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Urban Food Policies and UNESCO Biosphere Reserves

Emplacing innovative governance in CollinaPo (Turin, Italy)

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Riccardo Giovanni Bruno Turin, January 11th, 2026

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Summary

This thesis investigates Urban Food Policies (UFP) as tools for the governance of food systems, with the aim of reframing food not as a market commodity but, once again, as a matter of rights. To do so, this work undertakes a geography-grounded inquiry concerning UFP development by relying on the critical assessment and application of the City-Region Food System (CRFS) approach developed by FAO.

Chapter I presents the research, clarifying how, standing on action-research carried out in UNESCO Man and the Biosphere Reserve CollinaPo, this work combines a critical theoretical understanding of CRFS's three pillars with empirical research in the context of CollinaPo to assess what territorial knowledge of food systems is pivotal for the development of effective UFP.

Then, the thesis is divided into two parts.

First Part, "Geographical perspectives on the relocalization of food systems", addresses the theoretical basis to understand UFP within the existing large debates on the need of relocalizing food.

More specifically, Chapter II situates UFP within the current globalized food regime's failures and highlights how food relocalization approaches may provide solutions. The Chapter debates the possibilities of relocalization approaches implementation in relation to the issue of governance. Also, it selects the CRFS approach as a relevant paradigm for connecting the discourses of relocalization with the UFP framework. The CRFS approach comprises three key pillars: territoriality and city-regions, sustainable food systems, and multistakeholder engagement and participatory governance.

The thesis then undertakes a critical theoretical assessment of CRFS's three pillars.

Chapter III addresses the first pillar through a systematic literature review of CRFS, revealing a key conceptual gap: while the approach promotes the adoption of the city-region spatial dimension for the food systems' understanding, CRFS does not meaningfully address the complexity of the geographical theoretical background of this dimension, which leads to unsolid applications, as presented in a cases review, undertaken in the same Chapter.

Chapter IV addresses this gap by reconceptualizing the city-region in a way that is theoretically grounded in the literature and analytically relevant within the CRFS framework. The Chapter also suggests a set of criteria to assess potential CRFS city-region structures. This toolkit is applied within Turin's possible city-regions to compare the relevant scales at which Turin's CRFS might be studied and governed.

The comparison is helpful to identify the CollinaPo Biosphere Reserve as a relevant extension for the present CRFS research.

Second Part, “Planning Urban Food Policies,” focuses on CollinaPo and its food system, with the aim of identifying which UFP can be developed to govern the newly identified CRFS.

Therefore, more detailly, Chapter V introduces the CollinaPo case, as both a UNESCO-designated Man and the Biosphere (MAB) Reserve and a complex socio-spatial context. A territorial assessment is developed, offering a situated reading of CollinaPo’s characteristics.

Chapter VI shifts to a systemic analysis of the food system, addressing the second pillar of CRFS, mapping CollinaPo’s food system components and drivers, and relying on unstructured interviews with key players in the supply chains. The sustainability of the food system is investigated through the lens of resilience. Also, a SWOT analysis of the food system is developed to display the conditions of CollinaPo’s food system. The results of this full-scale assessment serve the purposes of Chapter VII, which investigates the third pillar of CRFS.

Chapter VII addresses the issue of governance, debating the lack of meaningful participation in the present development of UFP; then, by drawing on the current understanding of the need for democracy, the Chapter presents a multi-level stakeholder study to assess key actors and opportunities, in the context of CollinaPo, toward the development of a participatory UFP.

In the end, Chapter VIII synthesizes the whole research and suggests a policy proposal tailored to the CollinaPo context.

This research produces multiple outcomes. Its main contributions include a critical reassessment of the three pillars of City-Region Food Systems; a redefinition of the city-region perimeter with particular attention to its geographical dimension, a conceptual clarification of resilience within sustainable food systems, a deeper understanding of the issue of democratic participation in the context of governance.

In addition to these theoretical contributions, the study advances a set of methodological approaches for the assessment of food systems, with particular emphasis on multistakeholder engagement and participatory governance. These approaches are presented as replicable tools for analyzing and supporting food system transformations across different territorial contexts.

This thesis contributes to current academic debates on food systems and food governance, while offering insights of practical relevance for policymakers and practitioners.

Acknowledgment

The work you are about to read was not easy to produce. Not so much because of the research design itself, which deals with a relatively simple assumption – food is a right; as such, it must be governed by the people – but because of the multiple challenges and possibilities that emerged in parallel, and which, in order to be managed, required significant organization, energy distribution, and collective efforts that were not initially foreseen.

For this reason, aware that this complexity will unfortunately emerge in some opaque and flawed passages, I would like to thank those who made this work possible and undoubtedly better than I could have done on my own.

First of all, I would like to thank the thesis Supervisors. Above all, Prof. Egidio Dansero, for giving me opportunity and space to express my unorthodox academic approach, giving voice to research that, from the outset, was action- and territory-oriented, in their broadest geographical sense. I would also like to thank Prof. Giacomo Pettenati for his pivotal research suggestions, which were useful both for the thesis and for my personal growth. Thanks to Prof. Claudia Cassatella for her important bibliographical and methodological insights. A further heartfelt thanks goes to Prof. Carlo Genova for supporting me from the outset to successfully structure this work.

I feel it is my duty, not out of formality but out of sincere gratitude, to thank Prof. Donatella Privitera and Prof. Alessandra Manganelli for carefully and thoroughly reviewing this thesis. Your suggestions have greatly improved the overall quality of the work.

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Further formal thanks, but done with sincere affection, go to the research group within which I completed my doctoral studies. The so-called *Atlante del Cibo di Torino Metropolitana* was providential in accompanying me on a path of authentic growth, capable of turning an unaware passionate into something more akin, at least in part, to a true researcher. Prof. Alessia Toldo, Dr. Luca Battisti, Dr. Giuseppina Bifulco, Dr. Federico Cuomo, Dr. Beatrice Ferlaino, Dr. Karl Kraehmer, thank you. A mention goes to Dr. Tommaso Tonet for all the cartography work done together.

Another special mention goes to Dr. Veronica Allegretti. This thesis is largely the result of countless discussions we had. My sincere thanks.

Other acknowledgments rightfully go to those who accompanied me along the way, making this thesis humanly possible.

I thank my parents Laura e Ivano. Although it may seem like a cliché, I cannot express how much this journey depended on you. In the daily challenges, your support has been providential in helping me to persevere and complete this work.

I would also like to thank my uncle Angelo, who taught me so much about food and supply chains.

Many thanks to my "Greek Week" friends, who allowed me to fully experience the dual nature of this doctorate. While I often found myself working at *Campus Einaudi* and therefore did not fully experience the *Sottopalco* of *Castello del Valentino*, you made sure I never felt left out and allowed me to share that part of the journey as well.

Last but not least, I would like to thank Chiara. You have been with me since the beginning of this journey; sharing both successes and sleepless moments of fatigue. I trust you will continue to be there. Thank you.

Thanks to Giulia, Elisabetta, Pietro and many others. It is often said that a PhD is one of the loneliest experiences one can have; mine definitely wasn't.

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I. The kitchen's tools

1. Introduction

Chapter I provides the necessary information to understand this thesis and the research behind it; in brief, it addresses the activities that were carried out to develop the research, other than displaying the process of the thesis writing.

"What to know about this research" begins with a presentation of the context of research, also mentioning the peculiar intention of relying on a UNESCO Man and Biosphere Reserve as a case study for the main research topic of Urban Food Policies. More detailly, the reasons behind the Man and Biosphere CollinaPo Reserve selection are presented, also mentioning what issues were faced in selecting this choice. Moreover, the research questions are posed, aiming at providing immediate understanding of the research's theoretical and methodological goals.

Then, the overall research methodology is explained.

Furthermore, given the complex interplay of subjects and interests that were crossed by this thesis, the ethical considerations are addressed with the specific goal of displaying the eventual compromising relations that requested careful attention to avoid research biases.

The structure of the thesis is finally presented, together with a summary of the two Parts that compose this work.

2. The context of the research

The present work is the outcome of the research activities carried out in fulfilment of my Doctor of Philosophy in "Urban Food Policies: A new domain of public action" [1] in the PhD program "Urban and Regional Development" of the Polytechnic of Turin.

The origin of this research stems from the definition of Urban Food Policies adopted within the call for the doctorate project, which identified UFP as participatory and strategic planning tools situated at the intersection of local governmental action and bottom-up mobilization of food system actors. In this light, UFP should surpass sectorial initiatives, becoming multi-sectoral, integrated

[1] From now on, Urban Food Policies are referred to as "UFP".

governance tools that, to be fully effective, require a deep transformation on the level of governmental approaches toward food.

From this starting premise, this research addresses UFP as a concept that encompasses both what is often described as urban food strategies, typically voluntary, vision-oriented frameworks and action programs, and more formalized commitments that embed food system objectives within more institutional structures (Dansero, Pettenati, Toldo, & Bonavero, 2019).

Before delving into the specific information concerning the work, it is important to mention that this thesis integrates a diverse array of research opportunities, extensive fieldwork, and a variety of related activities, which do not belong to my PhD path only. More detailly, some are specifically part of the PhD; others are not.

As my PhD scholarship is funded under the National Recovery and Resilience Plan (PNRR), there were some mandatory tasks to complete. At first, it is essential to consider that the topic of research was given, as the scholarship was so-called "fixed"; in detail, when I applied for this PhD's position, I was already aware that the central topic of my research would have concerned the issue of Urban Food Policies, and, although I was allowed to explore it without any theoretical or empirical limit, it could not change as the overall framework of work.

Moreover, as my scholarship was funded by the PNRR-NGEU, necessary compliances were demanded and must be mentioned for transparency. On the one hand, it was required to spend 6 months of research within an Italian institution; on the other hand, 6 months must be spent within an international institution.

Concerning the research period to be spent in Italy, I worked with the City of Turin, where I had the opportunity to collaborate with the office of *Assessore alla cura della città alla Protezione civile e ai Servizi civici della Città di Torino*[2]. In this framework, a case study on a stimulant potential was suggested. It consists of the Man And Biosphere UNESCO CollinaPo Reserve[3] (Figure 1).

CollinaPo is deputed to protect the local environment while involving local communities, with the goal of stimulating a more sustainable human-nature interaction in the light of sustainable development.

[2] When referring to institutions per their institutional roles, I will use Italian original version. If, instead, I am referring to the boundaries, competencies' definition, space, I will use English-translated words.

[3] From now on, it is referred to as "CollinaPo". More information on the case study is available in Chapter V.

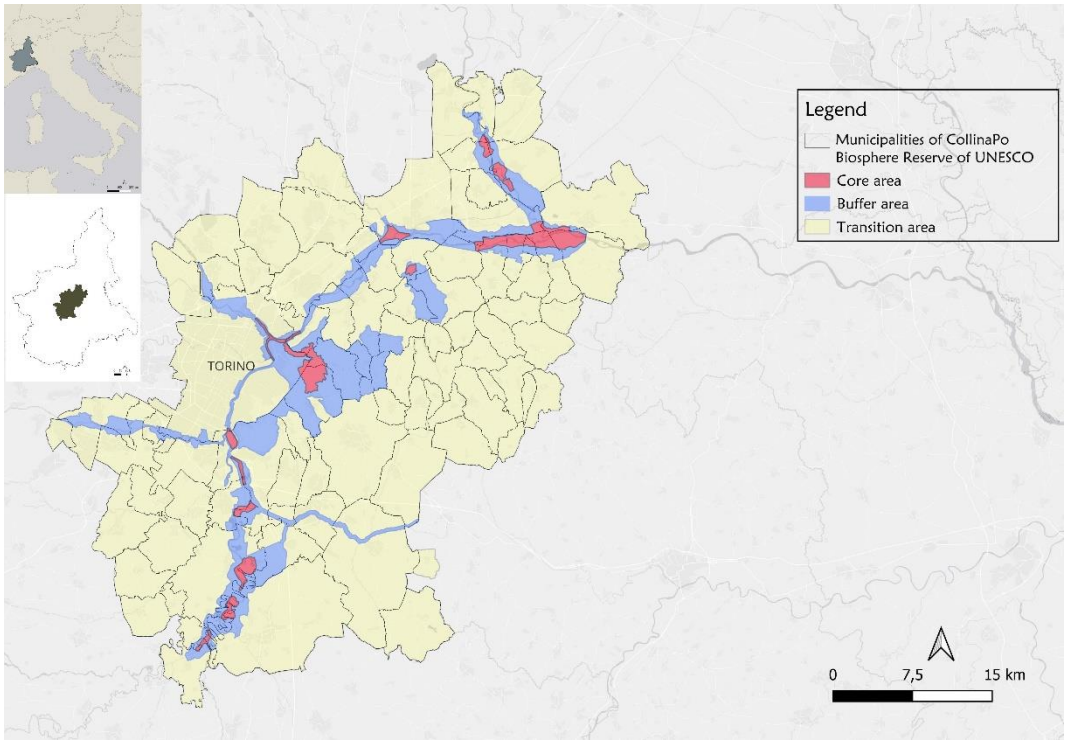

Figure 1. MAB UNESCO CollinaPo Biosphere Reserve and its zonation
Source: Author's elaboration based on data from CollinaPo Biosphere Reserve

Critical reflections concerning the case's validity were carried out and are addressed in Chapter IV. Nonetheless, to briefly summarize this work, I have spent 6 months of fieldwork in CollinaPo between June 2023 and August 2023, and from January 2024 to May 2024; plus, another significant number of weeks were unorderly spent in CollinaPo over the three years of my PhD.

On the other hand, regarding the mandatory abroad period, to fully experience the potential of this task, I split it into three periods. Between November 2023 and December 2023, I undertook my first research period at Trinity College, Dublin, Ireland, where I worked within the European Union Horizon 2020 project CULTIVATE under the mentorship of Prof. Anna Davies.

In this experience, I focused on learning the Food Sharing Initiatives mapping methodology (Davies & Evans, 2019), providing my work with a comprehensive understanding of how to acknowledge and map grassroots movements and bottom-up food initiatives within the urban context.

Following this, I continued my research at AERES University of Applied Sciences in Almere, the Netherlands, collaborating with Prof. Henk Renting. Here, from June 2024 to September 2024, I delved into the contributions of major food regional planning to polycentric UFP, conducting extensive research on the

integration and coordination of food strategies across multiple urban centers within specific Dutch provinces. More detailly, given the unique framework of food governance in the Netherlands, which is highly advanced and prosperous concerning the UFP development, I meant to understand how the different regulatory frameworks exist and how they eventually applied the City-Region Food System approach (CRFS), lately selected as the fundamental approach at the basis of this thesis.

A third abroad period was spent at INRAE in Montpellier, France, where I had the opportunity to work with Prof. Coline Perrin, between October 2024 and December 2024. Here, I better explored the role of food inequalities in food systems, focusing on food security and the ways through which local institutions can start innovative processes of inclusive food governance.

2.1. Doing research in the Atlante del Cibo di Torino Metropolitana

It is relevant to mention that, aside from the mandatory tasks to comply with, demanded by the PNRR-NGEU scholarship, I was actively involved in four major research projects concerning UFP, and in several other minor research activities and projects, within the research group active in the field of UFP research at the University of Turin, under the guidance of Prof. Egidio Dansero.

Here, although the activities were minor and parallel to the main fundamental PhD framework of research, I benefited from interactions, networking opportunities, and engagement with multiple scholars. Particularly, I had the chance to deal with the research carried out by *Atlante del Cibo di Torino Metropolitana* (Turin Food Atlas)[4], which, being an agreement among multiple institutional bodies, allowed me to directly interact with *Città di Torino*, *Regione Piemonte,* and *Camera di Commercio*, allowing me to establish successful channels of communication for data collection.

Through the Turin Food Atlas, I was actively involved in the European Union Horizon 2020 project FUSILLI, which aimed to enhance the sustainability of urban food systems by developing innovative local living labs. This project involved 12 cities across several European countries working together to develop and implement innovative food policies across all stages of the food chain, from production to waste management, aiming to create sustainable, inclusive, and healthy food systems (Battisti & Cuomo, 2022).

Concerning the activities carried out in Turin, it is relevant to recall that FUSILLI provided the framework where Città di Torino committed to the

[4] https://atlantedelcibo.it/

development of a UFP via innovative institutional processes; in particular, the establishment of the *Gruppo Interdipartimentale e Interassessorile per le Politiche Alimentari* (GIPA)[5] of Città di Torino gave momentum to the topic of food from a governance perspective.

Indeed, as visible in Figure 2, although several activities contributed to installing UFP discourses and processes in Turin in the last decade, FUSILLI was the cornerstone of the institutionalization process.

