoupling of direct support, put forward by the Fishler's Commission (2007), that meant a deep revision of the sector. The decoupling mechanism implied a reduction of EU support and market stabilisation through inter-branch agreements and cooperation. The aggregation of tomato producers into POs had already started in the 2000s, when producers and processors associations formalised inter-branch contracts to set granted quantity of products, reference price and qualitative characteristics for the annual campaign. In this phase, the institutional novelty was an intermediate body to ensure the good functioning of inter-branch relations. In Northern Italy, a first inter-branch association (the District of processed tomato of Northern Italy) was set up by POs and processing industries in the provinces of Parma, Piacenza and Cremona just in the year of CMO reform (2007). In the subsequent four years, the district area was extended to other Northern Italian provinces and went beyond the Emilia-Romagna region by including POs and tomato industries of Lombardy, Piedmont and Veneto. In 2011, this association was transformed into an Inter-Branch Organisation (IBO), formally acknowledged by Emilia-Romagna Region and then approved by the European Commission.

In Extremadura, relations between tomato growers and processors were handled by the "Comisiòn Interprofessional Territorial del Tomato para Industria", set up in 1992 as a governmental agency to control and monitor the fulfilment of inter-branch contracts. In 2001, it was reorganised and became the Association "Mesa del Tomate" (Tomato Bureau), grouping POs, cooperatives and processing industries, mainly in charge of quality control of tomato delivered to industries and focusing on commercial aspects and on pesticide residues (Llerena Ruiz *et al.,* 2021). Nowadays, all processing tomato producers belong to POs, are affiliated with Mesa del Tomate and benefit from the scheme. The Mesa del Tomate has been managing inter-branch contracts (quantity, reference price and qualitative characteristics) and mediating between the different partners (Branthôme, 2017). Extremadura shows a parallel process of diffusion of POs linked to the CMO reform. Cooperatives, either individually or as associations of cooperatives (Cooperativas Agro-Alimentarias Extremadura, formerly named Unión Extremeña de Cooperativas Agrarias – Unexca) have also applied to be acknowledged as POs. The birth of the cooperative processing industry in Extremadura is, however, more recent than in Northern Italy (2002-2003).

In conclusion, the CAP support and related reforms had a substantial role in accompanying and influencing the economic and institutional dynamics of the tomato sector in both regions.

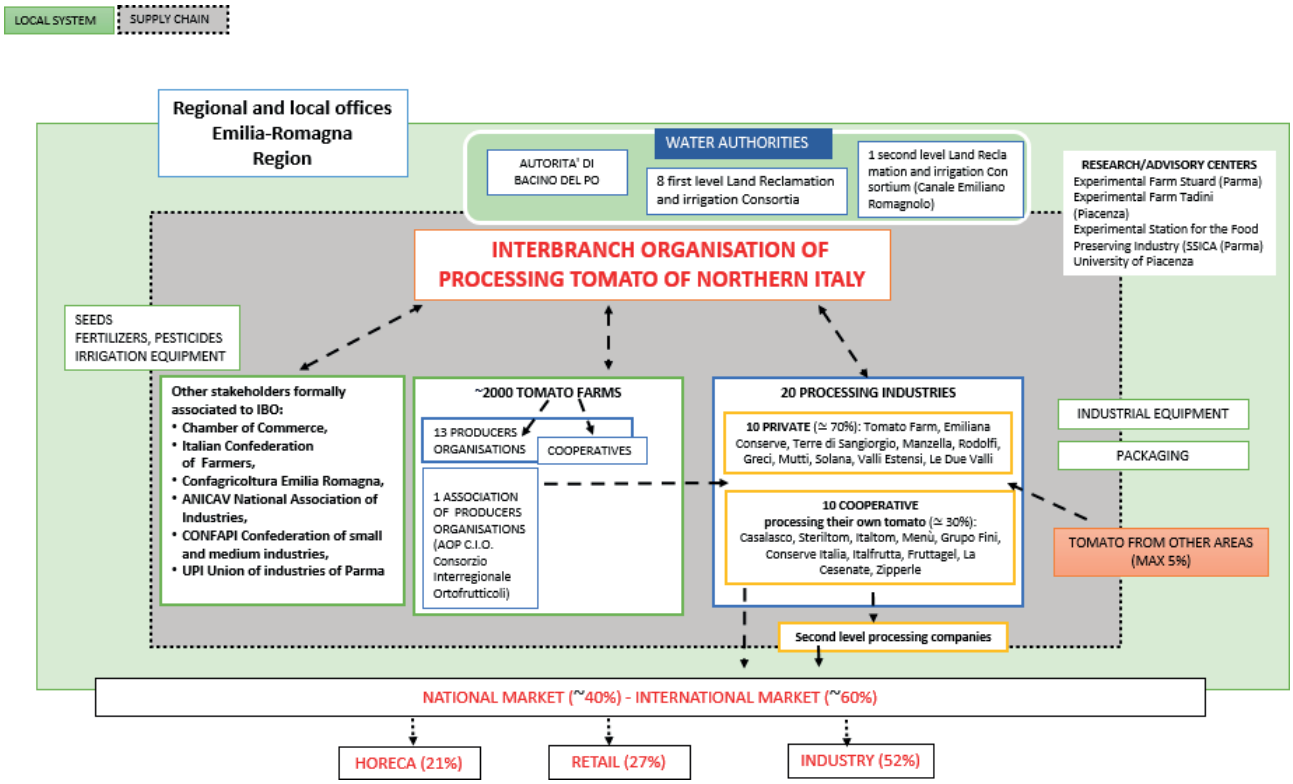
The organisation of supply chains is summarised in Figure 4 (Northern Italy) and Figure 5 (Extremadura). Based on qualitative analysis of the existing literature and interviews with experts and local stakeholders, these figures outline the main components of the two supply chains under analysis (represented in the grey areas of the two figures) and relations[3] with other actors in the broader territorial context (green areas).

In 2022, the main actors of the Italian supply chain are farmers and cooperatives, grouped in 12 POs, and 21 processing industries, partly cooperative and partly private, having direct relations with foreign and national markets. The IBO is a mediator and bonding agent between the chain's actors. A key initial role to create IBO was played by the province of Parma. The importance of non-sectoral actors is witnessed also by the inclusion of local authorities and research and training bodies among IBO's associates and Advisory Board. Research and experimental institutions have always been accompanying technological and agronomic enhancement both in agricultural practices and industrial processing. Three research centres (two experimental farms and one experimental station for food processing industries) and the Agriculture Departments of the local Universities (Parma and Piacenza) currently implement field trials on new tomato cultivars, more sustainable plant-protection treatments, training and advisory activities, and a broader range of industrial research from the first processing to innovative packaging materials and by-product recycling. The networks between the IBO and regional research and experimental centres are often structured through specific research projects, under the form of European Innovation Partnerships (EIP-Agri) funded by rural development measures.

Broader networks within the area also include Irrigation and Reclamation Consortia operating across the river Po Valley, which have been formalised through specific protocols of understanding, notably to manage the tomato irrigation needs in the peak season. Beyond formal relationships, frequent meetings and day-by-day contacts with water authorities are functional to advocacy initiatives aiming to influence the regional policies for water infrastructures. Two-thirds of the cultivation and most of the

[3] Relations have not been measured as regards the intensity since, at this stage of the research, the main objective was undertaking an inventory of main actors and understanding their role in the supply chain.

Figure 4. The actors of the processed tomato supply chain in Northern Italy.



relevant stakeholders are in Emilia-Romagna, notably in three provinces (Piacenza, Parma and Ferrara). This territorial concentration affects IBO's policy networks: in fact, advocacy and lobbying activities are more effective in Emilia-Romagna than in other concerned regions ("*our main institution of reference is the Region, because of the proximity with our main stakeholders*", from interviews with IBO actors). According to our estimates, tomato growers and processors have been beneficiaries of the CAP measures[4] for about 301 million EUR, more than one-fifth of the total CAP spending from 2003-2015 in Emilia-Romagna (Mantino, Forcina, 2017).

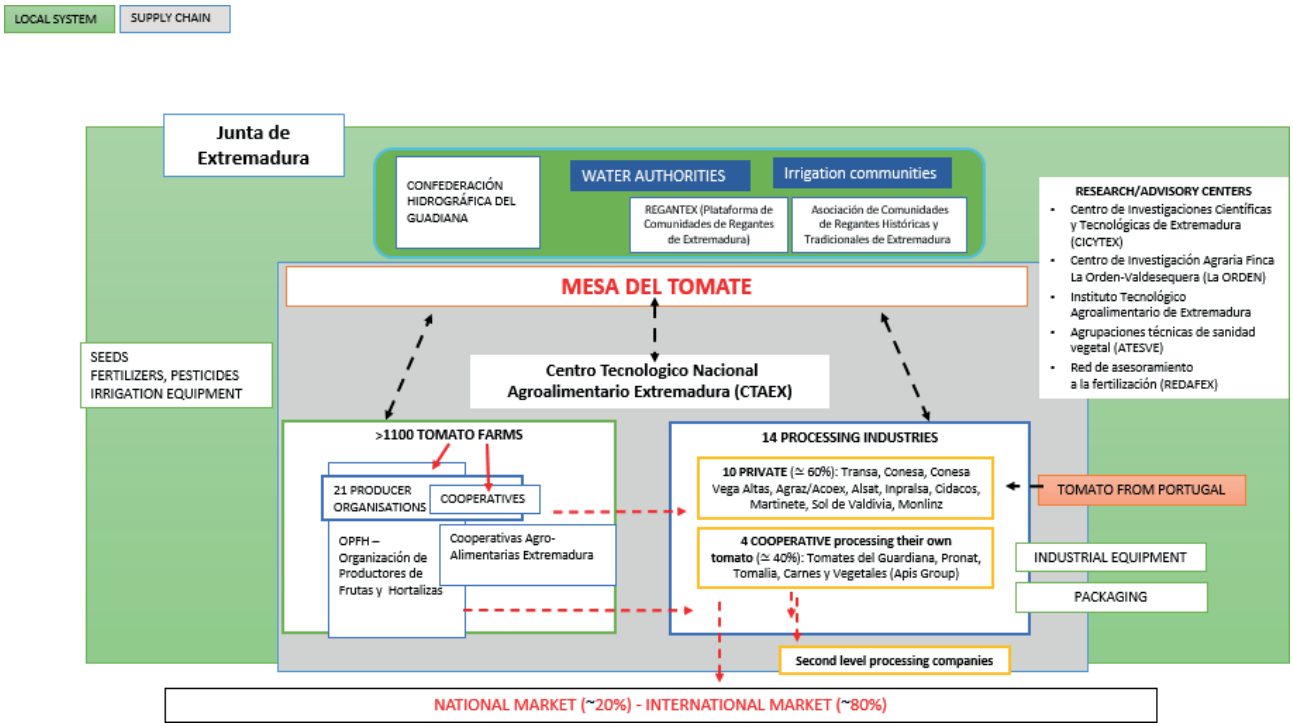
IBO's territorial networks also include formal collaborations with vocational training centres, accredited by the regional administration, to promote training courses for personnel to be recruited for specific skills unavailable in the local/regional labour market.

Intense connections have been set between the tomato industry and local food industry as the destination of the first processed tomato (i.e., concentrated tomato paste) to produce higher-valued food products (i.e., sauces, etc.). The proximity of a diversified system of food industries (as, for example, in the so-called Parma Food Valley District) represents a source of external economies for the supply chain that has been reinforcing its stability over time.

The Mesa del Tomate plays the role of supervisor of quality controls of tomato delivered to industries within the supply chain. The Mesa does not formally act as an inter-branch institution, although it performs some functions typical of an IBO. In fact, this association is led by a council composed of twelve members, with equal representation of the agricultural and industrial sectors. A similar balance of power is adopted in the IBO of Northern Italy. Within the primary producers' component, in Extremadura, the share of cooperatives is 60% of total production (and 40% of the processed tomato), much higher than in the Italian case (30%). However, the average quantity of tomato contracted by each PO is 90,300 tons in Extremadura and 170,120 tons in Northern Italy, implying a weaker bargaining power of the processing industry in the former. Furthermore, in Extremadura, the possibility of contracts between individual tomato producers and the processing industry is admitted (whereas it is not possible in Northern

[4] Most of these CAP interventions are the transitory coupled direct support and CMO Fruit and Vegetables Operational Programmes. Over time, coupled support disappeared and agro-climatic payments became more important for tomato producers.

Figure 5. The actors of the processed tomato supply chain in Extremadura.



Italy). Mediation of conflicting interests between POs and processing firms is a difficult task in both areas, which becomes more relevant at the beginning of each production campaign. However, the Northern Italian IBO seems to play a more proactive role than the Mesa del Tomate in Extremadura. In the latter case, Mesa is involved mainly as a "discussion forum" upon quality controls, related sanction and reward criteria, and resolution of conflicts related to the qualitative characteristics of tomato delivered to the industry. Figure 5 shows that, unlike the Italian case, CTAEX (Centro Tecnológico Nacional Agroalimentario Extremadura), a private centre for innovation and food technology founded in January 2001, provides advanced research and advisory services in the agri-food sector and also carries out more operative functions: monitoring contract terms and technical assistance on quality and environmental standards required by law and integrated production rules. In this regard, CTAEX represents a significant difference from the Italian case. Indeed, a huge research and knowledge exchange programme of CTAEX has been funded by Mesa del Tomate since 2001[5], and many other relevant research projects have been conducted lately by the CTAEX and Mesa del Tomate, mainly financed by European funds[6]. Besides the CTAEX, which is a private entity, another public body (CICYTEX – Centro de Investigaciones Científicas y Tecnológicas de Extremadura) carries out research projects funded mainly by public institutions.

The CTAEX also provides updated information on technological and market issues through the Observatory for processing tomato[7]. This undoubtedly fills a series of information gaps which are evident, by contrast, in the Northern Italian supply chain where research and knowledge exchange between private industries and research institutions appears still quite fragmented.

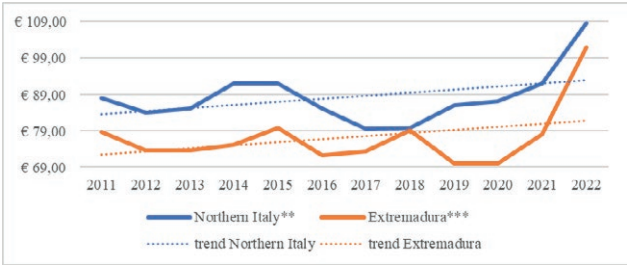
The Extremadura local system, by contrast, has developed less intense relations with local actors beyond the supply chain. Structured and formalised channels of cooperation with water management authorities, vocational training centres, etc., are not in the Mesa del Tomate's range of activities.

[5] CTAEX has implemented a huge programme of knowledge exchange transfer between 2001 and 2010 through experimental farms and laboratories to spread practices of integrated production among tomato growers and processors (Llerena Ruiz *et al.*, 2021).

[6] CTAEX has implemented a huge programme of knowledge exchange transfer between 2001 and 2010 through experimental farms and laboratories to spread practices of integrated production among tomato growers and processors (Llerena Ruiz, 2016) and through EU-funded research programmes (see: https://observatoriotomate.com/ctaex/id/).

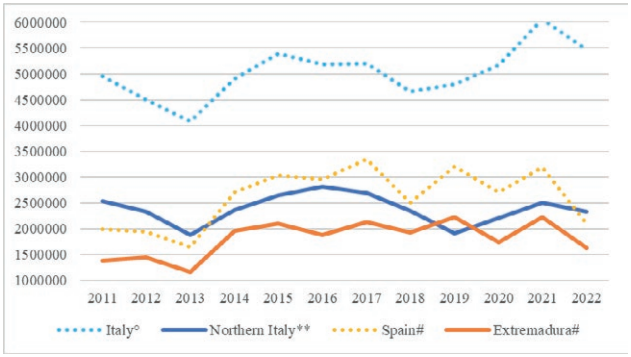
[7] For more information: https://observatoriotomate.com/

Figure 6. Annual level of contracted reference prices in Northern Italy and Extremadura (2011-2022).



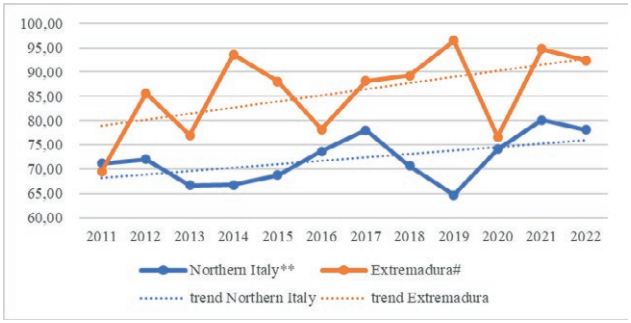
Source: Own elaboration on different sources of data: ** IBO Processing Tomato of Northern Italy; *** Universidad de Exremadura, Informe La agricultura y la ganaderia extremena, various years.

Figure 7. Processed tomato in the two countries and in Northern Italy and Extremadura (tons, years 2011-2022).



Source: Own elaboration on different sources of data: °WPTC; **IBO Processing Tomato of Northern Italy; #Observatorio Tomate on data Mesa del Tomate and Consejería de Medio Ambiente, Rural Políticas Agrarias y Territorio de la Junta de Extremadura.

Figure 8. Tomato yield in Northern Italy and Extremadura (tons per hectare, years 2011-2022).



Source: Own elaborations on different sources of data: **IBO Processing Tomato of Northern Italy; #Observatorio Tomate on data Mesa del Tomate and Consejería de Medio Ambiente, Rural Políticas Agrarias y Territorio de la Junta de Extremadura.

Processed tomato is produced in both areas on a contractual basis, and trading between POs and processing firms happens under common and transparent rules. Commercial relationships are regulated by Standard Contracts (defined by a national law in Spain) or Framework Contracts (defined by the IBO in Northern Italy). Non-compliance with agreed rules in quantity or quality is penalised in different ways, ranging from fines to exclusion from the association in the case of Northern Italy. Fulfilling the rules (no pesticide residues or chemical ingredients, brix level, consistency, flaws, etc.) guarantees prices agreed in the negotiation. Figure 6 shows trends in reference prices agreed in each campaign between 2011 and 2022. Prices can be variable annually due to different factors, but in both local systems, trends have been upward over the decade. In the last three years, adverse climatic conditions (drought), COVID-19, and rising market demand have pushed contracted prices upwards, notably in Northern Italy. This trend aligns with world and European reference prices, which have been continuously rising since 2019 (He Peng, 2022). In conclusion, the effects of inter-branch contracts have meant improvements in production quality and environmental sustainability, alongside better prices for primary producers.

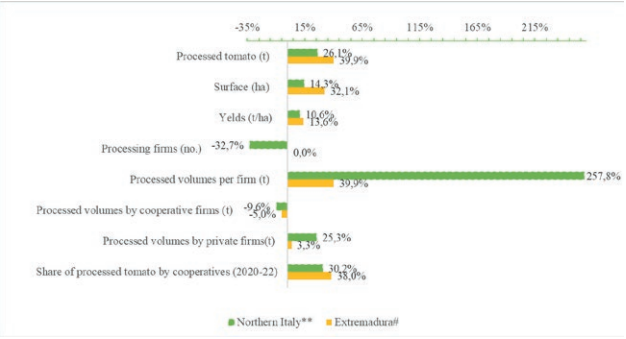
4.2. Factors of competitiveness

Italy and Spain are the most important producers of processed tomato in the European Union and ranked as second and third in the top five world producers for the year 2022. Northern Italy's production of processed tomato is higher than Extremadura and close to the total Spanish production (Figure 7): in the last three years, the annual average processed volume is 2.9 million, against 1.9 million tons in Extremadura.

Trends in the last decade are increasing (despite the reduction in some years due to adverse climatic conditions) in both areas due to a rising extension of planted surfaces (notably in Extremadura) and agricultural yields. The yield gap between the two areas is striking (Figure 8) due to the better climatic conditions of Extremadura and the exceptional duration of the harvest season. Yield progress, in general, has been significant due to the genetic improvement of local varieties and agricultural practices in both areas, but it appears particularly outstanding in Extremadura, where it doubled between 2001 and 2014 (Llerena Ruiz, 2016).

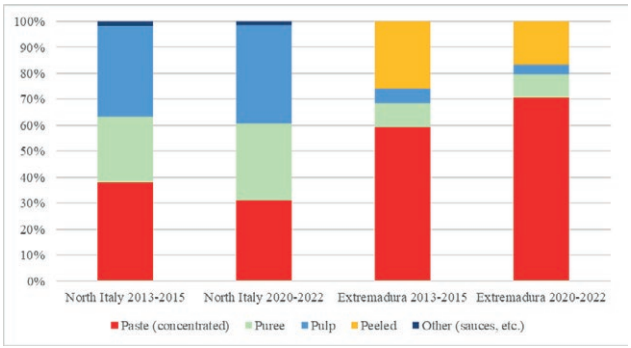
Restructuring processing capacities, implying a reduction in the number of companies, took place notably in Northern Italy, with a parallel huge growth of their

Figure 9. Supply chain dynamics: % rate of change between average 2011-13 and average 2020-22 in the two areas.



Source: Own elaborations on different sources of data: **IBO Processing Tomato of Northern Italy; #Observatorio Tomate on data Mesa del Tomate and Consejería de Medio Ambiente, Rural Políticas Agrarias y Territorio de la Junta de Extremadura.

Figure 10. Processed tomato categories of production: % shares of tons processed in the different categories, comparison between average 2013-2015 and average 2020-2022 in the two areas.



Source: Authors' estimates on data from ISTAT (Northern Italy) and from Observatorio Tomate on data Mesa del Tomate and Consejería de Medio Ambiente, Rural Políticas Agrarias y Territorio de la Junta de Extremadura and from MAPA – External Trade (Extremadura).

production volumes (Figure 9): the private processing companies have been expanding their production volumes, whereas the cooperative ones are lagging behind or reducing their productive share at territorial level, remaining around 30-38% of total tomato production.

The two supply chains grew in the recent decade by achieving different market niches (Figure 10). The Northern Italian processing industry has been increasing the production shares of pulps (about 40% of total production) and purees (30%), whereas concentrated paste has decreased. By contrast, in Extremadura, the dominant production, showing an increasing trend over the decade, is the one reported under customs codes 200290.91-99, which includes concentrated pastes with a dry matter content from more than 30% by weight up to dehydrated tomato powder at 96-98% Brix. Extremadura hosts some of the world's leaders in the dried powdered tomato market, like CONESA, TRANSA and Tomates del Guadiana companies, which have very few competitors on the world market. This different specialisation implies that the two areas under examination are competing in different segments of the tomato markets. The Extremadura industrial companies have recently sought to expand canned tomato production (peeled and pulp categories) (Branthôme, 2021), but the dominant production remains dehydrated powdered tomato, representing a raw material for further processing outside the Extremadura region. Furthermore, the static trend of exports of peeled and pulp tomato underlines the difficulty of gaining market shares by competing with Italian exports, the world leader in these categories.

Both local systems have performed well in export dynamics in the last decade (average change rate between three-year periods 2013-2015 and 2020-2022): exports' value grew 35% in Extremadura and 43% in Northern Italy. Product specialisation differs since Northern Italy increased pulps (+52%) and puree (+68%). In contrast, Extremadura had an outstanding performance in exporting concentrate tomato (+159% of concentrate up to 30% of dry matter) in the European market. Unfortunately, there is no comparable information on export composition for Northern Italy. Still, experts confirm a more significant share of exports towards Germany and, within extra-UE markets, in the USA.

The different market specialisation also implies a different capability to keep a relevant share of agricultural value added in the concerned territory. The analysis shows that the Northern-Italy supply chain provides more elaborate products than Extremadura due to different competitiveness factors: technological progress, business strategies and better marketing capabilities (through private brands, for example). Some of these factors pertain strictly to the specific management capabilities, which have been accumulated over years of product specialisation, diffusion of innovation and relationships with export markets.

5. THE RESPONSES OF LOCAL SYSTEMS TO SOCIO-ECONOMIC AND ENVIRONMENTAL TRANSITIONS

This section aims to respond to the third research question concerning how socioeconomic and environmental transitions are impacting the two areas, and which responses they are providing.

The two local systems have been facing increasing transition challenges in the last decade. The most significant macro-drivers and trends have been as follows:

a) competition with other world producers (notably California and China) on international and European markets, based on quality and health standards (He Peng, 2022; Vazquez, 2022);

b) demographic changes, which imply a high rate of depopulation in regions like Extremadura and low rates of fertility and high ageing of the population for regions of Northern Italy (Mantino *et al*., 2023). These demographic changes might translate into a reduction of the labour force at the local level and increasing difficulty in recruiting skilled personnel for the processing industry. A shrinking labour force has been only partially counterbalanced by extra-European immigration and capital-intensive technology (i.e., through diffusion of mechanical harvesting). The issue of investing in skills and permanent labour resources holds true in both supply chains. Still, the problem of discontinuity in the labour supply over the years is common in all tomato industries, but it is stronger in Extremadura because of the prevalence of temporary employment in the tomato industry. In Northern Italy, according to interviewed stakeholders, the presence of more elaborate and high-value-added production requires more skilled personnel;

c) climate change implies increasingly warm temperatures in the growing season and reduction of water availability for a high water-demanding cultivation and processing industry. Increasing competition with other users (industrial, power generation, civil uses, waterways) has been occurring in the last decade and a transition to higher efficiency and new water sources will be required;

d) digitalisation and use of ICT in processed tomato production is another transition that has become functional to face market competition, demographic and climate changes and perceived by all stakeholders as still insufficiently developed in digital infrastructures and necessary skills.

Further transition challenges come to local systems from the policy reform at European level: the Green Deal and related strategies moving towards a healthier and sustainable EU food system raises new challenges for the agricultural sector and tomato industry. First, the Farm to Fork Strategy (European Commission, 2020) sets new policy objectives by 2030, like the following: 1) reducing the overall use and risk of chemical pesticides by 50%; 2) reducing the use of fertilisers by 20%; 3) ensuring that at least 25% of the EU's agricultural land is under organic farming; 4) revising the existing Food Contract Material (FCM) legislation to ensure food safety standards and support sustainable packaging solutions, and contribute to reducing food waste in the EU; 5) revising the Food Information to Consumers (FIC) to enable consumers to make informed and health-conscious food choices (nutrition and healthy chains, origin of food, date marking, etc.). Second, the "*FIT for 55*" Strategy set as an objective the reduction of at least 55% of greenhouse gas emissions by 2030. In conclusion, future EU policies set relevant transition challenges, which appear very ambitious according to a recent position of the European Association of Tomato Processors (Vazquez, 2022).

Local systems responded to the different transitions in different ways (individual and systemic responses). Individual responses are put forward by tomato industries to enhance their competitive capacity in the national and international markets. In both local systems, the industry's responses are quite similar and developed along these lines: a) the adoption of quality and environmental certification for their product themselves, agricultural practices, and traceability systems. To access different types of certifications, some industries also conducted studies on the water footprint of tomato production practices (cultivation, processing, packaging, and transport) (Mantino, Forcina, 2018); b) investment in tomato varieties complying with the criteria demanded by the industry (Brix, lycopene content, viscosity, etc.) to guarantee the quality of raw materials. For example, the Spanish group CONESA, one of the biggest groups in this country, promoted experimental fields and improved agricultural practices in 1,400 hectares that the group is currently cultivating; c) diversified industry's production, aimed to increase the value of finished products rather than the quantity of raw processed materials. Several industries have increased low-concentration products, particularly pulps and refined pulps, and innovative versatile and eco-friendly packaging systems, such as bag-in-box.

Systemic responses usually have a more collective-action nature, being promoted by public bodies or associations of producers in the interest of supply chain actors, like IBO in Northern Italy or Mesa del Tomate in Extremadura. Systemic responses imply the following process (see Figure 1): analysis and acknowledgement of needs, search for stakeholders' consensus, preparation of strategies, implementation of response, and learning (Mantino *et al*., 2023). They also imply searching for funds and exploitation of policy networks. This process is driven by a medium-long-term vision of challenges and needs for change. Systemic responses consist of either sectoral responses or territorial responses, being actions limited to the supply chain or to a set of networks beyond the sector.

Examples of systemic responses are research and experimental projects developed in the two areas by

institutions "embedded" in the supply chain. Several local institutions have been conducting research, training and knowledge-exchange activities, linked to the supply chain's needs. Table 1 illustrates recent projects implemented in the 2018-2023 period in the two areas by category of research topic and number of projects involving the IBO of Northern Italy and Mesa del Tomate and CTAEX in their partnerships. Research topics reveal the priorities selected by stakeholders: there is an evident prevalence of projects related to energy, plant protection, water, and human health. It is worth noting that tomato productivity is rarely the main research objective, still it appears in some multi-objective projects as secondary target, conditioned by sustainability targets. Alongside environmental transitions, these projects aim to face cost reduction and digitalisation. IBO and Mesa del Tomate are in four project partnerships, particularly in Operational Groups of EIP EU-funded projects. These kinds of projects always require partners who are highly representative of territorial needs and knowledge transfer to local operators.

Systemic territorial responses are more frequent in the Northern Italian area, where the IBO works on transition challenges through a broader set of local networks. Interviews with local stakeholders highlighted demographic changes and the availability of water resources for irrigation as the main challenges at stake. Demographic trends in the last decade have been influencing the labour supply at local level so that the agro-industrial system is unable to recruit a skilled labour force. The mismatch between labour supply and demand is particularly evident for some skilled jobs (process control, maintenance technicians, shift supervision, etc.). Secondary education in vocational schools is unable to provide students with adequate skills. Agro-industrial firms are forced to look for potential employees in non-technical high schools and train them through internship periods. The IBO took on board these needs by promoting training programmes for skilled job seekers to overcome this mismatch. Furthermore, it set up a protocol of intent with the Ministry of Agricultural Policies aiming to provide labour opportunities to victims of illegal hiring (*caporalato*).

Regarding water issues, drought causes land degradation through increased soil erosion, and soil erosion increases hydrogeological instability that makes flooding and landslides more frequent in the event of abundant rainfalls. The shortage of water resources is becoming an increasingly pervasive and complex issue (in Extremadura, for example, in recent years, the storage capacities of existing reservoirs have fallen by 40% according to experts interviewed), particularly in terms of governance solutions. The role of irrigation management bodies became crucial since they control freshwater levels, evaluate water requirements for different local users and decide the amount of water supply and withdrawals for irrigation accordingly, depending on water level fluctuations due to seasonality or drought episodes. Their role goes far beyond regulating water for irrigation since it involves the choice between different water users and has broader environmental implications. In Northern Italy, irrigation and reclamation consortia work in strict coordination with Producers' Organisations. POs and experi-

Table 1. Research and experimental projects in tomato production and processing in the two areas by categories of topics.

Category of projects*	Northern Italy	IBO in partnership	Extremadura	CTAEX in partnership
A. Sustainability				
A.1 Plant protection treatments	2	1	1	
A.2 Energy saving processes in processing industries	1		1	1
A.3 Water footprints in processing industries	1		1	1
A.4 Water efficiency in tomato growing			1	
A.5 Nutrition and organoleptic properties of processed tomato	4		1	
B. Digitalisation				
B.1 Surface monitoring	1	1	1	1
C. Socio-economic issues				
C.1 Transition analysis and related policies	1	1		
C.2 Production costs and competitiveness	1	1		
D. Multi-objective projects			1	1
Total	11	4	7	4

*The categories have been defined to group projects on homogeneous topics
Source: our survey on programmes of research institutions.

mental centres support farmers in using DSS (Decision Support Systems), such as sensor technology, weather stations and other innovative devices, to increase efficiency in monitoring and using irrigation water. In this regard, the IBO seeks to voice the problems of the supply chain and advocate policy interventions (like restructuring irrigation networks or creating new reservoirs). IBO policy networks have been activated to mobilise available funds at regional and national level (the Rural Development Plan in Emilia-Romagna and the National Resilience and Recovery Plan). In conclusion, the IBO connects the supply chain actors with territorial and policy networks beyond the sectoral borders. In Extremadura, the governance of water shortage remains within the sectoral borders: irrigation associations (*comunidades de regantes*) annually agree with POs on the quantity of land that can be irrigated in the case of water scarcity.

5. CONCLUSIONS

The first objective of this paper was an understanding of the nature of the two Local Agri-Food Systems. Through a comparative analysis, this study focuses on the importance of inter-branch relations of two supply chains in the processed tomato sector. Processed tomato supply chains of Extremadura and Northern Italy represent two different examples of inter-branch organisation within European agri-food production and diversified relations between the supply chain and territorial development. The social and economic relevance of these supply chains and their relationships with the broader territory make us analyse them under the conceptual category of LAFS. Despite significant differences in origins and socio-economic history, these two LAFS show several similarities in the development pattern, and the capacity to compete with other prominent international producers, like China and California. In the change process, CAP's role was to accompany the rapid growth and foster organisational adjustments through the diffusion of POs and inter-branch contracts.

The role of sectoral and territorial factors can explain the different competitiveness and response to change and transition in the two areas. The governance solutions have indeed been quite different. Still, in both cases, the inter-branch governance ensured a climate of cooperation, price stability and better conditions for primary producers.

Demographic and socioeconomic macro-trends and climate and digital changes in the last decade have created new challenges for local systems. Likewise, these systems have different capacities to comply with and use policy transition goals, incentives and regulatory tools introduced recently by the EU Green Deal and related strategies. This study sought to understand how the two areas have been responding to transitions by focusing on cooperation networks and governance, factors which authors like Camagni, Capello (2013) include in the broader concept of territorial capital. Cooperation has been developed within the supply chain (sectoral governance) and the broader territory (territorial governance). This study confirms the importance of both governance levels but concludes that territorial governance becomes increasingly essential as transitions involve challenges that overcome agro-industrial borders. Demographic change's influences on the labour market, and water management of increasingly scarce resources due to climate change, etc., cannot be faced only within the supply chain's actors and need the involvement of larger social and political networks.

Furthermore, this study highlights the relevance of systemic responses, rather than individual ones (performed by single economic operators). This becomes possible when the intermediate body created to govern inter-branch relations shows capabilities to take on wider challenges and undertake coherent initiatives. In practice, the overarching inter-branch organisation, despite its nature being mainly private, plays a public role by acting in the more general interest of the local community and generates immaterial public goods (trust and cooperative attitudes). This intermediary body works as a trigger for further supply chain consolidation and competitiveness achievements.