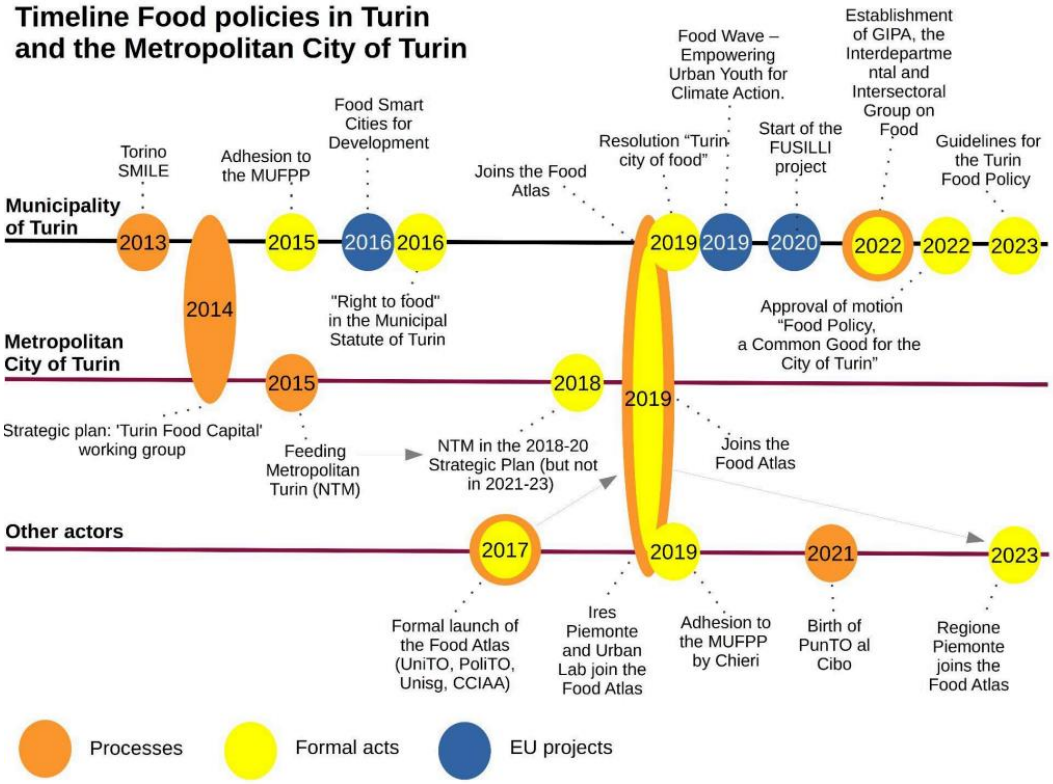

Figure 2. Toward an Urban Food Policy in Turin

Source: Krähmer, K., & et al. (2025). *The food system of Turin, Italy AfriFOODlinks city profile report*. Turin.

Third, I mention the Italian *Progetto di Ricerca di Interesse Nazionale* "PRIN - Emplacing Food Narratives, policies and spaces in Italy. Rethinking the territorial dimensions of food, in the challenges of justice, sustainability, cultural identity and local development"[6]. Starting with a review of the current landscape of UFP, this

[5] Interdepartmental and Intersectoral Group on Food Policies
[6] https://www.emplacingfood.unito.it/

project had the general objective of rethinking food-space relationships (in their various forms, such as place, territory, landscape, and region), with particular attention to the role of urban and local scales. The aim was to ultimately provide a critical and practical contribution to the affirmation of innovative UFP through a multidimensional and multiscale territorial approach (Dansero & Allegretti, 2023).

This project was particularly relevant because, due its theoretical reflections and innovative knowledge concerning the connections between UFP and territory (Lazzeroni, Berti, Bruno, & Rossi, 2023), it pragmatically contributed to this thesis' theoretical advancements.

The fourth relevant project to mention is "Agritech"[7]; funded by PNRR, it focused on understanding the spatial dynamics of UFP, dealing with the relation between cities and surrounding regions. With a strong interest in the CRFS approach, the Agritech project has successively underscored the importance of a polycentric approach to UFP, moving from the relevance of a static city-centered framework to a larger dimension, aiming at including the network of urban and rural interactions with a focus over the processes that stand outside cities (Kraehmer, Battisti, Berti, Bruno, & Dansero, 2023). This perspective emerged as particularly relevant for the Turin Metropolitan area, where the regional scale and Turin's central role in food systems decision-making processes are pivotal, but where other minor cities play important roles as well, also displaying the existence of multiple differences within the larger food system, leading to the understanding of a polycentric structure of the regional food system.

2.2. A few academic conferences that improved this work

Beyond the methodological and analytical opportunities already discussed, this research benefited from a fortunate alignment with several major national and international conferences held during the doctoral period. These events offered valuable platforms for refining assumptions and testing hypotheses in dialogue with leading scholars, practitioners, and institutional actors.

At first, the active involvement in the Steering Committee of AESOP's Sustainable Food Planning group enabled participation in two key biennial events: the AESOP Sustainable Food Planning Conference 2024 (Brussels, 19–22 June 2024) and the AESOP Youth Meeting "Emerging Voices for the Changemaking of Food Systems" 2025 (Montpellier, 11–13 June 2025). Both occasions allowed for better locating the research within current debates on territorial food governance, urban-rural linkages, and policy innovation in Europe.

[7] See: https://agritechcenter.it/spokes/

Moreover, concerning Urban Food Policies, I had the opportunity to co-organize and attend the VIII *Incontro Nazionale Rete Politiche Locali del Cibo* (Turin, 30–31 January 2025). This meeting brought together experts and policymakers from across Italy.

In addition, the XXXIV *Congresso Geografico Italiano* (Turin, 3–5 September 2025) offered the opportunity to deepen geographical issues, lately applied to this thesis. The Congresso Geografico Italiano, together with the 35th International Geographical Congress (Dublin, 24–30 August 2024), allowed me to deepen my understanding and reflections on the topic of bioregions, which are pivotal to the theoretical part of this thesis. In general, they both offered comparative perspectives rooted in both global and national geographical scholarship.

The 5th World Congress of Biosphere Reserves (Hangzhou, 22–26 September 2025) was a third milestone. This event, which is held only once every ten years, is highly significant in the context of the MAB Programme, as it means to formally improve the Programme's general strategy. Hangzhou's conference replaced the previous Lima Action Plan, which concerned the 2016-2025 period, with a new strategic framework valid for the 2026–2035 decade.

Engaging with UNESCO's leading experts provided a once in a lifetime opportunity to critically position the CollinaPo BR case within the broader international debate on the future of Biosphere Reserves' governance, and to fit my research with the UNESCO's one.

3. Research issues and questions

In recent years, cities have become increasingly central to the politics of food. Facing multiple issues like rising urban populations, environmental challenges, and social inequalities, local governments are also more invited to shape food systems in a way that does not concern efficiency only but also addresses justice and ecology. The framework where this responsibility stands is now generally called Urban Food Policies (UFP) and is increasingly acknowledged as pivotal to deal with food systems' sustainability at the city level.

Urban Food Policies (UFP) are place-based governance frameworks that transcend sectoral and market-oriented policy logics and allow urban and urban-regional institutions to intervene in food systems to pursue public objectives related to sustainability, equity, resilience, and justice. Yet, despite their diffusion and understanding, UFP continue to be conceptually disjointed and unevenly operationalized, especially when it comes to their spatial grounding, and articulation across urban–regional scales.

The way that various theoretical frameworks of local food systems, the City-Region Food System (CRFS) approach among others, inform specific governance structures is not sufficiently addressed by existing scholarship, which frequently treats UFP as either normative policy agendas or collections of isolated instruments.

Not enough exploration, on the other hand, has been offered on UFP articulation with complex, site-driven conditions such as UNESCO Man and Biosphere Reserves, where goals for biodiversity are concomitantly entangled with issues of human wellbeing as well as systems-level explorations into socio-ecological aspects.

Having clarified the opportunities that allowed me to develop this work and what this thesis addresses, it becomes essential to debate the research questions that will guide this thorough, multi-scalar analysis, firmly rooted in geographical considerations. The research is structured around two main research questions, reflecting the thesis's combined theoretical and empirical orientation.

RQ1, more theoretical in the beginning, addresses the conceptual dimensions of UFP and is articulated through three sub-questions that intend to perimeter the focus of the research.

RQ2, instead, regards the empirical application of UFP, assessing how this set of policies can go beyond the issue of food and also support the achievement of UNESCO Man and the Biosphere Reserve's goals in the specific context of CollinaPo.

More specifically, the theoretical side of the research aims to explore the implications of using multiple approaches to understanding urban food systems for the development of successful UFP. In this framework, the overall research question of this work consists of:

> RQ 1: How do different theoretical frameworks and operational paradigms concerning local*ized* food systems contribute to the development of effective Urban Food Policies, particularly within unique contexts such as UNESCO Man and Biosphere Reserves?

The main challenge in developing effective UFP is recognizing that no single blueprint exists. Some potential theoretical frameworks offer interesting one-fits-all solutions, but their strengths and limitations vary widely and are highly context-dependent.

For this reason, the research question deliberately refers to "local-ized" food systems, rather than simply "local", meaning to emphasize the constructed nature of food systems that are taken into consideration in this work. As Muchnik clarifies (2009), while local is mostly used to refer to a fixed, inherent characteristic of a

place at a given moment, localized points to a system that was subjected to transformation, that has become rooted in a particular territory through specific social, economic, and political dynamics, but that was not necessarily born there, nor guaranteed to remain (Bowen & Mutersbaugh, Local or localized? Exploring the contributions of Franco-Mediterranean agrifood theory to alternative food research, 2013).

Therefore, there exist important successful cases that can be considered exemplary; nonetheless, each UFP's instalment success depends on whether existing compelling theoretical approaches are relevant to be applied, even if practical characteristics and specificities are different. In detail, because UFP operate within a complex framework, embedded in globalized food supply chains while simultaneously responding to growing calls for more localized, place-based food systems, designing such policies is especially difficult.

These challenges raise the issue of understanding how UFP navigate this tension between global structures and local ambitions. It is within this context that a second fundamental research question of this work emerges:

> Sub-RQ 1: To what extent do Urban Food Policies engage with food relocalization approaches?

Also relying on what has been stated above, this research aims to move beyond the UFP's focus over the notion of "urban", instead embracing the broader connections between food in urban areas and its production in the surrounding regions. In this context, the City-Region Food System (CRFS) approach is taken into consideration to explore possible food systems' improvements.

By dealing with this approach, the research seeks to address a key gap in literature: the need to connect urban food governance with the broader territorial processes behind relocalization of food that could successfully support it. In doing so, it builds on and contributes to the growing body of work at the intersection of urban and regional studies, particularly around questions of territorial UFP development and application. Consequently, this work acknowledges that the development of effective UFP requires a comprehensive understanding of food systems and the many interconnected processes that shape them (social, environmental, economic, and political) at the territorial level. To fully understand this complexity, I do not embrace the CRFS approach without questioning it; rather, I engage with the theoretical foundations that preceded the CRFS framework, in order to ground the research in a deeper understanding of the city-region dynamics relevant to the purposes of governing the issue of food. This includes examining

the complex relationships between cities, their extended territories, and the socio-spatial processes that shape food systems.

Sub-RQ 2: How does the City-Region Food System approach acknowledge the territorial component of food systems?

Starting with this new knowledge, the last objective of this group of questions regards critically understanding how the CRFS approach is practically capable of stimulating the creation of UFP, given its innovative territorial knowledge. Therefore, the fourth sub-question asks

Sub-RQ 3: In what ways does the City-Region Food System approach enhance the production of Urban Food Policies?

Then, given the specific case study that is taken into consideration, a unique research question emerges. Considering the hybrid nature of CollinaPo's context, encompassing urban, peri-urban, and rural elements, this work deals with an additional layer of complexity, where the goals of ecological conservation, community participation, and sustainable development must align with the need of developing a successful process of food system's governance.

In other words, considering that MAB UNESCO Reserves showcase an opportunity to investigate the relations between human needs and environmental conservation, understanding the correlations with urban food systems can be strategic. A deeper knowledge of sustainable food systems could reveal innovative pathways toward the development of more environmentally sustainable human actions.

Bringing these threads together, the research aims to investigate how UFP, shaped by relocalization efforts, can support sustainable territorial governance in protected landscapes. The guiding research questions are:

RQ 2: How can Urban Food Policies contribute to CollinaPo's achievement of MAB UNESCO Reserves' goals?

In order to answer this question, it is necessary to have a better understanding of the specific characteristics of the food system, on one side, and to critically analyze the governance innovations required for MAB UNESCO Reserves to function, on the other side. Indeed, the landscapes that Biosphere Reserves seek to preserve could be severely impacted if innovative food procedures fail to consider sustainability and policymakers do not include communities in decisions about

sustainable development. Additionally, since BRs represent larger regional territories, as per their designation mandate (See Chapter V), this research helps to establish the intersection between UFP and MAB UNESCO goals, by relying on the hybrid urban-rural setting of CollinaPo.

In the end, therefore, the intention is to understand if, in this geographical context, a "urban-regional food policy" might be a promising response to a territory in search of a new identity.

4. Methodology

The present section addresses the methodology of this research. In detail, I briefly outline how this work was constructed and refined over the course of the PhD. Indeed, rather than strictly aligning to a fixed model, the approach evolved gradually through continuous engagement with the field and the multiple experiences that I have mentioned before.

Lately, I intend to discuss the overarching methodological framework that supports the research, including its epistemological foundations and guiding principles.

4.1. The research phases

This work relies on an initial intensive preparatory work, undertaken jointly within *Politecnico di Torino* and *Università di Torino*. Indeed, benefitting from the inter-university PhD program of belonging, this stage involved a comprehensive review of scholarly literature on Urban Food Policies (UFP), food governance, territorial development, and broader themes such as critical urban theories. The purpose of this literature review was to identify the latest innovations and theoretical advancements in the governance of urban food systems, with a specific concern over the geographical and territorial components at the basis of UFP. To achieve this, a series of structured activities was undertaken, including collaborative team meetings, by participating to the Turin Food Atlas, and the development of presentations, written assignments, and seminars with both internal colleagues and external experts in the Polytechnic of Turin (January 2023).

The second phase, consisting of a pre-field period, was crucial for establishing a foundational understanding of the study context. This period provided a rich opportunity to familiarize with the local environment and its key actors, particularly those associated with the CollinaPo framework of governance. During this time, preliminary groundwork was laid by identifying and reaching out to potential contacts, especially within the municipal administration of Turin. Additionally, this

phase involved conducting non-structured interviews with various stakeholders to gain a holistic understanding of the ongoing processes, dynamics, and potential influences within the framework of MAB Biosphere Reserves. Considering the literature gaps regarding both CollinaPo Biosphere Reserve and BRs in general, these exploratory interviews were not merely an activity to engage with the fieldwork (Johnson, Onwuegbuzie, Tucker, & Icenogle, 2014), but meant to map out the pragmatic terrain of the research, identify relevant actors, and discern what unique processes were relevant to the context of study (June 2023).

In these initial stages, I dealt with the geographical understanding that could effectively support the selection of CollinaPo as a successful case study, aiming to consider it, as requested by the City of Turin, but without risking taking it for granted. For this reason, I started careful research concerning the validity of CollinaPo as a relevant framework below geographical perspectives, particularly assessing its validity against other forms of city-regions relevant to an eventual City-Region Food System of Turin.

Other important studies have been conducted on the geographical understanding of the city-region spatial framework. Indeed, given that it emerged as pivotal in the development of the City-Region Food System approach, I wanted to determine whether CollinaPo could serve as a city-region for Turin's food system. This understanding continued throughout the initial research process (September 2023).

Building upon the insights gained from the pre-field period, the third phase was meant to applying the knowledge acquired during a visiting period at Trinity College. This phase was particularly pivotal as it introduced a refined methodological approach for analysing non-commercial actors within urban food systems, by relying on the so-called Food Sharing Initiatives (FSIs) (Davies & Evans, 2019), ultimately identifying the key potential stakeholders who would be instrumental in developing a comprehensive UFP for the region of CollinaPo (January 2024).

Lately, a thorough investigation was conducted using data provided by the *Camera di Commercio*, with the objective of comprehensively assessing each component of the local food supply chain. This involved the collection and organization of detailed information on actors and activities across all stages, from production and food processing to distribution, retail, and consumption, also including bars, restaurants and hotels that serve food. For each node of the supply chain, data were gathered regarding the geographical position of actors, the physical extension of their operations, the type of food products involved, and their specific role within the system. Several descriptive cartographies were produced and depict the exact location and density of each selected information (May 2024).

Then, a deep stakeholder mapping and analysis conducted during the research phase led to the identification of 256 pertinent stakeholders. This phase led to disclose a rich framework where CollinaPo's food system actors were highlighted by this thorough mapping exercise, which also exposed a wide range of actors whose functions and interactions would strongly benefit the eventual urban-regional food policy of CollinaPo.

Following the initial identification of key stakeholders, the research advanced to another critical phase, marked by the second visiting period, carried out in the Netherlands. This period was dedicated to a deeper exploration of the City-Region Food System (CRFS) approach and its potential applicability to the CollinaPo's context. The aim was to assess whether this framework, which emphasizes the integration of urban and rural food systems within a specific city-regional geographic area, could offer a meaningful lens through which to analyse CollinaPo's food system and enhance its food governance practices. During this phase, extensive observation was undertaken to comprehend benefits and challenges that emerge implementing the CRFS approach; moreover, some in-depth unstructured interviews have been carried out to assess how Dutch food system's actors perceive their own belonging to local CRFS (September 2024).

When I came back from the Netherlands, I applied the gathered knowledge to my context, by systematically organizing the identified stakeholders into four distinct groups that consisted of: Public Administration, Private Enterprise, Alternative Food Network, and Civil Society. This classification was helpful to structure the subsequent stages of the study, because it allowed to develop an engagement strategy that took into consideration the specific characteristics and roles of each group within the food system of CollinaPo.

In this framework, relying on the stakeholder mapping developed earlier, data collection efforts were intensified to gather all necessary information to support the next phase of research, which involved the stakeholder analysis based on their level of power, interest, and dimension. This served as a basis for conducting semi-structured interviews with selected stakeholders.

These interviews were carefully designed to explore the stakeholders' perspectives, experiences, and positions regarding the current state and future of CollinaPo first, and its possible food system's governance second.

Initially, I was convinced that semi-structured interviews were successful for all the interviewees; nonetheless, as I came to understand that CollinaPo was relatively unknown to a large portion of the population, I came to believe that it was not possible to pose identical questions to all selected individuals. Instead, it was necessary to separate the interviews into two macro-groups: on one side, the

individuals who, once contacted, manifested having sufficient knowledge of CollinaPo were interviewed using a semi-structured questionnaire. On the other hand, people who were relevant to the comprehension of the local food system but did not know enough about the Man and Biosphere Program were interviewed only about their roles in the food systems.

Therefore, given that not all stakeholders were available for semi-structured interviews, the snowball sampling technique was used to identify other individuals with sufficient understanding of MAB CollinaPo's functioning, thereby expanding the interview pool in a more comprehensive and inclusive manner (October 2024).

Although this condition was apparently problematic, it allowed to include multiple levels of familiarity with CollinaPo, also enriching the research with both place-specific and system-wide perspectives.

Then, after all the interviews have been carried out, a final important opportunity occurred during a research stay in Montpellier, where the engagement with local policymakers provided valuable suggestions concerning how to interpret the insights gathered so far and to build upon them. Their input helped clarify a potential direction for the research's following phase, particularly in translating the findings into a concrete, actionable outcome. As a result, I began shaping one of the most important outputs of this work: the co-design of a possible CollinaPo Biosphere Reserve' urban-regional food policy proposal (December 2024).

By the end of this participatory process, I had gathered a rich and multilayered set of insights that formed the foundation for proposing the first Urban Food Policy for the CollinaPo Biosphere Reserve. This effort respects both food systems' needs, but also aligns with the principles of the MAB UNESCO framework (August 2025).

The final months of the PhD program were dedicated to thesis writing; in July 2025, the empirical research ended, and efforts were put into the production of the thesis, in the monograph version, only (October 2025).

4.2. The tools of research

Having clarified the chronological phases that shaped this research process, it is now necessary to turn to the broader methodological architecture of the thesis.

Due to the multidisciplinary and mixed methods nature of the work, the methodology presented here does not explain each relevant detail of the empirical research. Instead, each Chapter includes a dedicated paragraph the details the specific data collection and analysis methods relevant for that section. However, a concise summary of the in-chapter method description is provided below (Tab. 1).

This decision is rooted in the fact that the City-Region Food System approach is composed of three distinct pieces of knowledge and investigation, which

necessarily lead to independent theoretical investigation and empirical research. By discussing the methodologies separately, the aim is to provide greater clarity, because chapter addresses a different theoretical framework and, therefore, an independent body of data (Thompson, 2013).

Nevertheless, it is important to acknowledge that, at the heart of this work, lies an Action-Research (AR) methodology (Cohen, Manion, & Morrison, 2017). This was not simply adopted as an out-of-stage choice but emerged as a crucial fact of my research, entirely fitting within the broader action-research already established over the last decade by the Turin Food Atlas. Indeed, even if in Participatory Research (PR) or in Participatory Action-Research (PAR) (Khanlou & Peter, 2005), the condition of the researcher as an on-field actor depends on the field's autonomous intention to be studied and involved in the process, it is important to acknowledge that AR is also a process of iterative knowledge production where

> "each circle consists of formulating a plan of action (planning), implementing the plan (action), and fact-finding about the results of the plan (evaluation) in order to concurrently solve problems and create new knowledge. Based on the evaluation, the plan is revised and a new plan is implemented, and hence another cycle begins" (ibid., p. 2334).

In this research, although my initial stance concerned only the assessment of CollinaPo's food system governance challenges, I was explicitly asked to, through my work, contribute to the BR's capacity to produce positive implications. Clearly, this depended on sustained engagement with local actors, facilitation of collaborative processes, and research structures that were flexible enough to respond to the needs and complexities of the territory whenever they emerged.

This approach proved particularly fitting given the nature of the case itself. CollinaPo was not highly visible within the scope of research on UFP due to hard-to-reach actors, informal practices, and limited visibility in institutional or policy frameworks (Castree, 2005). Given that this MAB area lacked robust infrastructure for food governance and was often left aside in dominant narratives of institutional governance, this case presented both unique methodological challenges and rich opportunities to test the theoretical approach of CRFS, which I considered relevant to investigate.

This research consisted of a multi-phase, mixed-method, and action-oriented work, meaning to investigate the potential for UFP development within a city-region framework (Figure 3), adopting the CRFS approach.

At first, the work addressed a systematic literature review, conducted using the PRISMA method, to the theoretical basis of City-Region Food Systems (CRFS) and

to position it within existing debates on the city-region concept. Based on the outcomes of this review, an analytical toolkit is developed to identify the city-region areas suitable for the CRFS implementation.

This tool is applied through a desk-based territorial analysis focused on the context of Turin and its possible city-regions. Here and lately, much use of cartography has been made. More specifically, to provide a situated reading of the processes ongoing in the territory, multiple spatial arrangements were assessed based on land-use patterns, administrative boundaries, food system flows, and governance structures. From this analysis, the CollinaPo area was identified as a relevant case. Therefore, although initial interest in this area was publicly expressed, the decision to proceed was confirmed only after empirical evidence demonstrated its suitability as a City-Region Food System context.

Then, a qualitative territorial assessment was started, aimed at deepening the socio-spatial configuration of CollinaPo together with its environmental, economic, and institutional features. A full-scale assessment of the food system is also carried out. This phase combined desk research, primarily using institutional databases such as those from the *Camera di Commercio*, with unstructured interviews with actors across the food supply chain. The aim was to gather insights regarding the current state and potential future trajectories of the food system.

Semi-structured interviews were conducted with actors who demonstrated prior knowledge of the BR, allowing for a grounded understanding of local governance dynamics and perceived challenges. Overall, I conducted 29 semi-structured interviews alongside 16 unstructured interviews organized on two analytical axes: 1) exploratory, developed at the beginning of the research, to delimit relevant objects, actors, and practices within the MAB Collina Po Reserve (n=4), and 2) in-depth on the CollinaPo food system (n=12). For both, purposive sampling was adopted.

Interviewees' participation was voluntary and, to ensure it, I affirmed the right to refuse or withdraw at any time from the interview.

Also, I managed to inform consent with particular care; especially within remote sessions, I have explained materials line-by-line and given multiple opportunities for questions.

The online interviews made it partially difficult to fully understand the interviewee's perceptions over the discourses; so, I scheduled pauses for clarification before and during the interview and clearly allowed participants to skip any question. Audio was captured only after consent, fully transcribed, and pseudonymized. The data conservation respected GDPR principles.

Following this, other important pieces of research consisted of a stakeholder mapping and analysis. The mapping was developed through desk research and categorization, serving as a step for the successive engagement. The analysis was conducted to assess relevant actors' contributions within the local food system.

Finally, the empirical findings were gathered into a cohesive policy-oriented outcome. Based on the previous analytical steps, the research developed a context-specific Urban Food Policy proposal for the CollinaPo area.

Through these steps, the outcomes of the research mean to be both evidence-based and co-produced.

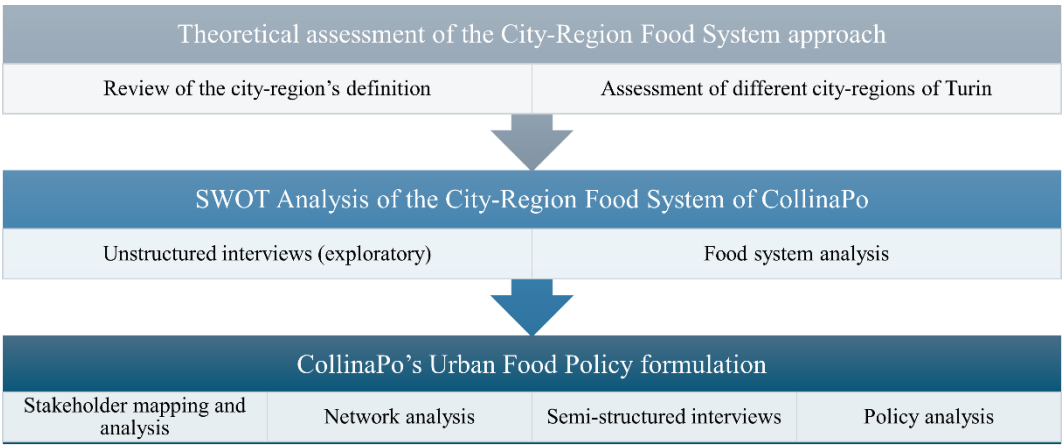

Figure 3. The methodology of this thesis
Source: Author's elaboration

Chapter	Methods	Data collection techniques	Data analysis technique
IV	Qualitative	Secondary data collection	Spatial analysis
V	Qualitative	Secondary data collection	Spatial analysis

VI	Mixed	Primary data collection	Spatial analysis
		Unstructured interviews	Content analysis
VII	Qualitative	Primary data collection	Stakeholder analysis
		Semi-structured interviews	Thematic analysis
			Network analysis

Table 1: Summary of the methodology
Source: Author's elaboration

4.3. Ethics and positionality

In undertaking this research on UFP in CollinaPo, my positionality and the ethics surrounding it have been central to all phases of the research, from the project design and methodology to fieldwork and the analysis and interpretation of the findings.

Although the research is not sensitive per se or in terms of its direct consequences, I still consider it crucial to critically reflect on my positionality as a researcher, given the number of important issues taken into account in the research.

For this reason, I initially undertook a detailed examination of the research's epistemological approach. For this work, it is relevant to rely on Lo´pezi-Gelats and Ta`bara, who affirm that:

"in the current fast-changing times, a transition from [ecological] realist to social constructivist accounts may further shed some light on the current discrepancies in the agro-food policy domain" (López-i-Gelats & Tàbara, 2010, p. 355).

The social constructivist epistemology is particularly relevant in the context of food systems, where governance is constructed through the acknowledgment of practices, discourses, and institutions embedded within specific socio-historical and spatial conditions. Acknowledging this, means understanding that there is no single objective standpoint from which to interpret such complex systems (Hay, 2015)

Within this framework, I aim to produce research that is both situated and reflective, not only advocating for sustainable practices but also calling for deeper ecological care that transcends sustainability as a policy buzzword and embraces it as a true commitment. In doing so, I accept that my role as a researcher is not detached or passive, but active within the socio-ecological systems I seek to understand and, inevitably, influence (Neumann, 2005); therefore, my role brings responsibility.

Central to the ethics of my research on CollinaPo are questions about my own relation to the field. In the context of the present work, this means questioning the interests and power relations that shape the development and implementation of policies, as well as their multidimensional impacts (Madhok, 2020). In detail, given that my research was recognized as a political process by the people that I have met, I must acknowledge that the choices made in the research can have important implications.

A key question that arose during the fieldwork regarded my positionality, as both a Turin native and a person with social connections within the area of study. Indeed, they might have shaped the directions of research in terms of people seen and places visited. From the beginning of the research, I was able to rely on an important network of long-standing relationships with local associations, informal groups, and policymakers, which greatly contributed to this work.

Although valuable to get access to key actors and discourses, these connections could bias my perception influencing who I spoke to, how I framed the research, and how I interpreted the data.

I chose to reflect on how my social position, values, and existing relationships might impact the research process; here, rather than trying to neutralize these influences, which is neither realistic nor actually desirable, I treated nativeness as a tool for reflexivity (Ntanyoma, 2021). I regularly revisited my assumptions, with particular attention on examining how I engaged with different stakeholders. These reflections also brought into focus the socio-economic profile of the CollinaPo area[8]. It is inhabited by wealthy residents; high housing costs are high discourage poorer individuals to move there. Starting a community-led UFP with the hills in the centre, risks reinforcing existing inequalities.

Furthermore, as explained above, part of the research was carried out in collaboration with Città di Torino, which might introduce additional biases into my work. Being embedded within the organization that holds interests over the research

[8] The CollinaPo Biosphere Reserve comprises many municipalities beyond the more known “hilly” area. Nonetheless, when mentioning this context, common understanding leads to think about the hilly areas surrounding Turin only.

could lead to unconscious biases, as well as the possibility that my perspectives are shaped by the interests and values of the people I work with (MacLean, Posner, Thomson, Wood, & Jean, 2019). To address this possible issue, I was careful to include voices beyond the institutional or environmental elite. For example, I conducted unstructured interviews with actors involved in the food system who had little or no knowledge of the CollinaPo Biosphere Reserve (BR). These conversations offered valuable insight into the everyday functioning of the food system and helped to ground the research in a more diverse set of lived experiences.

A few more words must be spent on the use of cartographic representation: in this study, maps are instruments through which I clearly express my feelings toward the possibilities of the areas that I study; therefore, they encode my own selection of topics to represent. The displayed data privileges certain processes while downweighs others. Crucially, coverage is asymmetric: areas, actors, and flows that are not sampled or are only weakly documented are under-represented or absent, so the resulting visual field does not constitute a complete frame.

This issue shall be raised because it leads to visual patterns which might be read as territorial regularities despite incomplete observation or scale effects. In short, the maps are persuasive analytic tools, but not neutral reality-descriptors; therefore, even if I make limits explicit, they must not be considered as certainly accurate, as they represent my personal view over the represented topic.

Surely, I do my best to adopt a reflexive stance, using maps to surface asymmetrical power relations, ethically grounded and open to scrutiny and contestation.

Rather than treating bias as a threat to objectivity, I approached it as something to be critically acknowledged and made transparent. In this way, my position as an engaged and situated researcher became not a liability, but a point of departure for building a more inclusive and context-sensitive understanding of the region's food system dynamics and possible governance (Podsakoff, MacKenzie, & Podsakoff, 2012).

5. The thesis's structure

The thesis's dissertation is divided into two Parts: the first, "Part One: Geographical perspectives on the relocalization of food systems", is more grounded in theoretical inquiry, and the second, "Part Two: Planning Urban Food Policies", is primarily meant to drive the empirical application.

While, as already explained above, the format departs from more conventional structures, it was developed to ensure a coherent progression from theory to practice. Each Chapter contributes to a layered understanding of UFP by pairing

conceptual perspectives with evidence, finally responding to each of the RQs. Except for RQ 1, which is answered throughout the entire work, the other RQs are discussed within a specific chapter.

What follows is a detailed overview of the dissertation's structure.

5.1. First Part

At the beginning, this dissertation lays the conceptual and methodological foundations for understanding how UFP exist and have been theoretically conceived within the broader framework of food systems.

The first part deals with the ties between food systems and globalized supply chains, meaning to understand what solutions are brought by recent relocalization approaches. It examines how the City-Region Food System (CRFS) approach, more than others, emerges immediately applicable to stimulate relocalization.

More detailly, Chapter II begins by situating Urban Food Policies within the ongoing tension between globalized food supply chains and simultaneous opposite efforts to re-localize food systems by challenging the dominant framework. Here, Sub-RQ 2 is addressed. The Chapter explores how food relocalization strategies intersect with UFP and introduces the CRFS approach as a relevant one to operationalize this intersection. Here, attention is given to the ways in which UFP may engage with broader territorial dynamics, revealing the need of approaches that address the issues of scale in the framework of food governance.

Chapter III, dealing with Sub-RQ 2, then delves deeper into the CRFS concept through a systematic literature review, first, and a case review, second, aiming to assess how the notion of the city-region is understood and applied in existing CRFS frameworks. While institutions and scholars increasingly promote the CRFS model as a tool for sustainable food governance, the Chapter identifies a significant gap: the city-region's geographical dimension is often poorly defined or entirely not addressed. The lack of spatial understanding limits the possibility to install CRFS in the reality.

In response to this gap, Chapter IV proposes a rethinking of the city-region concept tailored to the needs of food system planning. It offers both a theoretical discussion and, successively, a methodological toolkit for identifying and evaluating the territorial boundaries that might define a CRFS. By developing a set of spatial and functional criteria, the Chapter tests possible layouts for the Turin city-region.

This analysis ultimately identifies CollinaPo as a significant and coherent territorial unit for the development of a CRFS. This finding, finally emerging from

evidence, provides the empirical and conceptual basis for the fieldwork presented in the second part of the dissertation.

5.2. Second Part

Building on the conceptual foundations developed in Part One, the second part of the dissertation shifts toward a more empirically grounded investigation, aiming at responding to RQ 2, centered on the CollinaPo territory. This section translates the broader reflections on relocalized food systems and city-region dynamics into concrete research actions, exploring how UFP can be conceived, co-developed, and potentially implemented in a context with no knowledge of food systems' governance attempts. The focus regards identifying the parts of the food system that possibly play a role in supporting the implementation of the CRFS approach.

Chapter V introduces the CollinaPo case study. The context is both a recognized UNESCO Man and the Biosphere Reserve and a complex socio-spatial system, due to the presence of Turin. The Chapter opens with a reflection on the meaning of the MAB designation, examining how this international program intersects with other UNESCO ones. After, the specifics of the MAB Programme are discussed, aiming to understand how they intersect with the reality of sustainable development.

This is followed by a detailed territorial assessment that combines desk research with interviews with informed actors. They offers insights into how the CollinaPo territory is perceived, particularly regarding the opportunities and responsibilities associated with the MAB framework.

Chapter VII assesses CollinaPo's food system. Here, the analysis focuses on mapping the multiple components of the supply chain, paying special attention to the so-called "drivers", the inputs of the food system that contribute to shape it. Indeed, unlike other studies that prioritize sustainability as a reachable target, this Chapter reframes it both theoretically and empirically by giving larger attention to the concept of resilience: the capacity of the food system to ensure food security for its inhabitants in the light of systemic challenges.

The following stage of the research turns to stakeholder engagement and participatory governance. Through comprehensive stakeholder mapping and analysis, the research identifies the key actors involved in shaping CollinaPo's food system, who were interviewed to develop a situated understanding of the possibilities for installing a UFP.