These conclusions provide relevant elements for policy design in terms of how to foster/acknowledge IBOs as effective change agents, underlying the importance of supporting systemic responses through public incentives that also cover transaction costs of intermediate bodies. It should be recalled that CAP instruments (notably the Rural Development Policy) support the creation and running costs of local development agencies (i.e., the Local Action Groups of LEADER initiative and the Operational Groups of the European Innovation Partnerships). Still, CMO regulations foresee no similar support for inter-branch organisations, despite their relevant role in promoting local projects, advising relevant actors and brokering among local stakeholders. Furthermore, among the systemic long-term actions, research and knowledge transfer investments may bring higher added value than extremely dispersed subsidies to farmers (Beck *et al.*, 2020). This study has shown that inter-branch organisations are also proactive in promoting projects in line with transition challenges and participating directly with them.

Finally, there are also relevant implications for future research, in terms of need to combine quantitative and qualitative approaches to the study of localised agri-food chains and define appropriate governance indicators at territorial level. Governance indicators are not a new topic in the literature on territorial development (see, for example, the case of the LEADER approach), but further efforts should be addressed to extend indicators to relations between supply chains and local territories. Differential characteristics in terms of inter-professional contracts, policy networks, research networks, relations with other institutional actors (i.e., water management bodies), etc. need to be better defined and quantified as competitiveness factors of supply chain districts.

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Agrifood system between global and territorial vision – Research article

Shaping territorial agri-food systems through social innovations: The example of Valposchiavo, Switzerland

Paul Froning*, Rike Stotten

Institute of Sociology, Mountain Agriculture Research Unit, University of Innsbruck, Innsbruck, Austria
*Corresponding author. E-mail: paul.froning@uibk.ac.at

Abstract. Territorial agri-food systems can be characterized as social innovations that challenge corporate food governance. These systems involve a diverse array of actors operating at the local level, with the shared objective of promoting locally sourced and environmentally sustainable products. To gain deeper insights into the interplay of social innovation and territorial governance, we investigated the case of Valposchiavo, Switzerland. In this unique setting, diverse actors have initiated an innovative approach to territorial development, emphasizing the revalorizing of local resources. To unravel the intricacies of the development process, we applied the territorial social innovation framework, specifically tailored for analyzing the role of social innovations within Valposchiavo's territorial agri-food system. Our research incorporated existing interviews and supplemented them with problem-centred interviews conducted in the field. Results underscore that the development approach of *100% Valposchiavo* constitutes a territorial social innovation. This innovation is evident in the formation of diverse local collaborations, establishing novel multi-actor settings within the territorial agri-food system, with an emphasis on collective values aligned with organic agriculture. Our study also identifies an innovative territorial governance approach aimed at obtaining certification as an organic region in the future. This signifies a proactive step towards creating a sustainable and certified organic framework to institutionalize territorial agri-food system.

Keywords: social innovation, agri-food systems, agri-food networks, territorial governance, organic regions, Valposchiavo.
JEL codes: Q, R.

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HIGHLIGHTS

- *100% Valposchiavo* constitutes a territorial social innovation that challenges established corporate food governance structures.
- The Valposchiavo territorial agri-food system prioritizes the revalorization of local resources by strengthening values-based supply chains initiated by local actors.
- At the governance level, the territorial agri-food system is shaped by local multi-actor collaborations establishing a comprehensive strategy for achieving certification as an organic region in the longer term.

1. INTRODUCTION

Recent debates (Bosworth *et al.,* 2020; Neumeier, 2012; Bock, 2016) emphasize the role of social innovation in territorial development, stressing the social dimension for successful rural development. Social innovation is herein defined as a set of processes propelled by social collaboration and learning, aimed at addressing unmet social needs (Bock, 2016: 4). An example of social innovation would be alternative food networks (AFNs), conceptualized as networks challenging corporate food governance by offering new ways of production and consumption of food (Vercher, 2022). A more recent manifestation of AFNs are territorialized agri-food systems, highlighting the spatial importance of AFNs. Instead of reducing the perspective on single initiatives, as AFNs tend to do (Lamine *et al.,* 2018), territorial agri-food systems adopt a holistic perspective, starting from the entire territory with its local specificities and a diversity of initiatives. Territorial agri-food systems aspire to embrace "*the diversity of actors involved in the production, processing, distribution and consumption of food products at the territorial scale who aim at favouring local and ecological products*" (Lamine *et al.,* 2018: 4).The active involvement of diverse actors shaping such systems is referred to as local agency (Lamine *et al.,* 2018). Scholars (Lamine *et al.,* 2018; Vercher, 2022; Sanz-Cañada and Muchnik, 2016) have explored small-scale approaches of AFNs as expressions of territorial agri-food systems. On a larger scale, we also consider organic regions as a form of territorial agri-food systems, as this novel approach aligns with the values of organic farming for territorial development (Stotten and Froning, 2023; Packer and Zanasi, 2023).

In Valposchiavo, Switzerland, a dynamic group of actors has initiated an innovative territorial development approach known as *100% Valposchiavo,* driven by social collaboration with an emphasis on revalorizing local resources (Stotten and Froning, 2023; Stettler and Mayer, 2023). This contribution aims to elucidate the role and significance of social innovations within the approach *100% Valposchiavo* as a territorial agri-food system. Our hypothesis is that the territorial agri-food system of Valposchiavo represents territorial social innovations. In addressing the limited conceptual frameworks exploring social innovation processes (Bock, 2016), we apply the theoretical framework territorial social innovation (TerriSI), developed by Vercher (2022), to analyze the actions that make up these social innovations. We ask: How does the territorial agri-food system of the development approach of *100% Valposchiavo* constitute a TerriSI?

We proceed as follows: In Section 2 we present the concept of territorial agri-food systems, in Section 3 we explore the need for a conceptual framework investigating territorial social innovations. In Section 4 we provide material about the case study region and the methods applied. In Section 5 we describe and discuss the territorial agri-food system, focusing on diverse actor constellations that give rise to innovative social relations and practices. Finally, these findings are synthesized in the context of the research question and conclusions are drawn in Section 6.

2. RESEARCH CONTEXT: TERRITORIAL AGRI-FOOD SYSTEMS

Within the global capitalistic economic hegemony, corporate food governance dominates agricultural and food systems, conceptually framed as the corporate food regime (Jakobsen, 2021; Friedmann and McMichael, 1989). It is characterized by a power shift from manufacturers to transnational (agribusiness) corporations, strong financialization and privatization of the entire agri-food sector (Jakobsen, 2021), and a limited agency of local actors within alternative food systems (Stotten, 2024). One important consequence of the corporate food regime is the integration and interconnectivity of rural areas – as places of agricultural production – into global, large-scale, and distanced supply chains and capitalistic market structures (Jakobsen, 2021), leading to a *globalized countryside* (Woods 2007: 492). What is described as "food from nowhere" (McMichael, 2005; Campbell, 2009) can be understood as a *disembedding* (Polanyi, 1973 in Ermann *et al.,* 2018: 41) of rural agri-food systems as well as traditional livelihoods. It leads to the erosion of social cohesion of communities (Ermann *et al.,* 2018). The opposing concept of "food from somewhere" Campbell (2009) captures the call for regionalization of agri-food systems that are perceived as socially and ecologically more embedded in social structures of communities and contribute to the socio-economic well-being of communities (Campbell, 2009: 313; Ermann *et al.,* 2018). Additionally, following Schermer (2015), the "food from here" approach amounts to a de-commodification of food that reveals new forms of agency in food chains. One expression of this approach are AFNs (Renting *et al.,* 2003; Ermann *et al.,* 2018; Lamine *et al.,* 2012), understood as close producer and consumer networks, often initiated through local civic engagement and aimed at democratizing the agri-food system (Lamine *et al.,* 2018; Vercher 2022). In AFNs local actors initiate novel forms of rather short and closed food supply chains in a given territory (Renting *et al.,* 2003) to increase the resilience of agri-food systems and to main-

tain rural livelihoods (Lamine *et al.,* 2012; DuPuis and Goodman, 2005).

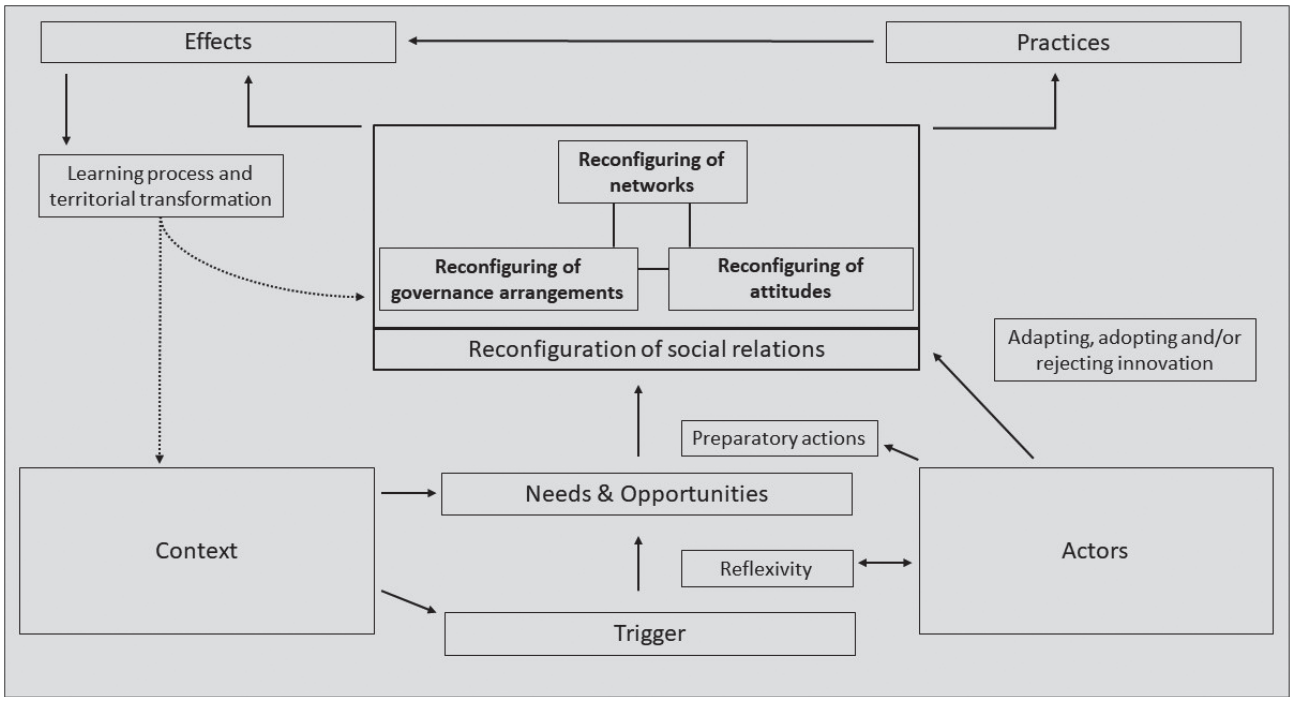
Similarly, so-called *quality food networks* emerge in the context of what is referred to as a "quality turn" in agri-food studies, with initiatives of local brands and geographic indications offering alternatives to the corporate food regime (Lamine *et al.,* 2018; Watts *et al.,* 2005). While the analysis of both alternative food and quality food networks tends to capture only individual initiatives or products, territorial agri-food networks also take distinctive characteristics of territories, traditional place-based farming systems, and cultural identities of a territory into account as essential for achieving sustainable rural development (Lamine *et al.,* 2018; Lamine *et al.,* 2012). Further, territorial agri-food networks are integrated with other activities in the territory, such as landscape conversation, tourism, or education (Lamine *et al.,* 2012). They encompass diverse actors that combine mostly organic production based on values and principles of organic agriculture with agro-ecology to strengthen local, organic values-based supply chains (Lamine *et al.,* 2018; Vercher, 2022; Stotten *et al.,* 2018). These values-based supply chains are part of the holistic understanding of a territorial agri-food system approach that further aims to strengthen territorial rural development in general (Lamine *et al.,* 2012; Lamine *et al.,* 2018). This territorial development can be spatially institutionalized through the creation of organic regions (Stotten and Froning, 2023). Conceptually, Lamine *et al.,* (2012) stress that territorial agri-food systems rely, first, on a diversity of initiatives that form networks and, second, on appropriate governance mechanisms that support these (p. 232). Further, the wider active involvement of actors, which is a form of reconfiguration of social relations and practices, is evident in AFNs and can improve territorial agri-food systems in general. These new relations and practices are therefore crucial for social innovation processes, referred to below (Vercher, 2022).

3. CONCEPTUAL FRAMEWORK: TERRITORIAL SOCIAL INNOVATION

Theoretically, this article draws on the concepts of rural and territorial social innovation (SI) (Bock, 2016; Vercher, 2022). Applied in complex and multidisciplinary settings, SI serves as a governance practice by policymakers but more recently also as a theoretical concept in research (Moulaert *et al.,* 2017; Neumeier, 2012). These diverse contexts complicate a general definition (Bock, 2016; Secco *et al.,* 2017), but in the most common understanding SI is seen "[…] *as a motor of change rooted in social collaboration and social learning, the response to unmet social needs as a desirable outcome, and society as the arena in which change should take place*." (Bock, 2016: 4). SI is considered closely associated with local development initiatives and civic action of communities that collectively promote new or improved values, behaviours, and practices (Bock, 2016; Vercher, 2022; Neumeier, 2012). Vercher (2022) therefore highlights SI as a *"process of reconfiguration in social relations that leads to new forms of action and enables the satisfaction of collective goals, whose main result is the creation of social value* (p. 3). Generally SI generates beneficial outcomes that tackle negative impacts of globalization like marginalization or market pressures on rural communities. SI is able to improve the socio-economic situation of communities, for example, through the provision of small-scale sustainable products and services, novel forms of business and initiatives, as well as through the support of new information and communication technologies (Barlagne *et al.,* 2021; Bock, 2016). In addition, SI has intangible effects, such as social inclusion, capacity-building through new collaborative networks, or stronger community resilience (Vercher, 2022; Barlagne *et al.,* 2021). Importantly, the concept of SI centres on local agency with current rural development approaches like the neo-endogenous development (Ray, 2006), as both concepts are oriented on local community and citizen engagement. Simultaneously they also acknowledge exogenous and external factors, resources, and networks as crucial for ensuring sustainable rural development of communities (Bosworth *et al.,* 2020; Bock, 2016; Chatzichristos *et al.,* 2021).

To overcome criticism of SI as just a buzzword and a rather vague, broad concept (Bock, 2016; Schermer and Kroismayr, 2020), sound theoretical frames are needed to conceptualize and grasp the processes of SI (Neumeier, 2012; Bock, 2016). Recently Vercher (2022) has proposed such a conceptual framework (Figure 1) for analyzing SI processes with a specific territorial focus, which he calls territorial social innovation (TerriSI). He argues that "*through the generation of new social relations, communities can implement diverse practices, unleash other types of innovations, and deliver effects in unexpected domains* […]" (p. 4) and thus achieve a territorial dimension of the social innovation process. The analysis of TerriSI processes in a certain community starts with *triggers* based on the economic, socio-cultural, and environmental context of a specific territory. They can be understood as positive or negative impulses that activate initial action based on specific needs and opportunities of the territory. Both needs and opportunities depend on the constellation of diverse actors

Figure 1. Conceptual framework of territorial social innovation (TerriSI) after Vercher 2022, simplified**.**



involved in the SI process. Central to the concept is an analysis of the reconfiguration dimensions of social relations between the actors. This includes, first, the reconfiguration of networks; second, the reconfiguration of attitudes; and, third, the reconfiguration of governance processes. While the first one focuses on emerging new actor constellations and the role of different actors, the second highlights changing attitudes and perspectives the actors develop. The reconfiguration of governance processes includes new forms of coordination and organization within the new network. For empirical investigation, social innovation processes in AFNs with a explicitly territorial focus are rare (Vercher, 2022). One notable exception is their application in the context of an AFN on the island of Ibiza, Spain, which revealed that social innovations with a strong territorial dimension significantly contribute to the improvement of AFNs (Vercher, 2022). Building on Vercher's (2022) framework, this article extends the analysis beyond a single AFN to encompass the numerous initiatives and actors that form *100% Valposchiavo*.

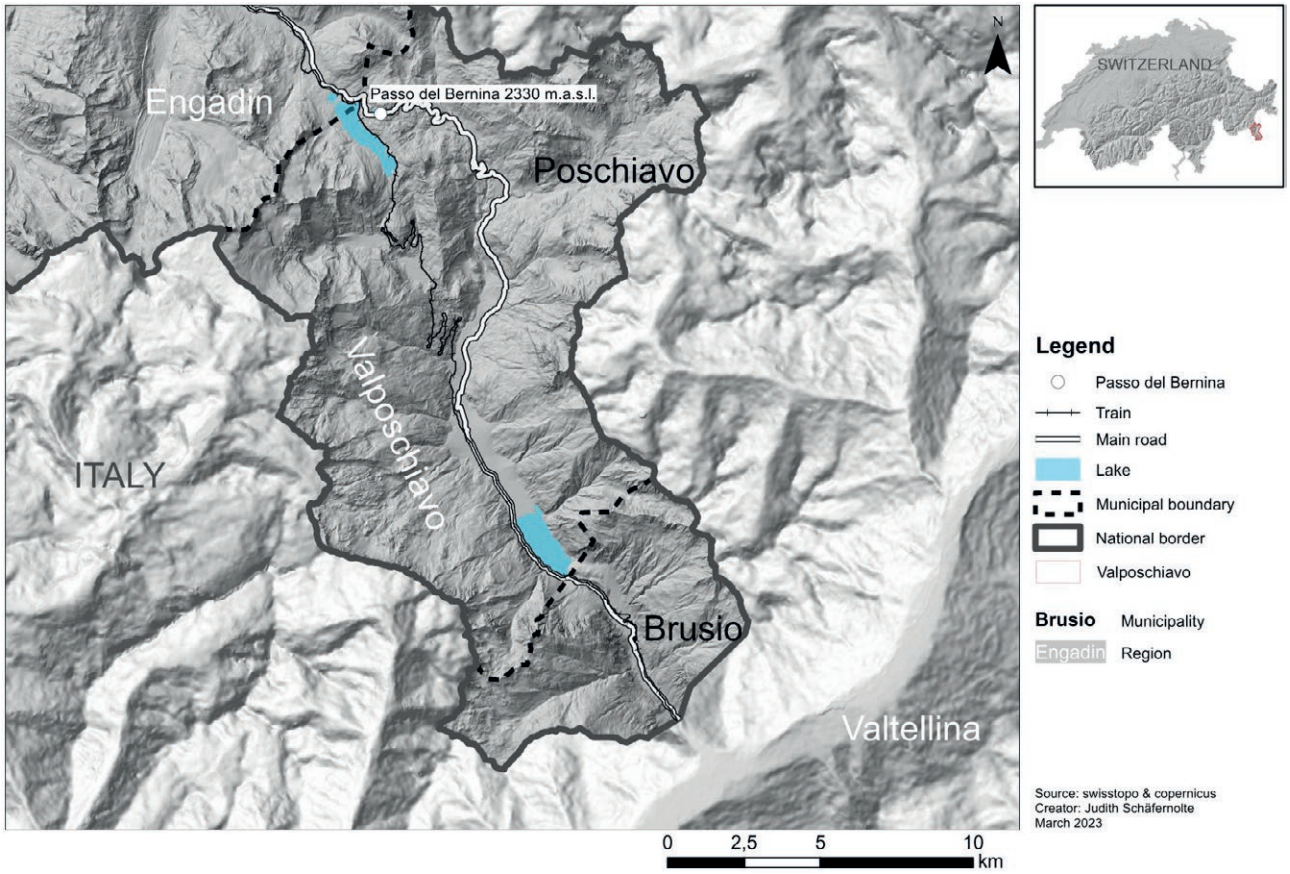
4. MATERIAL AND METHODS

Our research findings were obtained by a study using the framework of values-based modes of production and consumption in a contemporary food regime, as outlined in the project (https://foodalternatives.at/). Within this context, the Valposchiavo case study provided valuable insights in the territorial organization of organic regions (Stotten and Froning, 2023). A brief summary of the materials and methods is presented here while more comprehensive information can be found in the corresponding publication (Stotten and Froning, 2023).

4.1. Case study area

Valposchiavo, located in the southern part of Switzerland in the canton of Grisons and bordering on the Italian region of Lombardy, covers the communities of Poschiavo and Brusio, which form the political district of Regione Bernina (Figure 2). The region's distinct geography and topography, ranging from over 3,000 m.a.s.l. to 553 m.a.s.l. in the south, create microclimates conductive to diverse farming systems (Semadeni *et al.*, 1994; Lentz, 1990). While traditional farming systems, including mixed crop farming with animal husbandry and arable farming, remain integral to the socio-economic well-being (Lentz, 1990), there is an ongoing shift towards organic agriculture (BfS, 2021). The local hydropower company *Repower,* as well as the company *Rhaetian Train,* which operates the Bernina train line, are major employers in the valley (Regione Bernina, 2016;

Figure 2. Map of Valposchiavo, created by Judith Schäfernolte.



Regionalentwicklung OBV, 2015). Moreover, the *Rhaetian Railway*, part of the train line between Thusis in Switzerland and Tirano in Italy, is a UNESCO-certified cultural world heritage site. This status contributes to the local tourism focused on soft tourism options, particularly in the summer season (Stettler, 2021; Semadeni *et al.,* 1994). The cultural identity of the population is heavily influenced by its border location to Italy, by multilingualism (Italian-speaking majority in the valley), the local importance of cultural heritage, and a historically ongoing exchange introducing external perspectives and new ideas into the valley.

4.2. Overview of regional development initiatives

The *100% Valposchiavo,* a territorial development strategy established in the past two decades (Howald, 2015), involves several initiatives and projects led by local actors in agriculture, tourism, the hospitality trade, and regional planning. Its primary objective is to revalorize local agri-food supply chains and enhance the socio-economic well-being of the community (Luminati, 2021; Pola, 2020). A pivotal milestone was the formation of an Agricultural Compensation Fund Group in 2012, joined by the local hydropower company, the municipalities, and farmers associations (Pola, 2020), jointly dedicated to strengthening the local agri-food sector (Luminati and Rinallo, 2021).

Guided by the ongoing implementation of the regional development project (PRE[1]) since its initiation in 2012 (Beti *et al.,* 2014), this approach has a threefold strategy: First, a marketing concept is employed; second, a B2B marketing platform is established to enhance collaboration along the agri-food supply chains; and, third, an overarching coordination is maintained (Beti

[1] PRE stands for *Projekt für Regionale Entwicklung* (project for regional development), which is a national funding scheme to support Swiss agriculture and rural development in mountain regions. The main aim is to increase the added value in the agricultural sector across several supply chains in a certain region. More information: PRE / Projekt Regionale Entwicklung <https://www.blw.admin.ch/blw/de/home/instrumente/laendliche-entwicklung-und-strukturverbesserungen/laendliche-entwicklung/was_ist_ein_pre.html>.

et al., 2014; Luminati and Rinallo, 2021). In 2015 the local tourism board *Turismo Valposchiavo*, in collaboration with agri-food associations, launched the territorial brand *100% Valposchiavo*. This initiative, with various dimensions, focuses on revalorizing regional, traditional, and typical products from Valposchiavo through a certification scheme (Howald, 2015).

In addition to these practical initiatives, local actors affiliated with an educational training and knowledge centre have devised a long-term strategy, called *Smart Valley Bio,* with the objective of certifying the valley as an organic region (Beti *et al.,* 2014). The strategy aims to transition the agricultural sector to organic production while strengthening smart landscape management (Beti *et al.,* 2014). One core aspect of the strategy is the *Community Hypermap,* a participatory digital tool designed to raise awareness about the cultural landscape's value, pointing out specific socio-cultural and historic characteristics (Luminati, 2021).

4.3. Methodological approach

To analyze the various facets of the social innovation process, we employ the theoretical framework TerriSI developed by Vercher (2022). This framework highlights "reconfigurations of social relations" as the primary process of TerriSI. Uncovering these reconfigurations requires a qualitative methodology. Therefore we reanalyzed the comprehensive data obtained for the territorial organization of organic regions.

Initially a document analysis (Bowen, 2009) involved the examination of publicly available video interviews (Bandtel, 2015) produced with local and external experts during the scientific "Forum – Origin, Diversity, and Territories" on the theme "Breakdown and rebound of territorialized food systems"[2]. Transcripts were provided by the forum. As a follow-up step in our research methodology, we undertook a secondary analysis of qualitative data (Heaton, 2008; Ruggiano and Perry, 2019). This involved the analysis of an interview transcript conducted with an expert in the context of another research project (Stettler, 2021). Because of challenges in contacting this individual and an alignment of research objectives, we opted to reuse the existing qualitative material, emphasizing efficiency in existing resources and research funding (Heaton, 2008). Building on this explorative groundwork, we conducted in-depth, problem-centred interviews (Bogner *et al.,* 2009) with five experts in January 2023, supplemented by one expert interview online. Additionally, brief informal interviews with stakeholders, such as bakers, a pasta producer, restaurants, hotels, and farmers, were documented in protocols (Gray and Jensen, 2022) for subsequent evaluation (see Appendix). All interview transcripts were anonymized by the authors, however, for experts representing public bodies their function was not anonymized.

The data obtained from the video interviews, the existing interview, and self-conducted interviews underwent a descriptive evaluation through qualitative content analysis according to Mayring (2015). The coding process, facilitated by the software MAXQDA, had previously been executed for the initial study in Valposchiavo (Stotten and Froning, 2023). For this article's specific focus on social innovation, we extracted codes from the existing dataset that deal with social innovation aspects. Employing the TerriSI framework with specific focus on the process of "reconfiguration of social relations" (Figure 1), we applied these codes to the framework for further interpretation.

5. RESULTS AND DISCUSSION

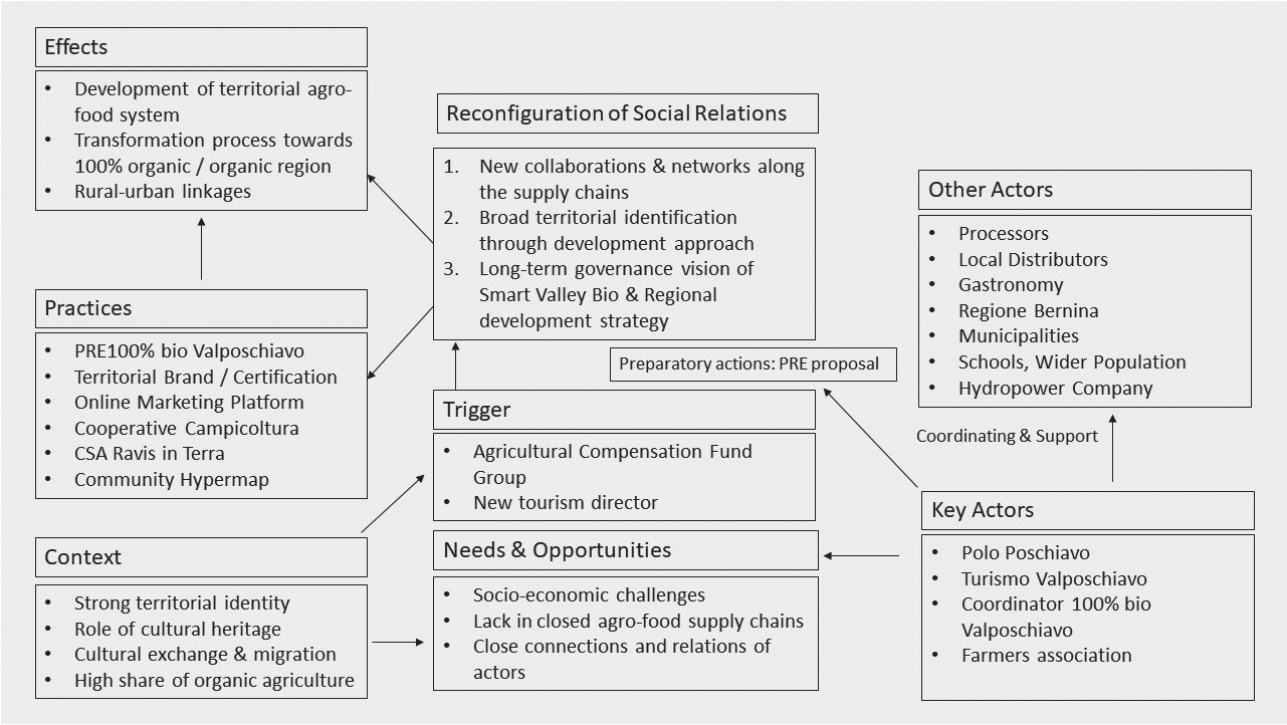
In the following section we present and discuss our results within the framework of TerriSI as suggested by Vercher (2022) (Section 3, Figure 3). The individual subsections below explore the pivotal elements of the TerriSI framework.

5.1. Context, needs & opportunities of the territory

As a peripheral and remote mountain valley, Valposchiavo is facing demographic changes, such as an aging population, youth outmigration by young people, and diverse socio-economic challenges. This, coupled with the general decline in mountain agriculture (MacDonald *et al.,* 2000; Semadeni *et al.,* 1994), highlights the need to rejuvenate the local agri-food system. Despite strong social ties, demographic changes and outmigration has led to decreased farming activities and a lack of local collaborative agri-food supply chains (Semadeni *et al.,* 1994; Howald, 2015). In addition, Valposchiavo possesses unique characteristics that can serve as opportunities for innovative agri-food initiatives. The

[2] The forum Origin, Diversity and Territories is an international scientific platform on the interactions between cultural and biologi-cal diversities and the sustainable territorial valorization of products and services whose quality is linked to their origin. The videos were recorded by scientists of the Forum during the event held on 13-15 October 2021, in Valposchiavo Switzerland. More information: https://origin-for-sustainability.org/en/page-daccueil-en/. Videos are publicly available online: https://www.youtube.com/watch?v=runP_q9rIYk&list=PLhCbJMRU6mEeEbiZ8vll9f2eFvN2YJvuA&index=8

Figure 3. TerriSI process of the *100% Valposchiavo*, following Vercher 2022, created by the authors.



local population's strong ties to the cultural landscape, marked by diverse farming activities and aesthetic landscape patterns (Schirpke *et al.,* 2019), presents potential for territorial innovation.

The rich intercultural exchange in Valposchiavo is evident in traditional agri-food products, influenced by historic relations with neighbouring Valtellina, Italy. Examples include the traditional pasta dish *Pizzocheri*, or the Valposchiavo cheese, showcasing the historic and territorial value attributed to local agri-food products. Another opportunity for territorial innovations lies in Valposchiavo's cultural heritage, exemplified by *UNESCO World Heritage* certification of the Bernina train line in 2008 (Pola, 2020), or the restoration of traditional farming systems on terraced drystone walls.

Ongoing migration from Valposchiavo for work or education, coupled with strong social ties, leads to some individuals returning to the valley (Gracheva *et al.,* 2019; Bausch, 2014). Returnees bring external knowledge, fostering social innovation (Florida, 2002; Bausch, 2014), exemplified by key contributors shaping the development of *100% Valposchiavo*. The high organic farming rate, exceeding 90% in 2022, initiated by Bio-Pioneers 40 years ago, presents a significant opportunity for territorial innovation in the agri-food sector (Darnhofer, 2005).

5.2. Triggers

In response to identified needs and opportunities, the TerriSI (Figure 3) in Valposchiavo's agri-food system is encapsulated in the initiative known as *100% Valposchiavo* as illustrated in Figure 3 and detailed by Stettler and Mayer (2023). The impetus for this innovation can be traced by to a 2004/2005 study on local organic agriculture, which revealed a notably high percentage of organic farms. This study inspired efforts to increase the prevalence of organic farming and products while enhancing added value within the valley. In 2012 the establishment of an Agricultural Compensation Fund Group marked a deliberate move by local actors to strengthen the agri-food sector on a territorial level. Financial support from the local hydropower company played an important role for the later development process.

The collective decision to pursue an integrated and territorial approach involving various actors and sectors, rather than a mere compensation payment, can be understood as a trigger within the TerriSI framework (Figure 3). This initiative, in collaboration with experienced local actors in regional development, evolved into the PRE *100% (bio) Valposchiavo* proposal. Simultaneously, a new external tourism director in Valposchiavo

championed an integrated tourism model, fostering close collaboration between local agri-food system actors and tourism. Farmers' cooperatives, together with the new tourism board, created the territorial brand *100% Valposchiavo* to revalorize agri-food products from the valley and promote local added value.

5.3. Reconfiguration of social relations

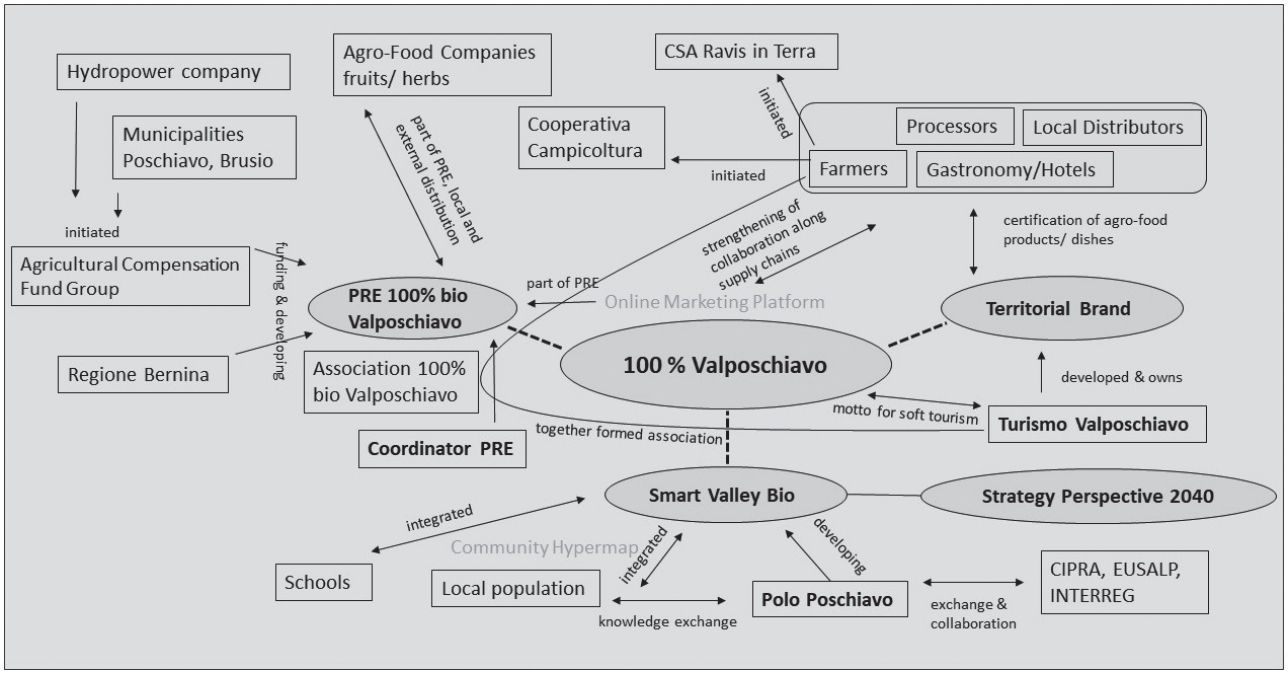
The aspects elucidated in the preceding subsections serve as the foundation for reshaping social relations, central element of the TerriSI framework (cf. Section 3, Figures 2 and 3). Diverse actors actively contribute to the development of the TerriSI *100% Valposchiavo* by initiating three key processes to reshape social relations. First, they establish innovative internal as well as external networks and collaborations within the territorial agri-food system. Second, their efforts concentrate on fostering collective attitudes and values. Third, they devise new coordination mechanisms and broader territorial development structures. The subsequent sections examine and discuss these three aspects in detail.