The last Chapter, responding to Sub-RQ 3, brings together the multiple empirical evidence to suggest a urban-regional food policy tailored to the CollinaPo Biosphere Reserve.

Aware that this multidimensional work may hold a certain degree of complexity, the table below offers a brief synthesis of the overall thesis. This does not display the Chapters' headings, but, rather, the major contents of the work in a structured way.

Section	Key steps of research
First Part	1. The reasons why Urban Food Policies are needed 2. Urban Food Policies and the approaches for food systems' relocalization 3. The City-Region Food System contribution to the issue of food governance 4. The City-Region Food System and the city-region definition's theoretical limit 5. Understanding the CRFS's city-region through the concepts of territoriality and bioregion 6. The selection of Turin's city-region: CollinaPo Biosphere Reserve of UNESCO
Second Part	1. The spatial and demographic classification of CollinaPo 2. Assessment of CollinaPo's food system (drivers, supply chains, political dimensions) 3. The SWOT analysis to clarify the framework of governance intervention 4. Stakeholders' engagement and participatory governance processes creation 5. CollinaPo stakeholders' assessment (stakeholders mapping, stakeholder power-interest-size analysis, network analysis, semi-structured interviews) 6. The possible food governance structure of CollinaPo

Table 1.1: Synthesis of the path of this thesis
Source: Author's elaboration

6. Synthesis

Chapter I has established the key premises of this work. It began by presenting the study's context and outlining the decision to work within the UNESCO-designated Man and Biosphere (MAB) Reserve of CollinaPo.

The Chapter presented the research methodology. The approach is qualitative and structured across several phases. The Chapter clarified the overall methodology, leaving the explanation of each method's selection to in-chapter clarification.

The thesis' structure was presented. The work is divided into two Parts. The first one addresses the theoretical and conceptual foundations of the research. The second presents the empirical investigation conducted in the CollinaPo context.

FIRST PART. GEOGRAPHICAL PERSPECTIVES ON THE RELOCALIZATION OF FOOD SYSTEMS

II. At the intersection of global processes and local urgencies: the role of Urban Food Policies

1. Introduction

This Chapter opens by tracing the emergence of UFP, examining the specific concerns and institutional ambitions that have shaped their development. It investigates how these policies seek to reconfigure the relationship between cities and food, particularly by aiming to guarantee food security within increasingly complex urban environments. The aim is to respond to the first sub-research question: to what extent do Urban Food Policies engage with food relocalization approaches?

On one side, UFP are discussed in relation to the realities of a globalized food system, characterized by long, opaque supply chains, that often exceed local control. On the other side, they deal with the growing proliferation of locally driven initiatives seeking to relocalize food.

Caught between these two poles, Urban Food Policies inhabit a space of strategic uncertainty. Their ability to transform is shaped as much by the global logic they cannot escape as by the local experiments they are expected to support. How, then, do UFP define themselves in this in-between? And more crucially, how do the rising approaches to food relocalization relate to UFP, not just in terms of practice, but in terms of governance?

To explore this, the Chapter develops a review of the literature on food relocalization. In particular, food relocalization approaches are taken into

consideration not as specific categories, but as different modes of engaging with the challenge of governing food in and through the urban. The objective is to understand whether, and to what extent, these approaches intersect with the institutional possibility of implementation, in terms of UFP.

Through this investigation, the Chapter addreses a fundamental tension at the heart of contemporary UFP: how to deal with food systems that are both locally grounded and global-related.

2. The Urban Food Policies in a globalized food system

In the context of the contemporary food systems, described by Morgan et al. (2008), as globalized, industrialized, and financialized, largely governed by a handful of powerful economic and political actors who control aspects of production, distribution, and consumption (Pettenati & Toldo, 2018), cities emerge as spaces where resistance to these dominant forces is necessary and feasible.

Among other potential tools to carry out this attempt, Urban Food Policies (UFP[9]) were affirmed as transformative public actions that can possibly respond to the globalization of supply chains. UFP consist of

> "innovative, voluntary actions, "flexible tools" capable of providing a space for cooperation, consultation, and regional and local networking among the (local) public and private sectors, and civil society" (Magarini, Dansero, & Bottiglieri, 2017, p. 69).

They gained relevance due to the need to deal with the interconnected, but different, nodes of food systems, intersecting issues of production, distribution and consumption in urban frameworks (Morley & Morgan, 2021).

Though, initially, the opportunities of a cross-sectoral perspective over food issues resonated more profoundly within academic circles than among policymakers, it is now widely acknowledged that Urban Food Policies can bear successful, yet not definitive, innovative governance of food, particularly within urban governments.

In this framework, it is relevant to recall the Milan Urban Food Policy Pact (MUFPP)[10], that was established at the end of Expo 2015, which stands as a platform of dialogue and commitment by cities worldwide to enhance urban food systems' governance via the development of UFP (Dansero, Pettenati, & Toldo,

[9] Urban Food Policies, in the plural form, will be referred to as "UFP"
[10] See www.milanurbanfoodpolicypact.org

2017). By the end of 2025, more than 350 cities signed the pact, engaging in various cooperative initiatives to promote awareness and responsibility regarding food issues in urban spaces. Moreover, the pact specifically encourages the sharing of best practices and aims to foster constructive dialogue between diverse urban environments to improve food sustainability, food accessibility and policy effectiveness. Hence, started as pioneering ideas related to Urban Food Planning, UFP now stand as a major area of research and application of innovative tools of food governance for many urban governments (Pothukuchi & Kaufman, 1999; Morley & Morgan, 2021).

Aiming at setting an initial framework for understanding the urgence of UFP research, it is essential to acknowledge that discussing how food and cities relate, is crucial because, since 2008, over half the global population now resides in urban areas. With more than 4 billion people living in cities, understanding the dynamics between urbanization and food systems' capacity of feeding this huge population is essential (FAO, 2018). Explaining this relation in numbers, FAO affirms that cities consume 70-80% of the world's food supply, yet this high level of consumption does not equate to better food access. In fact, over 400 million urban dwellers still face significant food insecurity challenges (FAO, 2018). This data led to an important consideration: despite the growing interest and acknowledgment of the relevance of food issues into urban governance, many cities continue to struggle with severe food insecurity worldwide.

Food security occurs when "all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996, p. 7). Nevertheless, the amount of people who are experiencing food insecurity is rapidly increasing also whereas food issues seemed to be disappeared (Larsson & Sjöqvist, 2021). Furthermore, latest reports on global hunger status are extremely severe, displaying a situation in which "moderate or severe food insecurity affected 33.3 percent of adults living in rural areas in 2022 compared with 28.8 percent in peri-urban areas and 26.0 percent in urban areas" (FAO, IFAD, UNICEF, WFP, & WHO, 2023, p. xvi). In detail, given crescent phenomena of uneven access to this resource, food-related tensions at the world level are setting unstable frames for food security.

To understand this paradox, it is relevant to recall that the history of UFP is relatively new; as well expressed by Pothukuchi and Kaufman (1999), for what has been defined as a "misinterpretation of food", this good has been treated as a production-oriented matter only; it was considered related to, and so managed by, rural areas only. City representatives did not intend to deal with the food

governance; in particular, given four major reasons, urban governors kept pursuing the belief that food issues shall not enter urban discourses.

At first, their assumptions depended on the idea that food systems did not require special attention as they were stresses-respondents, despite some minor unsolvable issues; secondly, the food sector was not considered relevant within the spectrum of interest of urban planners; third, the food sector, in spite of transport and housing sectors, was not financially attractive and, so, not relevant to address; finally, food was considered an agricultural issue only (ibid.).

In support of the latter, it is important to acknowledge that, in the last century, rural areas were almost entirely converted in "production platforms" meant for mass production aimed at nurturing global markets, by relying on Fordist techniques; rural agricultural spaces were subjugated to supply chains' needs, for cities, and, so, overall production was compulsively increased (Tubiana, 1989), with little consideration about the impacts of this globalized systemic processes over urban and non-urban spaces. In this context, food and the whole gathering of related processes was put outside of cities and subjected to capitalistic logics, with the final goal of improving quantities of production at the least possible costs (McMichael & Myhre, 1991).

A consequent result was that Global North countries started experiencing raising levels of food insecurity and food-related issues (Bartelmeß, Jasiok, Kühnel, & Yildiz, 2022), but the convinced belief that food was not a matter of interest for Global North countries induced a lack of specific commitment in dealing with this raising problem.

Adopting the definition developed by Morgan and Sonnino within one of the most initial and successful works concerning UFP, there emerged an authentic "New Food Equation" that brought together food insecurity, unsustainability and poor urban governance, that called for an urgent responsibilities' acknowledgement at the municipal level (2010).

In this framework, the dramatic rise in food prices during 2007-2008, which sparked political protests in over 60 countries, including many middle- and high-income ones, has (un)fortunately contributed to shift the matter food security into the realm of urban governance, illustrating that this issue goes beyond economic boundaries, and rather cross-cuts multiple spheres of public health and overall urban liveability too (Morgan, 2015).

What rightfully emerged, was the necessity of installing specific governance initiatives that focus on the "place-based socio-natures" of food, addressing an inclusive ecology of the processes that finally might take into consideration the co-

production of knowledge and change concerning the urban food systems (Moragues-Faus & Mardsen, 2017).

This approach called for a re-politicization and socialization of agri-food studies, thereby opening new political and practical spaces for a broader array of stakeholders within the urban food systems, toward the creation of effective Urban Food Policies.

2.1. Long supply chains of food

Before delving into the characteristics of UFP, it is important to understand what space they should occupy and, more detailly, what issues should be addressed by these policies. Indeed, food systems are everything except for in-cities processes only; rather, they extend at much larger scales. Therefore, what contributions can UFP effectively bring?

With special regard to food destined to largely inhabited urban spaces, the neoliberal food regime's rise of 1980s irremediably transformed global system labor and political-ecological relationships, stimulating a massive exploitation of distant landscapes (Brenner & Ghosh, 2022). The concentrated urban growth started to dictate how far-off areas evolve boosting deep socio-ecological changes via transforming them into resource extraction zones to match the needs of cities, particularly referring to the production of nourishment, energy and other resources (Brenner & Schmid, 2015).

To better understand the implications of what previously said, I recall the situation of Bresaola[11] of Valtellina IGP (*Indicazione Geografica Protetta*[12]), where the relationship between local branding and the needs of large supply chains entails severe environmental consequences on distant spaces. In detail, initially produced in Lombardy, Italy, bresaola was originally prepared using beef meat; nonetheless, given the enormous demand for this good, and the need of ensuring sufficient raw materials supplies, it nowadays mainly consists of Zebu meat imported from Brazil (Zappalaglio, 2018; Di Fiore, 2022). How that? Rigamonti, among the major Italian producers of bresaola, is fully controlled by JBS, "the world's largest meat company" according to The Guardian (Bauck, 2024), since 2011, and JBS owns some of the large livestock farming spaces in Brazil (Bjorkhaug, Magnan, & Lawrence, 2018), where Zebu meat is produced and then exported to Italy to be

[11] A very well-known kind of Italian ham

[12] IGP is the name that identifies products originating from a specific geographical area, which is relevant for its quality, reputation or other characteristics, and where at least one of the stages of the products' preparation takes place. For details, see Article 5, paragraph 2, Regulation (EU) 1151/2012.

bresaol-*ified.* Consumers are rarely aware of it, because of the untransparent packaging that misrepresents this meat as an Italian product.

This discovery was largely treated as an issue of misinformation only; in 2023, I joined a public event, where the matter of the Zebu meat used to produce Italian bresaola was addressed as a problem of "poor honesty toward citizens, who deserve to know what they eat". Practically, the anger regarded the usage of the Brazilian meat for an Italian product only; nonetheless, few were addressing the urgent issues that lie behind. The production of Zebu meat for Bresaola of Valtellina directly contributed, and contributes, to deforestation and biodiversity loss in Brazil (de Abreu, 2022). This is primarily due to the expansion of livestock farming, which necessitates clearing large areas of rainforest (Mano, 2019; Skidmore, et al., 2021), other than the soy production necessary to feed the animals (Furlan Amaral, Bento de Souza Ferreira Filho, Squarize Chagas, & Adami, 2021). Moreover, these actions disrupt local ecosystems, leading to the displacement of wildlife and the destruction of habitats.

In other words, the high demand for bresaola, largely destined to cities' consumers, is among the direct responsible for the destruction of distant ecosystems which previously did not relate to urban frameworks at all. Cities consume placeless food, and its inhabitants are rarely concerned about the faith of its productive non-urban landscapes.

Leaving behind the consequences of bresaola consumption, identical reasonings can be applied to other products. Recent data show with intense clarity that, in terms of crop production for example, there is an evident correlation between cities' needs and the exploitation of non-urban spaces; as affirmed above, more than 70% of the global food production is destined to cities (FAO, Cities and Local Governments at the Forefront in Building Inclusive and Resilient Food Systems Key results from the FAO survey Key results from the FAO survey "Urban Food Systems and COVID-19", 2020), with highly visible impacts; indeed, as shown in Figure 4, the world's population (blue) concentrates into densely populated urban centers (the yellow circles put in evidence areas where there are more than 50,000 inhabitants every 5 km^2), while they demand much space in terms of global food production, which are colored in red. In other words, cities are dependent on a global network of agricultural regions that span various continents and climates.

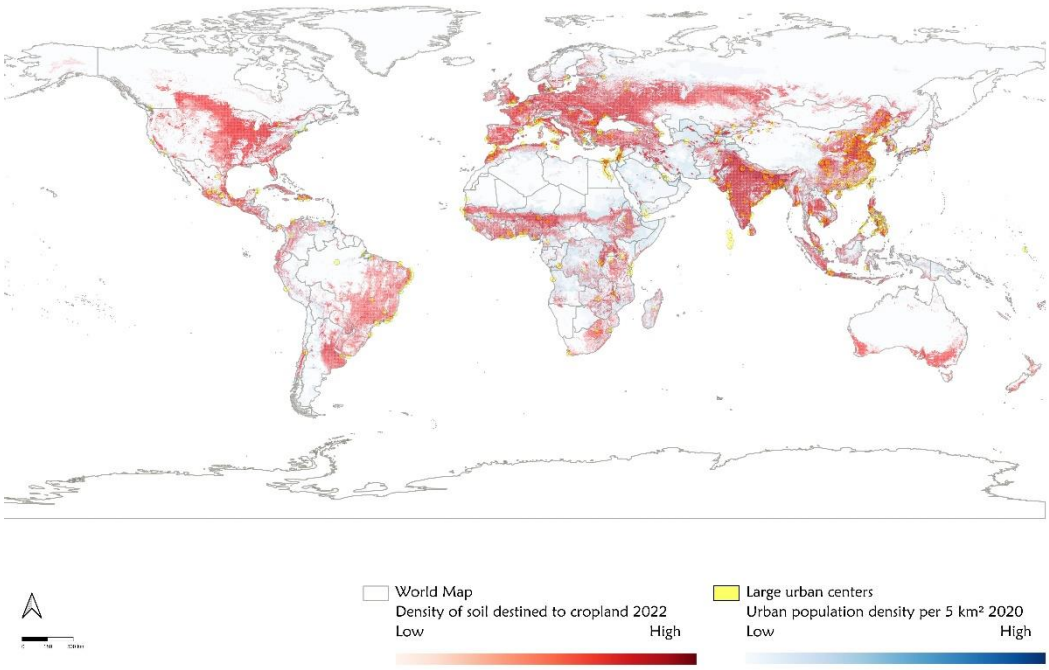

Figure 4. Spatial distribution of occurrence of cropland over countries (red), urban population density (blue) and large cities (yellow)
Source: Author's elaboration on FAO and NASA's data (2022)

The sum of the impacts of the largest food systems is responsible for "60% of global terrestrial biodiversity loss, 24% of greenhouse gas emissions, 33% of degraded soils and the overexploitation of 20% of aquifers" (Oliver, 2018, p. 2; UNEP, 2016). Concerning polluting emissions, food systems account for 17% of Global North emissions (Crippa, et al., 2021). As also affirmed by Zurek et al., "transformation of food systems around the globe is urgent, not only because of their GHG emissions but also because they fall completely short in equitably distributing food" (2022, p. 1416).

Related to this reflection, it is important to underline that nearly half of the planet's habitable land is already used for agriculture, leaving little room for expansion without harming ecosystems (Ellis, Goldewijk, Siebert, Lightman, & Ramankutty, 2010). More detailly, the IPCC, noting that land is a finite resource, affirms that by 2015 humans were already using three-quarters of the ice-free land surface; croplands alone already occupied around 12–14 % of that area (IPCC, 2019).

FAO figures showed that total agricultural land reached 4.8 billion hectares, 1.6 billion hectares of cropland and 3.2 billion hectares of pasture (Parré, Chagas, & Arends-Kunning, 2024). This surface was not naturally available. Rather, it was created by expanding the agricultural areas at expenses of the natural environment. The agricultural areas' appropriation is now responsible for almost 90 % of global deforestation and conversion of forests to cropland, and livestock grazing causes more than half of forest loss (FAO, 2021); around ten million hectares of forest are still being cleared each year, so further expansion would mean further deforestation.

However, the main issue is not the shortage of cultivable soil, but its use. The livestock grazing accounts for about 80 % of agricultural land but supplies only 17 % of global calories and 38 % of protein (Rosegrant & et al., 2009). FAO estimates that if the 40 % of crops currently fed to animals were eaten directly by people, nine billion people could be fed in 2050 without expanding cropland (FAO, Livestock and landscapes, 2012, p. 2).

Therefore, while some neoliberal perspectives, in line with Malthusian theories (Malthus, 1798), argue that there is simply not enough land to feed the growing global population, this view is fundamentally misguided. Evidence shows that shifting dietary patterns toward more plant-based foods can substantially reduce land pressures, safeguard forests, allow all people to be nourished, and ultimately demonstrate that today's land scarcity is a consequence of our land-use choices rather than an unavoidable Malthusian constraint.

This concept is echoed in numerous recent studies and reports that address the failing food systems' status (Biel, 2016; de Schutter, 2014; Haddad & et al., 2016; IPES-Food, 2018). What emerges is a delicate and often weak connection among different parts along the food chain (Parker & Johnson, 2019), which do not operate successfully. The most consolidated and cohesive narrative regards the existence of an authentic global "crisis" over food systems' conditions (Global Panel on Agriculture and Food Systems Nutr., 2016), with a widespread consensus on the urgent need for change.

UNCTAD advocates for a "paradigm shift" (Nicita, Ognivtsev, & Shirotori, 2013), and the belief is that the "trajectory of food systems must be changed" (UNEP, 2016, p. 24).

The important information to discuss regards the fact that, despite what happened for millennia (Daviron, Perrin, Soulard, & Menant, 2019), there are no longer unique proximate rural spaces feeding cities. The latter are no longer sovereign of the consumed food; they cannot govern food and, rather, they depend on important global supply chains driven by private actors. What stands outside the cities, is, apparently, dramatically part of a larger gather of hinterlands which

“expose local territories and communities to increasing turbulence, risk, and precarity while systematically degrading the ecological preconditions of both human and nonhuman life” (Brenner & Katsikis, 2021, p. 31).

In this framework, it is relevant to recall that the food sector now consists of a fully globalized network of processes, within which two perspectives emerge. The first, typically associated with multinational corporations, conceives of agriculture primarily as a provider of raw materials for the food industry. The second, by contrast, regards agriculture as a reservoir of high-quality products and specialties to be promoted and enhanced (Ivona & Privitera, 2015). Although apparently contrasting, due to the intensity of attention placed on production methods, the two perspectives share a common feature: both reveal a pervasive integration of agriculture into the global dynamics of capitalist accumulation (Inglis, 2010; Friedmann, 1994).

“Nel settore agroalimentare sono presenti la maggior parte degli elementi che vengono considerati come esemplificativi della globalizzazione economica: (i) la globalizzazione degli scambi commerciali; (ii) il ruolo delle imprese multinazionali; (iii) la divisione internazionale del lavoro e le catene globali del valore; (iv) la concentrazione della filiera; (v) la creazione di geografie diseguali”[13] (Pettenati & Toldo, 2018, p. 30).

Processes described by Pettenati and Toldo demonstrate that the agri-food sector can increasingly be defined as a sophisticated network of interests, in which agricultural products and services transcend their national origins, flowing across international boundaries following specific routes.

This expansive network of trade is strongly governed by the influential role of multinational corporations. These corporations hold considerable power, shaping every aspect of the sector from the production techniques to the complexities of distribution channels, thereby molding global market trends. Commonly, the gathering of dominant groups in the food sector is known as “Big Food”. This name defines the existence of few enormous food producers which create a condition of considerable imbalance of power and a deficiency in transparency, adversely impacting the less powerful members of food systems, including consumers and small-scale growers who own poor or null power in the market (Clapp & Scrinis, Big Food, Nutritionism, and Corporate Power, 2017).

[13] “In the agri-food sector, most elements that are considered exemplary of economic globalization are present: (i) the globalization of trade; (ii) the role of multinational companies; (iii) the international division of labor and global value chains; (iv) the concentration of the supply chain; (v) the creation of unequal geographies”.

Within this global module, there is an interest-guided international division of labor. Production processes are strategically allocated across various countries, optimized to capitalize on economic efficiencies inherent in each location; in other words, severe processes of delocalization for costs' reduction take place (Nicita, Ognivtsev, & Shirotori, 2013). This configuration released the emergence of global, interconnected, and opaque value chains that put in connection food production and consumption from the sourcing of raw materials to the delivery of finished products, across highly diverse landscapes.

A consequent significant outcome of these affirmed paradigms is the concentration of the supply chain. A small group of large entities commands the phases of production, distribution, and sales within the agricultural sector. This aggregation of power tends to create a market dominated by a few key players, with enormous repercussions for biodiversity and diversity of food (Liberti, 2016).

In the late '80s, the global market for agricultural products, such as fertilizers and pesticides, was dominated by approximately twenty companies (which already displayed a significant concentration of power). This number consolidated to seven major corporations by 2002, namely Syngenta, Aventis, Monsanto, BASF, Dow, Bayer, and DuPont; finally, the latest wave of mergers has diminished the count of leading companies to four: Bayer-Monsanto, DowDuPont/Corteva, ChemChina-Syngenta, and BASF, which now hold power over the fundamental agricultural products' market with no competition from smaller entities (Pettenati & Toldo, 2018; OECD, 2018).

In this framework, a landscape of unequal geographies within the agri-food sector emerged (Brenner & Katsikis, 2021): certain regions have become pivotal hubs of agricultural activity, while others are responsible for food processing, with the final consumption happening in third countries. Behind this situation, there are the investments and strategic choices of multinational corporations, which intend to reduce costs.

In support of this affirmation, I cannot avoid mentioning the outstanding contribution given by Liberti's research of planet destruction prompted by a few food industries. Investigating the supply chains of some products, in a follow-the-thing inquiry (Cook, 2004), he successfully demonstrated the effects of food globalization on distant spaces. Among the others, tuna gives real evidence of the interconnectedness of distant spaces solely based on the capitalist ways of producing food.

"Un pesce catturato da una nave taiwanese nella zona economica esclusiva di Tuvalu nel Pacifico può essere trasportato in una fabbrica thailandese da una nave frigorifera battente bandiera panamense attraverso un contratto gestito da una

società di brokeraggio con sede negli Stati Uniti e finire poi in una salade niçoise servita in un ristorante di Parigi" (Liberti, 2016, p. 174)[14].

The multinational companies relentlessly fish tuna, depleting the oceans in a careless quest to supply European cities. They shift their production facilities across different regions, depending on where tuna stocks are most abundant, with little regard for the environmental impact (ibid.).

Avocados, soya, tuna and tomatoes are other significant examples of food that is consumed at striking levels, but is produced much far from the zones of final consumption (Liberti, 2016; Denvir, Arima, González-Rodríguez, & al., 2022), with severe social and environmental implications in the places of production which are rarely evident to consumers' eyes.

This socioeconomic structure dedicated to extracting resources from distant spaces, only apparently aimed at nurturing the global population, and rather dedicated to expanding profits of a few subjects, fully displays the existence of a hidden problematic disconnection within food chains (Wiskerke, 2009). Indeed, the upscaling of supply chains in pursuit of cost efficiency has dramatically led to a growing detachment between producers and consumers, creating anonymity that now characterizes many food products (Oosterveer, 2007); moreover, the increasing complexity of these processes has deepened the confusion for consumers, leaving them unable to trace the origin or true nature of their food (Vuylsteke, Vackier, Verbeke, & Van Huylenbroeck, 2004).

The disconnection between producers and consumers "contributes to the persistence of a nature/culture divide" (Bethaney, 2011, p. 511), especially in urban areas, where food is often perceived as a mere commodity, divorced from its natural and cultural roots. Moreover, this disembedding of food production from its local or regional identity reinforces the existence of a system (Roep & Wiskerke, 2006), wherein food's uniqueness and connection to place are lost, only to be purposively replaced by artificially constructed identities (Castells, 2004)[15].

[14] "Tuna is the clearest symbol of the globalization of food and the ramifications generated by world trade. A fish caught by a Taiwanese ship in the Tuvalu exclusive economic zone in the Pacific can be transported to a Thai factory by a Panamanian-flagged reefer ship through a contract managed by a US-based brokerage firm and end up in a salade niçoise served in a Paris restaurant".

[15] In this thesis, the rich and extensive debate on "place" developed within human and critical geography is not examined in depth, not due to a lack of interest in the topic, but because such a discussion would divert the argument from the core focus of this work, the Urban Food Policies. Even though Chapter IV is more specifically devoted to critical geographic theory, the discourse on place is not addressed there either, as the analysis takes a different direction, prioritizing the more immediate territorial understanding of food systems' governance over broader spatial ontologies. Therefore, whenever the term place is used here, it refers in a operational sense to the situated, context-specific configuration of social, institutional, and material relations within which UFP emerge and take shape, without engaging with the broader ontological and epistemological controversies surrounding the concept (Massey, 2005; Agnew, 2011).

This results not only in the erosion of cultural and ecological specificity, but also in the progressive dismantling of food sovereignty, as communities grow increasingly reliant on distant, opaque, and unaccountable food systems. In this context, food systems' resilience is undermined not just by the external dependencies, but by the disempowerment of local actors and the fragmentation and abandonment of local ways of production (Figueroa-Helland, Thomas, & Pérez Aguilera, 2018).

3. Let's re-localize food systems

Considering the dynamics outlined above, it becomes increasingly evident that contemporary food systems have evolved and yet evolve into problematic arrangements. The growing detachment between production and consumption (Wiskerke, 2009), the loss of cultural and ecological specificity, and the dominance of globalized, efficiency-driven supply chains are not isolated issues, they are symptomatic of systemic distortions that affect how food is produced, distributed, valued, and, consequently, ignored below a governance perspective.

As cities must comply with these fragilities, made more and more visible through environmental degradation, social inequalities, and the widening gap between production and consumption, UFP have become a way to act, locally, within an increasingly complex global framework (Alvarado, Denis, Azzimonti, Vysokolan, & Tcheton, 2020).

Some tentative practices are emerging and mean to unsettle the globalized order by questioning who controls food, where it comes from, and how it should be governed (Munton, 2008). These pressures can be summarized within the UFP framework as an innovative political will to move beyond mere management of the status quo, positioning food policy attempts at the crossroads of broader structural transformations.

As visible in contexts where this set of policies are available since a long time (CDM, 2023), by promoting shorter supply chains, encouraging local production, and stimulating public attention to food access and waste, UFP are actively working to re-anchor food systems within urban territories and regain public control over food governance (Moragues-Faus, 2017).

However, there is a fundamental paradox embedded within this approach: while UFP are motivated by the goal of improving better food systems, they often remain confined to the city's administrative borders, inadvertently neglecting the critical flows and networks that inherently link urban centers with external contexts (Subbing, Candel, & Termeer, 2021). This gap between intention and practical implementation becomes particularly stark when considering how food systems

truly operate. Food does not adhere to rigid urban boundaries; rather, it traverses diverse landscapes, shaped by relational dynamics that extend far beyond city limits. Focusing exclusively on governing food within administrative urban perimeters tends to miss the deeper, more intricate spatial relationships that fundamentally sustain urban food supply (FAO, 2018), particularly those concerning food production, which occurs outside densely inhabited cities. It is within this shifting landscape that approaches to food relocalization are gaining visibility.

These efforts are primarily driven by the desire to reduce reliance on long supply chains, mitigate the risks associated with global disruptions, and foster more resilient, self-sufficient "local" food systems (Pettenati & Toldo, 2018). As Feagan highlights (2007), local is shaped not just by spatial closeness but by a set of dimensions, making it rich in meaning and contested as a term. It transcends practical or logistical considerations, emerging instead as a larger, symbolic and political stance too.

More than just a matter of distance, "local" embodies a plurality of significances that embrace, among other things, the restructuring of food systems around human-scale relationships, the community involvement, and the environmental-ecological responsibility (Bethaney, 2011). In this sense, the drive towards food relocalization is not just a practical reaction to the emerging failure of global supply chains; it is a deeper critique of the inherently fragile structure of the globalized food model (Wiskerke, 2009). In particular, the implicit aim behind this reconceptualization attempt regards challenging the foundational assumption that efficiency, pursued through centralization and long-distance distribution, inherently equates to food security.

These approaches do not serve as policy pathways but rather embody a fundamental rethinking of how food systems should exist and function (Coulson & Sonnino, 2019). Unlike UFP's focus that often instrumentalizes the "local" as a logistical efficiency, relocalization positions it as the fundamental attribute of successful food systems. It posits that bringing food production and consumption closer together is not just an operational adjustment, but one of the positive outcomes of the desired transformation. In this theoretical context, spatial proximity acquires intrinsic value and becomes more than just a spatial coordinate (Reckinger, 2022). It enhances an overall systemic improvement that also includes food systems' sustainability.

This framework must not be taken for granted; rather, scholars deal with the critical issue of "local trap" to debate approaches that treat the localization of food systems as uncritically assumed to be inherently superior to other scales, regional,

national, or global (Born & Purcell, 2006). The local trap essentially exagerates the strategic pursuit of localization with its ultimate purpose, reducing complex sustainability challenges to highly simplistic narratives where "local" means better. This perspective risks essentializing spatial proximity as unequivocally good, disregarding the potential limitations and contradictions that can arise when local systems are idealized without further scrutiny (Battersby & Watson, 2019). Therefore, while spatial proximity remains a central tenet of food relocalization, it must be critically examined and contextually applied rather than being adopted as a universal solution.

Avoiding the local trap requires moving beyond the presumption that physical nearness alone ensures resilience or justice. Instead, it calls for a more reflexive approach that evaluates how localized systems integrate with other relevant parts genuinely.

The focus of this work, therefore, regards not to celebrate the idea of "local" but to understand how it is sustainably put into action. Different approaches to relocalization use the concept in various ways, sometimes as a practical tool to reduce food miles (Schnell, 2013), other times as a symbolic gesture towards reclaiming community control over food systems (Brunori, 2007).

The real question is not whether the local is good or bad, but how it is framed and mobilized within specific contexts and what for, particularly given the need to find political tools that can transform relocalization approaches into reality. To address this, it is worth exploring how various relocalization approaches interpret the crucial issue of feasibility, in terms of the engagement with policy tools, particularly UFP.

3.1. Possible approaches

Having established the critical importance of thoughtfully integrating spatial proximity within food relocalization efforts, it becomes essential to examine the concrete strategies that have emerged to operationalize these concepts. Indeed, food relocalization is not a monolithic process, but, rather, multiple approaches exist reflecting diverse contexts, objectives, and scales of implementation. They range from grassroots community-driven initiatives to policy-oriented frameworks, and intersect with challenges that do not regard governance issues only (Inglis, 2010).

This section develops a conceptual analysis of the main approaches to food relocalization, examining how each of them frames the matter of governance, mobilizing the notion of proximity to restructure food systems in a territorially grounded way. The focus is not on evaluating their implementation in practice, but on exploring their theoretical capacity to inform and guide the relocalization of

food. For this reason, although some approaches are more often brought into practice, there is no preference in this section, for what regards the application's wideness; rather, all significant theoretical approaches are taken into consideration.

A very initial approach in the framework of food relocalization is the so-called Urban and Peri-Urban Agriculture (UPA) one. Present in academic discourses since decades (Yeung, 1987), early studies defined it as the cultivation of food within urban and peri-urban spaces, UPA directly integrates food production into the urban landscape itself, making it a critical strategy for rethinking urban food systems.

Lately, FAO formalized the definition, by considering urban agriculture as food production within built-up areas and peri-urban agriculture as farming practices located in the transitional zones surrounding cities (FAO, 1999; Drechsel & Kunze, 2001). This clear differentiation underscored the dual spatial nature of UPA: it spans both the dense urban core and its adjacent rural fringes, finally giving food a role of protagonism in urban planning (Gallent, 2006). Therefore, UPA is not just a "naif" practice as public discourses tend to affirm, but a transformative way of embedding agriculture into the very building of the city, thus challenging the conventional separation between urban living and food production.

For these reasons, UPA originally gained momentum, particularly in the Global South, as a pragmatic response to rapid urbanization and the need to secure low-cost food supplies for growing urban populations (Prain, Simon, Halliday, & Drechsel, 2022). In these contexts, it was affirmed as a bottom-up strategy to increase food availability, particularly for economically marginalized communities. Characterized by being informal in practice, UPA proved quite successful to encounter urban demands of food, contributing to local economic growth, engaging a wide range of urban residents, especially from lower-income groups (Satterthwaite, McGranahan, & Tacoli, 2010).

The core rationale behind UPA lies in its ability to physically reduce the distance between food production and consumption. In this sense, proximity is understood in strictly spatial terms: food is produced within or around the city to increase local availability, reduce logistical dependency, and make use of underutilized urban land. Although many initiatives depend on collective engagement and localized coordination to take root, where community organizations, and residents are responsible of these spaces, the emphasis is primarily directed on improving urban food supply and buffering the city's vulnerability to external disruptions, rather than foreseeing a larger transformation of the food system (Barthel, Parker, & Ernstson, 2013).

From this initial context, the term Alternative Food Networks (AFNs) emerged as the crucial and pioneering way of referring to those processes aiming at

challenging the dominant agro-industrial paradigm by proposing new ways to locally organize food production, distribution, and consumption (Renting, Marsden, & Banks, 2003).

While the term encompasses a very broad set of practices (Murdoch, Marsden, & Banks, 2000), even UPA according to some (Ribeiro, Harmsen, Feola, Carréon, & Worrell, 2021), it is impossible to discuss food relocalization without acknowledging the pivotal role played by AFNs, as they represent the foundational framework through which food relocalization approaches are now addressed.

These networks are driven by the intention to create new, more direct relationships between food producers and consumers, with an explicit focus on the importance of transparency (Alvarado, Denis, Azzimonti, Vysokolan, & Tcheton, 2020). Although the concept of AFNs did not experience broad transformation, it is relevant to frame its raising in the early 2000s, coinciding with what scholars identify as the "quality turn" in consumer's behavior (Goodman, 2003). During this period, consumers began to seek food products that granted a larger amount of information and qualities, abandoning the conceptualization of food as a pure commodity.