5.4. Internal and external networks

Reconfigured networks form a crucial part within the process of social innovations (Vercher, 2022). Fig. 4 shows the network of important actors and initiatives, following the network configuration by Vercher 2022 (p. 11).

In the territorial agri-food system diverse actors, spanning producers, the hospitality trade, accommodation services, industry, regional development, and politics (Figure 4) are shaping processes around *100% Valposchiavo*, the PRE or the *Smart Valley Bio* strategy. Instead of a single closed network, multiple internal and external networks exist, characterized by loose and overlapping connections (Figure 4). In addition, three key actors significantly shape the development process of the TerriSI *100% Valposchiavo* (also Stotten and Froning, 2023). First, a publicly funded institution, established in the 1990s as an educational training centre, especially in ICT, has evolved into a local hub for initiating and managing regional development projects. Serving as a central point where various projects are initiated, this centre links actors within and outside the territory and plays an innovative role (Vercher, 2022) in the overall process. Second, the local tourism entity *Turismo Valposchiavo* actively shapes and promotes the TerriSI, owning the territorial brand *100% Valposchiavo* and overseeing the marketing concept of the PRE. This direct connection of tourism with the agri-food system aligns with sustainable regional development (Kauppila *et al.*, 2009). Third, the coordinator of the PRE *100% (bio) Valposchiavo* takes charge of project implementation by fostering collaboration along the supply chains and consulting

Figure 4. Network of actors within the TerriSI *100% Valposchiavo*, configuration by Vercher 2022, created by the authors.



farmers for the further transition to organic production. Together these three actors embody strong social capital that spills over to other actors, such as farmers, processors, distributors, acting as what Böcher (2009) calls regional promoters (also Bosworth *et al.,* 2020). At the same time they wield considerable influence in the valley, actively participating in and shaping numerous development initiatives (Bosworth *et al.,* 2016).

An illustration of renewed collaboration in the local agri-food network is the production of *100% Valposchiavo* Ravioli. Three individual small agri-food businesses have joined forces, using local flour from revived organic grain production by the *Campicoltura* cooperative, local vegetables, and pursuing a nose-to-tail strategy. A range of ravioli variations are produced, certified with the *100% Valposchiavo* brand, and distributed in local stores. Restaurants and hotels participating in the *Charta 100% Valposchiavo* serve these ravioli as one of their local dishes. This product exemplifies how novel agri-food initiatives facilitate renewed collaboration. Another project showcasing community involvement is the local community-supported agriculture (CSA) (see also Figure 4). Initiated by a group of female farmers aiming to collectively produce local, organic vegetables, the CSA involved a group of 20 prosumers. Although currently paused because of organizational issues, it exemplifies Valposchiavo's capacity to initiate not only innovative quality food networks with formal support (PRE, territorial brand) but also civic, more informal networks akin to typical AFNs (Lamine *et al.,* 2018).

In addition to internal networks, robust distribution networks exist for certain local agro-food companies, along with close collaboration at a political level in alpine-wide networks[3]. These elements signify that Valposchiavo's development approach aligns with a neo-endogenous development model (Stotten and Froning, 2023; Ray, 2006).

5.5. New attitudes and identification

The local production of typical agri-food products is a reconfiguration and renewal of old practices and knowledge, garnering strong support from actors along the agri-food supply chains and the wider population in alignment with *100% Valposchiavo* approach. Several actors attributed their share to using territorial and local resources to the impact of the territorial brand and the supportive structure provided by the PRE. This reorientation fosters closer relations between producers and consumers (Renting *et al.,* 2003), facilitated by an online marketing platform (B2B) connecting local agri-food actors, a crucial professionalization aspect in the light of AFNs (Vercher, 2022). Moreover, the long-standing emphasis on organic farming, now propelled by the PRE, aligns with an integrated and holistic development (Luttikholt, 2007; Darnhofer, 2005). Tourism in Valposchiavo deliberately opted against large tourist infrastructure, redirecting their focus to agri-food products, culinary experiences, and soft tourism activities, reflecting an attitudinal shift within the TerriSI framework (Vercher, 2022). Lastly, the preservation of cultural heritage plays a crucial role, as Valposchiavo actors promote traditional products and renew old farming techniques within the SI process.

5.6. New coordination and governance structures

In the context of *100% Valposchiavo*, local actors have developed coordination mechanisms and introduced new governance structures. First, the PRE is coordinated by an association committed to ensuring the project's sustainability and long-term success. The president of the political unit *Regione Bernina,* and responsible for general regional development in Valposchiavo, plays a dual role, facilitating political acceptance and backing the wider territorial development approach (Böcher, 2009; Bosworth *et al.,* 2016). This linkage to governance levels promotes the transformation towards organic farming and integrates organic values at the governance level. Second, the innovative agri-food system is embedded in a broader territorial strategy for rural development aimed at certifying Valposchiavo as an organic region or *Smart Valley Bio*. Starting from a long-term vision, actors around *the educational training centre* have initiated this approach to reach 100% organic farming and integrate various initiatives and projects, including the territorial brand, into a comprehensive strategy for the entire valley. Instead of a top-down implementation, the wider population actively participates through the so-called *Community Hypermap*. Therein, school kids and individuals digitally archive their territorial perspectives, ideas, and wishes. This tool, along with the online marketing platform (B2B), exemplifies the supportive role of ICT in social innovation processes (Barlagne *et al.,* 2021). Moreover, a diverse group of local actors recently launched *Perspective 2040*, a regional development strategy that integrates projects, initiatives, and networks. This includes a monitoring scheme to provide a tangible basis for certifying Valposchiavo as an organic region in the future.

[3] For instance: CIPRA / International Commission for the Protection of the Alps; EUSALP / EU Strategy for the Alpine Region

6. SYNTHESIS AND CONCLUSION

In this contribution, we explored how the territorial agri-food system in Valposchiavo creates territorial social innovations (Vercher, 2022). Our findings reveal that the development approach of *100% Valposchiavo* can indeed be regarded as a territorial agri-food system (Lamine *et al.,* 2018). Rooted in a spatial and territorial context, it emphasizes local identity and culture, highlighting traditional agri-food products and the origin of resources from the valley. This spatial importance, characterized by specific territorial attributes, is consistently expressed, notably through the territorial brand. In line with Lamine *et al.,* (2018), the territorial agri-food system, rather than a singular AFN, has spurred various initiatives on both practical and governance levels. Beyond the formal certification scheme for the territorial brand, initiatives have emerged, such as the CSA initiative, the grain cooperative, and the predominantly organic place-based farming systems. In addition, the integration of activities beyond farming, including landscape conservation, tourism and education, is evident in the territorial agri-food system of *100% Valposchiavo* (see also Lamine *et al.,* 2012). The soft tourism model and the *Community Hypermap* exemplify this integration. The characteristics of *100% Valposchiavo* as a territorial agri-food system also indicate territorial social innovations in line with the TerriSI framework proposed by Vercher (2022).

The foundational elements crucial to this endeavour are the unique territorial context, the diverse constellation of the actors, and the identified needs and opportunities (Figure 4). The aforementioned key actors have adeptly leveraged the territorial context, aligning it with existing needs and opportunities. The realization of this synergy, achieved through collective and participatory efforts to revalorize existing resources within the territory, forms the core of TerriSI's social relations reconfiguration (Figure 3, Vercher, 2022).

Our exploration has identified three drivers of the reconfiguration of social relations essential to the TerriSI framework. First, diverse actors have formed novel internal as well as external networks and collaborations along the agri-food supply chains. This collaborative effort across different backgrounds (farming, tourism, politics) is a crucial aspect of social innovation processes in general (Bock, 2016; Neumeier, 2012). Moreover, the current development approaches of neo-endogenous development (Ray, 2001) reinforce robust internal and external networks in Valposchiavo for sustainable rural development. In addition to local initiation, external knowledge and expertise, particularly from (re)-migrated key actors, has introduced creative ideas and perspectives. Second, these networks converge on collective attitudes and values, emphasizing principles like organic agriculture and the significance of cultural heritage. This aspect is not only crucial for the social innovation process (Bock, 2016; Vercher, 2022) but also for territorial agri-food systems (Lamine *et al.,* 2018). Third, new coordination mechanisms and governance instruments have been established by embedding the territorial agri-food system within a wider long-term territorial development strategy aimed at achieving certification as an organic region. This long-term strategy and transformative moment of *100% Valposchiavo* aligns with the needs and ultimate development goals inherent in social innovation processes (Bock, 2016). While specific numerical metrics are unavailable, indicators such as an improved socio-economic situation in Valposchiavo, reflected in higher hotel occupation rates and increased external awareness as well as local support of Valposchiavo's development approach, confirm what Bock (2016) summarizes as "beneficial outcomes" of social innovation processes (p. 4). In this context the territorial agri-food system of Valposchiavo represents alternative pathways compared to the prevailing corporate food governance with its disembedding tendencies (Jakobsen, 2021; Erman *et al.,* 2018).

To conclude, this empirical study reveals how territorial agri-food systems, exemplified by *100% Valposchiavo,* represent a manifestation of territorial social innovation. While these examples demonstrate the concept well, the formalization of governance mechanisms – an important aspect of the reconfiguration process within the TerriSI framework – is still ongoing. These territorial agri-food systems are not yet collectively organized. However, since social innovations inherently involve open learning processes (Bock, 2016), the unclear governance structures and the formation of an organic region should be seen as necessary opportunities for sustainable transformation in the future (Vercher, 2022). While this article has focused on the process of TerriSI as a whole, further research could explore in more detail the reconfiguration processes of social relations to better understand their potential for the social innovation. Research is also needed on how social value, such as identification through local consumption, is created within the community on a more abstract level. We looked at territorial agri-food systems through the perspective of social innovation, with an emphasis on social relations. However, future contributions could explore into the economic aspects to shed light on the product innovations of *100% Valposchiavo.*

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AUTHOR CONTRIBUTIONS

Conceptualization, P.F., R.S.; Methodology, P.F., R.S.; Formal Analysis, P.F.; Investigation, P.F., R.S.; Writing – Original Draft, P.F.; Writing – Review & Editing, R.S., P.F.; Visualization, P.F.; Project administration, R.S.; Funding Acquisition, R.S.; Supervision, R.S.

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Appendix. List of interview participants with explication of functions and type of interview.

Abbr.	Function	Type of interview
E1	PRE *100% (bio) Valposchiavo*, representative	Secondary video interview, transcript
E1b	PRE *100% (bio) Valposchiavo,* representative	Problem-centred interview, transcript
E2	Municipality of Poschiavo, representative	Secondary video interview, transcript
E3	Educational training centre, representative	Secondary video interview, transcript
E3b	Educational training centre, representative	Problem-centred interview, (online) transcript
E4	EM Lyon Business School, professor researched *100% Valposchiavo* for many years	Secondary video interview, transcript
E5	Dairy cooperative, representative	Secondary video interview, transcript
E6	Community supported agriculture, founder initiator and farmer	Secondary video interview, transcript
E6b	Community supported agriculture, founder initiator and farmer	Problem-centred interview, transcript
E7	Organic herb farm, founder	Secondary video interview, transcript
E7b	Organic herb farm, founder	Problem-centred interview, transcript
E8	*100% Valposchiavo Ravioli* production, co-founder	Secondary video interview, transcript
E9	Landscape restoration project, founder	Secondary video interview, transcript
E10	Municipal forestry company, representative	Secondary video interview, transcript
E11	IT company, co-founder	Secondary video interview, transcript
E12	*Repower* energy, representative	Secondary video interview, transcript
E13	Fruit farmer	Secondary video interview, transcript
E13b	Fruit farmer	Informal interview, protocol
E14	Project development agency, founder	Transcript offered by Stettler 2021
E15	*Valposchiavo Turismo*, representative	Problem-centred interview, transcript
E16	School Poschiavo, teacher,	Problem-centred interview, transcript
E17	Hotel owner	Informal interview, protocol
E18	Butcher	Informal interview, protocol

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Agrifood system between global and territorial vision – Research article

Farmers' markets as a sustainable model of producers-consumers relationships: evidence from Tuscany

Matteo Mengoni, Andrea Marescotti*, Giovanni Belletti

Department of Economics and Management, University of Florence, Italy
*Corresponding author. E-mail: andrea.marescotti@unifi.it

Abstract. Evidence from the literature emphasize the role of Farmers' Markets (FMs) in enhancing economic benefits for both producers and consumers, improving social outcomes and benefiting the environment. Therefore, FMs can be conceived not just as an alternative to the market, but also as a specific way of shaping producers-consumers relationships, which influences and is at the same time the result of their respective selling-buying models. This article aims at investigating the hypothesis of FMs as a specific and structural form of producers-consumers relationships, and collecting evidence on their perceptions, motivations and behaviour at the markets, and on the impact of selling and purchasing at these FMs on sustainability dimensions. For this purpose, we selected a sample of FMs in the north of Tuscany (Italy) and submitted two in-person semi-structured questionnaires, to both producers and consumers. The methodology was based on actors' self-assessment supported by guiding interviewers. Results showed how producers and consumers participating in FMs, although with differences across FMs types, do not only activate market relationships, but share, learn and build values together. Indeed, FMs are perceived by the actors involved as a structural and alternative framework, giving space and shaping alternative producers-consumers connections.

Keywords: farmers' markets, short food supply chains, alternative food networks, sustainability, proximity economy.
JEL codes: Q12, Q13.

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HIGHLIGHTS

- FMs are widespread in Tuscany, differing in terms of promoters, degree of actors' involvement, governance and functioning.
- In each FM, producers and consumers create their own organisational space, reflecting the characteristics of the products they exchange, their idea of agrifood systems, and the relational model that better suits their values.
- FMs constitute an innovative and alternative economic and social space, structuring producers-consumers relations and shaping their selling and buying models.

1. INTRODUCTION

Over the last few decades, the agri-food system has undergone rapid and deep changes, characterized by a strong trend toward globalization, privatization and vertical coordination (Swinnen and Maertens, 2007; Hendrickson and Heffernan, 2002). These shifts have resulted from various demographics, political, social, technical, economic and cultural factors, culminating in the emergence of an industrialized model of food production and distribution. In this model, large-scale food processing companies and supermarket chains have come to dominate a progressively globalized food system.

Simultaneously, shifts in consumers' behaviours and needs have been driven by societal and economic transformation. The decline of the economic importance of agriculture in rural areas, coupled with urbanization, has led to the geographical separation of agricultural production from consumption centres. This geographical gap needs a complex network of physical (transport, storage, packaging, processing), digital (e-commerce platforms, websites, online stores) and informational connections facilitated by diverse stakeholders. Moreover, income growth, changes in work organisation and shifts in family structure have heightened the demand for additional services in the food purchasing process, reducing consumers direct engagement with farming activities. These changes in the agri-food system have presented an opportunity to make a wide range of food products available globally, thereby enhancing food security and safety, and improving nutritional, technological and sensory attributes of food.

At the same time, the rise of global food chains has raised concerns, notably regarding vulnerability. The industrialized food provisioning model has sparked growing criticisms across multiple dimensions. Economically, smallholders and SMEs face growing challenges in market accessing due to the complexity of adhering to quality standards and the dominance of larger industrial and distribution players, coupled with price compression at the farm gate and increased market price volatility.

The growing geographical, cultural, information divide between production and consumption, along with the negative effects of food system industrialization on equity and fairness, environmental degradation and the loss of social relations, have spurred renewed emphasis on short food supply chains (SFSCs). The increasing interest in SFSCs worldwide, driven by farmers, consumers and citizens, and in some cases, public authorities, underscores the need for alternative food systems that can fulfil some functions overlooked by the industrialized model. SFSCs aim to bridge the gap between food production and consumption, while supporting small producers in achieving viable livelihoods and vibrant rural communities.

Indeed, SFSCs are often characterized as "alternative" (Goodman, DuPuis and Goodman, 2011) or "civic" (Lamine, 2005) supply-chains, or even "nested markets" (Van der Ploeg, Jingzhong and Schneider, 2012). They represent a shift away from industrialized agriculture and food production mainly in developed countries, prioritizing social and environmental sustainability over purely economic considerations. In essence, SFSCs can be conceptualized as an alternative component within the global food system, with a focus on transforming the principle of production and market exchange. Their development spurred a wide theoretical debate over the innovative character of such initiatives – their "alternativeness" – as well as with their "transformative" role. This transformation places emphasis on fairness, solidarity and sustainability.

The recent Covid-19 pandemic has further reinforced the interest in SFSCs. Travel restrictions encouraged the search for alternative food supply methods to reduce physical contacts, while disruption in international trade prompted a re-evaluation of locally produced foods. In this context, SFSCs and local productions have emerged as avenues for innovations, combining social and technological advancements (Belletti and Marescotti, 2020; Nemes *et al.*, 2021; Hobbes, 2021), as well as experimenting new forms of governance and relational connections.

This article aims at investigating Farmers' Markets (FMs) as a special form of producers-consumers relationship which goes beyond the pure economic sphere of market exchange, shaping a new arena where social relationships between producers and consumers can develop, and where actors' participations show different motivations other than economic profitability, to embrace a whole set of economic, social and environmental values (Manser, 2022), such as territorial proximity, community belonging, environmental care, social relationships, learning. In other words, as Smithers *et al.* (2008: 338; cit. in Manser, 2022) put it, FMs are important "as not only a site of exchange, but also as a venue for negotiated meaning in the local food landscape". Analysing a sample of Tuscan FMs belonging to three Italian FMs' networks, this article tries to compare more "institutional" FMs (Coldiretti and Cia) to more "alternative" ones (Genuino Clandestino), to see how through their different governance structures and functioning mechanisms they respond to different objectives, ideas and values that are the expression of the actors involved (producers and consumers). The ultimate goal of this article is

to feed the debate on FMs as alternative and innovative tools, tailored to producers and consumer needs, motivation and expectation, and contributing to the transition towards more sustainable and resilient territorial food systems.

2. THE SUSTAINABILITY OF FARMERS' MARKETS

FMs have been increasingly spreading in Italy since the late 1990s, as a way for farmers and small-medium enterprises to increase their position on the market and their share of value added, bypassing intermediaries, and for consumers to get high quality, fresh and healthy food from local sources. FMs exist under various forms and can be activated and led by a variety of different stakeholders (producers, consumers, municipalities, professionals' organisations). Therefore, FMs can be conceived not just an alternative route to market for producers and consumers to satisfy their respective needs, but they can constitute a specific form of producers-consumers relationship, which influences and is at the same time the result of their respective selling-buying models. In other terms, FMs can represent a model of "proximity economy" (Marotta and Nazzaro, 2023), where producers sell their products to local citizens, and consumers are interested in buying products and services from their own territory, while exchanging and strengthening ties and values that can no longer be found in conventional marketing channels.

The sustainability of FMs is a strongly debated issue in the academic arena (Forssell and Lankoski, 2014; Michel-Villarreal *et al*., 2019; Chiffoleau and Dourian, 2020), especially in comparison with long conventional food chains (Brunori *et al*., 2016; Galli *et al*., 2015), and has gained increasing political attention in view of the beneficial outcomes they are likely to provide for the economy, environment and society as a whole (Vittersø *et al*., 2019).

2.1. The economic dimension

Many studies suggest that FMs can contribute to rural development and economic regeneration. FMs can be new sources of value added to retain locally, stimulating rural economic regeneration and dynamism (Marotta and Nazzaro, 2023). They can create "new economic spaces" enhancing the local attributes such as terroir, traditional knowledge and landrace species, which can translate into higher prices (DuPuis and Goodman, 2005; Van der Ploeg *et al*., 2000; Marsden *et al*., 2002). Shortening the number of links in the supply chain results in a "multiplier effect", that is increased local sales, increased demand for local services and increased labour markets (Otto and Varner, 2005; Henneberry *et al*., 2009). Some studies have also suggested that the presence of FMs attracts shoppers into areas they would otherwise not visit and creates new opportunities for tourism, the revenue from which tends to remain in the local economy, triggering its multiplier effects in the local community (Lev *et al*., 2003).

At individual level, the most reported economic benefit associated with FMs is the increase in producers' incomes. Selling through FMs enables producers, thanks to the elimination of intermediaries (distributors, wholesalers, etc.), to further process and add value themselves to their produce, which in turn allows them to add a price premium on these products and thereby capture a greater share of the profits (Pearson *et al*., 2011; Sage, 2003).

The higher quality and increased freshness of products usually observed in FMs, also increases the economic value for consumers, who can buy food that lasts longer and thus reduce food waste (Marino and Cicatiello, 2012).

2.2. The social dimension

Among the positive effects of SFSCs on the three pillars of sustainability, the social ones are usually the most cited in the literature (Demartini *et al*., 2017). Kneafsey *et al.* (2013) identified three main social areas of impact, namely (1) social interaction, trust and social embeddedness, (2) sense of community, (3) knowledge and behavioural change.

Building relationships of trust is crucial in every experience of FMs. The social dimension is one of the most highlighted aspects by consumers who attend FMs, who often greatly value the atmosphere of their shopping experience. Consumers tend to become loyal customers and to develop confidential relationships with sellers and producers, so that over time, the feeling of trust is no longer referred to the food product itself but to the fact that one can trust the farmer to produce this food in a "safe" way, because the consumer knows the farmer and holds him/her responsible (Hendrickson and Heffernan, 2002; cit. in Kneafsey *et al*., 2013).

Another important dimension influenced by SFSCs is what Kneafsey *et al.* (2013) call "sense of community". FMs have the potential to empower and revitalise local communities, increase work opportunities for young farmers and for people who would be excluded from traditional agriculture (women, pensioners, disabled) and therefore create new employment. They can succeed in keeping rural communities in rural areas and avoid

their desertification and isolation, by creating new forms of relationships between the city and the countryside.

Moreover, SFSCs tend to favour cooperation at all levels and small producers can benefit from working with others (producers, consumers and institutions), since this enables them to reach markets they would otherwise not reach through, for example, shared logistics and delivery operations, shared labelling schemes, shared publicity and promotional campaigns. This can also favour co-operation towards innovation, through the establishment of networks of knowledge exchange, skills training and technical relations among farmers (Mastronardi *et al.*, 2015; Vittersø *et al.*, 2019; Kneafsey *et al.*, 2013; Mancini *et al.*, 2019).

Looking at the more emotional acceptation of the sense of community, SFSCs can contribute to strengthen cultural and regional identities, enhance social cohesion and community building by instilling a sense of pride and belonging to a particular area or social group (Vittersø *et al.*, 2019).

The third social dimension concerns knowledge leading to behavioural change. Consumers attending SFSCs, through social relationships with producers, sellers and other consumers, may learn information on how the food is produced, the methods used and specific organoleptic and territorial attributes, improving their food awareness, culinary education and sustainable food choices. This makes it easier for consumers to evaluate the fairness of prices and understand the true cost and externalities of food production (Malak-Rawlikowska *et al.*, 2019; Vittersø *et al.*, 2019; Mastronardi *et al.*, 2015).

2.3. The environmental dimension

The environmental impact is the more uncertain of the three sustainability pillars. In the literature, the more commonly reported effects that FMs are likely to have on the environment are reduction in food miles and carbon footprint, positive impacts on biodiversity and reduction in the use of agrochemicals on organic farms. Notwithstanding this, quantitative evidence on these effects is quite rare, due to the difficulty in measuring environmental effects and externalities of the different types of SFSCs.

FMs are likely to have a positive impact on agrobiodiversity since, with the necessity to meet consumers' demand for variety, usually met by supermarkets, they feel the need to diversify production instead of specialising in one or two crops, often rediscovering ancient and traditional varieties or introducing organic farming (Bullock, 2000).

In FMs, farmers may also have the tendency to adopt more sustainable practices to reduce negative externalities of agriculture on the environment, such as avoiding the use of pesticides and agrochemicals (typical in organic production), contrasting water pollution and land degradation, protecting natural habitats, reducing packaging of products, contributing to food waste reduction through fresh and high-quality products, paying attention to animal welfare (Marino and Cicatiello, 2012).

FMs, being based on the close relationship between producers and consumers at a local level, may contribute to reduce "food miles", namely the distance food travels to reach consumers, and therefore lower the negative externalities linked to food transportation such as CO_2 emissions and air pollution (DEFRA 2005; cit. in Mastronardi *et al.*, 2015, and in Marino *et al.*, 2013). Nevertheless, on this last point, there is a lack of agreement in the literature since consumers driving to and from the local retail place (market, farm or pick-up point) to buy small quantities of food can be more "carbon intensive" per kilo of product compared to ordinary shopping (Vittersø *et al.*, 2019; Mancini *et al.*, 2019).

3. DATA AND METHODS

Farmers' markets in Tuscany have a long historical tradition, dating back to the early 1970s and originating from farmers' search for alternative ways to the dominant development model of the industrial agrifood system. In recent years, FMs have begun to attract the growing interest of consumers, but also of public actors, in particular regional and local administrations, who started to perceive their value in local development processes and to take direct action for their promotion (Brunori *et al.*, 2009). Nowadays, FMs are still very widespread in the region, varying in terms of types of promoters (professional producers' organisations, consumers' associations, public institutions, small farmers' networks), degree of actors' involvement, governance and functioning.

This article aims to investigate Farmers' Markets (FMs) as a new arena for social relationships between producers and consumers, where actors show different motivations other than economic profitability that embrace a whole set of economic, social and environmental values.

For the purpose of this study, we selected a sample of 9 farmers markets on the Florence-Prato-Pistoia plain (in the north of Tuscany, Italy, see Figure 1) belonging to three different networks: Coldiretti, Cia and Genuino Clandestino. Coldiretti (*Confederazione Nazionale Coltivatori Diretti*) and Cia (*Confederazione Italiana Agricoltori*) are the two main Italian farmers' unions, both

Figure 1. Location of the case study area: Florence-Prato-Pistoia plain, Tuscany, central Italy.

organising and managing a network of farmers' markets, respectively *Campagna Amica* FMs and *La Spesa in Campagna* FMs. Genuino Clandestino, instead, is a local association gathering small farmers campaigning for food sovereignty. While the two farmers' unions are very institutionalised organisations, the last one is a bottom-up network of farmers, with a quite strong political connotation and a militant approach to themes such as food self-determination and food sovereignty. In our sample we selected 2 Cia FMs, 5 Coldiretti FMs and 2 Genuino Clandestino FMs (Table 1). All these FMs are recent markets, created in the last 10-15 years by independent farmers' groups (Genuino Clandestino) or according to nation-wide initiatives of the two farmers' unions (Coldiretti and Cia). In these FMs, depending on the regulations of each single market, producers mostly sell their own products, or those produced by other members of these networks. Most of the producers participating in these FMs are local or regional producers, with a few exceptions for those selling very specific or traditional products from other Italian regions.

For each selected market, we conducted some in-person interviews, submitting two different questionnaires to a sample of 34 producers and 181 consumers, with the aim of collecting evidence on their perceptions, motivations and behaviour in the markets, and on the impact of selling/purchasing in these farmers markets on sustainability dimensions. The two samples were almost equally distributed among the 9 markets, with 3-4 producers and 20 consumers interviewed for each one. Interviews were conducted in April and May 2023.

The producers' sample contains mostly small family businesses located in Tuscany, around the provinces of Florence, Prato, Pistoia and Lucca, with some exceptions of non-Tuscan producers selling particular kind of products such as Parmigiano Reggiano from Emilia-Romagna (central Italy) and citrus fruit from Basilicata (southern Italy). For the majority, producers sell fruit and vegetables, cheese and milk derivatives, meat and cold cuts, and olive oil, which is a very typical and widespread product in Tuscany, largely used in the culinary tradition.

Consumers in the sample are 61% females (111 individuals) and 39% males (70 individuals), with an average age of 56 years old (min. 19, max. 90) and an average family size of 2.73 components.

The methodology employed is based on actors' self-assessment supported by a guiding interviewer. The questionnaire submitted to producers is divided into two main sections. The first section contains open-ended questions collecting descriptive information on the characteristics of respondents' businesses and their participation in the specific FM (e.g., organisational arrange-

Table 1. Structure of the sample in relation to the market characteristics.

Market	City	Network	N° producers	N° consumers
Piazza Alberti	Florence (FI)	CIA	4	20
Parterre	Florence (FI)	CIA	3	20
Novoli	Florence (FI)	COLDIRETTI	3	20
Cascine	Florence (FI)	COLDIRETTI	4	20
Osmannoro	Sesto Fiorentino (FI)	COLDIRETTI	4	20
Sacra Famiglia	Prato (PO)	COLDIRETTI	4	21
Via dell'Annona	Pistoia (PT)	COLDIRETTI	5	20
Piazza Tasso	Florence (FI)	Genuino Clandestino	4	20
Le Fornaci	Pistoia (PT)	Genuino Clandestino	3	20
Total			34	181

ments, resources needed, motivations and expectations, difficulties and future needs). The second section contains two sets of structured questions, the first set asking producers to evaluate (on a 5-point Likert scale, from "not important" to "very important") the importance of a list of seven criteria (income increase, income security and stability, fairness and social justice, supporting the local community, consumers' satisfaction, reduction of negative environmental externalities, preservation of local resources) in the decision-making process of their business, and the second set asking them to assess (on a 5-point Likert scale, from "very negative" to "very positive") the impact of the specific FM on a list of 33 economic (EC), social (S) and environmental (EN) aspects (Table 2).

The questionnaire submitted to consumers contains closed-ended questions dealing, in the first part, with the general characteristics of consumers' participation in the specific market (e.g., frequency of attendance, types of products purchased, average expenditure). The second part of the questionnaire contains some questions asking consumers to express (on a 3-points Likert scale) their agreement with the perceived impact of the FM on a list of consumption attributes grouped into 3 categories (consumption experience and prices (CE), quality and health (QH), localness and the environment (LE)) and with the factors perceived as limiting (LM) the access and frequency of purchases at FMs (Table 3).

4. RESULTS

Results show that both the producers and consumers interviewed use farmers' markets in a stable and continuous way, as their main commercial outlet. 76% of the producers in the sample also participate in other FMs than the one in which they were interviewed, and 79% of them consider FMs as "very important" in relation to their economic turnover (Figure 2). Moreover, the majority of producers offer a quite wide supply products at the FM (Figure 3), with 56% of producers selling 3 or more categories of products, 26% of them 4 or more categories, and 15% 5 or more categories.

Looking at consumers (Figure 4), 71% of the sample frequently buy products at the FM where they were interviewed (50% of them weekly and 21% a few times a month), while 42% also frequently buy products from other FMs. Moreover, the majority of consumers buy a quite varied basket of products at the FM (Figure 3), with 80% of consumers buying 3 or more categories of products, 56% of them 4 or more categories, and 35% 5 or more, suggesting a use of FMs for the usual food shopping.

Producers in the sample on average evaluated social and environmental criteria ("support local community", "consumers' satisfaction", "reduction of negative environmental externalities" and "preservation of local resources") as significantly more important in their productive and marketing decisions than economic criteria ("income increase" and "income security and stability"). However, some differences emerged across different FMs networks (Figure 5). Most of the producers from Genuino Clandestino (91%) consider social and environmental decision-making criteria very important and only 28% of them attribute importance to economic ones. Instead, in Cia and especially Coldiretti markets, even if most of the producers attribute a significant importance to social and environmental criteria, they still also consider economic criteria very important (50% of producers in Cia and 90% in Coldiretti).

Concerning sustainability, producers on average evaluated the impacts of FMs as positive on all the items analysed in the three sustainability dimensions but, however, environmental and social aspects are perceived as

Table 2. Decision-making criteria and FMs' impacts from the producers' questionnaire.

Economic impacts (EC)
EC1) Price level
EC2) Income level
EC3) Sales predictability
EC4) Access to market
EC5) Power & autonomy
EC6) Products & income diversification
EC7) Unfit products
EC8) Favourable payment terms
EC9) Risk sharing
EC10) Resource sharing
EC11) Distributive equity
EC12) Local economy growth
EC13) Consumers' satisfaction
EC14) Economic resilience to external shocks
Social impacts (S)
S1) Trust & relationships
S2) Producers' cooperation
S3) Local jobs
S4) Marginalised workers
S5) Producers' wellbeing
S6) Female empowerment
S7) Community empowerment
S8) Local identity & knowledge preservation
S9) Consumers' food awareness
S10) Affordability for consumers
S11) Job resilience to external shocks
Environmental impacts (EN)
EN1) Transport pollution
EN2) Packaging pollution
EN3) Food waste
EN4) Pesticides
EN5) Agrobiodiversity preservation
EN6) Animal welfare
EN7) Resources regeneration
EN8) Environmental awareness

Source: authors' elaboration. Questionnaire adapted from the COACH project methodology.

Table 3. Consumption attributes among consumers at FMs.

Consumption experience and prices (CE)
CE1) It saves me money
CE2) It saves me time
CE3) It allows me to shop more pleasantly
CE4) I find a wider and more diverse selection of products than in the supermarket
CE5) After the COVID pandemic I increased my purchases at the farmers' market
Quality and health (QH)
QH1) It makes it easier for me to buy typical and traditional products
QH2) It makes it easier for me to buy seasonal fruit and vegetables
QH3) I find fresher and better-quality produce
QH4) It contributes to a more varied and healthier diet
Localness and environment (LE)
LE1) It makes it easier for me to buy local products
LE2) It allows me to reduce food waste
LE3) It allows me to reduce pollution due to transport
LE4) It allows me to reduce packaging waste
LE5) It contributes to supporting local producers
Limiting factors (LM)
LM1) Too much time is needed
LM2) I cannot find all products when I need them
LM3) Purchasing is too complicated (management, logistics)
LM4) Products are too expensive
LM5) Little variety of products available

more positively influenced by FMs than economic ones. Looking across the three different networks of FMs, some interesting differences emerge (Figure 6). Genuino Clandestino producers are the most critical producers, especially towards the impact on purely economic aspects (EC1-EC5, EC8, EC11), while they perceive a positive impact of the FM on economic resilience (EC14), thanks to the possibility of coping with different market risks though diversification (EC6), sale of products unfit (EC7) for modern markets (small defects, imperfect shape/size) risk and resources sharing mechanisms (EC9, EC10). Producers of this network also perceived the social impacts of the FM as very positive, especially on dimensions linked to trust, cooperation, job creation and resilience, producers' wellbeing and community empowerment (S1-S4, S7, S11), while they are less convinced of the effects on consumers' awareness, and food identity preservation (S8, S9, S10), and of the capacity of FMs to counteract negative environmental externalities of agri-food production (EN1-EN8). Producers from Cia and Coldiretti, instead, tend to be more in line with each other in the whole spectrum of sustainability aspects, even if Cia producers clearly show a more positive perception of the environmental impacts of FMs.