Looking for attributes associated with authenticity, traceability, and community connections, AFNs emerged as a response to this evolving demand, proposing that food systems should provide sustenance alternatively from mainstream supply chains (Lamine, Garçon, & Brunori, 2018; Brunori, 2007). Adopting a relational understanding of proximity, AFNs counteract the anonymity conventional agro-industrial supply chains, introducing trust and mutual responsibility into the food system.

Third, emerging almost concurrently with AFNs, yet distinct in their focus, Short Food Supply Chains (SFSCs) offer a more targeted approach to food relocalization (Renting, Marsden, & Banks, 2003). The rise of SFSCs, much like AFNs, regards once again a response to growing concerns about the environmental and social consequences of the dominant industrial agri-food model (Jarz˛ebowski, Bourlakis, & Bezat-Jarz ˛ebowska, 2020). Unlike AFNs, which often engage with broader socio-political critiques, SFSCs take a more functional approach, focusing on how to directly link producers with consumers by reducing the spatial and social distance within food networks. This focus sets them apart from UPA too, as SFSCs prioritize building direct connections between producers and consumers, thus creating more streamlined and locally rooted food systems, other than expanding local food production. The fundamental idea behind SFSCs regards the consideration of spatial proximity as a key factor in strengthening local agri-food systems (Aubry & Kebir, 2013). By deliberately cutting down the number of intermediaries, these

chains bring producers closer to consumers; yet this occurs adopting a geographical perspective that entails a spatial diminishing of food chains' parts (Freidberg & Goldstein, 2011).

Then, born in the same period of AFNs and SFSCs, there affirmed a body of relocalization approaches that do not deal with the supply chains only; rather, they meant to expand to a reconceptualization of the food system entirely, also entailing other frameworks and potential issues at stake.

Among these, the Local Food Systems (LFS) marked an important development (Hinrichs, 2000). While sharing practical overlaps with other approaches, LFS differ for a stronger emphasis on place-based governance and collective engagement (Thomson, Radhakrishna, Maretzki, & Inciong, 2006). Less concerning the set of practices, and more regarding the overall framework thinking, LFS position food systems at the heart of a larger territorial project within the relational and institutional framework of the communities.

Initially pertaining to US and Canada at the start of 2000s, LFS have been described as food systems rooted in specific places, that are simultaneously profitable, ecologically sound, and socially just (Feenstra, 1997). This multidimensional definition suggests that localness is not simply a spatial variable, but the basis for cultivating systems that reflect shared values on a territorial basis. In this sense, LFS deal with a more relational understanding of proximity as a condition through which human interactions, trust, and co-responsibility are reactivated in the context of food.

Crucially, unlike others, LFS deal less with the material aspect of food. Rather, they address the social interactions of the territory, and their importance toward food systems' improvement. The active participation of local actors is the key focus.

From a technical standpoint, LFS also point to the efficiency potential of re-scaling food systems (Mount, 2012). By minimizing transport distances and storage time, and by optimizing logistics at a micro-regional level, they reduce environmental pressure while maintaining freshness and quality (Van Hauwermeiren, Coene, Engelen, & Mathijs, 2007).

LFS distinguish from other efficiency discourses due to the ethical-political lens through which gains are framed: efficiency is not an isolated goal, but the result of food provisioning organization in relation to local priorities and capacities. The strength of this approach lies in its ability to combine logistical rationality with the social infrastructures of care, solidarity, and democratic participation. In this regard, the key element of LFS does not regard the distance between producers and

consumers but the reframing of food as a medium through which localities articulate and enact their own futures (Reckinger, 2022).

In direct continuum, there exist other approaches that address the territorial perspective of food; particularly, two closely related but distinct frameworks, Localized Agri-Food Systems, LAFS or LAS (Fournier & Muchnik, 2010), and Systèmes Agroalimentaires Localisés (SYAL), were developed. Both approaches are grounded in the idea that food systems should not only be relocalized but also be meaningfully re-embedded in their territorial contexts, drawing on locally specific resources, both material and immaterial (Bowen & Mutersbaugh, 2013).

While LAFS and SYAL share a common conceptual origin, they have evolved differently in response to the socio-economic and political realities of the regions in which they have been applied (Fournier & Muchnik, 2010). The theoretical foundations of LAFS and SYAL are deeply connected to earlier French research on industrial districts and localized production systems (*Systèmes Productifs Localisés*, SPLs) (Aubron & Moity-Maïzi, 2007). The work of Courlet and Pecqueur (1992), as well as contributions on industrial clusters by Schmitz and Musyk (1994), played a pivotal role in shaping a new field of inquiry focused on localized production dynamics. These studies marked a key conceptual shift: from understanding space as a passive stage to economic activity, to viewing territory as a historically constructed socio-economic system, endowed with its own logic of reproduction and development (Courlet, 2002). The study of SPLs, and by extension, SYALs, focuses on the forms of coordination and innovation made possible through constructed proximities within a shared territorial space.

In this context, LAFS emphasizes the economic valorization of place through the organization of short supply chains and the strategic promotion of territorial quality. Typically articulated through agri-food clusters or districts, LAFS deal with the cooperation among local producers, public institutions, and intermediary organizations relevant for the construction of a strong, market-oriented food identity anchored to place.

Related, but different, the SYAL approach, while conceptually aligned with LAFS, has been significantly reinterpreted as a vital tool for promoting sustainable rural development first (Mascarenhas & Touzard, 2018). SYAL emphasizes food sovereignty, the autonomy and resilience of rural communities, and the inclusion of smallholder farmers and Indigenous populations. Local food systems are not simply seen as market strategies, but as frameworks for rebuilding alternatives to the dominant agro-industrial model, rooted in short, diversified, and agroecological supply chains (Arfini & Mancini, 2019).

Thus, on one side, LAFS prioritizes territorial branding and quality-based market access (Giacomini & Mancini, 2015); on the other side, SYAL suggests that food systems can become instruments of transformation given that they address issues of equity, sustainability, and local empowerment. The two frameworks, although sharing a strong territorial perspective, highly diverge on the focus: one is more oriented toward place-based economic value, the other deals with the territorial construction of alternatives.

Far from being mutually exclusive, these two approaches are complementary expressions of what food relocalization can entail when grounded in specific territorial trajectories. LAFS offers tools for structuring local economic ecosystems where institutions and actors collaborate around quality and identity (Mantino & Vanni, 2018). SYAL, meanwhile, foregrounds the political reappropriation of food systems by marginalized groups, encouraging more inclusive and ecologically attuned forms of food governance.

Together, LAFS and SYAL offer a powerful lens through which to understand relocalization not as a single model, but as a plurality of situated, historically grounded processes, each shaped by the specific constraints, assets, and ambitions of the territories in which they unfold. From this, most recent perspectives expand the reflection by referring to food systems relocalization highly on territorial basis, particularly understanding the relations between urban and rural environments.

Among others, the so-called City-Region Food System (CRFS) approach, developed by FAO and RUAF (Blay-Palmer, et al., 2018), puts the accent on the relationships between urban, and rural hinterlands, emphasizing the need for collaborative strategies on food that transcend municipal limits. More detailly, although CRFS aims at relocalizing food like other approaches, by connecting urban food consumption with the larger productive regional areas, it expands this view by also incorporating the city-regional geographical dimension with a particular focus on governance aspects and reflections over the concept of territoriality (Tecco, Bagliani, Dansero, & Peano, 2017).

CRFS offers a multidimensional understanding, which intervenes on a rather large number of fields, seeking to enhance the local sustainability of the food systems by integrating ecological and socio-economic aspects too (Roosendaal, et al., 2020).

At the base of this relocalization perspective, it lies the acknowledgement of territorial processes that must be considered, if meaning to deal with localized food.

More in detail, among the numerous innovative pieces, the CRFS advancements lie in the intention to be cross-cutting and in its systematic approach to intra- and

inter-urban processes of the food systems, taking into account the diverse territorial specificities (Blay-Palmer, et al., 2023).

Finally, positioned at the intersection of territorial development, food relocalization and agroecological transition, the Agroecology-based Local Agri-Food Systems (ALAS) proposes a deeply integrated model that seeks to re-embed food systems within ecological, social, and institutional contexts (López-García & González De Molina, 2021).

In continuity with the recognition that food relocalization necessarily exceeds urban boundaries, ALAS articulates food systems as contexts where rural and urban actors collaborate in advancing agroecological food relations across multiple scales (González De Molina & López-Garcia, 2021).

The distinctiveness of ALAS lies in their capacity to operate agroecology on a local scale and with the clear goal of undertaking full food system's transformation. They are conceived as frameworks that enable both the upscaling (policy integration, institutional support) and out-scaling (territorial expansion and replication) of agroecological practices (López-García & González de Molina, 2020).

Unlike more restricted initiatives, ALAS aims at emphasizing multi-actor and multi-level governance, thereby providing the architecture necessary to support the complex agroecological transition processes that unfold across spatial, institutional, and socio-political domains. This territorial organization reflects the same design logic that governs agroecosystems themselves: systems should be productive, stable over time, and resilient to environmental and economic fluctuations (Figueroa-Helland, Thomas, & Pérez Aguilera, 2018).

However, ALAS does not intend to downsize those criteria, equating them to technical parameter. Rather, it means to understand them as socially constructed systems, emerging out of negotiation, coordination, and strategic alignment among local actors. In other words, they activate underutilized territorial resources that are often excluded or devalued within dominant agro-industrial models (López-García & Carrascosa-García, 2023). ALAS thus becomes a tool of broader territorial regeneration, and food consists in the vehicle to rethink both ecological and socio-economic relations.

Also, ALAS bear different institutional architecture. It is surely sustained by the mobilization capacity of local food networks and social movements, but the consolidation is highly dependent on the proactive involvement of public authorities, especially at the local and regional levels. ALAS therefore require not only grassroots dynamism, but also favorable policy environments. González de Molina refers to as "nested food policies" across territorial scales (López-García &

González de Molina, 2020). These policies must enable rural–urban cooperation, facilitate the aggregation of agroecological initiatives, and provide the structural conditions necessary to allow innovative food models to emerge.

It is now clear how rich the landscape of food relocalization approaches is; thre is remarkable plurality of suggestions, shaped by specific frameworks, contexts, and logics. They entail a diversity of strategies that propose the relocalization of food systems according to multiple characteristics.

First, UPA and SFSCS suggest reconnecting production and consumption, primarily through the reduction of distances and intermediaries to enhance local availability and market proximity. In contrast, frameworks like LAFS and ALAS pursue a slightly different objective, meaning to foster territorial transformation by addressing the socio-economic, ecological, and institutional structures that underpin food systems, thus embedding relocalization within broader processes of sustainable development and territorial governance.

Although they are heterogeneous in terms of characteristics, targets, and adaptability of relocalization practices to different socio-economic conditions and cultural settings, they share the trait of pursuing a common objective: to counteract the spatial, social, and ecological disconnections imposed by globalized agri-food regimes, and to re-anchor food systems within local dynamics and territorial identities.

Yet, despite the rich goals prospected by these approaches, a problematic need for applicability emerges throughout all of them. While they offer innovative solutions to the failures of global mainstream supply chains, they lack an explicit understanding of the empirical policy interventions needed to support these changes (Matacena, 2016). The focus tends to remain on the organization of the community, without clearly addressing the role played by the institutional frameworks required to coordinate, sustain, and scale these initiatives over time.

Governance, when and if mentioned, is often treated as an implicit contextual information rather than as a central mechanism that mediates food systems (Moragues-Faus, 2021). This absence reveals a critical weakness. Where a coherent integration between governance frameworks and relocalization approaches lacks, these strategies remain confined to experimental academic initiatives, lacking the structural foundation necessary to evolve into systemic and enduring solutions. This disconnection prevents relocalization efforts from being visible, scalable and trustable enough to effectively bring transformations to food systems over the long term.

The challenge, therefore, lies not in expanding the number or variety of relocalization initiatives, but to critically assess how those already existing, many

of which already possess significant transformative potential, can be rendered operational by aligning them with governance structures. In this perspective, therefore, governance is not a further element to investigate but the framework through which food relocalization can be realized.

Although the issue of governance will be better debated in Chapter VII, it is relevant to propose an anticipation here. Drawing on the broader definition of governance as the set of relational processes through which heterogeneous actors interact, coordinate, and contest the formulation and implementation of collective objectives within a given territorial context (Rhodes, 1997; Ansell & Gash, 2008), this work adopts Lizzi and Righettini's reflections on collaborative governance, which is understood as a specific mode of governance in which public and private actors work collectively through structured, ongoing, and institutionalized interactions to negotiate potentially conflicting interests, define shared strategies and goals, and jointly decide on the implementation and, at times, co-funding of policies and programmes (Lizzi & Righettini, 2022). Another definition adopted in this work underscores the hybrid nature of food governance, wherein institutional arrangements and bottom-up initiatives dynamically interact to produce contextually variable modes of collective action (Manganelli, 2022). Within this context, UFP production acquires significance as a structured yet partial instantiation of these broader, contested processes.

UFP are therefore not equated with food governance, for two distinct reasons. First, governance denotes relational processes that exceed formal policy formulations like UFP (Ansell & Gash, 2008). Second, food systems may be governed through emergent, non-explicit mechanisms, even if dedicated UFP framework are absent (Cretella, 2025). UFP consist in formal devices that explicitly orient a plurality of parts of food systems at once, facilitating their coordination and overcoming fragmentation across sectoral domains. Here, the analytical challenge lies in determining whether, and to what extent, the relocalization approaches translate into reality, through UFP. This leads to a critical question: how do food relocalization approaches engage with governance via UFP?

4. Attempts of relocalization and the issue of governance

4.1. A review of the literature on relocalization

This question cuts to the core of relocalization's political viability. Some approaches reveal a conscious effort to build governance architectures capable of interfacing with policy frameworks, thus extending their influence beyond local niches and enabling broader territorial transitions. Others, however, remain trapped

in a logic of insularity, privileging autonomy over institutional engagement and inadvertently limiting their capacity to scale, replicate, or challenge the dominant agri-food model.

To address this, a literature review is conducted, aimed at identifying studies that explicitly analyze the intersection between the relocalization approaches mentioned above and their integration of UFP. Therefore, the review employes structured key phrase searches, displayed in Tab. 2, across the Web of Science and Scopus databases, ensuring comprehensive coverage of scientific literature (phase 1); given the number of articles broadly covering these topics, the phrase search regards articles' keywords only[16]. This choice stems from the intention to deal with the literature that explicitly manifests the intention of dealing with the issue of UFP and the attempt of relocalizing food.

The approaches taken into consideration are Urban and Peri-Urban Agriculture, Alternative Food Networks, Short Food Supply Chains, Local Food System, Localized Agri-Food Systems, Systèmes Agroalimentaires Localisés, City-Region Food System, Agroecology-based Local Agri-Food Systems.

The items are selected over a time span of 16 years, meaning to include initial works on Urban Food Policies and most recent research too (PUBYEAR > 2008 AND PUBYEAR < 2024). No item is unincluded due to the language. All items are taken into consideration in this phase, even if they pertain to different geographical regions from the present research one.

Database	Search String	No. of Results
Scopus	KEY (urban AND food AND policy; AND urban AND peri-urban AND agriculture)	17
Web of Science	KEY (urban AND food AND policy; AND urban AND peri-urban AND agriculture)	8

[16] The literature review has been carried out in April 2025

Scopus	KEY (urban AND food AND policy; AND alternative AND food AND networks)	12
Web of Science	KEY (urban AND food AND policy; AND alternative AND food AND networks)	6
Scopus	KEY (urban AND food AND policy; AND short AND food AND supply AND chains)	4
Web of Science	KEY (urban AND food AND policy; AND short AND food AND supply AND chains)	1
Scopus	KEY (urban AND food AND policy; AND local AND food AND system)	33
Web of Science	KEY (urban AND food AND policy; AND local AND food AND system)	13
Scopus	KEY (urban AND food AND policy; AND localized AND agri-food AND system)	0

Web of Science	KEY (urban AND food AND policy; AND localized AND agri-food AND system)	0
Scopus	KEY (urban AND food AND policy; AND systèmes AND agroalimentaires AND localisés)	0
Web of Science	KEY (urban AND food AND policy; AND systèmes AND agroalimentaires AND localisés)	0
Scopus	KEY (urban AND food AND policy; AND city-region AND food AND system)	9
Web of Science	KEY (urban AND food AND policy; AND city-region AND food AND system)	7
Scopus	KEY (urban AND food AND policy; AND agroecology-based AND local AND agri-food AND systems)	0
Web of Science	KEY (urban AND food AND policy; AND agroecology-based AND local	0

	AND agri-food AND systems)

Table 2: Search of food relocalization approaches and their relations to UFP in the databases (phase 1)
Source: Author's elaboration

From the initial review process of Tab. 2, it was possible to observe significant differences in the degree of interaction between relocalization approaches and UFP. In particular, the search conducted across Scopus and Web of Science revealed that Localized Agri-Food Systems (LAFS), Systèmes Agroalimentaires Localisés (SYAL), and Agroecology-based Local Agri-Food Systems (ALAS) returned no results[17]. Therefore, they are now excluded from the following step.

Within the remaining approaches, the identified records from both databases are cross-checked to eliminate duplicates and ensure the accuracy and uniqueness of sources considered (Tab. 3) (phase 2).