To test the hypothesis of FMs as a structural marketing and relational strategy for producers, alternative to conventional distribution channels, going beyond the mere economic profitability and embracing also a set of other economic, social and environmental values (Manser, 2022), we selected four of the impact variables as "proxy" for stability and intensity of producers' rela-

Figure 2. Importance of FMs in relation to producers' economic turnover.

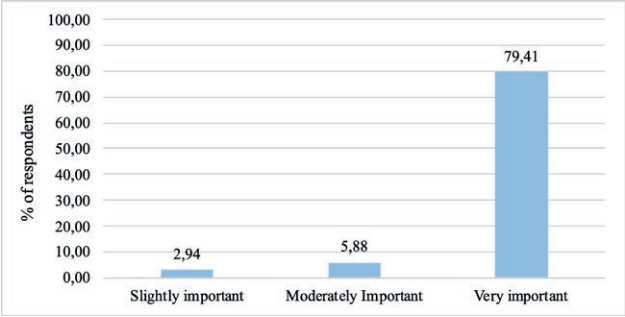


Figure 3. Producers supply of and consumers' demand for products at FMs.

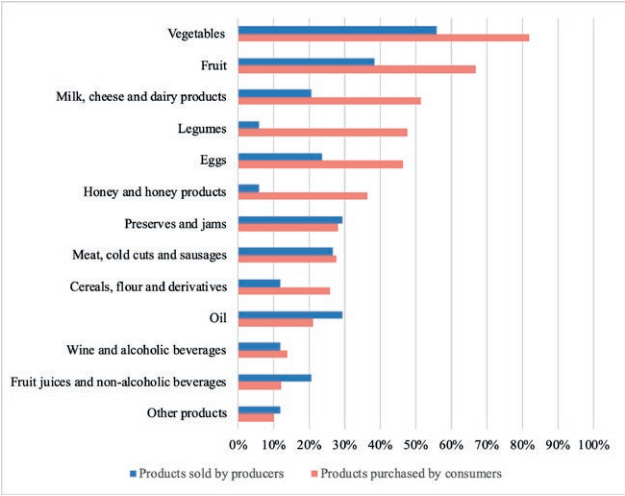


Figure 4. Consumers' frequency of purchase at FMs.

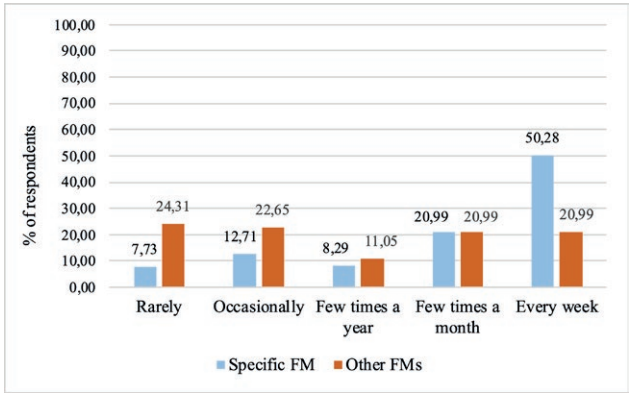
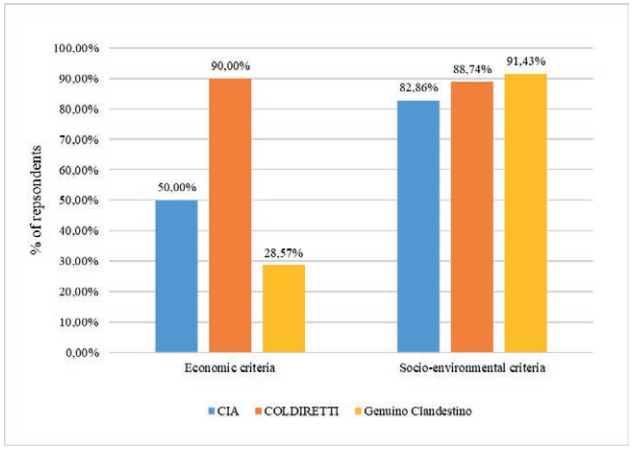
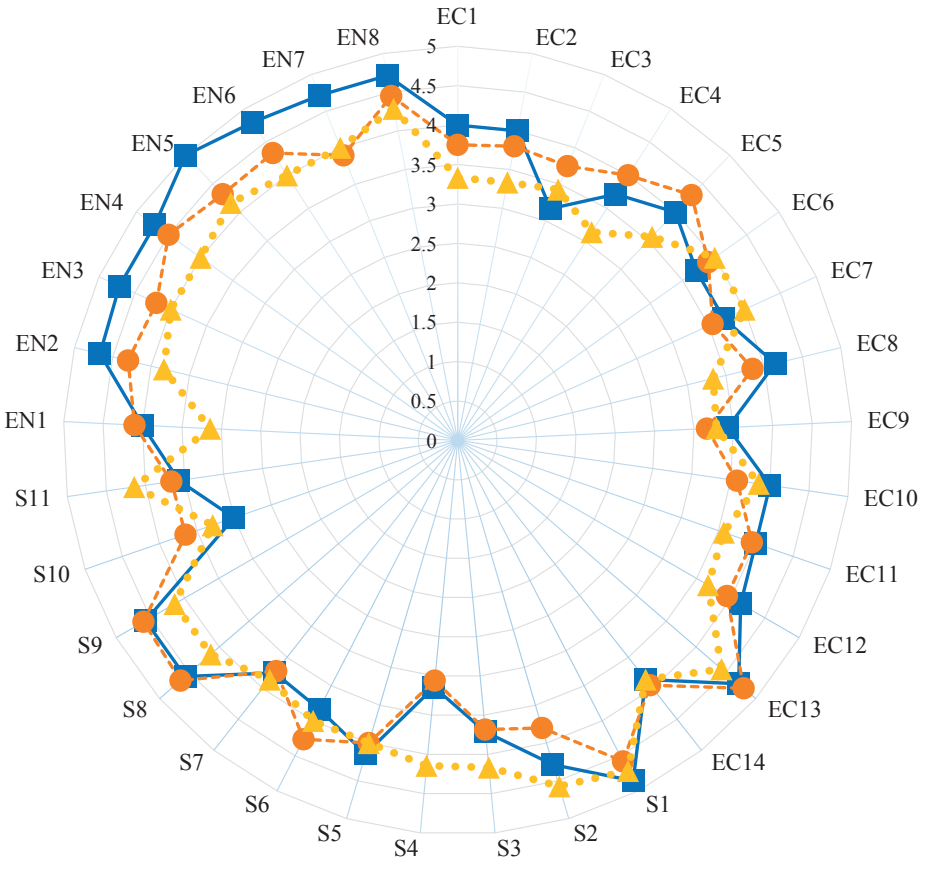


Figure 5. Importance of economic and socio-environmental criteria in producers' decision-making processes.



tionship with the FM and its other actors (other producers and consumers). The four proxy variables concern economic aspects like risk-sharing (EC9) and resource-sharing (EC10) with other actors, and social aspects such as the building of social and trust relationships between different actors (S1) and cooperation dynamics between producers (S2). Results (Figure 7) show how the two social proxy variables (S1 and S2) are perceived as very much positively influenced by FMs, coherently with what can be found in the literature (Mastronardi *et al.*, 2015; Vittersø *et al.*, 2019; Kneafsey *et al.*, 2013; Mancini *et al.*, 2019). Indeed, 79% of the sample producers consider the impact of FMs as positive on cooperation between producers (S2) and 97% of them consider the impact of FMs as positive on trust and social relations between producers and consumers (S1), with no "non positive" answers. For the economic proxy variable EC10 – i.e., the possibility of sharing resources with other producers, consumers or other actors – the perceived effect of FMs is significantly positive, with 64% of the sample producers declaring a positive impact. Instead, for the other economic proxy variable EC9 – concerning the possibility to share risk with other producers, consumers or other actors – the majority of actors (59%) perceived a non-positive impact of FMs, while 35% of them perceived it as positive. In reality, looking deeper into the non-positive answers, only 15% of the producers expressed a negative impact of FMs on risk-sharing, while 44% of them perceived that impact as neutral ("neither positive nor negative"), which could be indicative of the fact that collective risk-coping mechanisms are not put in place by the interviewed producers, or that they are implemented outside the markets, regardless of producers' participation in FMs. No significative differences across FMs networks were found for these four proxy variables, suggesting that the degree of intensity and stability of relations between

Figure 6. Sustainability impacts of FMs. Average of producers' answers on a 1-5 Likert scale by FM network ("very negative" to "very positive").

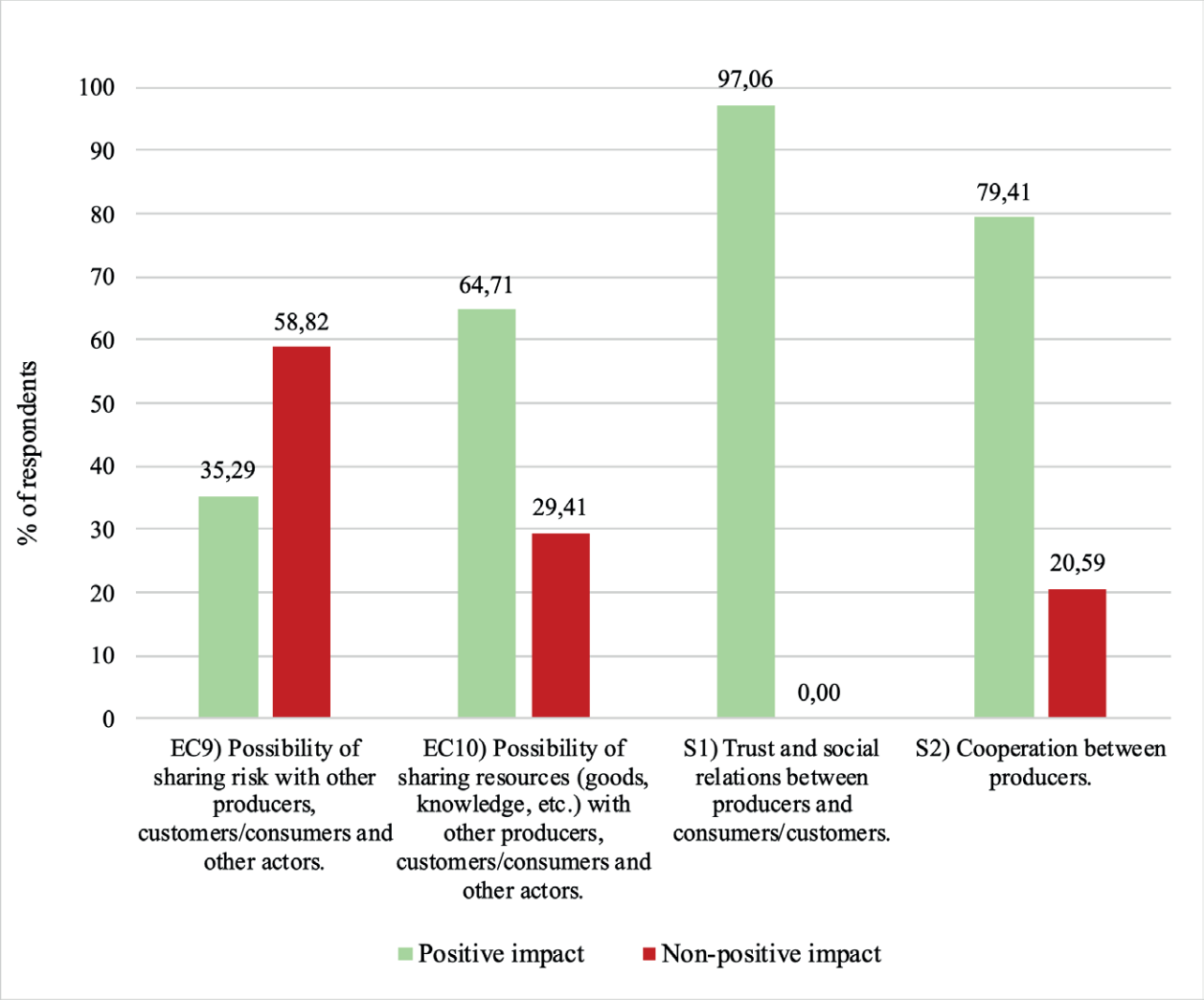


Economic Impacts	Social Impacts	Environmental Impacts
EC1) Price level	S1) Trust & relationships	EN1) Transport pollution
EC2) Income level	S2) Producers' cooperation	EN2) Packaging pollution
EC3) Sales predictability	S3) Local jobs	EN3) Food waste
EC4) Access to market	S4) Marginalised workers	EN4) Pesticides
EC5) Power & autonomy	S5) Producers' wellbeing	EN5) Agrobiodiversity preservation
EC6) Products & income diversification	S6) Female empowerment	EN6) Animal welfare
EC7) Unfit products	S7) Community empowerment	EN7) Resources regeneration
EC8) Favourable payment terms	S8) Local identity & knowledge preservation	EN8) Environmental awareness
EC9) Risk sharing	S9) Consumers' food awareness	
EC10) Resource sharing	S10) Affordability for consumers	
EC11) Distributive equity	S11) Job resilience to external shocks	
EC12) Local economy growth		
EC13) Consumers' satisfaction		
EC14) Economic resilience to external shocks		

producers and other actors in FMs (other producers and consumers) is not influenced by the FM type, unlike their content, objectives and motivations which vary across FMs, as discussed above.

Consumers in the sample on average consider FMs as positively impacting on their consumption behaviour, diet, and on the territory and the environment, compared to conventional distribution channels (Figure 8), as highlighted in the literature on this topic (Marino and Cicatiello, 2012; Malak-Rawlikowska *et al.*, 2019; Vittersø *et al.*, 2019; Mastronardi *et al.*, 2015). Notwithstanding this, on more economic aspects such as saving money/time or finding a wide selection of products (BH1, BH2, BH4) only 25-30% of them agree, which probably shows the awareness of FMs often being more time-money consuming than conventional channels, especially to complete the full weekly shopping. As happened for producers, it is interesting again

Figure 7. Producers' perception of the impact of FMs on variables EC9, EC10, S1 and S2.

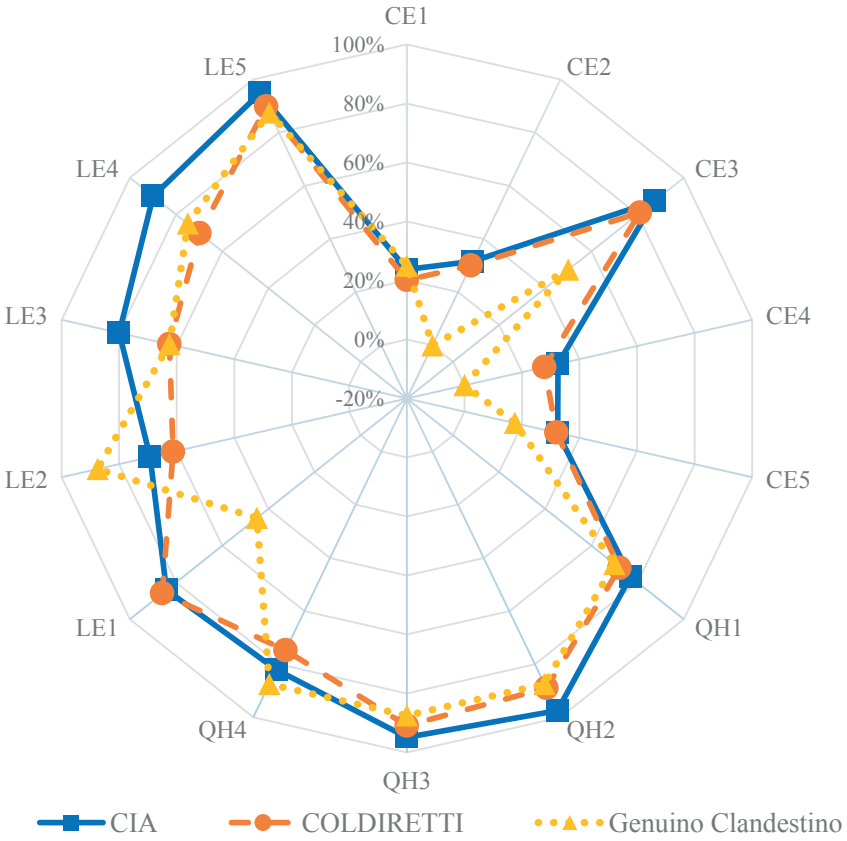


The graph represents positive VS non-positive perceived impact (by producers), with positive including "very positive" and "positive" response options and "non-positive" including "neither positive nor negative", "negative" and "very negative" response options.

to note the differences in perceptions of Genuino Clandestino consumers. Indeed, their perception of economic aspects (CE1, CE2, CE4) is even worse than that of the rest of the sample, while most of them are quite sceptical about the pleasantness of the shopping experience (CE3) and do not agree on the facility to buy local products (LE1). Instead, they are quite in line with the rest of the sample in appreciating the impact of FMs on their diet improvement (QH1-QH4), supporting local producers (LE5) and reducing negative environmental effects (LE2-LE4).

Concerning factors that can limit consumers' access and hinder more frequent purchases at FMs (Figure 9), the most agreed were the variability of the supply over time (LM2) and the cost of products (LM4), but also the limited variety of products (LM5) and the extra time needed to shop at FMs (LM1) were mentioned by a significant number of respondents. Genuino Clandestino consumers perceived as highly limiting the time needed to shop (LM1) at FMs and the variability of the supply (LM2), while Cia consumers stressed more as hindering factors the limited variety of products (LM5) and their cost (LM4).

Figure 8. Consumers' perception on the impact of FMs on consumption behaviour, diet, territory and environment (% of respondents agreeing with each item).



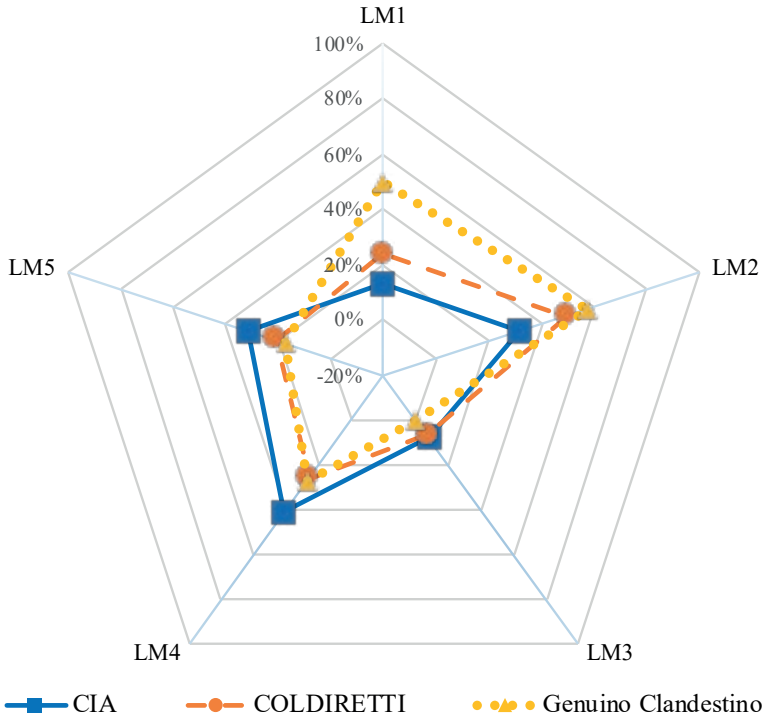
Consumption experience and prices (CE)	Quality and health (QH)	Localness and environment (LE)
CE1) It saves me money	QH1) It makes it easier for me to buy typical and traditional products	LE1) It makes it easier for me to buy local products
CE2) It saves me time	QH2) It makes it easier for me to buy seasonal fruit and vegetables	LE2) It allows me to reduce food waste
CE3) It allows me to shop more pleasantly	QH3) I find fresher and better quality produce	LE3) It allows me to reduce pollution due to transport
CE4) I find a wider and more diverse selection of products than in the supermarket	QH4) It contributes to a more varied and healthier diet	LE4) It allows me to reduce packaging waste
CE5) After the COVID pandemic I increased my purchases at the farmers' market		LE5) It contributes to supporting local producers

5. DISCUSSION

Results from the analysis show that, for most of the actors involved, FMs appear to be a specific and structural choice that reflects producers and consumers' expectations and motivations, giving a particular imprinting to their respective selling and buying models, to the extent that they constitute a specific way of shaping their mutual relationships.

FMs are not just a sporadic choice, but a structured and continuous way of intending producers-consumers economic and social relations. On one side, they reflect a specific approach to food and agriculture, and they better suit the products, values and messages these actors bring with them and are interesting to sell, buy, convey and share with each other (Alkon, 2008). On the other side, FMs themselves influence and shape producers and consumers' selling and buying habits and behaviours, and their mutual relationships. The continuity and stability of these relations is confirmed by the results, which show how the majority of producers consider FMs as an extremely important market outlet in relation to their

Figure 9. Consumers' perception of factors limiting access and more frequent purchases at FMs (% of respondents agreeing with each item).



LM1) Too much time is needed	LM2) I cannot find all products when I need them	LM3) Purchasing is too complicated (management, logistics)	LM4) Products are too expensive	LM5) Little variety of products available

economic turnover, and they usually participate in several of them. Consumers too opt for FMs as a stable shopping modality, buying their products there weekly or very frequently and often attending more than one FM.

FMs are not a secondary or residual marketing channel, but a significant and important marketing and shopping modality. Indeed, most of the producers in the sample offer a quite diversified set of products, as well as the great majority of consumers buy a significantly varied basket of products (at least more than 3 categories of products), suggesting from both sides an intensive use of FMs for an important share of the usual marketing and shopping. Regarding producers, the variety of products sold also highlights how FMs, and more in general SFSCs, influence the farm's structure and strategy: indeed, as reported also by Lancaster and Torres (2019), conversely to conventional distribution channels, FMs tend to promote products diversification, which is often essential to better meet consumers' varied demand and achieve economic viability.

FMs are not just a marketing or purchasing choice to respond to producers and consumers' economic needs for selling and buying food by obtaining better remuneration and pursuing value for money. Even though the economic component surely still plays an important role behind producers and consumers' market choices, it is often not the primary engine of their involvement in FMs. Producers in the sample, besides economic motivations, attribute great importance to social and environmental criteria when making decisions on their business, such as supporting the local community and preserving the environment and local resources (Kneafsey *et al.*, 2013). Moreover, when it comes to the perceived impacts (Figure 4), they acknowledge that FMs have a significant influence in shaping relations between producers and consumers, as shown by their answers to the four relational stability-intensity "proxy" variables (EC9, EC10, S1, S2). Indeed, FMs tend to foster the development of both economic relations leading to share resources, knowledge (EC10) and market risks (EC9), and social relations based on trust (S1) and cooperation (S2). This intensifies the flow of information and exchanges between the two sides, which on the one hand positively affects producers' work-related wellbeing (S5) and con-

sumers' satisfaction about FMs (EC13), and on the other increases consumers' awareness about food products and production processes (S9), resulting in an enhanced capacity of FMs to preserve and valorise local food products and the related knowledge, culture and identity (S8). Consumers' perceptions confirm that FMs, through the intensification of producers-consumers relationships, enhance the flow of information between the two sides, making their shopping experience more pleasant (BH3) and easing the purchase of products which are not only seasonal, fresh and of good quality (DT2, DT3), but also typical, traditional (DT1) and local (TE1).

In this general framework coming out from the analysis, some interesting differences emerge between the more "institutional" and business-oriented FMs organised by the Coldiretti and Cia, and the more "alternative" and solidarity-oriented ones of the Genuino Clandestino network. In general, the actors from this network are more critical and severe in their opinions, especially towards more economic aspects to which they attribute far less importance than to social and environmental ones, and which they consider as less impacted by FMs. Indeed, producers and consumers from this network tend to share a quite strong "activist" and political attitude towards agriculture and food, being very close to ideas of self-sufficiency and food sovereignty, and therefore radically opposed to conventional agrifood production and distribution (Alkon, 2008). This often takes their opinions to extremes reflected in their answers, also because of their specific view of how relationships in agrifood systems should be shaped and function. Moreover, solidarity mechanisms in the network are quite strong, and exchanges and cooperation are very frequent, enhanced also by the informal participatory guarantee system (PGS) they put in place among producers, with frequent farm visits coupled to collective moments of work, resources (e.g., seeds) and knowledge sharing. This is reflected in their agreement on the positive impact of FMs on risk and resources sharing (EC9, EC10), and especially in their much higher perception of the positive influence on producers' cooperation and job resilience (S2-S4, S11), as the intensity of relations and solidarity within the network helps the member to cope with market risks and eventual external shocks.

These differences in actors' perceptions and attitudes toward FMs show how FMs are not all the same (Marino and Cicatiello, 2012). Besides some general characteristics and patterns, in each market producers and consumers create their own organisational space, which reflects the characteristics of the products they exchange, their idea and understanding of agriculture and agrifood systems, and the relational model that better suits the messages and values they want to bring about.

From all these evidences and considerations, the comparison between producers and consumers' results highlights a common pattern in their behaviour and perceptions in relation to FMs that seems to confirm our initial hypothesis. FMs are not just one of many ways of buying and selling food products that producers and consumers have at their disposal, but they emerge as a stable and critical alternative marketing and shopping choice, generating specific relational models between the actors involved which at the same time reflect, influence and enable the expression and practice of a given approach to food and agriculture.

6. CONCLUSIONS

The growth of FMs, together with the more general wave of emerging SFSCs, witnesses the desire of searching for alternatives to the conventional agri-food system. Indeed, in spite of the fact that the reality of SFSCs shows different types of initiatives and 'souls' of the movement, more or less aimed at a radical transformation of the conventional agri-food system, it is possible to read a general tendency towards overcoming the logic of the pure neo-classical market.

The results of this survey, although only exploratory in nature, show how both producers and consumers participating in FMs in Tuscany, although with differences across FMs types, do not only activate market relationships, but share, learn and build values together. The great importance attributed by the interviewed consumers to social and environmental criteria when making their decisions about which marketing channel to choose and which producer to buy from, and the lower importance attributed by producers to economic variables such as price premium, is a clear signal of the diversity of FMs. Indeed, as previous studies showed (Marino *et al.*, 2013; Vittersø, 2019), values such as FMs local identity, community building, knowledge and information exchange, trust, solidarity to local people, co-operation, eco-friendliness, waste reduction, often appear to be more important than economic advantages for both producers and consumers.

Therefore, FMs constitute an innovative and alternative economic and social space, structuring producers-consumers relations, as well as their relations with the market space itself and the products' exchange dynamics. If, on the one hand, they reflect a specific approach to food and agriculture and offer an appropriate space to channel and convey products, values and messages rep-

resenting this approach, on the other, FMs themselves influence and shape producers and consumers' selling and buying models, and their mutual relationship. This bidirectional and circular influence between the FM and its community of producers and consumers clearly emerged in the results of this article, in the way different types of FMs are created and structured to respond to the different objectives, ideas and values of their members, influencing and shaping them at the same time.

The approach followed in this article presents some limitations. The sample of both producers and consumers could have been bigger and include more FMs showing a more varied set of organisational models, to better appreciate the differences between them. Moreover, the methodological choice of designing the producers' survey as an actors' self-assessment, even though guided by an interviewer, may have slightly altered the robustness of results due to possible misunderstandings in the meaning of some questions and/or terminology.

Nevertheless, with this article we hope to feed the debate and contribute to the understanding of FMs as an alternative innovative tool supporting the development of more sustainable and resilient territorial food systems.

Future research on the governance mechanisms of the various types of FMs could help to understand the implications of different organisational models on the sustainability of FMs and their appropriateness according to actors' business structure and type, as well as in relation to their values and expectations. Interesting evidence could emerge from a comparison of the thematic dimension, between FMs with different degrees of "alternativeness" in their content or governance structure, of the spatial dimension, between FMs of different areas and regions of Italy, and of the time dimension, between "historical" and more recent FMs.

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AUTHOR CONTRIBUTIONS

M.M.: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing; A.M.: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing; G.B.: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing.

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Agrifood system between global and territorial vision – Short communication

Food self-reliant community policy in Quebec: an opportunity for the reterritorialisation of agrifood?

Mélanie Doyon*, Juan-Luis Klein

Département de géographie, UQAM, Quebec, Canada
*Corresponding author. E-mail: doyon.melanie@uqam.ca

Abstract. This article explores a new government policy in Quebec, the *Plan de développement d'une communauté nourricière* (plan for developing food self-reliant communities), and its possibilities as a niche for socio-territorial innovation. Beyond the issue of food, the policy creates an opportunity to bring together sectors and actors within local communities and local territories that have been distanced or completely disconnected from each other in the ascending trajectory of capitalism, which has led to the devitalisation of local communities. We examine the application of the policy by Saint-Camille, a rural municipality in Quebec where many experiments and social innovations in rural development have been carried out, and explore the new policy's potential as well as certain limitations.

Keywords: plan de développement d'une communauté nourricière, local food system, reterritorialization, Quebec, food self-reliant communities.
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HIGHLIGHTS

- The process of reterritorialisation of agriculture passes through an alternative model of society that is more socially and ecologically just.
- The food self-sufficient community can represent a prospect for strengthening the local food system and territorial integration of agriculture itself.
- Current agricultural policy in Quebec (Canada) has potential to support socio-territorial innovation niches aimed at adopting strategies that strengthen food self-sufficient local community.

1. INTRODUCTION

In Quebec, as elsewhere in the world, the COVID-19 pandemic shook up the economy, particularly food supply chains organised around major distribution hubs and connected to global markets, largely out of urban

centres. With no pronounced disruptions, the food system managed to weather the storm. However, in response to concerns and fears about the few signs of vulnerability and the fragility of the food supply chain, the Quebec government implemented several measures focused on local sourcing and, more generally, aimed at strengthening local food systems. In this article, we explore a measure that seems advantageous, as it has the potential to transform local food systems beyond the realm of agriculture: the *Plan de développement d'une communauté nourricière* (PDCN), or plan for developing food self-reliant communities. The policy was adopted in 2020 by the *Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec* (MAPAQ), the Quebec ministry of agriculture, fisheries and food. At the end of 2020, the ministry launched a call for projects to develop plans for implementation of local food strategies. In this article we focus on the transformative aspect of this policy.

The PDCN is a public policy that "aims to develop and promote a local food system" (MAPAQ, 2023: 6)[1]. It capitalises on "interactions between agrifood players, grassroots support and access to healthy, fresh, local food" and "takes into consideration more links in the local food system (producers, processors, retailers, community organisations, consumers)" (MAPAQ, 2022: 5).

This article focuses on the potential of this new government policy to support a niche for socio-territorial innovation. Beyond the food issue, the policy offers an opportunity to bring together sectors and actors within local communities and local territories that have been distanced or completely disconnected from each other in the ascending trajectory of capitalism, which has led to the gradual devitalisation of local communities. We focus on the case of Saint-Camille, a community recognised in Quebec as a place of experimentation and social innovation in rural development, in order to show this policy's potential, as well as certain of its limitations.

Before we proceed, it is important to note that Quebec is a province of the federal state of Canada. While the provinces of Canada, and Quebec in particular, have exclusive jurisdiction in certain areas of the law, this does not include agriculture and territorial development, which fall under both federal and provincial jurisdiction. However, the specific policies and bodies discussed in this text are under the jurisdiction of the provincial government.

[1] Authors' translation.

2. WHY IS RETERRITORIALISATION THE BASIS FOR ALTERNATIVE MODELS?

The aim of this article is to analyse an agricultural public policy adopted in Quebec that could encourage the restructuring of local communities around an approach concerned with where we live rather than interspatial competition. This analysis is important because the policy has potential to create niches of social and ecological transformation (Geels, 2002) and thereby further socio-territorial innovation (Klein *et al.*, 2014; Moulaert and Van den Broeck, 2018).

It is worth remembering that capitalist development has broken up the production of goods into production chains composed of various segments. The vertical and horizontal integration of these segments into industries driven by marketing and consumption (Olson, 2021), an integration intensified with globalisation (Sassen, 2007), has accentuated competition on a global scale, where the global and the local are combined (Cox, 1997; Pecqueur, 2006). Hence, the various chains of production are able to benefit from comparative advantages, which reduce production costs and therefore increase competitiveness (Moulaert and Swyngedouw, 1989). This quest for competitiveness is at the root of fierce competition exacerbated by globalisation (Porter, 2001), and this competition has transformed local territories into sources of advantage favouring the profitability of capital on global markets, with no regard for the needs and aspirations of the local population. With reference to the basic logic of capitalism, this model of development – indeed, of society – has been defined as extractivist and neoextractivist (Gudynas, 2011; Chagnon *et al.*, 2022).

This production mindset, which is part and parcel of industrial production, is just as characteristic of agricultural production and has affected and transformed rural territories as agribusiness has developed (Chagnon *et al.*, 2022). The process of deterritorialisation, in which the local is solely a source of production factors enabling increased productivity and profitability, is at the root of a territorial approach based on the notion of productive space, where what is produced has no connection with local needs, particularly in terms of food. To paraphrase Polanyi, this is what we might call the territorial disembedding of agricultural production, a deterritorialisation that progressively devitalises local environments insofar as what prevails is the maximisation of surplus value and, therefore, the reduction of local investment and income.

After the Second World War, Keynesian public policies were part of this process in two ways. Such policies supported agribusiness in order to develop the competitiveness of countries or regions, and secondly, they com-

pensated, particularly in Western states, for the losses incurred by local communities through public investment. The spread of neoliberal-inspired political perspectives has led governments to reduce their contribution, particularly to less competitive communities, intensifying the decline of those territories most negatively affected by the deterritorialisation of production.

The vision that inspires this article is part of an alternative approach to development – a post-extractivist and therefore emancipatory approach that advocates for the reterritorialisation of agriculture. As Escobar (2018) and Santos (2017) argue, it is at the level of local territories that the proposal for an alternative model of society can emerge, one that is more socially and ecologically just, since it is at this scale that one can try to meet the social and economic needs of the population while preserving nature. It is also possible to meet all the needs of local communities at this scale, whether in terms of goods or services. This is how we come to see territories as living environments rather than productive spaces.

At the local level, experiments to bring citizen and economic interests together are being organised in response to the destructuring caused by globalisation. This is what Pecqueur and Nadou (2018: 29) call "*faire territoire dans une économie mondialisée*", or place-making in a globalised economy. A social and solidarity-based economy is emerging at the local level, striving to put forward forms of economic development based on solidarity and liberated from the dominant productivist models (Frère and Laville, 2022). With grassroots support, the main actors are able to launch initiatives that mobilise social economy resources and combine them with other resources (public and private). The local level can thus be a point of convergence between economic approaches that value social capital and economic practices inspired by new values, for example, where individual enrichment is subjugated to objectives that prioritise ecological sustainability (Fontan, Klein and Van Schendel, 2023). Thus, we posit that the territory embodies a fundamental societal issue, which leads us to frame our analysis of innovative policies on agriculture as a proposal to reintegrate food production into territories – in other words, reterritorialisation (Doyon and Klein, 2019). In the following sections, we explain this approach in relation to Quebec.

3. THE GRADUAL DETERRITORIALISATION OF QUEBEC AGRICULTURE

In Quebec, as elsewhere, agriculture has long been practised with an eye toward local and national consumption to meet the needs of nearby communities. This territorial interweaving takes two main forms. On the one hand, commercial agriculture was established in the St Lawrence lowlands and central regions to feed the cities. With urbanisation and the growth of certain urban centres, in particular the city of Montreal, this form of agriculture has become increasingly important. On the other hand, in the more peripheral and remote regions, subsistence farming has supported the expansion of the ecumene, oriented toward forestry, mining or fishing. In these cases, agriculture made it possible to establish rural settlements to support the pioneer fronts, thus alleviating the problem of access to food. At the same time, it lowered the cost of reproduction of the workforce, increasing the rate of profit for the large companies exploiting natural resources and fostering capital accumulation that corresponds to what Harvey (2004) calls "accumulation by dispossession". This duality of agricultural forms lasted until roughly the Second World War.

In the aftermath of the Second World War, farming began a process of modernisation to serve the ever-growing urban population. In this context, the *Comité d'enquête pour la protection des agriculteurs et des consommateurs*[2], or committee for the protection of farmers and consumers, was set up in 1952 to identify the advantages and shortcomings of agriculture and to make recommendations for its revitalisation. The goal was to ensure the "progress and stability"[3] of agriculture to meet the needs of a growing, increasingly urban population, a growing proportion of whom worked in non-agricultural sectors. Ultimately, the aim was to maintain the most specialised and efficient farms capable of adapting to the new demands of urbanisation. This led to the concentration of farmland tenure and the disappearance of two thirds of the least productive farms, reducing the number of farms from 140,000 in the mid-1940s to less than 50,000 in the early 1980s (Dupont, 2009). The standards, policies and incentives adopted led to the development of a productivist and extractivist agriculture increasingly disconnected from local needs. The following section outlines the major stages of this evolution. The stages are framed by milestones that marked major political changes at the highest ranks of the Quebec government (see Table 1).

3.1. Milestones of political development

Until 1960, Quebec was governed by a very conservative and generally non-interventionist political party. In

[2] The committee report uses the words "committee" and "commission" interchangeably. Locally, it is known as the "*Commission Héon*".
[3] Authors' translation.

1960, the election of the Liberal Party marked the beginning of a major process of social, economic, cultural and political modernisation now known as the "Quiet Revolution". This modernisation, with a strong Keynesian orientation, resulted in the establishment of a modern quasi-nation-state, regional economic development policies focused on redistribution and productivity, the creation of major economic institutions, the nationalisation of hydroelectricity and the implementation of structures to encourage citizen consultation[4].

This process of modernisation was also concerned with agricultural development, in keeping with the recommendations of the aforementioned commission for the protection of farmers and consumers. In 1961, the Quebec government passed the Agricultural Rehabilitation and Development Act (ARDA), which allowed the province to implement a pilot plan for regional modernisation (Klein, 2010).

3.2. Government intervention in agriculture

In 1965, the government set up the *Commission royale d'enquête sur l'agriculture au Québec,* or royal commission on agriculture in Quebec, whose 1967 report highlighted the need to increase agricultural yields. The Commission recommended drainage work and increased used of chemical inputs to improve soil quality. Thus, this second commission also aimed to modernise agriculture and increase the income of farming families (MAPAQ, 2018).

The arrival in power of a separatist government in 1976 brought a major change in Quebec's agricultural policy. The *Ministère de l'Agriculture* was reformed and became the *Ministère de l'Agriculture et de l'Alimentation* (ministry of agriculture and food). The Act to Preserve Agricultural Land was enacted in 1978, delimiting a vast zone where non-agricultural land use was prohibited without authorisation. In 1979, the Act Respecting Land Use Planning and Development was passed. The law affected rural areas and modified local governance by creating supra-municipal bodies known as Regional County Municipalities (RCMs). In 1981, the government published a document entitled *Nourrir le Québec* about development prospects for agriculture, fishing and food. It emphasised the need for greater food self-sufficiency (MAPAQ, 1981). Massive investments were made along these lines during this period.

Between 1992 and 2001, a number of major meetings were organised around the agricultural sector. The main ones were the *Sommet sur l'agriculture* (1992), which resulted in the document *À l'heure des choix*, focusing on conquering new markets (Bouchard, 1992), and the *Conférence sur l'agriculture et l'agroalimentaire québécois* (1998), during which an agreement was reached to aim to double exports over a seven-year period. During this period, Quebec's agricultural policies focused on better positioning the agrifood sector in the context of globalisation. In particular, a decision was made to support large-scale pork production for export. This increased the demand for fodder, which had strong impacts on agriculture, the environment and territories and intensified the extractivist orientation of food production. This industrial, sector-based approach, disconnected from local and national food needs, has serious consequences, such as contamination of waterways, loss of forest cover, abandonment of land less suited to the productivist model, and concentration of agricultural capital.

In 2006, the *Commission sur l'avenir de l'agriculture et de l'agroalimentaire québécois,* or commission on the future of Quebec farming and agrifood, was set up and highlighted a number of issues facing Quebec's agriculture and agrifood sector. Although the Commission concluded that the agrifood sector was not in crisis, many players in the sector claimed to be "at a turning point" (CAAAQ, 2008: 13). The free-trade agreements signed by the Canadian government have ushered in an increasingly productivist agricultural model that clashes with environmental and health concerns, both from citizens and from farmers adhering to agroecological and proximity marketing models.

In 2013, a plan for food sovereignty in Quebec called the *Politique de souveraineté alimentaire* was adopted but then immediately abandoned by the neoliberal-inspired government elected in 2014. Finally, the *Alimenter notre monde* bio-food[5] policy, adopted in 2018 and still in force at the time of writing, aims to establish a "prosperous" and "sustainable" bio-food sector, and in particular to "strengthen the synergy between territories and the bio-food sector" (MAPAQ, 2018: 105)[6]. The main policy discussed in this article, the *Plan de développement d'une communauté nourricière* (PDCN), is being carried out as part of this bio-food policy.

3.3. The evolution of rural development policies

Obviously, rural development and agricultural development are not synonymous. But in order to fully

[4] For a summary of Quebec's economic development from the Quiet Revolution onwards, see Moralli *et al.* (2017).

[5] In Quebec, the term "bio-food" refers to agriculture, fisheries and aquaculture and agri-food sectors combined.

[6] Authors' translation.

Table 1. Evolution of agricultural and rural policy issues in Quebec.

Orientation	Policies and programmes	Policy and programme objectives
Before 1960 Conservative, but open to foreign capital; right-wing nationalist	*Comité d'enquête pour la protection des agriculteurs et des consommateurs*	– Assessment of the state of agriculture – First stances on the future of the agrifood industry – Recommendation to maintain the family farm
1960-1976 Keynesian; Quiet Revolution; hydroelectricity; economic nationalism	Agricultural Rehabilitation and Development Act *Commission royale d'enquête sur l'agriculture au Québec*	– Modernisation of soil use – Regional planning – Improving farm family incomes – Major drainage works
1976-1985 Keynesian, separatist social democrat	Act to Preserve Agricultural Land Act Respecting Land Use Planning and Development *Nourrir le Québec*	– Protecting agricultural land – Streamlining of land use – Food self-sufficiency – Sovereignty perspective
1986-1994 Deregulation; supportive state; reducing public services	*Sommet sur l'agriculture*	– Integration into globalisation – Shift to export farming
1994-2003 Keynesian, separatist social democrat	*Conférence sur l'agriculture et l'agroalimentaire* *Le rendez-vous des décideurs* PNR 1	– Doubling exports – Developing the pork industry for export – Support for rural revitalisation
2003-2012 Deregulation; re-engineering of the state	PNR 2 *Commission sur l'avenir de l'agriculture et de l'agroalimentaire québécois*	– Support for rural revitalisation – Finding of lack of diversity in agricultural models, but no government action
2012-2014 Separatist, social democrat	Food sovereignty policy	– Support for the bio-food sector
2014-2018 Neoliberal	*Alimenter notre monde* bio-food policy	– Synergy between territories and the bio-food industry
2018- … Right-wing nationalism; neoliberal; productivist; COVID era	*Plan de développement d'une communauté nourricière*	– Improving the local food system and food self-sufficiency – Empowering local communities

understand the scope of our main subject of study, the government plan to promote creation of food self-reliant communities, we must also take into account the policies recently adopted in Quebec to foster rural development, the organisations and programmes created by these policies, and their elimination in 2014.

Since 1990, various programmes have been implemented by the government to support rural communities. The flagship measure of government intervention in Quebec's rural communities was the *Politique nationale de la ruralité* (PNR), adopted in 2002 in response to the demands of rural and regional movements. The policy was based on four main orientations: 1) promoting the renewal and integration of populations; 2) fostering the development of the territory's human, cultural and physical resources; 3) ensuring the sustainability of rural communities; and 4) maintaining a balance between quality of life, the living environment, the natural environment and economic activities.

The PNR was implemented in three phases. The first (2002-2007) created rural pacts, which were contractual partnerships between the state and regional county municipalities, focusing on commitment and innovation (MAMROT, 2001). The second PNR (2007-2014) added rural laboratories, in-depth development experiments in little-studied fields of activity that represent promising avenues for rural communities (MAMROT, 2006: 32). These measures were to be reinforced in the third 10-year phase (2014-2024). They were meant to promote the multisectoral nature of the territories, including agriculture, but were dismantled by the neoliberal government elected in 2014 along with the organisations and programmes they had created.

The combination of the deterritorialisation of agriculture and the elimination of the PNR justifies our emphasis on the concept of the food self-reliant community and the government's plan to encourage its realisation. This policy fits well with the current neoliberal

approach, which advocates the withdrawal or even total elimination of the state's responsibility for territorial development. But it also opens a window of opportunity that communities can use to strengthen their agency and freedom from the constraints of extractivist agricultural development. Our hypothesis is that when built from a community perspective, the food self-reliant community carries the gene for agrifood reterritorialisation.

4. THE PDCN IN SAINT-CAMILLE

As mentioned, at the end of 2020, the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ) launched its first call for projects to carry out the PDCN[7]. In drafting their PDCN, communities are required to produce an overview and analysis of the food system in their territory, establish and maintain dialogue between the various stakeholders, and identify actions to implement in order to find solutions. As mentioned above, the plans must encourage interaction between agrifood actors, have grassroots support and provide access to healthy, fresh, local food (Québec, 2023). For MAPAQ, a food self-reliant community requires 1) productive land, 2) prosperous and responsible businesses, 3) improved access to healthy food, 4) increased local demand, 5) an optimised life cycle, and 6) local food governance.

Municipalities or groups of municipalities wishing to undertake such an approach must respond to the ministry's calls for projects. The municipality of Saint-Camille seized this opportunity. At the end of 2020, the first round of funding was granted to carry out PDCNs. Saint-Camille received $18,900 in funding from MAPAQ (Québec, 2021). Implementation of the plan was entrusted to the *Corporation de développement socioéconomique de Saint-Camille* (Saint-Camille socio-economic development corporation). We present this case as an example of a food self-reliant community plan carried out under the leadership of a community with strong, inclusive and well-established local governance. But first, a brief introduction to Saint-Camille is in order.

4.1. The community of Saint-Camille

Like many rural municipalities in Quebec at the turn of the 20th century, Saint-Camille's activities were essentially farming and forestry. Beginning in the 1950s, farming shifted from producing for family and local needs to a more commercial activity. This period was marked by the decline of small farms and the expansion of more productive ones. The farming population itself turned away from agriculture and moved to the cities, where they found employment in mining[8] and manufacturing. Thus, at its peak in 1911, Saint-Camille's population was over 1,000, whereas by 2001 it had dwindled to just 440 (Klein *et al.*, 2015). This demographic decline led to the disappearance of various services associated with agricultural activity, but also threatened the existence of services for the population, notably school, as well as the sustainability of the community itself. Under these circumstances, various initiatives were undertaken to revitalise the municipality.

In 1986, four residents set up a fund to acquire an important building in the heart of the municipality, the former general store. The premises were to be occupied by a non-profit organisation created at the same time with the mission of operating an intergenerational meeting space with a community and cultural vocation (Le P'tit bonheur de Saint-Camille, 2023) (see Figure 1). This organisation offers a weekly meal service in the municipality, providing a place for the community to meet, and promoting local products and locally grown vegetables.

The solidarity cooperative *La Clé des champs* was created in 2003 (Doyon *et al.*, 2020; Tremblay *et al.*, 2019). It became a private company in 2010, but it kept the same name. The vegetable grower couple who acquired the business have essentially the same goal as the cooperative once did, which is to provide the local population with fresh, healthy food (Klein *et al.*, 2015). Their produce is distributed through direct-to-consumer channels, such as the weekly baskets, as well as farmers' markets (local and regional).

The *Cultur'Innov* cooperative was founded in 2009, which, in addition to producing food, offered consulting services for non-timber forest products such as the cultivation of new berry varieties, nut trees, medicinal plants and mushrooms. Since 2017, it has a 4.5-hectare experimental orchard (Cultur'Innov, 2023). More recently, *Cultur'Innov* has invested in setting up a packaging and processing centre to serve producers (Doyon *et al.*, 2020).

Finally, in 2019, Saint-Camille adopted a local appellation of origin, *Fabrications d'origine camilloise*, which is meant to highlight the originality of local products and services and the expertise of their makers and suppliers including food (e.g., winter spinach, spicy wild boar pizza, apple creton). The same year, the municipali-

[7] During the COVID-19 pandemic, other measures such as the *Panier bleu*, essentially a showcase for local farmers, processors and merchants, were also put in place, leaning on local sourcing.

[8] The region was known for its asbestos mines. Les Sources Regional County Municipality is the new name (since 2006) of Asbestos Regional County Municipality.

Figure 1. The municipality of Saint-Camille, Quebec.

Produced by : Mourad Djaballah, cartographic technician, Department of Geography, UQAM

ty also adopted a local procurement policy, including for agrifood products.

4.2. Research and intervention method

The research work surrounding the Saint-Camille PDCN was carried out on the basis of grounded theory as proposed by Glaser (2002), according to which we begin on the ground and then generalise, and the partner-oriented research approach, which is based on the cross-fertilisation and co-construction of knowledge (Fontan *et al.*, 2014). The research is part of a larger project called *Ateliers des savoirs partagés*, or shared knowledge workshops, an experiment with rural communities taking action to reverse their devitalisation and researchers from the *Centre de recherche sur les innova-*

tions sociales (centre for research on social innovations, or CRISES). The project experiments with new ways of running events, offering services, promoting local heritage, living, developing the territory, revitalising and working toward food security. Saint-Camille was the only community that participated in the first round of the *Ateliers des savoirs partagés* (Klein *et al.*, 2015), while the Petit-Saguenay municipality and the Bellechasse regional county municipality joined in the second round (Tremblay *et al.*, 2022). The third round includes some 15 communities.

This type of partner-oriented research between the academic and practical worlds is part of a new approach in which the university becomes a stakeholder in community development. This partner-oriented approach allows for the creation of social innovations that respond to the needs and aspirations of citizens and communities (Bouchard, 2021). In this approach, researchers work with stakeholders to analyse the problems facing communities and identify potential ways to ensure their resilience. From a pragmatic and performative perspective (Gibson-Graham *et al.*, 2019), partner-oriented research allows for experimentation with new development strategies.

5. SAINT-CAMILLE'S PLAN FOR A FOOD SELF-RELIANT COMMUNITY

For Saint-Camille, the government's adoption of the PDCN and MAPAQ's call for projects represented a window of opportunity that stakeholders seized to develop and create a food self-reliant community (Doyon *et al.*, 2022). The municipality was already very proactive in developing its community and had a history of focusing on agrifood initiatives. The PDCN was intended to help tie together projects that were developing relatively autonomously (although, as mentioned above, some attention was paid to symbiotic relationships such as the use of local products) and to optimise the use of certain local resources. The municipality selected three main themes to guide the establishment of a food self-reliant community: food education and training, the development of food solutions, and the sustainability of local ecosystems and services (CODESESCA, 2022a).

Saint-Camille's PDCN, adopted at the end of 2022, is part of a long-term vision of local development. This vision, which guides the municipality's actions in a number of areas, provides that by 2030 Saint-Camille will be:

> *characterised by its avant-gardism and prosperity. It is recognised regionally and nationally for its strong agricultural nature. It is made up of a local ecosystem of strong, symbiotic organisations and businesses that help meet the community's current and future needs* (CODESESCA, 2022a: 6)[9].

The planning process followed the "classic" steps. First, an overview of the community and of the local food system was drawn up, using data from various organisations (e.g., Statistics Canada, Institut de la statistique du Québec) and ministries (e.g., MAPAQ). A survey, to which 83 people responded (out of a total population in 2021 of 551 inhabitants, or 225 households [Statistics Canada, 2023]), provided additional information. For example, while data are available for large game (e.g., deer, elk), this is not the case for smaller game (e.g., hares, grouse). The survey therefore provided a better understanding of the supply from natural areas (gathering, hunting, fishing, trapping), but also, more broadly, additional information about the territory and agricultural production activities, local food processing, local food distribution and marketing, and finally, waste management and reuse.

After the overview, a public consultation was carried out (in November 2021) in order to perform an analysis, with 61 people taking part. The analysis used two focus groups (in February and March 2022) with 10 local stakeholders to go into more depth. Among the strengths identified were the presence of actors operating in a diversified local agriculture model and the availability of land dedicated to agriculture; the absence of a critical mass of consumers and specialised food processing activities were considered weaknesses (CODESESCA, 2022).

Lastly, a two-phase process was used to reflect on the actions to be implemented or those that would benefit the municipality. First, an initial public consultation session provided an opportunity to present food initiatives launched by other rural communities in Quebec, in order to show the diversity of options and draw inspiration from them (Doyon *et al.*, 2022). Next, a second public consultation was held in June 2022. Some 25 people took part in this new meeting. During this exercise, a number of needs and potential solutions were identified. For example, residents expressed the need for infrastructure or equipment to store vegetables over winter. Local producers also in attendance at the meeting were quick to respond that their refrigerator could potentially be made available.

An eight-year plan was organised around three major objectives: 1) to transfer and enhance know-how, local natural food resources and food self-reliance potential; 2) to increase autonomy, resilience and local food solidarity; and 3) to ensure the sustainability and vitality of our local ecosystems and services (CODESES-

[9] Authors' translation.

CA, 2022). Every year since 2021, community members have been invited to take part in collective brainstorming on ways to become a food self-reliant community. A concrete achievement directly linked to the adoption of the PDCN is the creation of an *AgrÉcole* at the Saint-Camille primary school. The programme provides teaching materials, material resources and human resources to help schools integrate agrifood into their K-6 curriculum. After seeing the presentation on inspiring experiences as part of the PDCN (Doyon *et al*., 2022), the school submitted its application, which was accepted in February 2024.

6. DISCUSSION

The policy for creating food self-reliant communities differs from the major state interventions of the past. It is applied at the local level, with the aim of building local food systems, and thus differs from the usual government approach to agrifood, which is more large-scale and industry-focused. It emphasises the diversity of the actors involved. Saint-Camille's experience in implementing the PDCN shows the unifying potential of agrifood projects involving different actors: residents, private companies, municipalities. Indeed, the food self-sufficiency and local food movements are seen as opportunities (CODESESCA, 2022a).

However, in light of the process undertaken by Saint-Camille, but also more generally by other communities, certain limitations of the existing policy become apparent, and the process raises a number of questions. While funding is provided to develop a plan, that funding is actually somewhat limited (financial assistance of up to 50% of eligible expenses, up to a maximum of $40,000 [Cabinet du ministre de l'Agriculture, des Pêcheries et de l'Alimentation, 2021]). It is not enough money to hire someone to oversee developing the plan. Nor is it enough to hire someone to do the work necessary to implement the plan, such as follow-up, communications and events. The plan's development and implementation thus rely on existing employees, and its realisation on local actors. However, in September 2023, MAPAQ announced the creation of a new programme[10] to fund coordinating and carrying out projects of collective interest. There is every reason to believe that these funds could be obtained to coordinate the implementation of the plan and carry out actions.

What's more, mastery of the various aspects related to food self-reliant communities likely varies from one territory to another. Since local planners have not been specifically hired to carry out a PDCN, do they fully understand what a local food system is? Do they know the difference between the concepts of food autonomy and other related concepts that have different objectives, such as food sovereignty and food security? Do they understand issues related to healthy eating?

Moreover, granting funding through a call for projects puts local communities in competition with one another. While the government renews the amounts over the years and many, if not all, communities could potentially benefit, communities do not all have the same resources and expertise to apply for these funds. Such disparities are likely to persist during the development and implementation of the plans, and may contribute to keeping the areas most in need in a state of decline. In 1995, Saint-Camille created a socio-economic development corporation whose mission is to "promote agrifood and socio-cultural development, industrial/commercial expansion and the protection and integrity of the natural environment in the municipality" (CODESESCA, n.d., n.p.)[11]. This means it is someone's job to work specifically on this type of task, and that person has the knowledge and experience to enable the municipality to apply for funding, as well as expertise in organising community events. Moreover, as part of its PDCN, the community identified its own mobilisation capacity as a strength.

Finally, even if it is too early to assess the impact of a community's adoption of a PDCN, and even if food self-reliance projects are indeed being implemented in some rural areas, it is already evident that the size of a municipality (for example, just over 500 inhabitants in Saint-Camille) limits the actions that can be undertaken locally, a situation the Saint-Camille community identified as a weakness. It would certainly be beneficial, especially for small municipalities – as the case of Saint-Camille demonstrates – to conduct a similar reflection process at the supralocal level, meaning the regional county municipality (RCM), which is a long-standing grouping of municipalities within the same territory that form an administrative body.

7. CONCLUSION

The creation of a food self-reliant community in Saint-Camille is a logical extension of the municipality's recently adopted appellation, as it aims to promote (exchange and use) locally produced and processed food, among other goals (Pecqueur, 2023). So, despite the

[10] MAPAQ's 2023-2026 territorial and sectoral development programme

[11] Authors' translation.

questions they raise, PDCNs appear to us to be opportunities to change trends in local communities. This policy provides an opportunity for local communities to expand their repertoire of collective action, provided they have mobilised to combat the decline of their community. The Saint-Camille community's long-standing commitment to finding solutions to its problems, its ingenuity and the expertise of local actors and residents alike suggest that the PDCN can indeed contribute to the creation of a local food system and foster interactions between the various links in the agrifood chain, thereby supporting local agriculture and intersectorality in terms of both production and community services. In this way, the PDCN could also foster identity, a sense of belonging and collaborative governance.

For the time being, the food self-reliant community seems to us to be a niche for experimentation that uses some well-known strategies including locally grown food and food security, but also expands beyond those strategies as a niche of innovation. Firstly, it is based on the notion of the local community and thus lays out responses to the devitalising effects of globalisation, emerging as an option for upending existing hierarchies between the local and the global. Secondly, the food self-reliant community promotes the conditions for socio-economic reterritorialisation, since it brings production and consumption closer together, creates synergies between entrepreneurial initiative and work, articulates the ownership and use of resources, and allows the establishment of more harmonious relationships between the community and nature. In this respect, the PDCN opens the path to strategies to depart from the extractivist and productivist model and toward actions that "re-embed" agriculture in communities. However, these initiatives must not remain dependent on public policy, so as not to be subject to the political vagaries that can kill innovative experimentation, as seen in 2014 with the neoliberal government's elimination of the *Politique nationale de la ruralité*. The forms that food self-reliant communities will take, their contributions to the establishment of local food systems and to community food security, as well as their capacity to generate niches for social and ecological transformation, are certainly avenues of research to be explored in the years to come.

AUTHOR CONTRIBUTIONS

Conceptualization, JLK and MD; Methodology, MD and JLK; Investigation, MD and JLK; Writing – Original Draft, MD and JLK; Writing – Review & Editing, JLK and MD; Funding Acquisition, MD and JLK; Supervision, MD and JLK

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Agrifood system between global and territorial vision – Short communication

Farmer participation in CAP agri-environment measures for biodiversity conservation in Triglav National Park, Slovenia

Irena Bertoncelj*, Tanja Travnikar

Agricultural Institute of Slovenia
*Corresponding author. E-mail: irena.bertoncelj@kis.si

Abstract. Conservation of biodiversity at the field, farm and landscape levels is one of the agroecological principles. In Europe low-intensity farming practices which promote farmland biodiversity are financially supported by different agri-environment measures as part of the rural development policy (under the Common agricultural policy – CAP). We examined farmer participation in agri-environment measures in 8 municipalities within Triglav National Park (TNP) in Slovenia, with a focus on a selection of nine biodiversity promoting measures, which were comparable between the 2007-2013 and 2014-2020 program periods. We detected relatively low interest in any CAP measures with only approximately half of the TNP farmland being registered within the national system. Participation of TNP farmers in nine biodiversity promoting agri-environment measures (AEMs) has shown an overall positive trend between the two CAP programmes, with the most popular measures being organic farming and livestock grazing on high-alpine pastures. However, availability of CAP funds did not stop the farmland abandonment and there were some indications of tourism activities competing with agricultural production. To maintain biodiversity promoting agricultural practices in TNP in the future it will be important to implement agri-environmental measures with sufficiently high payments.

Keywords: agroecology transition, agri-environment measures, biodiversity conservation, protected areas.
JEL codes: Q1, Q5.

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HIGHLIGHTS

- Participation in nine comparable agri-environment measures (AEM) increased between the two CAP periods (2007-2013 and 2014-2020) in Triglav National Park but decreased for three AEMs, which demand most labour-intensive and time-consuming agricultural practices.
- The decline in farmer participation in nine biodiversity AEMs in the municipality of Bled indicates competition between agricultural and tourism activities.
- Availability of AEMs did not stop farmland abandonment in Triglav National Park.

1. INTRODUCTION

Food security for the rising human population is threatened by depletion of natural resources, erosion, urbanisation and climate change which prompted a call for a new ecological modernisation of agriculture (Horlings and Marsden, 2011). The principles of agroecology have evolved and today agroecology is associated with a set of environmental, socio-cultural, economic and political principles for management of food systems (Wezel *et al.*, 2014; 2020). Wezel *et al.* (2020) identified 13 consolidated agroecological principles which also include biodiversity, defined as "maintaining and enhancing diversity of species, functional diversity and genetic resources and thereby maintain overall agroecosystem biodiversity in time and space at field, farm and landscape levels".

Agriculture affects biodiversity at two different levels: at the local level due to differences in management practices in each individual field (ploughing, irrigation, use of agrochemicals), and at the regional level due to variability in cover of semi-natural or natural habitats at the landscape scale (Gonthier *et al.*, 2014; Tscharntke *et al.*, 2005). In their review article, Gonthier and colleagues found that less intensive agriculture at the local level increased the species diversity of plants with limited mobility. The species diversity of well-mobile vertebrates was positively influenced by the diversity of agricultural use at the regional level with a higher proportion of areas of natural and semi-natural habitats. Species diversity of invertebrates depended on management at both levels (Gonthier *et al.*, 2014). Similarly, Billeter and colleagues (2007) found that different groups of organisms responded differently to changes in agricultural landscape management, and the species diversity of all groups was higher in landscapes with a higher proportion of natural and semi-natural habitats.

Our society is facing a dilemma between providing enough food for the population (which requires agricultural intensification) and preserving nature and biodiversity and thus agriculture extensification. To promote low-intensity farming practices in Europe which support biodiversity in agricultural landscapes, European Common Agricultural Policy (CAP) measures provide compensation for farmers for the reduction in yields. These measures were implemented as agri-environment measures (in CAP 2007-2013) and as agri-environment-climate measures (in CAP 2014-2020). In their assessment of agroecological transition support by CAP 2014-2020, Linares Quero *et al.*, (2022) state that agri-environment measures (AEMs) and particularly organic farming were recognised as positive by stakeholders in 13 European countries out of 15 included in the study.

In Slovenia, the biodiversity conservation in agricultural landscapes is facing two opposite challenges with agriculture intensification in fertile lowlands and agriculture abandonment in areas facing natural or socio-economic constraints (Kaligarič and Ivajnšič, 2014; Žiberna and Konečnik Kotnik, 2020). The natural geographical conditions in the protected area of Triglav National Park in Slovenia are not ideal for agriculture, especially due to the rugged terrain and climatic conditions. Agriculture has adapted to the given conditions by focusing mostly on animal husbandry and low-intensity use of agricultural land, which are in line with the biodiversity conservation aims of this protected area. However, in recent decades the large landscape diversity of this area, comprising forests, high Alpine peaks and low-intensity agricultural ecosystems is mostly threatened by abandonment of mowing and grazing practices, leading to overgrowth of grasslands and transition into scrub and forest (Triglavski narodni park, 2016). The overgrowth of grasslands leads to loss of open habitat associated species resulting in overall biodiversity loss in a wider area. Therefore, measures are needed to preserve traditional agricultural practices in the Triglav National Park.

As part of the latter, several AEMs were available to farmers within the Triglav national park to encourage biodiversity friendly farming practices. We selected nine of these measures, which showed a continuation and comparability between the CAP 2007-2013 and CAP 2014-2020 programme periods. The aim of our study was to analyse participation of Triglav national park farmers in the nine selected agro-environmental measures that promote biodiversity and are comparable between the two CAP programming periods (CAP 2007-2013 and CAP 2014-2020).

2. MATERIALS AND METHODS

2.1. Study area

Triglav National Park (TNP) is located in the North-West Slovenia comprising Julian Alps with surrounding valleys, covering an area of 83,982 ha. It is named after Triglav, the highest mountain of Slovenia (2864 m above sea level). Land cover is predominantly forest (64%), followed by high altitude shrubland and rocky bare mountains (24%). There are 33 settlements with a total of 2420 inhabitants living in the area according to 2014 census. TNP is designated as a national park (IUCN category II) on the national level and as Natura 2000 and Biosphere reserve on the international level.

2.2. Common Agricultural Policy: agri-environmental measures

Slovenia adopted the CAP in 2004 following its integration into the European Union and the CAP 2007-2013 programme was the first to be implemented for the entire programme period. The CAP 2007-2013 introduced 25 agri-environment measures. In the next programme period (CAP 2014-2020) some of these measures were discontinued and some new ones were introduced with a total of 19 agri-environment-climate measures available to farmers. Furthermore, organic farming, which was previously included among agri-environment measures, was designated as an independent measure in CAP 2014-2020. Between those two programmes periods only 12 measures (including organic farming) were comparable and only nine of these were available to farmers within TNP. To estimate the trend of TNP farmer participation in agri-environmental measures, we selected years 2011 and 2017 as the representative years for the CAP 2007-2013 and CAP 2014-2020 programmes respectively. We focused our analysis on the following nine agri-environmental measures which were all designed as biodiversity conservation measures (promoting agriculture extensification) and their goals did not change between the two CAP periods:

- Organic farming
- Grazing on high-alpine pastures
- Breeding of indigenous and traditional breeds of farm animals
- Mowing of steep grasslands, exceeding 50% slope
- Preservation of special grassland habitats
- Preservation of tall tree meadow orchards
- Hand mowing of hummocky meadows
- Cultivation of indigenous and traditional varieties of agricultural plants
- Animal husbandry in areas of coexistence with large carnivores.

In our study, the data for farmer participation in AEMs was available at the level of municipalities, so eight municipalities (NUTS5 level) that are located in the TNP were included: Bled, Bohinj, Bovec, Gorje, Jesenice, Kobarid, Kranjska Gora and Tolmin. The territory of some of the municipalities extends beyond the border of TNP and the total area of all 8 municipalities was 179,800 ha.

Data on farmer participation in AEMs was obtained from the database of collective applications at the Agency of the Republic of Slovenia for Agricultural Markets and Rural Development (ARSKTRP). Collective applications contained limited spatial information of the farms (municipality), the area involved in individual CAP measures and the total amount of payments to farmers for specific CAP measures. Information about the area of agricultural land in individual municipalities was obtained from the national census statistics (Structural census of agriculture, SI-STAT database). We compiled the information on farmer participation in selected AEMs in eight TNP municipalities in two CAP periods using Microsoft Excel.

2.3. Assumptions and limitations

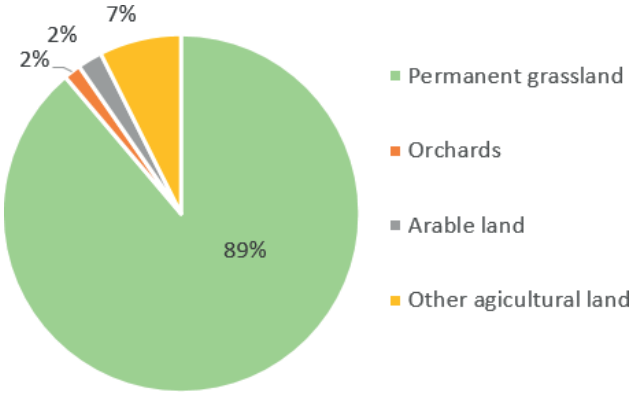
The implementation of AEMs in Slovenia is horizontal, where some agricultural areas may be eligible for more than one measure. Each measure is monitored by area involved in it (in hectares), which may result in double counting of some agricultural plots (gross area). Therefore, the information on the area (in hectares) involved in AEMs is cumulative. We do not have comparable data that count the area once (net area), and that is the main limitation of this research.