Food relocalization approach	**N. of Duplicated Items to Remove**	**No. of Remaining Items**
Urban and Peri-Urban Agriculture	7	18
Alternative Food Networks	5	13
Short Food Supply Chains	1	4

[17] Against potential and comprehensible criticism for relying on the phrase "urban food policy", which might limit the body of literature that deals with larger not urban-related food policy, a counter-test was carried out using "food policy" phrase only, and, yet there was no result.

Local Food System	13	33
City-Region Food System	7	9

Table 3: Removal of duplicated items (phase 2)
Source: Author's elaboration

Following the removal of duplicates through cross-checking, a screening phase was conducted based on the review of titles and abstracts. This step aimed to ensure that only publications explicitly addressing both the specific food relocalization approach under investigation and the theme of UFP were retained. Articles that referenced these terms in a too generic or unclear context, without providing an evident understanding on the intersection between the issues of interest, were excluded from the dataset (phase 3).

Food relocalization approach	**N. of non-relevant Items to Remove**	**No. of Remaining Items**
Urban and Peri-Urban Agriculture	7	11
Alternative Food Networks	7	6
Short Food Supply Chains	2	2
Local Food System	24	9
City-Region Food System	4	5

Table 4: Removal of non-relevant items (phase 3)
Source: Author's elaboration

Below are the remaining results, which are analyzed with a specific focus on the ways in which food relocalization approaches are articulated and rendered operational at the governance's attention. The analysis seeks to identify reflections regarding the ways in which food relocalization approaches become consistent, particularly within the framework of UFP.

Food relocalization approach	**Selected Items**
Urban and Peri-Urban Agriculture	(Sanz Sanz, Martinetti, & Napoléone, 2018; Cerrada-Serra, Colombo, Ortiz-Miranda, & Grando, 2018; Cinà & Khatami, 2017; Galli, et al., 2024; Lawton & Morrison, 2022; Lerner & Eakin, 2011; Mahesh, Amerasinghe, & Pavelic, 2015; Nikolaidou, Loudiyi, & Reckinger, 2023; Orlando, Spigarolo, Alali, & Bocchi, 2018; Paül & McKenzie, 2013; Olsson et al., 2016)
Alternative Food Networks	(Cretella, 2019; Dorenberg, Piorr, Zasada, Wascher, & Schmutz, 2022; Monticone & Samoggia, 2025; Monticone, et al., 2024; Pasquier Merino, Moncahon, & Espinosa Bonifaz, 2023; Reina-Usuga, Parra-Lòpez, & de Haro-Giménez, 2022)
Short Food Supply Chains	(González-Azcárate, Cruz-Maceín, Bardajf, & García-Rodríguez, 2023; Horvarth, Koning, Raton, & Combes, 2024)
Local Food System	(Buchan, Cloutier, Friedman, & Ostry, 2015; Clark, Conley, & Raja, 2021; Ilieva, Urban Food Systems Strategies: A Promising Tool for Implementing the SDGs in Practice, 2017;

	Mazzocchi & Marino, 2020; Mintz & McManus, 2014; Sibbing, Candel, & Termeer, 2021; Sonnino, 2019; Sonnino, 2014; Zerbian, Adams, Dooris, & Pool, 2022)
City-Region Food System	(Blay-Palmer, et al., 2018; Dubbeling, et al., 2017; Kraehmer, Battisti, Berti, Bruno, & Dansero, 2023; Steines, et al., 2024; López-García, et al., 2020)

Table 5: Final items selected for the literature review
Source: Author's elaboration

4.2. A dialogue between Urban Food Policies and selected approaches

This section examines how the chosen food relocalization approaches are integrated into, and operationalized through UFP, following Table 5. Here, five analytical domains that emerged from the literature review are listed.

These domains are analyzed according to the way in which they interact with institutional arrangements, policy tools, and urban governance structures. The analysis focuses on how UFP are coherently taken into consideration across these approaches, and evaluates how they are selectively mobilized within policy frameworks.

4.2.1. Urban and Peri-Urban Agriculture

The integration of Urban and Peri-Urban Agriculture (UPA) is frequently presented as a promising strategy to enhance urban sustainability, food security, and territorial resilience. However, a critical reading of the literature reveals that studies addressing UPA only partially engage with the governance dimension through the lens of UFP. While governance is often invoked, it is rarely framed explicitly within structured UFP and clear governance frameworks that could support the operationalization and scaling of UPA initiatives.

In several contributions (Cinà & Khatami, 2017; Lawton & Morrison, 2022), governance challenges are acknowledged, but there is limited reflection on how UFP could serve as a strategic instrument to overcome these barriers. These studies highlight institutional inertia, fragmented planning, or market-driven pressures that

marginalize peri-urban agriculture, yet they stop short of proposing UFP as a coherent governance tool to address these issues.

Conversely, some studies demonstrate more conscious engagement with UFP as facilitators of UPA development. Galli et al. explicitly connect spatial planning and food policies through participatory governance experiments, recognizing that without embedding UPA within urban policy frameworks, rural–urban synergies remain fragile (2024). Similarly, Orlando et al. illustrate how public procurement strategies, when integrated into metropolitan food policies, can actively support peri-urban production systems (2018). In these cases, the relevance of UFP is clearly acknowledged to institutionalize and sustain UPA practices.

Grassroots-driven analyses focus on social mobilization to secure access to land but often frame governance as a site of contestation rather than exploring how UFP could structurally support these efforts (Cerrada-Serra, Colombo, Ortiz-Miranda, & Grando, 2018). While bottom-up dynamics are crucial, the lack of reference to formal UFP suggests that UPA might perceive the first as operating in parallel, or even in opposition, to established policy frameworks, and does not aim at being integrated with a cohesive food policy framework.

Some expose governance gaps in peri-urban agriculture but miss the potential role of UFP in addressing them, leaving UPA disconnected from broader policy frameworks (Mahesh, Amerasinghe, & Pavelic, 2015). Similarly, Nikolaidou et al. call for transformative governance aligned with food democracy, yet they fail to explicitly link these concepts to actionable UFP, keeping the relationship between UPA and UFP vague and underdeveloped (2023).

Overall, the literature taken into consideration suggests fragmented engagement between UPA and UFP. While governance is widely discussed, only a small set of studies recognizes UFP as a critical framework to enhance the possibilities of UPA initiatives.

4.2.2. Alternative Food Networks

The relationship between Alternative Food Networks (AFNs) and UFP reveals a nuanced and often ambivalent engagement with governance structures. While AFNs are typically framed as grassroots responses to the industrialized global food system, the extent to which these initiatives are integrated into formal governance frameworks varies significantly across contexts. The reviewed literature demonstrates that, although AFNs inherently challenge conventional food regimes, their operational effectiveness and long-term viability is highly dependent upon the governance mechanisms.

Some provide a critical account of this intersection through the case of the Pisa Food Plan, highlighting how governance is not merely a passive stage but an ongoing arena where AFNs must navigate institutional dynamics (Cretella, 2019). The study underscores that while Urban Food Strategies rhetorically align with the values of AFNs, practical implementation often exposes conflicts between activist agendas and institutional priorities that lose trust in institutional politics. Cretella points to a significant risk of co-optation, where governance frameworks institutionalize AFNs without addressing the deeper structural critiques and real grassroots needs, they embody, thus diluting their transformative potential. "The Food Plan was certainly developed with good intentions (…), but it failed to achieve what was really absent from the local context: effective and lasting governing instruments for improving food access, quality and sustainability" (ibid., p. 127).

Similarly, Doernberg et al. emphasize that UFP have begun to recognize ANFs, and SFSCs more detailly, within policy frameworks; yet this recognition tends to be instrumental rather than transformative (2022). Governance, in this sense, is employed to enhance visibility and operational capacity, but often fails to address systemic barriers or foster meaningful policy innovation.

Pasquier et al., further complicate this picture by analyzing Mexico City local governments' engagement with food democracy through AFNs (2023). Their study illustrates that governance approaches tend to oscillate between enabling and constraining AFNs' development. While valued for their grassroots nature, there is little in-AFNs consensus on how to govern and support them without compromising their flexibility and community focus. This gap leaves AFNs exposed to inconsistent policies (ibid.).

Monticone and Samoggia emphasize that AFNs and UFP's integration depends on governance models that are participatory and adaptable to local contexts (2025). However, they note that many institutions adopt rigid, top-down approaches, ultimately conflicting with the decentralized and often informal nature of AFNs.

Reina-Usuga et al. further highlight that in Latin American cities, despite UFP offered initial support to AFNs, a lack of sustained political commitment often rendered these initiatives temporary (Reina-Usuga, Parra-Lòpez, & de Haro-Giménez, 2022). Even in other favorable cases (Monticone, et al., 2024), where cross-sectoral policies support AFNs, structural challenges such as resource constraints and institutional inertia persist.

Across these studies, governance emerges as pivotal to scaling AFNs, but current UFP frameworks often fall short in providing the consistent, integrated support necessary for their long-term impact within urban food systems.

4.2.3. Short Food Supply Chains

The relationship between SFSCs and UFP is marked by a growing recognition of governance as a critical enabler, yet the literature reveals persistent challenges in effectively operationalizing this connection. Gonzalez-Azcarate et al. provide a particularly insightful analysis, emphasizing how local governments, despite limited competencies and resources, are pivotal actors in fostering SFSCs within a city-region framework (2023). Their study illustrates how the reliance on municipal initiatives, often developed in isolation from regional and national frameworks, highlights the vulnerability of SFSCs promotion when not embedded within coherent, multi-level UFP strategies. For this reason, they point to the potential contributions of the CRFS approach as a promising governance lens to overcome institutional fragmentation, promote cross-scale collaboration, and address structural barriers such as limited production capacity, bureaucratic hurdles, and budget constraints (ibid.).

Horvarth et al. further stress the importance of governance implicitly, by identifying logistical inefficiencies and mismatches between supply and demand as core obstacles to SFSCs expansion (2024). Their findings, that draw on evidence from the Covid-19 period, suggest that while local authorities are increasingly engaging in SFSCs promotion, through urban planning tools, public procurement, or support for producer-consumer linkages, the absence of comprehensive policy frameworks addressing logistical coordination and outlet accessibility undermines long-term sustainability. The study suggests that targeted public policies beyond promotional efforts are needed, advocating for structural interventions to facilitate supply chain efficiency and equitable market access (ibid.).

The studies agree that SFSCs, despite their alignment with sustainability goals, cannot thrive without proactive, well-coordinated governance embedded within UFP. While there is evidence of innovative local practices, these remain constrained by limited institutional capacities. Thus, governance in this context is not only about supporting alternative markets but about structuring institutional arrangements that legitimize SFSCs as a central pillar of urban food strategies. Without such a paradigm shift, SFSCs tend to remain marginal.

4.2.4. Local Food System

The analysis of studies addressing the Local Food System (LFS) approach reveals a significant level of conceptual ambiguity and fragmentation, which poses critical challenges for its effective integration within UFP. A key issue emerging

from literature is the lack of a coherent and shared understanding of what constitutes an LFS. Although a detailed selection was carried out to avoid unrelated contributions, the term "local food system" is inconsistently and vaguely employed, addressing spatial proximity-based food initiatives and rarely referring to the structured framework advocating for systemic change, community resilience, and food sovereignty mentioned earlier.

As a direct consequence, Buchan et al. argue that a persistent possibility of falling into the local trap emerges, where the notion of "local" is uncritically assumed to be inherently sustainable or just (2015). To address this issue, they consider it highly relevant to create innovative regulatory frameworks that clarify what initiatives should be considered as part of the LFS and, therefore, deserve to be supported. Particularly, Food Policy Councils are given relevance as local participatory planning tools toward the positive installation of an LFS. "Food policy councils are advisory and advocacy bodies comprised of volunteers and stakeholders which focus on policies, goals and actions to support and enhance food related issues" (Roseland, 2012; Buchan, Cloutier, Friedman, & Ostry, 2015, p. 12).

Others express caution regarding the uncritical use of the term "local" too, noting how local food initiatives are often vulnerable to being steered by market-driven agendas rather than serving as vehicles for transformative change. However, a key contribution from Sonnino lies in highlighting a broader conceptual shift: she emphasizes that what have traditionally been termed UFP are increasingly being reframed as food governance (Sonnino, 2019). This evolution reflects a recognition that addressing food systems requires engaging with complex, relational, multi-scalar governance processes, other than policies.

In alignment with Sonnino, Zerbian et al. further emphasize that while local authorities are increasingly involved in food-related initiatives, there is little consistency in how LFS principles are operationalized within urban governance frameworks (2022). The absence of clear definitions and objectives often leads to fragmented policies, and random interventions. This incoherence weakens the strategic role that UFP could play in supporting LFS, reducing them to collections of isolated projects rather than components of an integrated food system transformation (Zerbian, Adams, Dooris, & Pool, 2022).

Others advance the discussion by framing food as a "civil common", following (Sumner, 2011), emphasizing that food systems should be governed as shared public goods requiring democratic stewardship (Clark, Conley, & Raja, 2021). This perspective calls for robust governance structures that actively engage citizens in managing food resources to serve collective goals. However, it also emerges how, in the absence of clear frameworks, urban governments struggle with inconsistent

interpretations of local food systems, resulting in fragmented policies that often address isolated priorities, without a coherent, integrated approach.

In conclusion, while the LFS approach holds significant promises for advancing sustainable and equitable food systems, the reviewed literature exposes a fundamental problem: the term “local food system” often serves as a catch-all category, encompassing divergent and sometimes conflicting perspectives. This lack of conceptual clarity directly impacts the capacity of UFP to engage with LFS in a meaningful way.

4.2.5. City-Region Food System

The CRFS approach demonstrates a notably advanced integration of governance considerations. Unlike other approaches, CRFS inherently emphasizes multi-level, multi-actor governance as a core operational principle, recognizing that sustainable food systems cannot be created if dealing with the improvement of production-consumption relations only.

Steines et al. highlight how CRFS fosters participatory governance structures that bridge urban, peri-urban, and rural divides, promoting co-designed food agendas embedded in territorial planning (2024). This holistic governance orientation is further reinforced by Dubbeling et al. (2017), whose comparative analysis across eight city-regions reveals that the CRFS framework not only guides policy adoption but actively facilitates territorial food planning processes, aligning local actions with broader sustainability objectives.

Blay-Palmer et al., critically expand on this by suggesting that CRFS serves as both a diagnostic and a transformative governance tool, capable of promoting new institutional arrangements to better support resilient food systems through integrated policy mechanisms (2018). López-García et al. provide concrete evidence from cities where the CRFS perspective is instrumental in articulating top-down and bottom-up governance dynamics, ensuring that agroecological practices and marginalized urban actors are central to UFP implementation (López-García, et al., 2020). This reflects a mature understanding of governance as a dynamic, negotiated process.

Even in contexts where challenges persist, such as policy incoherence or limited institutional capacity, the CRFS literature consistently frames governance as a lever for systemic change, advocating for trans-local networks, cross-sectoral collaboration, and the institutionalization of food policies beyond the municipal scale (Blay-Palmer, et al., 2018).

Therefore, CRFS studies stand out for their critical and constructive engagement with governance, offering pragmatic pathways to operationalize UFP in ways that are territorially grounded, socially inclusive, and ecologically resilient.

4.3. Looking for an applicable possibility, the City-Region Food System

The exploration of the major approaches to food relocalization exposes a profound and recurring dilemma: despite a proliferation of innovative practices and conceptual frameworks, there remains a fundamental unclarity concerning how these approaches should deal with cohesive, durable, and effective governance architectures.

Overall speaking, current models to arrest food systems' globalization, and to localize them in a sustainable way falter not due to the lack of creativity or grassroots momentum, but because they operate within policy vacuums, fragmented institutional landscapes, and conceptual ambiguities that hinder systemic impact.

Although it could be argued that this research has been partially shaped by the deliberate focus on the term "Urban Food Policy", potentially missing related discussions framed under different terminologies, the findings still reveal a major gap. Explicit structured reflections on governance are largely absent across the analyzed approaches. With few exceptions, most notably Sonnino (2019), who, dealing with LFS, explicitly reframes the debate by emphasizing the shift from "policy" to "governance" as a means to engage with the complex, multi-scalar nature of food systems, most studies fail to articulate how governance should be harnessed to capture the urgency of rethinking how food systems are framed and managed. Indeed, this conceptual awakening has yet to crystallize into coherent governance practices, leaving a landscape littered with disjointed initiatives and rhetorical commitments untethered from structural transformation (Zerbian, Adams, Dooris, & Pool, 2022).

In the discourse surrounding UPA, for instance, literature paints a picture of promise constrained by policy neglect. Here, governance is either conspicuously absent or reduced to a passive stage, incapable of orchestrating the kind of integrated strategies required to harness UPA's multifunctional potential. Even where innovative experiments emerge (Galli, et al., 2024), they remain fragile pockets of progress vulnerable to institutional apathy and political short-termism.

AFNs, often celebrated as the insurgent alternatives to the dominant agri-food regime, reveal another facet of this governance matter. While clearly disruptive in their attempt, AFNs struggle to navigate the treacherous terrain between autonomy

and institutionalization. Cretella's (2019) critical reflection on the Pisa Food Plan exemplifies how food agendas may become hollow frameworks, embracing the language of transformation but failing to deliver substantive shifts in governance paradigms.

The specter of cooptation looms large, as AFNs become subsumed within bureaucratic logics that neutralize their radical edge, reducing them to peculiar and exclusive consumption experiences (Goszczyński & Śpiewak, 2023; Michel-Villarreala, Vilalta-Perdomo, Hingley, & Canavari, 2025).