3. RESULTS

The results show that only 10% of the TNP area is under agricultural land use out of which 89% are permanent grasslands and only 2% are arable land (Figure 1). We detected a negative trend in agricultural land cover which had reduced from 8,972 ha in 2011 to 8,210 ha in 2017, with an average of 120 ha of agricultural land being abandoned every year. Only approximately half of the farmland area within TNP has been registered in the national register of agricultural holdings, in which agricultural plots are enrolled voluntarily by the farmers enabling them participation in the CAP measures. In 2011 a total of 3,770 ha (42%) were registered, which increased to 4,023 ha (49%) of farmland registered in 2017.

All subsequent analysis were conducted on the level of 8 TNP municipalities, also considering the agricultural land outside the official borders of the TNP with a total agricultural land cover of 11,769 ha. Considering all available AEMs, we observed an 11% decrease in the area of agricultural land enlisted in AEMs between the two CAP periods which surpassed the agricultural land abandonment in TNP (Table 1). The largest decline was detected in the municipalities of Bled (by 75%; from 719 ha to 181 ha) and Gorje (by 73%; from 566 ha to 154 ha; Table 1). The largest increase was observed in the municipalities of Bovec (by 74%; from 414 ha to 721 ha), Jesenice and Kranjska Gora (both by 18%; Table 1). A closer inspection revealed that this decrease can be attributed mostly to the measure of Sustainable animal breed-

Figure 1 Agricultural land use in the Triglav National Park.



ing (CAP 2007-2013) that was no longer available in the CAP 2014-2020.

We further concentrated our analysis on nine AEMs, which were comparable between the two programming periods (Table 2). In CAP 2007-2013 the percentage of the farmland enlisted in AEMs ranged between 10% (municipality Gorje) and 49% (municipality Bovec), with an average of 29% (3,376 ha; Table 2). In CAP 2014-2020 the enlisted farmland ranged between 15% (municipality Bled) and 84% (municipality Bovec) with an average of 48% (5,595 ha; Table 2).

Focusing on nine comparable AEMs, the participation of farmers in AEMs shows an overall positive trend between the CAP 2007-2013 and CAP 2014-2020, with a 66% average increase in agricultural area enlisted in these measures. The largest increase was observed in the municipalities of Kranjska Gora (143%) and Bovec (238%). The exception to this trend was municipality of Bled where a 53% decrease of the area enlisted in AEMs was detected (Table 2).

As for individual measures (Figure 2, Table 2), participation of farmers increased between 2011 and 2017 in 6 AEMs (these were organic farming; livestock grazing on high-alpine pastures; preservation of special grassland habitats; preservation of tall tree meadow orchards; cultivation of indigenous and traditional varieties of plants, and breeding of indigenous and traditional breeds of animals) and decreased in 3 measures (mowing of steep grasslands (exceeding 50% slope); mowing

Table 1. Agricultural land in eight TNP municipalities, enrolled in all available AEMs and in selected nine biodiversity promoting AEMs in two CAP programming periods.

TNP municipalities	Census data: agricul. Land (ha)	Agricultural area under AEMs in ha [participation in %]		
		All AEMs CAP 2007-2013	All AEMs CAP 2014-2020	Change (in ha) [%]
Bled	961	719 ha [*75%*]	181 ha [*19%*]	-537 [*-75%*]
Bohinj	1,718	1,496 ha [*87%*]	1,015 ha [*59%*]	-481 [*-32%*]
Bovec	784	414 ha [*53%*]	721 ha [*92%*]	308 [*+74%*]
Gorje	757	566 ha [*75%*]	154 ha [*20%*]	-412 [*-73%*]
Jesenice	597	470 ha [*79%*]	556 ha [*93%*]	86 [*+18%*]
Kobarid	1,740	1,286 ha [*74%*]	1,469 ha [*84%*]	183 [*+14%*]
Kranjska Gora	1,213	548 ha [*45%*]	646 ha [*53%*]	98 [*+18%*]
Tolmin	3,999	1,671 ha [*42%*]	1,661 ha [*42%*]	-10 [*-1%*]
TOTAL	11,769	7,170 ha [*61%*]	6,405 ha [*54%*]	-765 [*-11%*]
		9 selected AEMs CAP 2007-2013	9 selected AEMs CAP 2014-2020	Change (in ha) [%]
Bled	961	312 ha [*32%*]	145 ha [*15%*]	-167 [*-53%*]
Bohinj	1,718	786 ha [*46%*]	943 ha [*55%*]	157 [*+20%*]
Bovec	784	194 ha [*25%*]	655 ha [*84%*]	461 [*+238%*]
Gorje	757	76 ha [*10%*]	138 ha [*18%*]	62 [*+82%*]
Jesenice	597	244 ha [*41%*]	479 ha [*80%*]	235 [*+96%*]
Kobarid	1,740	856 ha [*49%*]	1,352 ha [*78%*]	496 [*+58%*]
Kranjska Gora	1,213	203 ha [*17%*]	492 ha [*41%*]	290 [*+143%*]
Tolmin	3,999	705 ha [*18%*]	1,391 ha [*35%*]	686 [*+97%*]
TOTAL	11,769	3,376 ha [*29%*]	5,595 ha [*48%*]	2,220 [*+66%*]

Source: Authors' calculation from compiled data of the Agency of the Republic of Slovenia for Agricultural Markets and Rural Development and from national census statistics.

Table 2 Agricultural land enrolled in selected nine biodiversity promoting AEMs in two CAP programming periods. Cumulative area (ha) in eight TNP municipalities is given.

	Agricultural area under AEMs, ha [participation, %]		
	CAP 2007-2013	CAP 2014-2020	Change (in ha) [participation, %]
Organic farming	1,678	2.590	912 [*+54%*]
Livestock grazing on high-alpine pastures	1,577	2.492	915 [*+58%*]
Mowing of steep grasslands (>50% slope)	62	31	-31 [*-50%*]
Preservation of special grassland habitats	5	411	406 [*+8120%*]
Preservation of tall tree meadow orchards	11	39	28 [*+255%*]
Mowing of hummocky meadows	22	9	-13 [*-59%*]
Cultivation of indigenous and traditional varieties of plant	1	11	10 [*1000%*]
Breeding of indigenous and traditional breeds of animals*	254	621	367 [*+144%*]
Livestock breeding in areas of large carnivore presence	20	12	-8 [*-40%*]
TOTAL	3,376	5,595	2,219 [*+66%*]

Note: * In LSU – Livestock unit (not measured in hectares).
Source: Authors' calculation from compiled data of the Agency of the Republic of Slovenia for Agricultural Markets and Rural Development and from national census statistics.

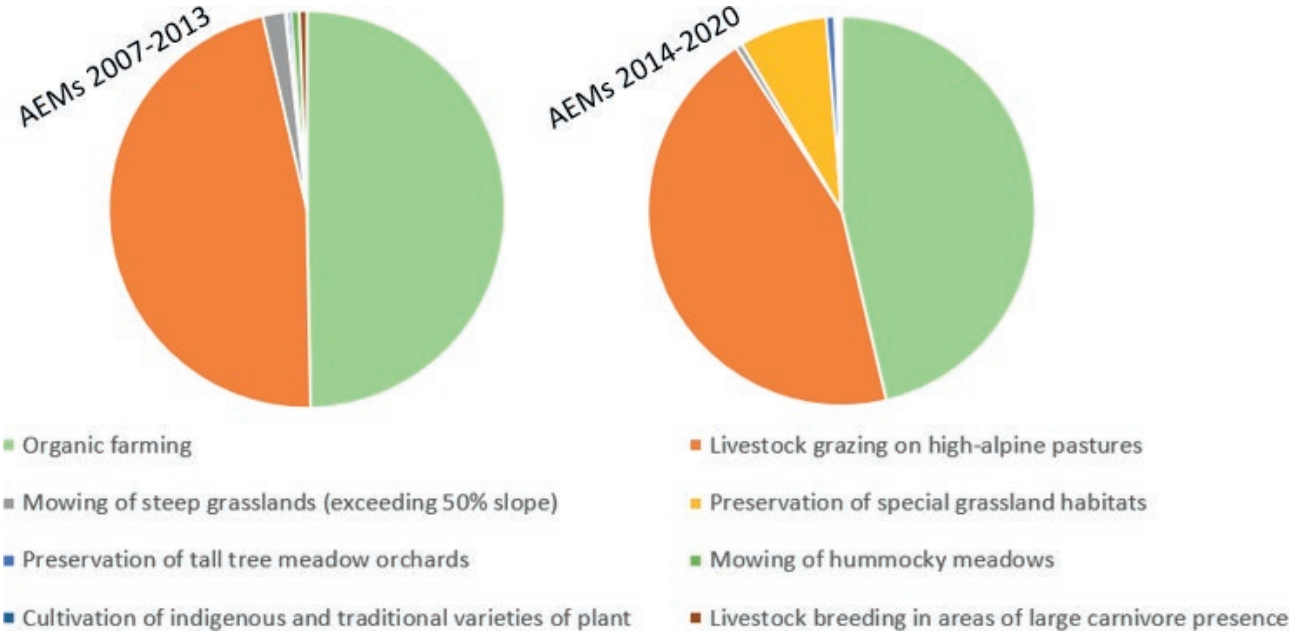
of hummocky meadows; livestock breeding in areas of large carnivore presence). These three measures had a relatively low participation already in CAP 2007-2013. The most popular measures in both programme periods were organic farming and livestock grazing on high-alpine meadows (Figure 2). In the CAP program period 2014-2020, the measure "preservation of special grassland habitats" also gained more attention, with the area involved in this measure increasing from 5 ha to 411 ha. There are two likely reasons for this increase: first the eligible area of ecologically important special grassland habitats was redefined and enlarged; the second was change in restrictions allowing earlier mowing date.

Organic farming is a system that bans the use of synthetic fertilizers and pesticides. It has generally shown positive effects on biodiversity and can be adopted in different agricultural production systems. In 2011, organic farming was implemented on 1,678 ha within TNP municipalities, and in the CAP 2014-2020, the implementation of this measure increased considerably by 54% to 2,590 ha (Table 2). A similar increase in the organic farming participation was also noticeable at the level of entire Slovenia. If we compare the area of TNP municipalities with Slovenia, we note that approximately 5.7% (CAP 2007-2013: 5.6%; CAP 2014-2020: 5.8%) of all organic farming was implemented in TNP municipalities. Organic farming was implemented by farmers from all eight municipalities of TNP.

Livestock grazing on high-alpine pastures was aimed at preservation of traditional transhumance practice based on summer livestock grazing of meadows at higher altitudes and prevention of their overgrowth. This measure was the second most frequently implemented in CAP 2007-2013 (on 1,577 ha of TNP municipalities). A significant almost 60% increase was recorded in CAP 2014-2020, when implementation was extended to 2,492 ha (Table 2). Increase in the implementation of this measure was also recorded at the level of entire Slovenia. Compared to the national level, implementation of the livestock grazing on high-alpine meadows in TNP municipalities represented 38% (CAP 2007-2013: 34.3%; CAP 2014-2020: 42.5%), which means that more than one third of this measure was implemented by TNP municipalities. This AEM was implemented by farmers from all eight municipalities of the TNP.

Preservation of special grassland habitats was designed to maintain and enhance biodiversity of plants, butterflies and birds and their grassland habitats. This measure was available to farmers in important ecological areas and enforced low stocking rates, limited use of organic fertilisers and late mowing or pasture dates. In TNP municipalities this measure was implemented on five hectares (CAP 2007-2013), with a significant increase in the next program period to 411 ha (Table 2). A considerable increase in the implementation of this measure was also recorded at the level of entire Slovenia, which is mainly the result of changed eligibility conditions, namely earlier mowing dates more adapted to local conditions. In comparison with Slovenia, this measure in the territory of the municipalities of TNP amounted to approximately 3%. In the CAP 2007-2013, this measure was implemented by farmers

Figure 2. Proportion of the area of eight selected AEMs implemented by TNP farmers in two CAP programming periods in all TNP municipalities. The measure "Breeding of indigenous and traditional breeds of animals" was not included as it was measured in livestock units and not in hectares.



from two TNP municipalities (Bled and Gorje), and in the next program period by farmers from all eight TNP municipalities.

Mowing of steep grasslands (exceeding 50% slope) required at least one mowing per season and banned the use of fertilisers and agrochemicals. This measure also did not allow the use of grassland as pasture. In CAP 2007-2013, the farms of TNP implemented this measure on 62 ha, and in the next program period on 31 ha. Thus, the implementation decreased by 50% (Table 2). The decrease of areas in this measure was also recorded at the level of Slovenia indicating that the financial compensation for energy and time-consuming manual mowing of steep grasslands was too low. Compared to Slovenia, farms in TNP municipalities implement approximately 8% of the total measure. In CAP 2007-2013, this measure was implemented in all eight municipalities of TNP, while in CAP 2014-2020 only in five municipalities (Gorje, Jesenice, Kobarid, Kranjska Gora and Tolmin).

Preservation of tall tree meadow orchards was directed at preservation and rejuvenation of this habitat and consequently conservation of associated plant and animal species. This measure was implemented on 11 ha in 2011, and on 39 ha in 2017 (Table 2). A slight increase in implementation of this measure was also recorded at the level of the entire Slovenia. Approximately 2% of this measure in Slovenia was carried out in the territory of the municipalities of TNP. In CAP 2007-2013, this measure was implemented by farmers from six municipalities of TNP (the measure was not implemented in Bohinj and Jesenice), and in CAP 2014-2020 by farms from all eight municipalities.

Mowing of hummocky meadows was limited to a specific alpine habitat characterised by pit and mound microrelief and associated with a very high diversity of plants and animals. This measure requires manual mowing and was implemented on a very small scale of the TNP area (22 ha in 2011 and 9 ha in 2017) and was implemented only in the TNP area and nowhere else in Slovenia. In the CAP 2007-2013, this measure was implemented by farms in the municipalities of Bled, Bohinj, Bovec and Gorje, and in the CAP 2014-2020, only by farms in the municipality of Bohinj.

Livestock breeding in areas of large carnivore presence supports maintenance of pastures in areas of coexistence with wolf and bear. Protection of livestock should be ensured using at least 160cm tall transportable electric fence for protection of the flock during nighttime. Alternatively, support is provided for livestock protection by the presence of a shepherd or of shepherd dogs. This measure was implemented on 20 ha in the TNP municipalities and decreased to 12 ha in the next programme period (Table 2). The decrease in participation of this measure is also recorded at the level of the whole Slovenia (probably due to slightly changed eligibility conditions), whereby a negligible percentage of this

measure (approximately 0.5%) is carried out in the TNP municipalities compared to Slovenia.

Breeding of indigenous and traditional breeds of animals strived to maintain genetic diversity of livestock breeds which are adapted to local conditions. This is the only analysed AEM which was measured in livestock units (LSU) and not in hectares. Farmers in the municipalities of TNP implemented this measure for 254 LSU in the CAP 2007-2013, and for 621 LSU in the CAP 2014-2020 (Table 2). Compared to the implementation of this measure in the entire Slovenia, farms of TNP municipalities implement approximately 10% of the total measure. This measure is implemented in all eight municipalities of the TNP.

Similarly, **cultivation of indigenous and traditional varieties of plants** was directed at maintaining agricultural plant diversity, focusing on varieties adapted to local conditions. This measure was also carried out on a very small scale (in 2011 on 1 ha, and in 2017 on 11 ha; Table 2). Even compared to Slovenia, a negligible percentage of this measure was implemented within TNP municipalities (approximately 0.05%).

4. DISCUSSION AND CONCLUSIONS

Although agriculture within TNP does not represent an important economic sector due to very limiting climatic and topographic conditions, farming nevertheless has a very important role in maintaining social balance, customs, and traditions. From the point of view of nature conservation, agricultural activity maintains a high diversity of habitats and landscape elements, which support higher biodiversity (Kleijn *et al.*, 2011; Tscharntke *et al.*, 2005; 2012). Given that the primary mission of this protected area is preservation of ecosystems and natural processes, diversity of habitat types, animal and plant species, and the quality and diversity of landscapes, continuation of low intensity farming is of crucial importance. Furthermore, protected areas such as TNP could serve as pilot sites for a much-needed shift in agroecological transition to "agroecology territories" as proposed by Wezel *et al.* (2016). In such territories three main domains must be considered for successful transition toward sustainable agriculture and food systems: adaptation of agricultural practices; conservation of biodiversity and natural resources; and development of embedded food systems (Wezel *et al.*, 2016).

In this paper we examined farmer participation in CAP agri-environment measures, however, we did not examine the actual effects of individual agri-environmental measures on biodiversity in TNP. Our assumption was that the CAP agri-environment measures are designed to support low intensity traditional farming practices and to preserve biodiversity. The availability of these measures did not manage to entirely halt the abandonment of farming within TNP with approximately 120 ha lost every year between 2011 and 2017 (from 8,972 to 8,210 ha). The continued abandonment of agricultural land in TNP despite the available CAP funds can be attributed to relatively low interest in CAP measures among the local farmers, implied from the fact that only approximately half of the TNP farmland area was registered in the national register of agricultural holdings, which is a pre-condition for farmer participation in CAP measures. Although we detected a slight increase in the percentage of registered farmland between 2011 and 2017 (+253 ha; from 42% to 49%) this percentage is still relatively low compared to the Slovene average of 70%.

The observed increase in overall farmer participation in nine biodiversity AEMs between the CAP 2007-2013 and CAP 2014-2020 programmes is a very positive signal. Interestingly, this increase was not driven purely by increase in payment amounts. The overall payment for 3,376 ha in 2011 was approximately 0.5 million EUR (149 EUR/ha) and for 5,595 ha in 2017 was 0.7 million (130 EUR/ha), indicating a slight decrease in payment per hectare.

Two of the most widely adopted biodiversity AEMs in TNP were organic farming and livestock grazing on high-alpine pastures, both more than doubling in area between CAP 2007-2013 and CAP 2014-2020. Organic farming is practiced on approximately 11% of farmland in Slovenia of which the predominant land use (79%) is grasslands (Travnikar *et al.*, 2023). Given the unfavourable natural conditions for intensive farming in TNP this transition to organic animal husbandry on low intensity alpine grasslands is unsurprising and required relatively few adaptions of the existing practices. This was also confirmed by other studies (Schmidtner *et al.*, 2012; Bjørkhaug and Blekesaune, 2013; Wollni and Andersson, 2014). Payments for transition to organic farming are higher compared to payments for further maintenance of this system which can partly explain the reduction in payments per hectare between the two CAP periods described in the previous paragraph (the analysis includes both payments for organic farming: transition and maintenance). Many studies show that farmers seek economic benefits in the CAP measures (Erjavec *et al.*, 2015, Uthes *et al.*, 2010), which implies that higher payments result in higher participation. Therefore, to increase participation, the agri-environment payments must be sufficiently attractive for the farmers.

Three biodiversity AEMs, namely mowing of steep grasslands (exceeding 50% slope), mowing of hummocky meadows and livestock breeding in areas of large carnivore presence were poorly implemented and farmer participation declined between 2011 and 2017. This indicates that farmers are less interested in labour-intensive and time-consuming agricultural practices (such as manual mowing of steep or hummocky meadows). Financial compensation plays an important breaking point, as farmers weigh the economic benefits and if the compensation for additional and difficult work is not high enough, they will not participate in AEMs (Juvančič *et al.*, 2012; Šumrada *et al.*, 2022). In addition to insufficient financial compensation, previous studies (Kerbler, 2008; Šumrada *et al.*, 2022) indicate that the demanding administration and strict eligibility conditions of AEMs, with general abandonment of agriculture due to unfavourable structural and socio-economic characteristics, are other possible causes of low participation in some AEMs.

Spatial comparison of farmer participation in AEMs among eight TNP municipalities has shown noticeable spatial variation. A considerable decrease in farmer participation in nine biodiversity AEMs in Bled municipality implies competition between farming and tourist activities, with Bled being one of the top tourist destinations in Slovenia. However, tourism in Bled could have encouraged farming in the neighbouring municipalities by bringing in the consumers of the high-quality local products.

Our quantitative analysis was based solely on available data on farmer participation in AEMs and did not include qualitative information based on questionnaires or interviews with farmers which would give us more insight into socio-economic factors influencing farmer participation in AEMs.

Our analysis focused on farmer participation in AECs with a positive impact on biodiversity in TNP. Kaligarič *et al.* (2019) found that agri-environment measures in CAP 2007-2013 aimed at conservation of high nature value (HNV) grasslands in Slovenia were poorly targeted with 41% of grasslands receiving this support not qualifying as HNV grasslands. This implies that a shift from currently used management-based measures, focusing on restrictions of farming practices, to result-based measures, relying on farmer knowledge and rewarding their conservation performance (Šumrada *et al.*, 2022; Burton and Schwarz, 2013) should be promoted, which would have a stronger impact on the agroecological transition.

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AUTHOR CONTRIBUTIONS

I.B.: Conceptualization, Methodology, Writing – Original, Review and Editing, Funding acquisition. T.T.: Conceptualization, Formal analysis, Writing – Original, Review and Editing.

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Agrifood system between global and territorial vision – Short communication

The territorial basket of goods and services and the social construction of markets: contributions from cooperatives and family-farmers' agrifood processing enterprises in Santa Catarina (Brazil)

Ademir Antonio Cazella[1,*], Andréia Tecchio[1], Sérgio Schneider[2], Valdete Boni[3,*]

[1] *Federal University of Santa Catarina (UFSC), Brazil*
[2] *Federal University of Rio Grande do Sul (UFRGS), Brazil*
[3] *Federal University of Fronteira Sul (UFFS), Brazil*
*Corresponding author. E-mail: ademir.cazella@ufsc.br; E-mail: valdete.boni@uffs.edu.br

Abstract. This article analyses the centrality of cooperativism in promoting sustainable territorial development, focusing on valorising territory-specific resources and promoting food and nutritional security through family-farmers' agrifood-processing enterprises. In theoretical terms, it combines the Territorial Basket of Goods and Services approach and the concept of social construction of territorialized markets. The reference territory is the operating region of a financial cooperative in western Santa Catarina state, southern Brazil. For almost three decades this cooperative focuses its operations on six rural municipalities, with approximately 38,000 inhabitants. Various other forms of cooperation undertaken by farming families are promoted, highlighted by a forum of family farming social organizations. This is a sphere of territorial governance that demands various kinds of support from public bodies. The main methodological resources mobilized were an inventory of existing family-farmer enterprises in the territory, drawn from secondary sources, and interviews with territorial leaders and managers of a sample of these enterprises. Most of the processed products are sold through short routes, creating a dense and complex territorial market for quality agrifood products. We conclude that the process of building this territory reveals the collective creation of a complex and dense network of other social organizations, which work to create marketing channels that shape the territorial market.

Keywords: territorial governance, territory-specific resources, healthy foods.
JEL codes: P25, Q12, Q13.

HIGHLIGHTS:

- The high density of family agri-enterprises represents the result of collective actions conducted by sociopolitical organizations competing for access to territorial resources and shared marketing channels.

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- Cooperativism plays a central role in development of this territorial market.
- The forum of family farming entities coordinated by Crediseara is an initiative to establish a system of territorial governance. The basket of territorialized goods and services is proof of that.

1. INTRODUCTION

The discussion about the relationship between farmers and markets has been changing in recent years. Criticisms of the various asymmetries involved in relations between family farmers and value chains, as well as the obstacles to reaching local market outlets such as farmers markets and public procurement purchase schemes, gave rise to debates on the conditions, opportunities and scope of territorial markets. Transport and logistics improvements and better access to means of communication (internet and social networks) mean that physical distances are no longer severe obstacles, as they were in the past. This turns medium-size cities and even some regions into convenient destinations for selling food products. Therefore, whether in Europe or even in countries like Brazil, the development of marketing strategies that consider the territory as a place for commerce is becoming increasingly frequent and noticeable.

Territories are physical spaces shaped by the interaction of various types of actors operating in different economic sectors such as agriculture, manufacturing, commerce and services, with a strong participation of public agents from municipalities, private agents from companies, and those from civil-society organizations. Territories encompass both rural and urban areas, creating new interactional dynamics between these spaces. Some territories are characterized by a more urban demographic concentration, while others still have most of their population living in rural areas.

The power relations and social processes of production and appropriation of space that occur at a territorial level underscore the centrality of issues such as mechanisms of governance and domination. This makes territories spaces of dispute and struggles and this dimension becomes particularly relevant when territory is considered as an analytical tool for understanding commercial interactions, economic exchanges and competition among agents. Thus, territorial markets are spaces where processes of (re)territorialization of relations of exchange of goods between actors occur (Haesbaert, 2004). Territorial markets are concrete spaces that become the stage on which power struggles are disputed and shares of economic surpluses are appropriated.

The empirical analysis that grounds this article is based on the western region of the state of Santa Catarina, located in the South of Brazil. In this region we found a complex cooperation network connecting family farming organizations, which develop strategies dedicated to marketing and establishing access to markets, especially for products processed by family agri-enterprises[1]. We aim to demonstrate the role played by this cooperation network, the leading organization of which is the Seara Rural Credit Cooperative (Crediseara), in promoting food and nutritional security and valorising territory-specific resources, through different formal and informal marketing channels. Most of the products processed are sold through short routes, creating a dense and complex territorial market for quality agri-food products. These strategies draw on inter-knowledge and relationships of proximity, which cross over rural and urban boundaries and are based on their own governance mechanisms. This allows them to reduce logistical costs and improve the value of their products. Our broad intention is to reveal the hidden resources present in the territory that are used and activated as assets by collective actors, in this case, a network of cooperatives and other social agents.

This article analyses the centrality of cooperativism in promoting sustainable territorial development, focusing on efforts to increase the value of territory-specific resources and promote food and nutritional security through family farmers' agrifood processing enterprises. In theoretical terms, it combines the territorial basket of goods and services approach and the concept of social construction of territorialized markets.

The article has four sections. In the first one we briefly present the formation and current characteristics of family farming in western Santa Catarina, which is the territory studied, as well as the methodological procedures that were adopted in collecting the data used. The second section presents the theoretical approach to the basket of territorial goods and services and the territorial markets approach. In the third section we discuss the central role of the Crediseara Cooperative as a critical actor that has shaped and enhanced territorial development in the region by fostering social organization and strengthening family-run agro-industries in the territory. In the final considerations we identify the role of the Crediseara cooperative in organizing a territorial governance mechanism. We conclude the study by showing that this collective actor played a central role that directly contributed to the construction of a territorial market.

[1] In this article, the terms "family farms", "agri-food processing enterprises" and "family agro-enterprises" are used synonymously and refer to small-scale family agro-companies in which family farmers work.

2. METHODOLOGY

The geographic scope of the study included the six municipalities in the territory covered by Crediseara, the Seara Rural Credit Cooperative. The empirical research was carried out between February and August 2023 and comprised data collection from secondary databases of local organizations, as well as field research and participant observation. The first stage of data collection conducted an inventory of family agri-enterprises in the territory, retrieved from the databases of the Union of Family Farm Cooperatives of Western Santa Catarina (União das Cooperativas da Agricultura Familiar do Oeste de Santa Catarina – UCAF) and the Association of Smallholder Farmers of Western Santa Catarina (Associação dos Pequenos Agricultores do Oeste Catarinense – APACO). In the second stage, sixteen territorial actors were interviewed, including five professionals from the state rural extension and research company (EPAGRI) and five from Crediseara, as well as two family-farming union leaders, two municipal administrators, one UCAF director and one Apaco director. The interviews complemented the inventory of family agri-enterprises, either those that are already formalized or those that are eligible for registration according to health and environmental standards, and described the main features and commercial strategies that they have adopted. In total, 108 family agri-enterprises were identified (50 formal and 58 informal) and 22 of their administrators were interviewed to better characterize their organizational strategies, particularly those focused on gaining access to markets. Six of these enterprises operate entirely informally.

From a theoretical perspective, the study draws from the Territorial Basket of Goods and Services (TBGS) approach, originally formulated by Pecqueur (2001), and on the concept of the social construction of territorial markets and their main governance mechanisms. The purpose of the study is to analyse institutional initiatives that bring together territorial actors to provide a heterogeneous supply – in the case studied, of foods processed by the agri-enterprises of family farmers – operating in territorial markets and supported by the specification of territorial resources (Colletis, Pecqueur, 1993; Campagne, Pecqueur, 2014).

3. HISTORICAL BACKGROUND OF FAMILY AGRI-ENTERPRISES IN THE TERRITORY OF WESTERN SANTA CATARINA, IN SOUTHERN BRAZIL

According to the 2017 Brazilian Agricultural Census, family farmers comprise 3,897,408 rural households, accounting for 76.82% of all rural households in the country (Brazilian Institute of Geography and Statistics [IBGE], 2019). Brazilian law defines a family farmer as one who practices activities in rural areas on small portions of land and predominantly uses the labour of family members.

In Santa Catarina, the importance of family farming in the agrarian structure is even more relevant than in the country as a whole. According to data from the IBGE agricultural census, in 2017 there were around 183 thousand rural properties in Brazil, of which 78% (i.e. 142,740) are family farmers. This model also occupies 72.5% of the state's agricultural workforce.

The settlement of western Santa Catarina is deeply related to family farming, which expanded in the early twentieth century, urged by the state-led colonization process, comprised largely by descendants of Italian and German immigrants. The presence of this category of farmers guaranteed a productive base that enabled the creation, from the 1960s onwards, of agrifood enterprises that process poultry, swine and, more recently milk, and which came to compose large private and cooperative economic conglomerates that operate in the national and international markets (Giombelli *et al.*, 2022b).

In the 1990s, sociopolitical mobilizations emerged in Brazil's rural areas that led to projects that have diverged from the hegemonic conventional and conservative agrarian modernization pattern. This resonates with what Gasselin *et al.* (2021) understood as the coexistence of distinct and sometimes antagonistic models of agricultural development in a single geographic space. Many small farmers continue with practices reminiscent of a peasant way of life, dedicated to polyculture, with production for self-consumption and sales of surpluses in the region. The authors highlight that this does not always deter the valorisation of territorial resources and local markets.

In the western region of Santa Catarina shown in Figure 1 where this study was conducted there has been a significant revitalization of the rural union movement in recent decades. A key role for strengthening the social organization of family farmers was played by the Association of Smallholder Farmers of Western Santa Catarina (Asociação dos Pequenos Agricultores do Oeste Catarinense – APACO), a technical-political advisory organization focused on family farming, created in 1989 (Búrigo, Rover, Ferreira, 2021). In partnership with other rural organizations, APACO encouraged the creation of financial cooperatives and networks of family agrifood enterprises (Estevam, Mior, 2014). APACO created the Central Unit of Family Agri-enterprises of Western Santa Catarina (UCAF), the collective brand Sabor Colonial (to differentiate in the market products processed

by family farming agri-enterprises) and the Cooperativa Central Sabor Colonial

The Seara Rural Credit Cooperative, in turn, was founded in 1994 and, since its inception has promoted access, especially for farming families, to financial resources and services. It operates mostly in six rural municipalities which have a total of some 38,000 inhabitants. Seara has 49% of this amount (18,620 inhabitants). This rural territory is located between two hub municipalities (Chapecó and Concórdia) with populations of 254,781 and 81,696 inhabitants, respectively, which expands the possibilities for building territorialized marketing channels (IBGE, 2023). The Cooperative encourages other forms of cooperation that coexist with conventional agricultural systems present in most family farming units in the territory. For the inventory of family agri-enterprises that we considered as the sample for this research, only those operating in a proper physical space to process raw materials were considered. The territory where the study was conducted is an important dairy region the production base of which consists of family farms that sell milk to medium and large dairies and produce cheeses from raw milk for the farm families own consumption and the sale of surpluses.

The 2017 Agricultural Census showed that approximately 58% (2,350 farm units) of the four thousand agricultural establishments in the six municipalities studied practice dairy farming. Most of these family farmers produce the so-called "colonial" cheese made from raw-milk in their home kitchens for the family's own consumption, but also to sell the surplus. Although these cases were disregarded in this analysis, we recognize that they fulfil an important role in food security in the territory and help maintain traditional food production techniques.

4. TERRITORIAL BASKET OF GOODS AND SERVICES AND TERRITORIAL MARKETS

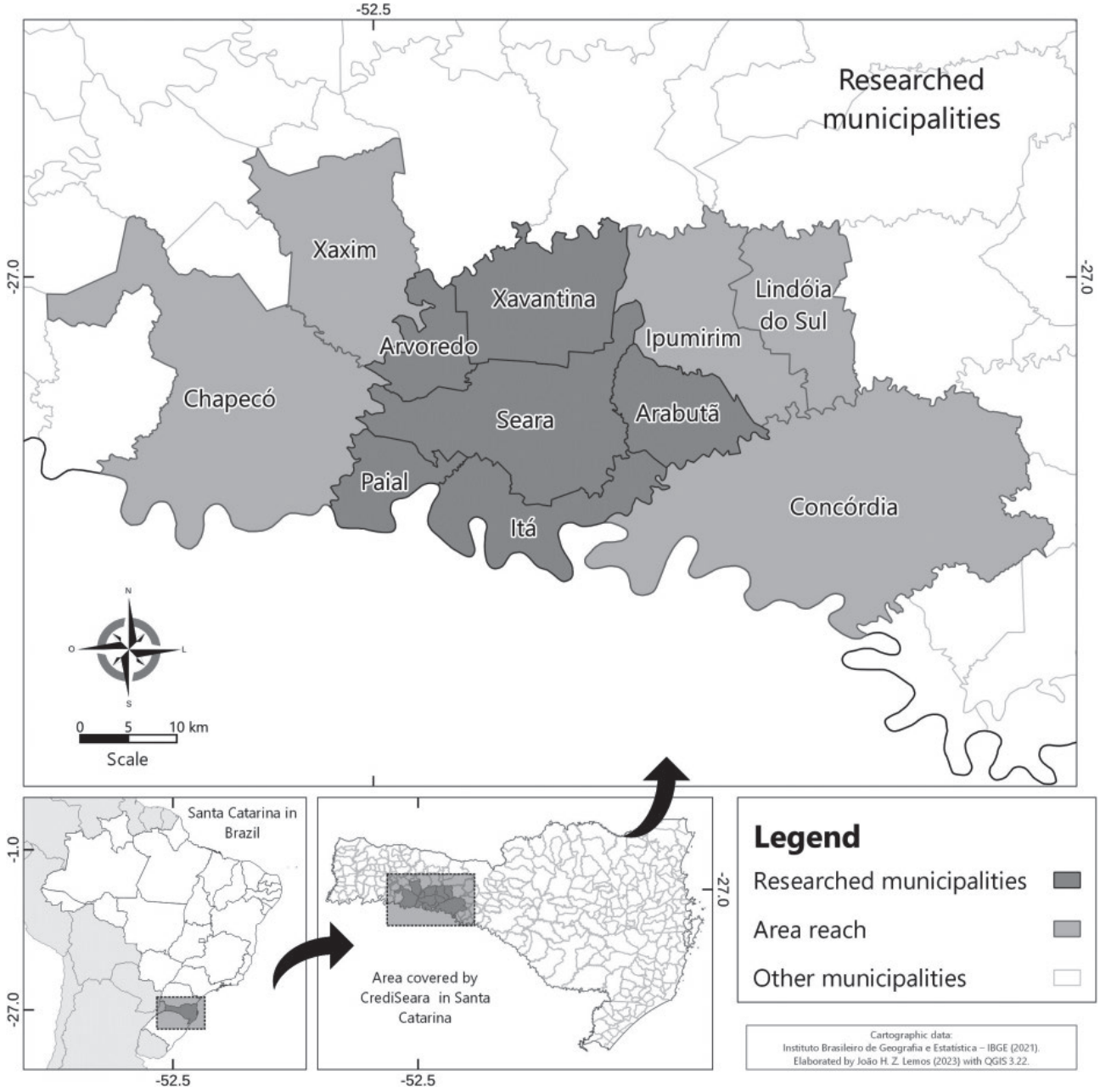
To emphasize the relevance of territory in rural development dynamics Colletis and Pecqueur (1993) pioneered the integration of the issue of resource specification into the examination of territorial development in rural areas. Their analysis triggered several studies on initiatives by social actors who strive to give value to territorial-specific resources. This concept has become fundamental to the Territorial basket of goods and services approach, which considers commercial and organizational actions by territorial actors dedicated to building a supply of goods and services imbued with specificities of the local ecosystem, know-how, and culture. The creativity shared by multi-territorial actors and the historical trajectory of cooperation explain a greater or lesser capacity to do what actors in other territories cannot or do not know how to do, but, primarily, to do it differently and better than what in other territories (Pecqueur, 2001; Pecqueur, 2005; Glon, Pecqueur, 2016).

An in-depth analysis of this issue highlighted three main components of the TBGS approach: quality products and services characteristic of the territory; an environment comprising particular natural, historical and sociocultural attributes; and a territorial governance system engendered by multi-actors (Hirczak *et al.*, 2008; Campagne, Pecqueur, 2014; Cazella *et al.*, 2019, 2020a; Medeiros, Sablayrolles, Cazella, 2021). The TBGS approach involves mobilizing environmental, landscape, historical and cultural attributes associated with localized agri-food systems and correlated territorial services. To this end, several marketing channels are developed by different social actors, giving structure to what Schneider (2016) called territorial markets. The territorial governance system represents an opportunity to foster an environment of social innovation capable of generating income based on qualities of the territory. This type of income is appropriated by the different productive segments or service providers, which is reasonably distributed among the different actors, although not equally.

The weakest element in most of the cases studied is the territorial governance system, which explains the recurrence of juxtaposed or disjointed initiatives in the territories (Hirczak *et al.*, 2008). A heterogeneous supply of quality products and services is present, but no social organization has taken the initiative to formulate and propose a cooperative action that allows shared supply and provides collective benefits. The dispersion of actions aimed at valorising territorial quality products and services weakens the ability to generate collective benefits, derived from the sale of similar types of goods associated with the natural environment and traditional know-how. A sustainable territorial development dynamics based on territorial markets involves the creation or reinforcement of existing cooperation networks, which implies rethinking the synergies between three categories of actors (public, private and collective).

The mechanisms mobilized to supply a basket of territorial goods and services and highlight them as distinct from outside ones and interconnect them with each other, are structured around two basic principles: i) the constitution of a specific "image" that characterizes a territory's products, by incorporating and connecting symbolic and material features; ii) the prioritization of territorial markets to "drive" in situ consumption, and the recognition of the basket's products and services by

Figure 1. Geographic location of Santa Catarina in Brazil, the territory within the state and the municipalities researched within the territory.



consumers – tourists, local residents and second home owners (Mollard, 2001).

Reflections on the pertinence of this approach for studying Brazilian rural territories have pointed to the need for adaptations, given the country's deep social inequalities. The "club effect", which benefits a select group of consumers, producers and service providers of territorial quality goods and services, is contrary to the precepts of sustainable territorial development. Findings of ongoing research indicate the need to prioritize, in the analytical model, the role played by local consumers, therefore by territorial markets, thus relativizing the centrality of tourists in generating quality territorial income (Cazella *et al.*, 2020a). This means rethinking the strategies for obtaining this type of income merely by increasing prices of quality products and services, since

this would exclude a significant portion of the population from consuming these goods and services.

Territorial markets can be understood as resources that are supported by formal rules and practices (laws, contracts, standards) and those that are informal/tacit (values, habits, customs) with a spatial basis (Schneider *et al.*, 2022). Territorial markets are not isolated or disconnected from global markets; on the contrary, the former exist and reproduce themselves in relation to the latter, using strategies of resistance, reaction and even coupling to maintain their relative autonomy (van der Ploeg *et al.*, 2022; van der Ploeg, Schneider, 2022; Schneider, Cassol, 2023). Both depend on the interconnection of social actors who seek to solve common problems by valorising territorial resources and generating new ways of working and acting from the grassroots.

In this article we intend to use the analytical references of the TBGS approach to understand the dynamics of building access to markets by a cooperative of family farmers, Crediseara. In fact, our main goal is to analyse the role played by a cooperation network, whose leading organization is the Seara Rural Credit Cooperative (Crediseara), in promoting food and nutritional security and valuing territory-specific resources, through different formal and informal marketing channels. The territory becomes an important space for understanding this dynamic because it creates the conditions of social cohesion that works as an amalgam to bring together farmers around an enterprise such as the cooperative. It is not just a territory given or established as a physical unit of action by some external agent and/or a portion of space that is the object of observation. On the contrary, to recall Pecquer's (2005) definition, it is a constructed territory, which is a process that results from the interaction of actors in a given space.

5. THE ROLE OF THE CREDISEARA COOPERATIVE IN THE CONSTRUCTION OF TERRITORIAL MARKETS

Crediseara operates in a particularly rural territory, where family farming units predominate, and most of its more than 6,700 members are family farmers. The cooperative has 60 employees, eight of whom are professionals responsible for providing financial and technical assistance to farming families. To strengthen ties with its social base, its leaders encourage the adoption of systems to produce healthy foods and the construction of territorial marketing channels for these foods.

The territorial governance set up under the initiative of Crediseara resulted in the creation, in 2008, of a forum of family farming entities that includes 19 organizations, with noteworthy participation of women farmers, small cooperatives, unions, family agri-enterprises, a direct-to-consumer sales association, a participatory organic farming assessment body, a "Casa Colonial" [a space for sale of family farm products] and groups with different vocations (Slow Food, raw-milk cheese production, herbal medicine, crafts and agritourism) (Tecchio *et al.*, 2022; Giombelli *et al.*, 2022a).

The 108 family agri-enterprises identified in this study were classified by using the analysis method developed by Lauermann (2023), who adopted five categories of processed products: i) products of animal origin: dairy, meat and processed meat, honey, fish and eggs; ii) products of plant origin: minimally processed derivatives of sugar cane, jams and jellies, preserves and flour iii) baked goods: breads, biscuits, cucas (German-style cakes) and pasta; iv) beverages and pulps; and v) diversified: processed products from more than one category. Table 1 presents the number of family agri-enterprises by category and subcategories, and indicates whether the activities follow legal standards.

Of the total family agri-enterprises identified, 50 are formalized and 58 operate informally. Most informal agri-enterprises process food products with stricter health standards and higher inspection costs, such as products of animal origin and beverages. The processing of food products in home kitchens or in places unable to be formalized for this purpose, which were not considered in this study, indicates that there are many small informal units that process agri-food products traded mostly on the basis of inter-knowledge and trusting relationships.

The main explanations for the informality of a significant number of family agri-enterprises, according to technical advisors, union leaders and members of farming families interviewed are as follows, in order of importance: i) strict legislation regarding health standards for agri-enterprises that process animal products and beverages; ii) the existence of marketing channels whose consumers do not require legalization; iii) high costs for keeping the enterprise legalized, notably related to laboratory analyses and administrative expenses; vi) the small-scale production makes a formal enterprise economically unviable when considering the operational costs of formalization; v) the lack of family succession leads older couples to maintain informal food processing without having to commit to regular deliveries on predetermined days and times; vi) families have changed to other more important economic activities and stopped processing food; and vii) legalization is underway. Of the 58 informal family agri-enterprises, only three are in this latter condition and two others are considering the

Table 1. Number of agri-enterprises in Crediseara's territory by category and subcategory of processed foods.

Category	Subcategory	Number of family agri-enterprises	
		Formal	Informal
Products of animal origin	Dairy products (cheese and other dairy products)	2	6
	Meat and processed meats (pork, poultry and beef)	5	2
	Honey	3	12
	Fish	-	2
	Eggs	4	-
	Subtotal	36	
Products of plant origin	Sugarcane derivatives (brown sugar, molasses)	4	3
	Jams and jellies/preserves	6	-
	Flour	3	1
	Yerba mate	1	1
	Subtotal	19	
Baked goods	Breads, biscuits, *cucas* (cakes), pasta and frozen snacks	18	6
	Subtotal	24	
Beverages	Beverages (juices, wine, *cachaça*)	1	21
	Subtotal	22	
Diversified (more than one product category)	Diversified (animal, plant, and beverage)	3	4
	Subtotal	7	
Family agri-enterprises in the territory	Total	50	58
		108	

Source: Field research (2023).

pros and cons of formalization. In the group of informal family agri-enterprises, five cases had once operated formally, but gave this up either because they had a guaranteed market or because they were managed by elderly couples with no one to pass the operation on to, and who have reduced production.

Regarding the categories of products processed by family agri-enterprises, Table 1 shows 36 processed products of animal origin, 19 of plant origin, 24 bakery products, 22 beverages and seven under diversified production including different categories in a single physical space, such as baked goods and fruit jams (*chimias*[2]). The category of processed animal products comprises 22 informal family agri-enterprises, with honey being the main product. Most informal family honey agri-enterprises sell the product in barrels to specialized companies in the region, which package and sell it under their own brands.

The processing of plant origin products is mostly formalized and diversified, with emphasis on fruit jams, preserves, brown sugar and corn flour. The production of baked goods frequently draws on traditional recipes linked to the cultures of descendants of Italian and German immigrants, especially various types of biscuits, *cucas* (cakes), and pasta. These family agri-enterprises have outstanding participation of women farmers in production and marketing, although women farmers also have a prominent role in most other family agri-enterprises (Boni, 2006; Tecchio *et al*., 2021). Regarding beverages, except for one family agri-enterprise that formalized its production of what are known as "colonial" [rustic] wines, all of the others are informal and focus on production of traditional wines and cachaças[3].

Among the formal family agri-enterprises, 17 adopt three legal forms of micro-enterprises and 31 are part of six decentralized cooperatives of family agri-enterprises present in the territory. In other words, 62% of formalized processing units are part of a cooperative of this nature. This complex network of cooperatives, which in the territory studied also has oversight by a solid credit cooperative, constitutes what van der Ploeg (2008) characterizes as a territorialized cooperative movement, distinct from conventional corporate cooperativism.

[2] Term of German origin used in the southern region of Brazil to refer to jams with a smooth homogenous texture made with juice, fruit pulp and even vegetables, and which are usually consumed with bread.

[3] Brown sugar and cachaça are produced from sugar cane juice. Brown sugar does not go through any refinement or bleaching with chemical additives and is richer in minerals than other sugars. Cachaça is the most popular distilled alcoholic drink in Brazil.

In the territory studied, most of these cooperatives were created in the decade of 2000 under the initiative of unions and technical advisory organizations, especially Crediseara, APACO and state and municipal rural extension agencies. Only one municipality in the territory does not have this type of cooperative. Their main objectives are to sell food products in the so-called institutional markets, especially public procurement for supplying public school cafeterias and social assistance institutions. In addition to farm families who own agri-enterprises, these cooperatives include farmers who sell fresh food products to public procurement programmes.

Indeed, it is necessary to recognize that Crediseara created this territorial dynamic in the local economy that has been enhancing the functioning and role of agro-industries and the products they produce. The cooperative played a crucial role in creating a brand, whose recognition can be seen in the products that receive the Sabor Colonial label. This recognition also occurs through the creation of a regional identity, since external agents, from other locations, recognize products from the territory. This allows it to be affirmed that the cooperative fosters a system of territorial governance around food products and markets. It arises from the organization of groups and begins to work on maintaining this form of organization and creating others that currently comprise a Forum of Entities. This Forum, in practice, has become an institution that carries out territorial governance. It is within the scope of this organizational logic that commercialization models and the construction of territorial markets are promoted.

The collective brand Sabor Colonial is another collective strategy aimed at market differentiation of agri-foods processed by family farming in western Santa Catarina. In the territory studied, the Sabor Colonial brand is used by sixteen family agri-enterprises that are affiliated to four decentralized cooperatives in addition to one that is separately established. A study by Boni (2006) shows that these cooperatives allowed associated family agri-enterprises to expand their portfolio of products and services over time and become references for the creation of new agri-processing enterprises.

According to Tecchio *et al.* (2023), Sabor Colonial incorporates specific intangible resources that are peculiar to descendants of European settlers, especially by referring consumers to products made on a small scale by family farmers who produce their own raw materials and, in most cases, use recipes and know-how that go back to their ancestors. In other words, most family agri-enterprises process local food and valorise territory-specific tangible and intangible resources, considered the basic precept of the TBGS approach. By invoking origin, bonds of trust and proximity, as well as the recognition and valorisation of the territory's historical heritage, especially its traditions, this brand contributes to the promotion of sustainable territorial development.

When it comes to distinctive quality labels, only two family agri-enterprises use the organic farming seal. Both are certified by the Ecovida Agroecology Network, a participatory assessment entity established under Brazilian organic farming legislation, which draws political support from a large number of family farming organizations in the region studied (Cazella *et al.*, 2020b)[4]. According to most interviewees, selling products in territorial markets and, consequently, in short marketing circuits, reduces the importance attributed by consumers to this type of specification. Since everyone sells their products without major restrictions, adherence to organic agriculture would increase operating costs without adding significant economic differences.

Regarding the origin of the raw materials used, most of them are produced by the family farmers who own the agri-enterprises, and it is common to supplement them with purchases from neighbouring farmers. The exceptions are wheat flour used by family-owned bakery agri-enterprises, rice processed by two mills, some of the beef from a slaughterhouse, as well as onions, cucumbers, quail eggs and vinegar used in preserves, which are not produced in the region studied.

Formalized family agri-enterprises have access to more marketing channels, which range from four to seven, while informal ones have one to three channels. In general, those that are formalized sell at farmers' markets, fruit shops, supermarkets, institutional markets aimed at school cafeterias and specialized institutions, particularly two "colonial houses" [spaces for sale of family farm products] established in the territory. The so-called "supermarkets" supplied by the family agri-enterprises are small and medium-sized. A study by Lauermann (2023), conducted in a territory close to that analysed in this article reveals that medium-sized supermarkets are the main sales channel in terms of economic value for family agri-enterprises. The "colonial houses" are, in turn, marketing channels that resulted from the mobilization and political achievements of segments of family farming that opted to promote territorial development projects in opposition to the productivist model associated with large corporate agri-manufacturers. The fact that these houses are located

[4] This network, established in 1998, was a pioneer in this type of organic quality assessment and operates in the three states of southern Brazil. In late 2022, the organic farming registry system of the Ministry of Agriculture listed 24,500 producers, 36% of whom were certified by 28 participatory assessment bodies, with the Ecovida Agroecology Network accounting for 23% of this total. This network has served as a reference for other initiatives that use this type of certification.

in the urban area of the municipalities allows for greater interaction with consumers.

Regarding commercialization in institutional markets, the Cooperativa Central Sabor Colonial organizes food product collection and distribution, and performs the bureaucratic processes that allow its individual cooperatives to participate in public bidding processes. Around 90% of the amount sold is intended to supply food to public schools in western Santa Catarina. Another marketing channel that is on the rise and differs from others is direct-to-consumers sales through agritourism initiatives, in which fourteen family agri-enterprises are included in two tourist routes. In addition to selling products processed on farms, six of them provide meals typical of the region's cuisine: coffee with baked goods, traditional sausages and cheeses and traditional dishes from Italian and German culture. Practically everything produced is sold in municipalities in the territory or the neighbouring region. In the case of informal family agri-enterprises, the main marketing channel consists of sales directly to customers with whom they have long-standing commercial relationships.

Finally, it is worth noting that 15 out of the 22 family agri-enterprises visited have a family member willing to ensure its succession. Furthermore, most of them mention that if they had more raw materials or labour, they could increase production. This explains the lack of any marketing action for processed products, as the quantity produced is below demand, according to the owners and other territorial actors interviewed. In addition to the lack of labour and raw materials, the limiting factors most frequently mentioned are the costs and bureaucracy involved in maintaining legal enterprises, which is associated with legislation considered inappropriate for small-scale production.

6. FINAL CONSIDERATIONS

The western region of Santa Catarina can be understood as a territory with a high institutional density and a leading organization, Crediseara, which operates in the financial market and has assumed the objective of promoting sustainable territorial development. The analysis of the construction of this territory presented in this article reveals the collective creation of a complex and dense network of various social organizations, whose actions aim to establish marketing channels that shape the territorial market. Cooperativism plays a central role in the construction of this market, operating to facilitate access to diversified sales channels, to reduce production, processing and logistics infrastructure costs, and establishing a governance system for this market, which is represented, for instance, in the management of a collective brand that benefits a group of small-holder family agri-enterprises.

In turn, the existence of this dynamic territorial market corroborates some of the key elements and contributions of the TBGS approach showing great potential as an analytical device for understanding economic realities marked by profound social inequalities, as found in Brazil. The issue goes beyond producing quality food aimed primarily at consumers with greater purchasing power in a certain territory. Rather, the case of Crediseara in the western region of Santa Catarina shows how a diversified supply scheme, distributed via different marketing channels, is able to reach a wider portion of the territory's population and benefit a greater variety of residents.

Another important aspect to highlight is the bonds of trust and solidarity that exist among the farmers who are members of Crediseara and other partner rural organizations and the urban consumers of agri-processed products they sell to. In this case, relationships between sellers and buyers are not based solely on discretionary criteria such as prices. It is worth recalling that people from the six municipalities in the territory share a common social origin. These ties are based on relationships of kinship, inter-knowledge, neighbourliness and reciprocity, which were the basis of social relations in rural communities during the period of land settling and territorial formation.

In recent decades the region has experienced significant social and economic changes, which have resulted in urbanization and physical distancing with the migration of many families from the countryside to the cities. However, this has not eliminated or destroyed the links formed by inter-knowledge and relationships among those who moved to live in cities and farming families. This aspect has been a decisive factor in the process of reconnecting consumers with products and goods that were part of their memory and previous food culture. The "products of colonial origin" marketed, more than commodities, have a symbolic appeal for many consumers seeking to regain contact with flavours, smells and recipes that were part of their way of life in the past or of that of their parents, when many lived in rural areas.

In this article we show that in the territory covered by the Crediseara cooperative, in the western region of Santa Catarina, Brazil, there is a dense network of cooperation that has played a critical role in forming a system of territorial governance, based on sharing information, logistics mechanisms, a brand and a marketing label, as well as a cultural identity. Crediseara plays a central

role in the territory by promoting and organizing a system that produces goods and commodities whose value derives from their territorial quality, which promotes food sovereignty and values specific territorial resources. In this sense, it is a case that expresses the characteristics of the TBGS. At the same time, Crediseara is a case that can be framed or analysed within the framework of territorial markets. In this paper we have shown that the cooperative's marketing strategy is based on short-chain marketing channels, whether formal or informal, which compose a dense and complex territorial market for quality agri-food products. In summary, although it is located in a region that exports products derived from chicken and pork-based proteins, the case studied in this article shows how the coexistence of small family farmers who create and maintain a group of small food businesses works and operates in practice through co-operation and access to media.

This high density of family agri-enterprises is not merely the result of individual entrepreneurship by farming families. It represents collective actions performed by sociopolitical organizations that dispute access to territorial resources and, particularly, to shared marketing channels, such as farmers' markets and colonial houses. Careful work of negotiation and conflict mediation is present, through which political leaders from different ideological currents simultaneously compete and cooperate with each other. In this sense, the existence of a forum of family farming entities coordinated by Crediseara can be deemed as an initiative to build a system of territorial governance, as advocated by the TBGS approach.

Finally, it is important to mention the lack of a broad public programme to support expanding the production of healthy foods and the number of family agri-enterprises. As we mentioned in this article, sustainable territorial development dynamics focused on territorial markets involve the creation or reinforcement of existing cooperation networks, which implies rethinking the synergies between three categories of actors (public, private and collective). An initiative like a broader programme should not be restricted to subsidized financing policies, since other issues must be addressed such as the severe impediments found in the legal tangle of health, environmental and fiscal rules that create an environment of insecurity.

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AUTHOR CONTRIBUTIONS

Conceptualization, A.A.C., A.T., V.B., S.S.; Methodology, A.A.C., A.T., V.B., S.S.; Investigation, A.A.C., A.T., V.B.; Writing – Original Draft, A.A.C., A.T., V.B.; Writing – Review & Editing, V.B., S.S.; Funding Acquisition, A.A.C.; Supervision, A.A.C., A.T., V.B.

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Research article

Insights into the agroecological transition: the case of two Italian bio-districts

Giovanni Dara Guccione[1,*], Laura Viganò[1], Alberto Sturla[1], Alessandra Vaccaro[1], Luca Colombo[2], Tiziana Pirelli[1], Francesca Varia[1]

[1] *CREA – Research Centre for Agricultural Policies and Bioeconomy, Italy*
[2] *FIRAB Italian Foundation for Research in Organic and Biodynamic Agriculture, Italy*
*Corresponding author. E-mail: giovanni.daraguccione@crea.gov.it

Abstract. Bio-districts are a specific form of aggregation which are particularly effective in implementing a multi-stakeholder, environmentally conscious, and place-based approach to food system sustainability. Bio-districts may facilitate the agroecological transition of the local food systems. The aim of this paper is to provide recommendations on how to promote the adoption of the agroecological approach through bio-districts, by analysing farmers' propensity towards agroecology, framing the level of attainement in the transition pathway, and shedding light on the barriers to the broader diffusion of agroecology. A qualitative comparative case study approach has been developed in two bio-districts in Italy. Based on the findings, farmers show a propensity to adopt the agroecological approach, However, a series of barriers have prevented reaching the top level of agroecological transition, especially the need for the adaptation of machinery, a shortage of skilled advisors for knowledge transfer, and poor community awareness. The findings suggest that there is urgent need to face policy, governance-related, and market-related challenges. This study lays the groundwork for the integration of the agroecological approach in the implementation of key policy instruments such as the Italian Common Agricultural Policy Strategic Plan and the European Union Action Plan for the Development of Organic Production.

Keywords: agroecology, organic farming, bio-district, local development, sustainability.
JEL codes: Q15, Q18, Q56.

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HIGHLIGHTS

- Farmers' awareness of the agroecology concept is low, but they show a propensity to adopt the agroecological approach.
- There are barriers to further progress in the agroecological transition processes, although this transition is quite advanced.
- Unlike conventional agriculture, agroecology requires a longer time frame for agronomic management, potentially affecting profitability.
- A bio-district strategy that is comprehensive and shared with all the local actors could help to overcome barriers.

1. INTRODUCTION

Agroecological transitions are systemic transformations of food systems (FSs), with the purpose of bringing in ecological dynamics through the involvement of multiple stakeholders (HLPE, 2019; Magrini *et al.*, 2019). Farmers are key actors in agroecological transitions: they translate "societal, environmental, and economic demands into practices and thereby strongly influencing outcomes for large parts of the landscape and acting as a potential co-carrier of transformation" (Bakker *et al.*, 2023: 689). The participation of non-farming businesses and the activation of infrastructure, processes and activities related to the post-production stages up to consumption is also needed (FAO, 2022). In fact, it is widely acknowledged that the adoption of an agroecological approach requires a fundamental rethinking of landscape structures, farm management, production methods, business strategies, supply networks, and consumption patterns (Brunori, 2022).

The political importance of a transition towards sustainable FSs has emerged since the Farm to Fork (F2F) Strategy (COM(2020) 381 final) of the European Union (EU) acknowledged the urgency of "a fair, healthy and environmentally-friendly food system" in the face of "inextricable links between healthy people, healthy societies and healthy planet". The main policy tools for implementing the F2F Strategy, namely the strategic plans of the Common Agricultural Policy (CAP) 2023-2027, are therefore oriented to support agroecological transition (Langlais, 2023; Vanni and Viganò, 2020) by developing synergies between the specific individualistic interventions of the CAP (so-called Pillar I) and the collective, territorial, and/or integrated approaches under Pillar II. Nonetheless, during this transitional phase from policy design to its implementation, one might ask whether there are barriers to agroecology so that one could collect elements to overcome them.

This paper is focused on bio-districts[1] (BDs) as a specific form of aggregation particularly effective in implementing a multi-stakeholder, environmentally conscious, and place-based approach to FS sustainability.

The development of organic agriculture and the transfer of its values and principles to all the activities in a territory (Schermer, 2005) as well as the construction of a governance and organisational model capable of activating the three dimensions of agroecology, such as science, practice, and movement (SPM) are central to their strategies (Migliorini and Wezel, 2017; Wezel *et al.*, 2009; Wezel and Bellon, 2018). At present, BDs could represent the forerunners of the agroecological transition of the local FSs. Scholars have already shown an interest in targeting BDs as areas for agroecological transition, particularly in terms of governance and participation aspects (Guareschi *et al.*, 2020; Passaro and Randelli, 2022). However, studies focusing on BDs as places where the incremental processes of moving from farm practices towards change at the FS level are lacking. The topic is politically relevant, thanks to the attention given to BDs by European and national policy documents. Specifically, the EU Action Plan for the Development of Organic Production (SWD(2021) 65 final) emphasises the feasibility of BDs as new business models for the integrated sustainable development of rural areas and commits to their development.

The aim of this paper is to provide recommendations on how to promote the adoption of the agroecological approach through BDs, by analysing farmers' propensity towards agroecology, framing the level in the transition pathway, and shedding light on the barriers to the broader diffusion of agroecology. A comparative case study has been developed with two BDs in Italy. The two cases were selected among the 51 Italian BDs (Dara Guccione and Sturla, 2021), as they are reasonably representative of BDs located in mountainous areas and plains or hilly areas, respectively. Mountainous areas are affected by socio-economic and productive issues, such as structural weakness of farms, population loss, and ageing. Plains or hilly areas are characterised by the presence of dominant supply chains and socio-environmental stressors at their borders (Mazzocchi *et al.*, 2021; Sturla, 2019). The work has been driven by the following research questions:

To what extent do farmers have a propensity for agroecology in the analysed territories?
At what level of the agroecological transition are the BDs?
What are the barriers to the adoption of the agroecological approach?

The underlying assumption is that the ability to embrace agroecological transition at the territory level depends on factors that are both internal and external to the farm: the characteristics of farmers and their farms, the vibrancy of the BDs, and the general context.

The following sections provide the conceptual framework of the research (Section 2), present the research methods and data (Section 3), and describe and

[1] Bio districts are conceptually connected to the notion of "industrial district" as introduced by Marshall (1920) and further developed by Italian economists (Sforzi, 2008; Becattini, 2017; Toccaceli and Pacciani, 2023). While the definition of BDs meets Marshall's in describing them as homogeneous territories where the concentration of specialised economic activities generates external economies of scale, they take from the Italian school the attribute of places where communities and productive milieux are inextricably tied.

discuss the results (Section 4). The last section delivers conclusions and implications (Section 5).

2. CONCEPTUAL FRAMEWORK

This paper is framed within the approach to agroecology theorised by Gliessman (2015), based on the assumption that the challenges related to agroecology should be addressed on three different fronts simultaneously, that is, starting from the practices adopted at the agroecosystem, farm, and landscape levels, while developing the science and social movement dimensions of agroecology. Specifically, practice should be based on the sustainable use of natural resources and on farmers' knowledge and priorities and should be targeted towards the provision of ecosystem services and productive diversification. Science should take on the characteristics of a participatory, holistic, transdisciplinary, and action-research-based approach (Agroecology Europe, 2016). Agroecological movements should defend small and family farms, farmers and rural communities, food sovereignty, local and short food supply chains, the diversity of indigenous seeds and breeds, and healthy and quality food (Agroecology Europe, 2016; Altieri *et al.*, 2015; Peano and Sottile, 2017; Wezel *et al.*, 2009).

Gliessman (2015) described the incremental pathway of transition to agroecology in five levels; the first three relate to the farm and the remaining two to the entire FS. These levels are: (1) increasing the efficiency of inputs; (2) replacing conventional inputs and practices with agroecological alternatives; (3) redesigning the agroecosystem based on a new set of ecological processes; (4) restoring a more direct connection between producers and consumers; and (5) building a new global FS based on equity, participation, and justice. Each level requires the provision of specific support methods to help stakeholders design and put into practice the desired changes, but the fifth level is particularly challenging as we move from a local to a global perspective. The spread around the world of different types of localised and extended alternative food networks (farmers' markets, pick your own, e-commerce, etc.), in which producers and consumers interact, and their growth in terms of size and influence are already starting a process of transformation of the global FS towards sustainability. Researchers have started to deepen the role of BDs with respect to agroecology. Their findings, although limited to the Italian experience and mostly based on qualitative analysis, have shown the specificity of this form of aggregation that makes BDs a suitable model for scaling from practice to movement, as required by agroecology (see, for example, Dara Guccione and Sturla, 2021; FAO, 2017; Passaro and Randelli, 2022; Povellato and Vanni, 2020; Sturla, 2019).

Through their actions aimed at placing the sustainability of productions at the heart of local development, BDs help bridge the gap between the incremental stages of the agroecological approach by involving all other elements of the community beyond production and processing (HLPE, 2019). In other words, their actions concern the embeddedness of FSs (Wezel *et al.*, 2016) and the engagement of the entire productive community, along with their cognitive resources, such as beliefs, values, individual strategies, norms, and informal agreements (Duru *et al.*, 2015), not to mention a cultural perspective shift to trigger the transition (Prost *et al.*, 2023).

Considering their bottom-up, comprehensive approach to sustainability, BDs are seen as the forerunners of the agroecological transition applied to local FSs, first and foremost by their promoters, but also by practitioners and scholars (Dara Guccione and Sturla, 2021). Guareschi *et al.* (2020) showed that the Parma BD (Emilia-Romagna region, central Italy) is able to create organisational structures, which connect local farmers to other economic sectors, and that intermediary institutions play an important role by bringing together different stakeholders. The coalition-building role of BDs has been also acknowledged to in other studies (HLPE, 2019; Rico Mendez *et al.*, 2021; Passaro and Randelli, 2022).

The natural inclination of BDs to promote the agroecological transition of local FSs cannot ignore the existing link between organic agriculture and agroecology. In Italy, the legal definition of BDs comes from the current legislation on organic farming (Law 23/2022, article 13) which defines them as "*local production systems, even of an inter-provincial or inter-regional nature, with a marked agricultural vocation [...] where cultivation, breeding, processing, and food preparation, within the territory identified by the bio-district, of organic products are significant [... and characterised ...] by integration with the other economic activities existing in the area of the district itself and by the presence of landscape areas of importance*". This definition highlights a series of agroecology-related aspects. First, it connects organic farming to local development by defining the role of a BD at the territorial level – that is, BDs are expected to adopt the systemic approach of agroecology by scaling the principles and the values of organic farming to all activities, even beyond the local FS (Schermer, 2005). Second, the definition underscores that the adoption of organic farming within BDs is linked to the objectives of reducing the negative environmental impacts of farming and upstream value chain steps, and to the improvement of

social aspects, such as respect for human rights and the dignity of people (IFOAM, 2019).

Despite common goals, organic farming (EU Reg. 2018/848) differs from agroecology. The major differences are that the former is focused on a framework of thresholds and prohibitions (e.g., the use of chemical inputs is prohibited). Intercropping is required in agroecology, but it is not mentioned in the EU organic farming regulations. Only in agroecology is the importance of agroforestry underlined in its different articulations (silvo-pastoral systems, silvo-arable systems, and agro-silvo-pastoral systems; Rosati *et al.*, 2021). Furthermore, the sustainable management of water resources and landscapes is just a principle in organic farming, while in agroecology it is operationalised, for example, by using drip irrigation, cover crops, and intercropping (Migliorini and Wezel, 2017), and by redesigning the agroecosystems in a joint and shared way with local actors, with the aim of controlling pests and increasing soil fertility, managing adverse weather conditions, and conserving and restoring biodiversity (Boeraeve *et al.*, 2020; Gliessman, 2015; Salliou and Barnaud, 2017). Organic farming is mostly certified by third party entities, while agroecology is not based on universally acknowledged international standards (Bellon *et al.*, 2011; Migliorini and Wezel, 2017). Beyond these differences, these approaches are compatible; actually, the adoption of an agroecological approach improves the performance of organic agriculture in the medium to long term from the point of view of environmental sustainability and food security, overcoming the organic production system based on the substitution of synthetic chemical inputs with those allowed by regulation (Ciaccia *et al.*, 2020).

3. RESEARCH METHODS AND DATA

This research developed a comparative case study approach using multiple methods and data sources (Yin, 2018) to generate a new understanding about agroecological transitions in the context of BDs. The empirical study was performed using a stepwise process (Figure 1).

In 2020, a survey was carried out by using computer-assisted web interviewing. An online questionnaire with 22 topics was administered to farmers (both conventional and organic) and processors, including those not belonging to BDs (Table 1).

The questionnaire comprised 31 questions – mostly multiple choice – divided into four sections. The first section collected data on the farm and on business. The remaining three sections were dedicated to the SPM dimensions of agroecology, with the aim of gathering information concerning agronomic practices, usage, and positioning in the local Agricultural Knowledge and Innovation System (AKIS), marketing strategies, supply chain relationships, and the social aspects of farming activities. There were 31 respondents from the *Valle*

Figure 1. The research design.

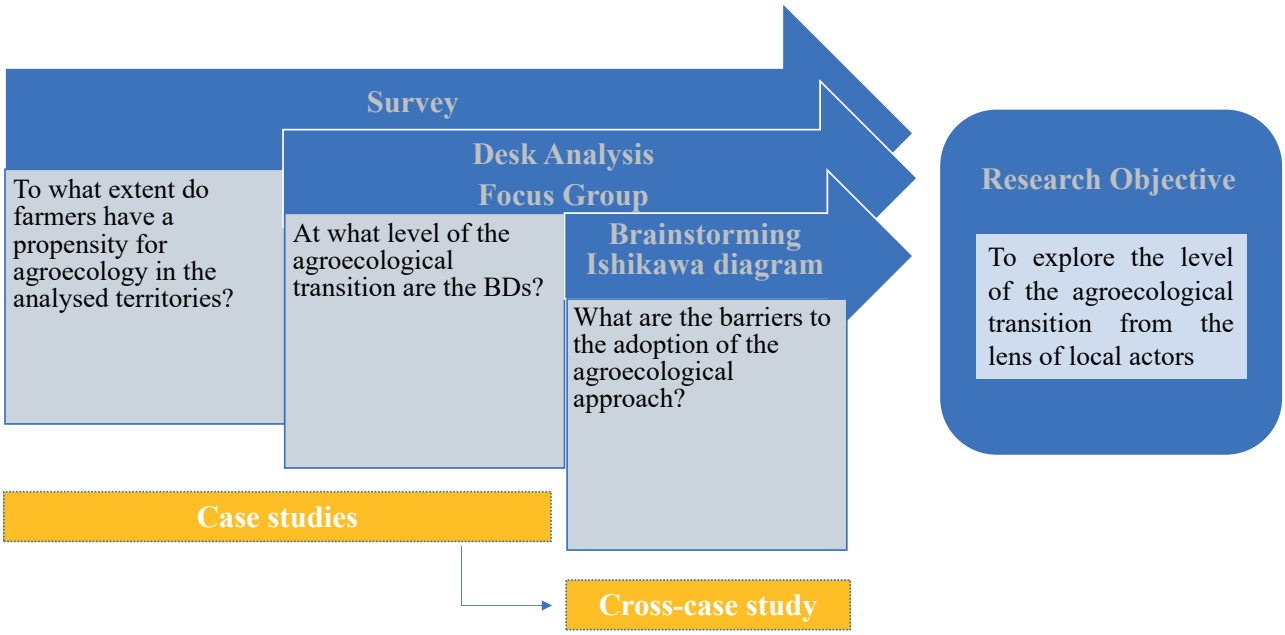


Table 1. Question topics in the online questionnaire marked by the agroecological dimensions.

	Question Topics
1	Crop diversification (P)
2	Crop and animal diversification (P)
3	Organic certification (P)
4	Sales channels (M)
5	Related activities (P)
6	Natural / semi-natural infrastructures (P)
7	Cultivation of local varieties (P)
8	Breeding of local breeds (P)
9	Agroecological cultivation practices (P)
10	Agroecological breeding systems (P)
11	Agroecological practices for the management of water resources (P)
12	Shared farm problem solving (S)
13	Collaboration with universities/research institutes (S)
14	Participation in research initiatives/projects (S)
15	Contribution to research initiatives (S)
16	Participation in training courses (S)
17	Social farming (M)
18	Participation in the organization of events, projects with schools, training courses, etc. (M)
19	Interaction with consumers (M)
20	Collaboration with other farms (M)
21	Collaboration with institutions (M)
22	Participation in networks (M)

Legend: S = Science; P = Practice; M = Movement.

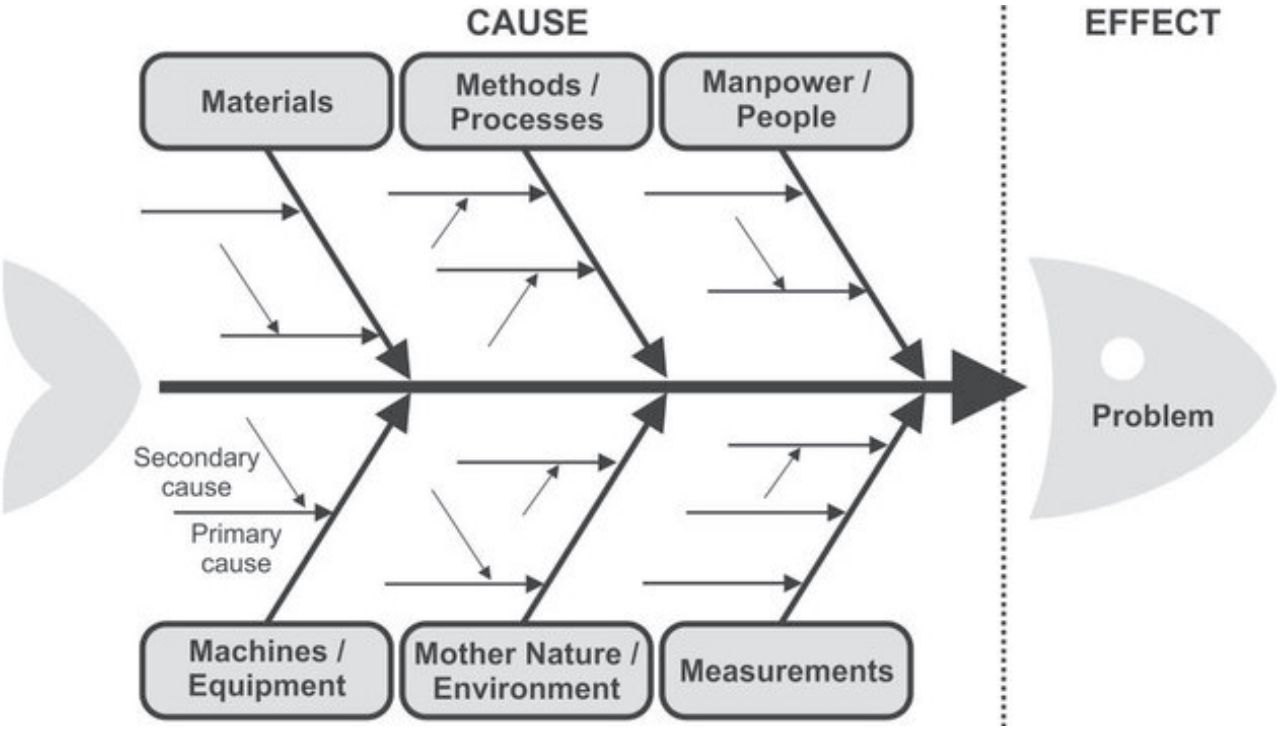
Camonica (*VC*) BD and 30 from the *Terre degli Elìmi* (*TdE*) BD.

The relevance of the three agroecological dimensions within each BD was defined by the average of the farms' answers with each agroecological connotation on the total items of the pertinent dimension. A specific Agroecological Propensity Index (API) was built for each BD to evaluate the farmers' propensity towards agroecology and to identify which of the three dimensions were more developed, as these describe the directions along which the interaction of the farms with the BD and its socio-economic and environmental context occurs. First, a score was calculated from the proportion of answers related to agroecology in the three dimensions (SPM) for 22 of the 31 questions. More specifically, because most of the questions allowed multiple answers, a value of "1" was assigned to questions where the number of chosen options relevant to a specific aspect of agroecology was higher than a given threshold, which differed from question to question. For example, for crop diversification, a score "1" was attributed to respondents with at least three crop categories (e.g., vegetables, legumes, cereals) or a permanent crop (vine, olive) on the farm (as in the 2014-2022 CAP greening). Otherwise, a value of "0" was assigned, as the contribution of the answer to the API was considered nil. In a second step, "1" was assigned to farms whose sum score was higher than 11, because they were considered to be inclined towards agroecology; "0" was assigned to farms with a sum score equal to or lower than this threshold. Assessment of the propensity towards agroecology in its three dimensions enables the identification of the functions of farms in fostering the transition at the local level, given that the renewal of FSs starts from the practices and relationships activated at the farm level (Gliessman, 2015).

As the questionnaires were addressed solely to farmers and processors, the transition at the territorial level was first explored through desk research relying on previous studies (Bergamelli, 2021; Sturla, 2019), grey literature, reports, conference papers, and the strategic documents of the two BDs. The results of this review were discussed in two focus groups, one for each BD. The participants were farmers and other BD members, such as local environmental associations, government, and research centres, with a total of 26 local actors in *VC* and 20 actors in *TdE*. The focus groups focused on four main themes: (1) drivers and barriers for farmers to adopt agroecological and/or sustainable practices; (2) the role of the local agribusiness system in communicating the values of agroecology and the role of consumers; (3) the strategy for raising awareness of sustainable FS among the local community; and (4) the role of BD and local administrations. The level of the agroecological transition achieved by the local FS was identified by reviewing the activities performed within the BDs, according to the five levels defined by Gliessman (2015).

The research team performed a cross-case analysis by discussing and interpreting the results obtained previously. During three brainstorming sessions, all considerations were summarised with an Ishikawa diagram (also known as a fishbone diagram), a tool often used to analyse problems by recognising and categorising their causes (Hristoski *et al.*, 2017; Ilie and Ciocoiu, 2010; Ishikawa and Loftus, 1990; Zielińska-Chmielewska *et al.*, 2021). Some adaptations were applied to the generic diagram, which is based on the so-called 5M+E (i.e., manpower/people; methods/processes; machines/equipment; and materials, measurements, and mother nature/environment; Figure 2). The most likely barriers identified as the main cause of the scarce adoption of the agroecological approach were depicted by the diagonal fish bones; each primary causal factor responding to an answer to the question "*Why does the problem exist?*" was represented by a horizontal bone.

Figure 2. A generic representation of an Ishikawa diagram.



Source: Hristoski *et al.* (2017).

This representation helped to maintain a clear distinction between the causes and effects of the problem.

3.1. Case studies

Valle Camonica (VC)

This BD covers an area of just over 350 km^2 in the Alpine valley in the province of Brescia, in Lombardy (Figure 3 and Table 2). Its territory consists of a highly urbanised valley floor, which is affected by the main communication routes and where agriculture is practiced on small plots of arable land and equally small vineyards. Livestock farming is concentrated at medium and high altitudes while the surrounding mountains are covered by forests and, at higher altitudes, by pastures. This BD was created in 2014 by a group of firms to counteract the phenomena of abandonment of agricultural activities by promoting more sustainable agricultural practices. Since its creation, this BD has been characterised by considerable activism, carried out almost exclusively with internal human and material resources and with the support of a few municipalities. The BD membership includes 18 farms, a brewery, three organic shops, and six social cooperatives.

Terre degli Elìmi (TdE)

Situated in the north-western part of Sicily, this BD represents 59% of the Trapani province (Figure 4 and Table 3). Predominantly characterised by rolling hills, this area is further adorned by a diverse and picturesque landscape. This BD was founded in 2019 by means a long bottom-up preparatory phase activated around local sustainability issues. The BD membership includes 28 farms, one oil mill, two cooperative wineries, and three producer associations.

This BD is affected by population decline. Nevertheless, several municipalities in this BD have employment and youth unemployment rates that are better than the provincial and regional averages. The utilised agricultural area of this BD is mainly dedicated to arable crops and permanent crops (especially vineyards and olive trees). Another important economic component is the agri-food industry, which is also linked to products certified as Protected Denomination of Origin (PDO) and Protected Geographical Indication (PGI).

Figure 3. Municipalities included in the *Valle Camonica* Bio-district, Lombardy region (province of Brescia).

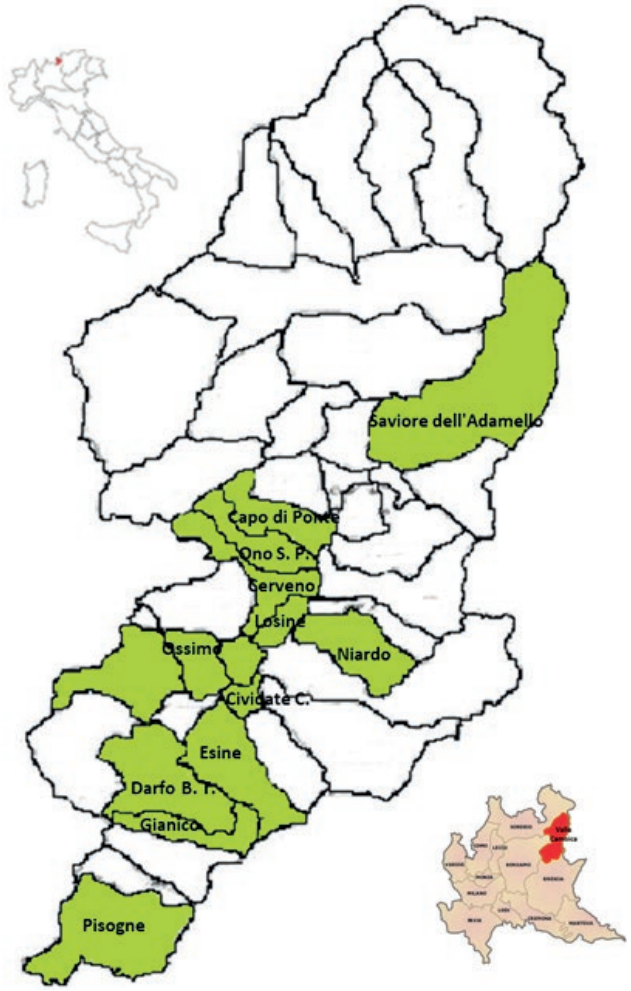
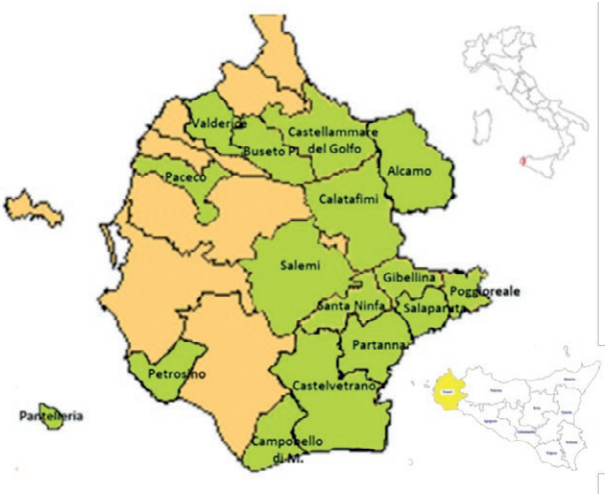


Figure 4. Municipalities included in the *Terre degli Elìmi* Bio-district, Sicily region (province of Trapani).



4. RESULTS AND DISCUSSION

4.1. The farmers' propensity for agroecology

In *VC*, the dimensions of movement and science are more developed than in *TdE*, while the practice component is quite developed in both BDs (Table 4). In *VC*, this is a direct result of tireless efforts to link the local population to local products, to train farmers, and to involve local institutions in local development projects.

Although these initiatives are still run by a dedicated group of farmers, they have the potential to become "lighthouses" for local agriculture, but the lack of public support severely hampers their actions. In contrast, in *TdE* agroecological practices are widespread, but a real movement focused on local needs is still to be developed. The scientific component is the least developed in both BDs, which is an obstacle to the dissemination of agroecological practices and to the transformation of the agroecosystem in a shared way with researchers and other farms, to maximise the environmental and economic benefits of agricultural production.

The API data are shown in Table 5. Just over a third of the farms participating in the survey showed an inclination towards agroecology, mainly concentrated in *VC* (48% of the respective total).

In *VC*, farmers who are aware of agroecology scored higher (10 farmers) than in *TdE* (7) because they are more involved in the activities of the BD. In both

Table 2. Territorial and demographic data of the municipalities in the *Valle Camonica* Bio-district.

	Population 2021 n.	Municipalities		Urban area km²	Population density Population 2021/ municipality area	Organic area 2021 ha	Organic farmers 2021 n.	Farm average size 2021 ha
		n.	km²					
Valle Camonica	46,478	14	351	133	133	60	15	4
Province total	1,253,157	205	4,786	262	262	7,447	445	17

Source: Elaboration on ISTAT and SIB data.

Table 3. Territorial and demographic data of the municipalities in the *Terre degli Elìmi* Bio-district.

	Population 2021 n.	Municipalities		Urban area km²	Population density Population2021/ municipality area	Organic area 2021 ha	Organic farmers 2021 n.	Farm average size 2021 ha
		n.	km²					
Terre degli Elìmi	178,875	16	1,454	81	123	23,928	1,049	23
Province total	417,22	24	2,47	193	169	34,573	1,471	24

Source: elaboration on ISTAT and SIB data.

Table 4. Average of farms' API scores for each dimension of Agroecology in the two Bio-districts.

Case	Agroecology as science	Agroecology as practice	Agroecology as movement
Valle Camonica	0.25	0.49	0.60
Terre degli Elìmi	0.17	0.45	0.44

Source: Elaboration by authors from questionnaires.

Table 5. Number of respondent farms with API = 1, relative percentage incidence and API average.

Case	Farms with API = 1 (No)	Incidence of farms with API = 1 on the total farms (%)	API average
Valle Camonica	15	*48*	0.50
Terre degli Elìmi	*7*	*23*	0.39
Total	23	*36*	0.45

Source: Elaboration by the authors from questionnaires.

territories, however, the productive milieu is not conducive to agroecology, and its principles and practices have not been adopted by those who are not members of the BD. This is particularly evident in *VC*, where activism clearly has not reached the non-member farms. Therefore, the BDs should activate processes of inclusion of non-member farmers, who are less inclined to adopt the agroecological approach, and of knowledge sharing, in order to spread this approach more widely and increase its effectiveness.

The farmers in both BD expressed a general mistrust of organic certification, but in *VC* it has a strong ideological connotation that prevents farmers from certifying. Therefore, farms that produce according to sustainable criteria can become members of the BD even without organic certification.

4.2. The level in the agroecological transition pathways

The *VC* strategy on agroecology is driven by the consideration that sustainability in the FS cannot be isolated from overall sustainability and requires the involvement of the local community, starting from consumers. Since its foundation in 2014, the actions of *VC* have been aimed at achieving greater local sustainability and equity. Starting from the conversion to organic farming by its founding farms, it has organised several training courses for other farmers willing to convert, as well as informative events for the local community (Bergamelli, 2021; Sturla, 2019). It actively seeks collaboration with local research institutions, administrations, and associations. Such activism has already led to the recovery of the local supply chain of neglected local wheat varieties, from the field to bread (the Growing Resilient Landscapes Project), to which several food education initiatives have been linked. Although such a renewal process struggles to reach the local population as a whole and to involve all the farmers and processors of *VC*, and the systemic nature of the agroecological approach requires interventions on many fronts – some of which are still unexplored, especially regarding the science dimension – it has reached level 4 of the transition towards agroecology (Table 6).

The protracted process of territorial consultation that marked the inception of *TdE* was accompanied by the initial strides of the agroecological approach, predating the formalisation of the BD (Table 7).

The increase in organic farming areas and the exchange of knowledge within the BD have indeed spurred the adoption of sustainable practices and techniques, extending even to operators without organic certification. Collaboration with research centres and universities has furthered the recovery and repurposing of production waste within the framework of the circular economy. Additionally, various initiatives promoting the direct sale of local organic products have emerged, in conjunction with PDO and PGI products. These have supported the development of other sectors such as tourism, catering, hotel hospitality, handicrafts, and the local artistic and cul-

Table 6. Achievement of the transition level in the *Valle Camonica* Bio-district.

Year	Activity	Transition level
2014	Conversion to organic farming of the Bio-district founding members	Level 2–3
since 2015	Bio-district fair	Level 4
since 2015	Training courses for perspective organic farmers	Level 2–3
2016	"Biosnack" in schools	Level 4
since 2018	Growing resilient landscapes project:	
	Elaboration of a growing protocol for local cereal varieties	Level 2
	Recovery of local cereal varieties in terraced fields	Level 3
	Recovery of the local wheat– Bread supply chain with training of local bakers	Level 4
	Training courses on baking local varieties for consumers	Level 4

Table 7. Achievement of transition level in the *Terre degli Elìmi* Bio-district.

Year	Activity	Transition level
2016	Adherence to organic certification systems	Level 2
2016	Crop diversification	Level 3
2016	Membership in associative forms (wineries, consortia)	Level 3
2016	Diversification of activities (contract farming, agritourism, tourist services, processing)	Level 4
2018	Practices and techniques for eco-sustainable agriculture	Level 2
2018	Agronomic practices (intercropping, rotations, cover crops, etc.)	Level 2
2019	Territorial services (public green space maintenance)	Level 4
2019	Agroecological infrastructure	Level 3
2019	Circular economy (composting, agricultural waste and by-products and pruning residues)	Level 4
2019	Farm exchange	Level 3
since 2020	Participation in research projects	Level 3
2020	Renewable energy production	Level 4
since 2021	Field experimentation	Level 3
2021	Selling organization within the territory (Ho.re.ca., SPG, farmers market)	Level 4
2022	Direct sales (e-commerce, retail outlet)	Level 4

tural offerings. The presence of notable tourist attractions, along with the considerable natural and cultural heritage, has also boosted initiatives aimed at the valorisation of the territory and its products. In addition, *TdE* has reached level 4 of the transition towards agroecology.

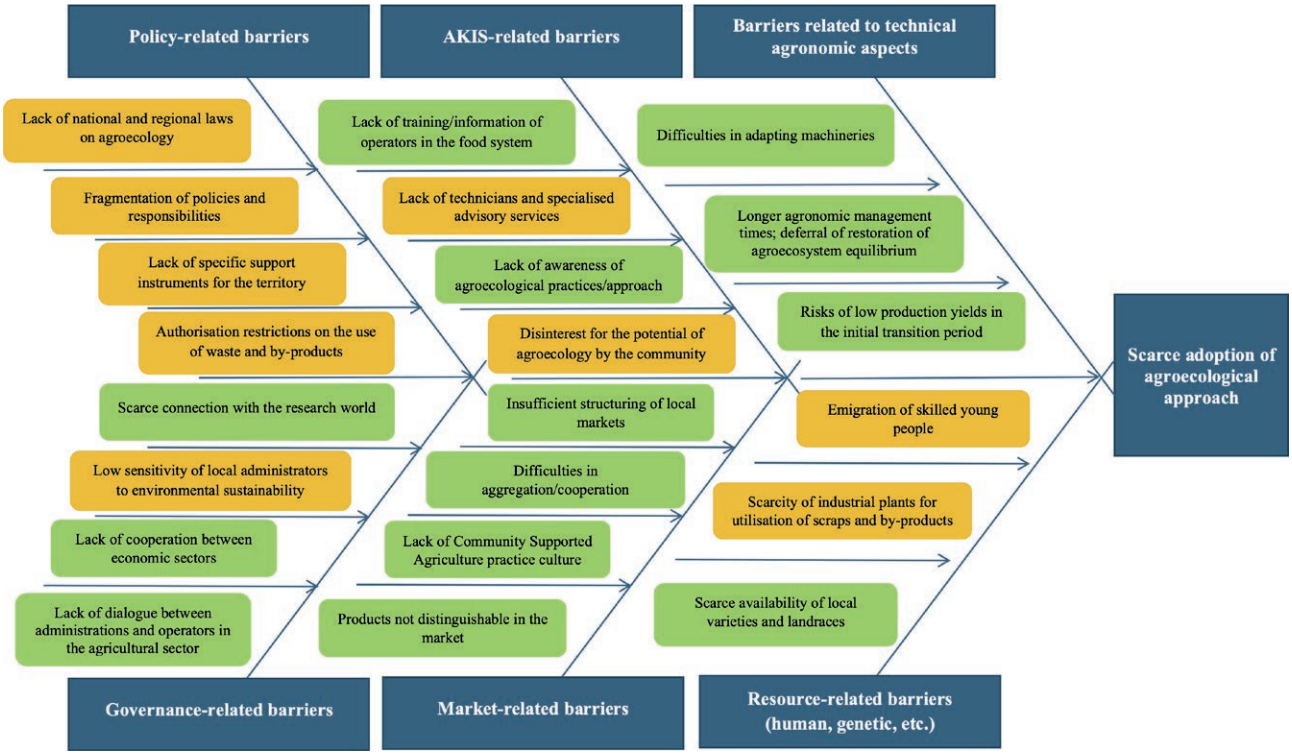
Both BDs, albeit to varying degrees, have contributed to the diffusion of the principles of participation, equity, and justice, and thus to the construction of a global FS shaped by these principles.

4.3. The barriers to the adoption of the agroecological approach

The adoption of agroecological behaviour is hindered by six clusters of barriers (Figure 5): (1) technical agronomic aspects, (2) resources, (3) AKIS, (4) market, (5) policies, and (6) governance. Among the 22 subcategories of barriers, some are endogenous to the farm (highlighted in green), while others are external (highlighted in orange).

The barriers related to technical agronomic aspects are linked to the difficulties that farmers have in adopting agroecological practices, mainly due to the fear of an initial decrease in yields. This problem is common to many organic farms and often leads them to adopt an input substitution model of organic farming, which, unlike agroecology, does not require substantial changes in management. Compared with conventional agriculture, agroecology implies longer timeframes for agronomic management and, therefore, for achieving results

Figure 5. Ishikawa diagram on the scarce adoption of the agroecological approach in two Italian bio-districts



in terms of both profitability and restoration of agroecosystem equilibria. Another obstacle is the challenge of covering the costs associated with adapting machinery and equipment for agroecological crop management.

Other barriers are directly related to the AKIS. These arise mainly from a scarcity of skilled advisors who can transfer knowledge and facilitate the application of research results and innovations in a way that meets the specific needs of the farm. As a result, farmers may find it difficult to access tailor-made advisory services. This barrier is particularly felt in *TdE*, where actors complain that advisors have poor agroecological skills. Informal channels (e.g., self-training), including peer-to-peer learning, are often the only source of information for many farmers (75% of respondents in *VC*). Formal sources (advisory services, farmers' organisations, research centres, and universities) are used more rarely.

The lack of skilled advisors contributes to maintaining a limited awareness of agroecological practices (e.g., intercropping, crop rotation, recycling, adoption of landraces, etc.) that farmers might already be using rather than following traditional techniques, leading to a low level of adoption of innovations or delaying it. Besides the significant number of farmers without awareness of the word "agroecology" (44 out of 61 respondents to the questionnaires), this is also indicated by the fact that the answers to the question about the type of the agroecological practices adopted were clustered among a few options: in *TdE*, manure heaps, rotations, and the use of pruning residues, while in *VC*, agroforestry, intercropping, and cover crops. These techniques are strongly connected to local land uses. However, the lack of awareness concerns not only the holistic agroecological approach at the farm level, but also the understanding that agroecological transition is a gradual process of adapting one's own agroecosystem. As a result, expert advice becomes paramount.

The shortage of skilled advisors is also accompanied by an inadequate supply of training/information services. Moreover, acquisition of the necessary entrepreneurial and technical skills is crucial for adopting agroecological behaviour (Bakker *et al.*, 2023; Ciliberti *et al.*, 2023; Ives *et al.*, 2020).

Also pertaining to the knowledge system is the barrier concerning the community's lack of awareness about agroecology. The local communities of both *VC* and *TdE* are not very interested in the role of local agriculture in the sustainable management of the territory and in the quality of the food consumed. This also hinders the creation of a demand for "agroecological"

products which could help to stimulate the adoption of agroecological practices by farmers, when the interaction between producers and consumers is fundamental in the transition processes towards sustainable FSs (Altieri *et al.*, 2015; Gliessman, 2015; Marino and Viganò, 2021; Wezel *et al.*, 2018).

Policy-related barriers are evident in the individual sectors as well as the overall framework of territorial development. Expectations for *ad hoc* legislation for agroecology at the national and regional levels have not been met. The fragmentation of intervention instruments and governmental responsibilities (at the national, regional, and local levels) as well as the lack of information on calls for tender and funding opportunities are barriers to radical modernisation projects. For example, during the *TdE* focus group, a farmer expressed the need to adopt the circular economy approach as a response to climate change, but recycling is hampered by some legal restrictions on the use of waste and by-products and by the lack of industrial facilities in the area.

Another major barrier is the lack of policies and instruments tailored to the specific characteristics and needs of the territories. The local actors referred to the measures to support organic farming, but they generally reported a serious feeling of abandonment by the institutions.

The governance-related barriers are closely connected to the previous ones, because they hinder the interaction between local forms of capital (economic, human, social, natural, cultural, etc.), needs, and aspirations with higher-level hierarchical policies (Anderson *et al.*, 2019; Viganò and Sturla, 2013). These barriers arise from the low sensitivity of local administrators to environmental sustainability; they do not share views with agricultural operators, and the latter are not very familiar with some local sustainability initiatives (e.g., voluntary "river contracts" for implementing territorial governance within a river basin). Governance-related barriers include the lack of cooperation with other economic sectors, weak links with research, and poor AKIS development. These barriers should be considered as a part of the wider issue of the lack of networking (e.g., local farmers associations, Solidarity Purchasing Groups, etc.). Apart from being members of the BDs, more than 60% of the interviewees do not belong to any network.

Moving to market-related barriers, the farmers stated that the choice of adopting agroecological practices has evolved over time along with an increasing awareness of environmental and health-related issues. Such an ethical motive is not detached from market considerations in response to the growing demand for high-quality and healthy food. This shift has been fostered by new generations taking over farm management, who have shown a greater aptitude for innovation, production diversification, distribution channels, and increased interactions with consumers. However, even the products and messages promoted by young farmers do not go beyond a narrow circle of regular customers. In *VC*, the main issue is the scarce integration between tourism, handicrafts, and agriculture, which is left to individual initiatives (e.g., local restaurants), while in *TdE*, the need to structure a local supply chain for certain products has been highlighted.

In a small mountain community like *VC*, there are few consumers but, surprisingly enough given that *VC* is very active in organising initiatives aimed at involving consumers. In addition, there is very limited awareness of the importance of consuming local food. On the other hand, the residents of *TdE* live in a peri-urban environment and seem to be more sensitive to food security issues.

On the demand side, agroecology is almost unknown to consumers and civil society, so products obtained using agroecology are not distinguishable on the market. Even organic farming does not seem to be a solution: in addition to the usual bureaucratic burden of the conversion to organic farming, conventional farmers in *VC* see organic certification as useless, as they consider their farming method to be more sustainable than the certification standard. Conventional farmers from *TdE* do not need organic certification because they already have a strong trust-based relationship with consumers through direct sales. The lack of a Community Supported Agriculture (CSA) culture negatively affects the possibility of building a stronger consumer-producer relationship (Espelt, 2020; Wezel *et al.*, 2016), for example, for building trust and creating a sense of community around local agriculture and food production. Consumer participation in production in its various forms (e.g., through pre-purchasing of products, harvest shares, or purchasing groups) is not supported by local food policies and governance structures, which could play a crucial role (e.g., through Green Public Procurement [GPP], education campaigns for schools and citizens, etc.).

In both BDs, the adoption of agroecological practices encounters resource-related barriers that are highly place specific, highlighting the importance of embracing innovation, sustainable resource management and maintaining biodiversity-based agriculture (Duru *et al.*, 2015). In *VC*, stakeholders firmly believe that preserving and promoting local breeds, varieties, and landraces can contribute to the resilience of agroecosystems; unfortunately, in Italy it is often challenging to find this genetic material on the market. Conversely, in *TdE* there are very few industrial facilities for recycling scraps and

by-products. Moreover, in some municipalities of the inland hills, the emigration of skilled young people is an issue, because the transition to agroecological practices is facilitated when young people take over farms. This offers a new and longer-term perspective on the development path of the farm, which over time justifies, for instance, the surrender to higher yields in the short term and intensive land use in favour of preserving natural resources.

5. CONCLUSIONS

The research described in this paper aimed to explore the agroecological transition by analysing farmers' propensity towards agroecology, the degree of transition at the territorial level, and the barriers to the systematic adoption of the agroecological approach. The findings show that *VC* is working to re-establish a more direct connection between producers and consumers, aiming at a vision of a global FS based on participation, localness, equity, and justice (levels 4 and 5). *TdE* is "younger" than *VC* by 5 years and characterised by intensive agriculture. The main aims of this BD are to improve the ecological performance of the agroecosystem and to reconnect producers and consumers within its flagship supply chains (levels 3 and 4). The solutions for developing and extending activities related to levels 2-4 of agroecological transition have already been partially identified within the two BDs. These are based on a clear awareness by local agroecological pioneers, who are the main drivers of the two BDs.

The results of the study suggest that BDs could foster a transition towards agroecology, but the systemic approach underlying it implies the need to further develop the three dimensions (SPM) through relevant context-specific actions based on participation and localness. This endeavour is not only about establishing local FSs and networks that hinge on the interaction between consumers and organic producers. It is also about aligning the entire local community with the values and principles of organic agriculture. These actions aim to ensure equity in terms of access to healthy food and to reduce the ecological footprint of all socio-economic activities in the district area (Gliessman, 2015). Therefore, to improve the sustainability of local FSs, BDs should define a comprehensive strategy and share it with public institutions and other stakeholders to activate and integrate several EU and national policies (also beyond the CAP; Sturla, 2023). Changing the global FS requires much more than BDs; however, they can contribute to the development of new modes of production and consumption based on equity, participation, and justice, which are necessary to change habits. This is worth consideration given the role that the European strategies assign to BDs as suitable tools for the sustainable revitalisation of rural areas, by tackling global problems (e.g., pollution, climate change, and disadvantages of rural areas) from a local perspective. Italy has emerged among European countries given that BDs are spread over almost 31% of the national territory, with some of them covering an entire region (Sardinia, Marche and Umbria).

This study is a starting point for more ambitious research on the agroecological transition of local FSs, as well as the transfer of this knowledge to the implementation of the Italian CAP Strategic Plan and of the EU Action Plan for the Development of Organic Production.

From a methodological perspective, a specific index was conceived to help describe and assess farmers' propensity to adopt behaviours and practices with agroecological connotations. Such an index led to an additional exploratory analysis of certain attributes of the farms considered to be more "agroecological", although a major limitation of this research is the small number of observations within the two study areas. The API could be made more robust by introducing a weighting system to consider the relative importance of the survey questions in relation to the agroecological approach. The Ishikawa diagram proved to be particularly effective not only in identifying the barriers related to the research problem, but also in better understanding the interlinkages between these barriers. Hence, a solution/action could contribute to solve more than one barrier to the same problem at the same time. The assessment of farmers' propensity towards agroecology and of the level of agroecological transition in BDs could trigger further multidisciplinary research that considers multiple cause-and-effect relationships between the different components (environmental, agricultural, social, economic, cultural, and political) that affect the barriers to the development of agroecology in a given context. Moreover, an Ishikawa diagram could be further refined by prioritising the barriers according to the application context.

AUTHOR CONTRIBUTIONS

G.D.G.: Conceptualization, Supervision, Writing, Original draft preparation, Reviewing and Editing. L.V.: Methodology, Data curation, Writing, Original draft preparation. A.S.: Data curation, Writing, Original draft preparation. A.V.: Writing, Original draft preparation, Reviewing. L.C.: Original draft preparation, Visualiza-

tion. T.P.: Original draft preparation, Visualization. F.V.: Methodology, Conceptualization, Supervision, Writing, Original draft preparation, Reviewing and Editing.

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