In the framework of AFNs, a specific example is provided by SFSCs; although emerging as authentic changemakers for food supply chains' functioning, they are strongly limited by regulatory frameworks that are unsupportive. Enhancing closer food chains is inevitably limited by jurisdictional limitations, resource deficits, and a lack of multi-scalar coordination. Here, governance is characterized by piecemeal interventions and ad hoc support, insufficient to rewire the structural underpinnings of urban food provisioning.

What is missing most is an overarching vision that provides the major framework for where SFSCs should exist. Given this absence, they risk becoming ephemeral solutions, considered only in moments of crisis and always accessible to few, but unsustainable for most of the population in the long run (Bayir, Charles, Sekhari, & Ouzrout, 2022).

Perhaps nowhere is the governance deficit more conceptually disorienting than in the discourse on LFS. The term has become a semantic catch-all, widely employed across policy, academia, and activism, yet rarely subjected to the critical interrogation it demands. This ambiguity is compounded by the proliferation of adjacent terms, such as LAFS and SYAL, at first, and territorial food systems and community-based food systems, at second, each introducing subtle nuances, but often caught within the LFS' framework without clear definitional boundaries (Hernandez, 2024). Rather than fostering conceptual clarity, this overlapping vocabulary generates further confusion, blurring distinctions that are crucial for understanding the spatial, social, and governance dimensions at stake.

In particular, the complexity depends on the divergent interpretation of the notion of "local" itself. In some cases, *local* is framed as an inherent feature, a descriptive characteristic of existing practices tied to proximity, place-based relationships, or traditional scales of production. In others, *local* is articulated as a target, a normative aspiration aimed at reconfiguring food systems toward greater territorial embeddedness and sustainability. This oscillation between local as a condition and local as a goal further destabilizes the discourse, making it difficult to assess whether policies and practices are engaging with grounded territorial

realities or simply reproducing an idealized, and often depoliticized, vision of proximity (Nemes, Reckinger, Lajos, & Zollet, 2022).

What finally emerges, if dealing with LFS, is a problematic uncertainty concerning the specific transformations that should occur. The lack of conceptual clarity makes it difficult to define what should change, for whom, and at what scale. This ambiguity becomes particularly relevant when attempting to discern the relationship between LFS approaches and UFP. Without a clear understanding of the objectives and mechanisms underpinning "localization", the current conceptual confusion opens the door to a proliferation of interventions, diverse in form but often lacking coherence or direction. As a result, this abundance of loosely connected initiatives risks diluting impact and generating actions that, while numerous and capillary, may ultimately prove null in driving meaningful territorial or systemic change.

Amidst this fragmented and often disillusioning panorama, CRFS emerges not simply as another framework but as a paradigmatic transformative shift. Unlike the approaches previously discussed, CRFS does not treat governance as a peripheral concern or a reactive mechanism. It considers governance the strategic nexus where urgent food systems' transformations are translated into an integrated, territorial project.

Possibly depending on FAO's strategic instructions, CRFS seems to clearly cultivate participatory governance ecosystems, while primarily aiming at dissolving boundaries between urban areas and their rural productive hinterlands (2024). In detail, what emerges is not governance as administration; rather, it is designed as a clear co-creation attempt, where diverse actors engage in the deliberate design of food systems that are contextually grounded and made resilient. According to Dubbeling et al., CRFS actively designs policy processes that align local agency with global sustainability imperatives through territorial cohesion (2017).

What makes CRFS truly groundbreaking is its capacity to reconcile what other approaches have treated as irreconcilable tensions: scale and locality with clear attempts of formal governance. Detailly, it shifts from a space of administrative containment to a site where food is no longer a marginal policy concern but a central axis around which territorial resilience can be organized.

While conventional approaches remain preoccupied with fitting food initiatives into existing institutional silos, CRFS challenges the premise itself. It positions food as a strategic entry point for rethinking territorial interdependencies, relational scales, and community involvement toward policymaking. In essence, the CRFS framework offers a radical departure from the status quo, as it invites policymakers, scholars, and practitioners to envision urban food governance not as a fragmented

set of policies, but as a coherent territorial strategy anchored in and for systemic thinking (Millard, et al., 2022).

This is not to suggest that CRFS is a panacea or a unique approach to consider. Nevertheless, it is worth nothing that it holds value in opening a conceptual space where the complexities of food, governance, and territory can be confronted jointly. Whether CRFS can translate its theoretical promise into effective practice remains an open question less depending on the framework itself and more on how it is critically engaged, adapted, and grounded in specific territorial contexts.

Indeed, very often, frameworks celebrated for their integrative vision risk being reduced to procedural checklists or symbolic gestures if detached from the socio-political realities they aim to reshape. In other words, to engage with successful UFP, invoking CRFS is not sufficient. What is required is a deliberate effort to activate its principles; it is important to treat governance as an inclusive process, to recognize territory as a relational and contested space, and to resist the temptation of simplifying complexity for institutional convenience.

The potential of CRFS, therefore, is not inherent; it is conditional. The challenge is to safeguard CRFS from the same pitfalls that have undermined other approaches: institutional inertia, market capture, and conceptual dilution. Whether CRFS' potential can be realized remains uncertain, but it is precisely within this uncertainty that critical inquiry, such as this thesis, finds its purpose.

5. Synthesis

This Chapter has investigated the complex and dynamic terrain of Urban Food Policies, situating them within the tension between increasingly globalized food systems and emerging efforts to bring food back to local.

To better understand how governance is interpreted and activated across various food relocalization strategies, the discussion examined five major approaches identified in the literature: Urban and Peri-Urban Agriculture, Alternative Food Networks, Short Food Supply Chains, Local Food Systems, and City-Region Food Systems. The analysis reveals that many of these strategies, despite their practical innovations and growing relevance, often lack a clear institutional anchoring.

Among the approaches considered, the City-Region Food System perspective stands out as significantly more advanced in its capacity to link territorial action with institutional strategy. CRFS offers a framework that explicitly engages with multi-scalar governance, participatory planning, and cross-sectoral coordination. Due to the capacity to integrate spatial, political, and ecological dimensions of food, across urban and rural spheres, the CRFS framework appears particularly promising to investigate in this thesis.

III. The City-Region Food System between theory and practice

1. Introduction

Building on the results of the second Chapter, the present one addresses the City-Region Food System (CRFS) approach as strategic in the framework of food governance. The CRFS approach does not adhere to rigid boundaries; rather, it adopts a flexible, context-specific model that integrates the city-region geographical dimension. This flexibility suggests that CRFS could embrace a newer and more pragmatic understanding of UFP.

Therefore, this Chapter investigates how CRFS emerges and considers the interconnected relationships between production, distribution, and consumption across cities and respective regions, finally displaying frameworks that can potentially reflect the socioecological relationships governing these processes.

Nonetheless, while the adaptable nature of CRFS may initially seem to support the newer food system's definitions that emphasize integration across different spaces, this very flexibility could also lead to complications. The challenge is not in recognizing the interconnected nature of the food system but in understanding how these connections function amid the disconnections and tensions between local and global processes. Hence, this Chapter addresses the second sub-research question: how does the City-Regin Food System approach acknowledge the territorial component of food systems?

After an in-depth introduction of the approach, a Systematic Literature Review, via the PRISMA method, is conducted to explore the theoretical foundations of CRFS, while empirical reflections debate this approach is applied in some specific frameworks.

Then, a review of cases is carried out concerning the ten contexts where the FAO has either implemented or encouraged its application. The analysis explores how the CRFS framework has been used in relation to diverse socio-economic, geographic, and governance settings. Central to this investigation is the city-region dimension. In addition to the spatial understanding of city-regions, the review also examines the other key dimensions of CRFS, including food systems approaches and participatory governance mechanisms.

2. A ten-years long approach

CRFS now stands as an affirming framework of work in the field of UFP. Its ability to address the broader geography of food systems seems particularly compelling, as it is well aligned with the spatial dimensions that need to be considered in food planning. Moreover, it is relevant to underline that there is an increasing number of cities that are currently applying the CRFS approach below FAO and other actors' guidance.

"In the first phase from 2015–2018, pilot city projects (Colombo, Sri Lanka; Kitwe and Lusaka, Zambia; Medellin, Colombia; Quito, Ecuador; Toronto, Canada; Utrecht, Netherlands) were guided as they developed and tested how CRFS could move them in more sustainable directions" (Blay-Palmer, et al., 2023, p. 353).

Then,

"The second step of the project is ongoing. (…) This work is taking place in Colombo, Sri Lanka; Kigali, Rwanda; Melbourne, Australia; and Tamale, Ghana" (ibid.).

Therefore, considering that no other food governance-related approach is experiencing this span of momentum, and this world-transversal consideration, CRFS strongly emerges as significant.

The most common and widely accepted definition of CRFS addresses it as the

"complex network of actors, processes, and relationships to do with food production, processing, marketing, and consumption that exist in each geographical region that includes a more or less concentrated urban center and its surrounding peri-urban and rural hinterland; a regional landscape across which flows of people, goods and ecosystem services are managed" (Forster, Hussein, & Mattheisen, 2015, p. 8).

It is worth noting that this definition was originally established during a meeting among partners involved in CRFS initiatives, which took place in Rome in December 2013 (Forster, Santini, Edwards, Flanagan, & Taguchi, 2014). Hence, relying on the work of Forster and Escudero (2014), among the firsts to pragmatically join the theoretical paradigm of city-regions (Rodrìguez-Pose, 2008), and the concept of food systems, a specific explanation regarding what lies behind the adoption of this definition misses; nonetheless, it is highly probable that the

accentuation of the "city-region" dimension was adopted to give a geographical component to the selected framework of analysis of food systems' studies.

In this context, it is meaningful to underline that the affirmation of city-regions as expanded urban units of reflection, strongly embodies the eventuality that some territorial processes may not respect administrative boundaries, and, rather, be understood only by adopting less fixed perspectives (Scott, 2001; Blay-Palmer, et al., 2018; Rodrìguez-Pose, 2008). The body of knowledge supporting this idea has underlined the relationships between urban and hinterland areas, emphasizing the need for strategies that transcend municipal limits (Thilbert, 2015) and embrace the regional ones.

As a result, the contemporary dialogues on UFP draw extensively from the body of city-region knowledge, affirming the necessity of relying on it to inform and shape policies that overcome the traditional extension of urban food systems.

Increasingly, scholars started to address regional-scale assessments, recognizing the interconnectedness of diverse and expanded geographical and socio-economic elements that collectively shape the urban food systems (Blay-Palmer, Sonnino, & Custot, 2016). Especially concerning their governance, this theoretical transformation reflected an understanding that was already mentioned before (HLPE, 2024): some issues transcend cities and urban contexts and necessitate a more holistic and geographically encompassing perspective. Therefore, the CRFS approach is built on a process that aims at considering an expanded space, also engaging all key stakeholders from the outset of the assessment to the UFP development (Blay-Palmer, et al., 2018).

This less fixed perspective, primarily meant to include the larger plethora of stakeholders that can exist in a city-region, might even lead to revised or fully new gatherings of the protagonists of UFP's development. As defined by CRFS' thinkers, the process of CRFS installment can result in the creation or revitalization of networks dedicated to food governance as well as the introduction of new cross-sectoral food programs and policies (Santini, Dubbeling, & Blay-Palmer, 2020).

2.1. Into the City-Region Food System approach

Although its establishment, and some even claim predominance, occurred rather rapidly, this approach is more than 10 years old[18]. According to the Scopus database, the first publication concerning CRFS, was released in 2014 and it

[18] "City region food systems emerged over 2012-3 in discourse across UN Agencies (UN Habitat, UNEP), Associations of local authorities (ICLEI), and the research community and is proposed as a spatial representation of food and agriculture for policy consideration at local, national and international levels. The term was defined in a 2013 Food and Agriculture Organization consultation" (Forster & Escudero, 2014, p. 1).

consisted in the work of Forster et al. (2014), aimed at presenting this innovative framework. Then, except for some successive publications, the CRFS framework remained somehow silent; its recent rapid affirmation has largely depended on the disruptions to food systems caused by the COVID-19 pandemic before (Millard, et al., 2022), and the Russia-Ukraine war later (van Osch & Archontaki, 2023). Indeed, they have shed light upon critical disadvantages of the globalized supply chains of food, which displayed possible instability and failures. Especially thanks to the work of Blay-Palmer, Santini et al. (2021), which focused on the need to build resilience in food systems after COVID-19, attention was claimed on the need to install innovative food system frameworks targeting more robust and local supply chains (ibid.).

In this framework, the CRFS approach is supported by, and supports, three major initiatives that guide its role in creating more sustainable food systems (Blay-Palmer, et al., 2023). First, the Sustainable Development Goals (SDGs) link CRFS to global challenges such as improving food security at first, reducing rural migration, promoting gender equality and education, improving health and nutrition, and addressing climate change through sustainable practices (Sachs, Lafortune, & Kroll, 2022). Second, MUFPP promotes CRFS as an innovative enabler for cities and regions to develop coordinated UFP, supported by practical indicators and case studies (Blay-Palmer, et al., 2023). Finally, the New Urban Agenda affirms to stimulate the creation of food "policies across urban, peri-urban and rural areas to facilitate the production, storage, transport and marketing of food to consumers in adequate and affordable ways" (UN-Habitat III, 2017, Paragraph 123). This emphasizes that regional food systems shall be conceived as pivotal in planning to strengthen resilience, ensure food security, and minimize environmental impact.

Thus, CRFS offers a way to strengthen regional food networks and promote resilience by ensuring that local actors have greater control and agency in shaping their food systems (Forster, Egal, & Puhac, 2023). More detailly, this approach enlightened the need to reduce the power of long supply chains on the market, to finally expand local food security. To do so, urban food systems shall be primarily analyzed and assessed on a larger scale, but with the final purpose of mitigating the risks associated with supply chain disruptions at the very local level, improving the overall food system and enhancing participative governance strategies (Blay-Palmer, et al., 2018).

2.1.1. Three pillars of the City-Region Food System

To comprehensively analyze the concept of CRFS, an initial, but fundamental, source is *Building sustainable and resilient city region food systems-Assessment and planning handbook*. This recent tool developed by FAO provides the fundamental knowledge that is necessary to rely on, if aiming at dealing with CRFS. It assesses the three theoretical pillars at the basis of the approach: territoriality and the concept of city-regions, the food system approach, and the multistakeholder engagement and participatory governance (FAO, 2023).

2.1.2. Territoriality and city-regions

Concerning the first concept, FAO partially relies on previous theoretical conceptualization of city-regions, quoting Rodriguez-Pose's work, and affirms that it consists in a larger urban center, or in a conglomeration of smaller urban centers, surrounded by peri-urban areas and rural hinterland (FAO, 2023; Rodrìguez-Pose, 2008).

Yet, the area of interest is not as fixed as it seems: "the region is more than the sum of its locals" (Clancy & Ruhf, 2010, p. 4); in geographical terms, this entails that the city-region is not only composed of urban spaces fitting within a larger rural area; rather, several urban centers are expected to be reciprocally connected by links that pass through multiple municipal boundaries and entail several fields of connection (FAO, 2023). The accent is put on the coexistence of urban, peri-urban and rural areas affirming that all these parts are actively involved in generating a "city-region".

The purpose consists in providing a spatial framework that is inherently rooted in local contexts and that addresses cities of all sizes along with their neighboring regions. It shall be adaptable to the unique characteristics of each area, leveraging existing regional assets and addressing specific local challenges to create a more resilient and integrated food system (Blay-Palmer, et al., 2023).

Yet, the decision to set unfixed boundaries and to allow different contexts to self-determine the extension of the own city-region, starkly contrasts with the clarification provided by the UN-HABITAT in collaboration with other entities, who affirm that city-regions consist of areas

"within which the connections between one or more cities and the surrounding rural land are intense and functionally (economically, socially, politically and geographically) connected. These areas are typically 80-100 km across and occupy

up to 10,000 km²" (SALGA, UN-HABITAT, & South African Department of Human Settlements, 2018).

Hence, if the city-region was already provided with a spatial framework possessing explicitly set boundaries, is it possible to subject the perimeter-setting to each independent context's decision?

The CRFS approach is grounded in a territory-led perspective, affirming that what matters are the connections among urban centers, seen as vital to creating more sustainable and locally integrated food systems. The approach focuses on how local spaces shape food systems and highlights the importance of governance structures that are participatory and representative of the region (Blay-Palmer, et al., 2023). While recognizing the role of national and global food networks, the emphasis is put on reducing reliance on external inputs and prioritizing local food production to increase resilience and stability (Jennings, Cottee, Curtis, & Miller, 2015).

Other important scholars, like Dubbeling et. al (2017), affirm that "the CRFS concept builds on and brings together a number of different traditions and epistemologies" (ibid., p. 3). CRFS' conceptual innovation relies on the intention of establishing a territorial approach for urban food systems governance, encompassing food systems' interrelations with urban-rural areas. In spite of other works on food, CRFS gives relevance to the unique processes that characterize the selected space. Consequently, the role of territorial connections, encompassing not only the relations between food in urban and rural zones but also the flows of nutrients, water, and energy within cities, and the embeddedness of food systems in their territorial contexts, are responsible for defining the city-region extension (Schejtman & Berdegué, 2008).

Therefore, the gathering of processes that might be relevant to consider, paves the way for the first crucial task requested when applying this approach: defining the boundaries of a CRFS; indeed, city-regions' perimeters are expected to account for a variety of overlapping criteria and dynamic factors (FAO, 2023). For this reason, the limits are not fixed but rather fluid, as is the approach itself. Hence, they might be shaped by administrative and jurisdictional areas, but also by natural geographic features, and by population densities too (FAO, 2023; Roosendaal, et al., 2020).

In analyzing Allen and Cochrane's work, Battersby and Watson reflect on the acknowledgment that tensions exist between the traditional concept of regions as fixed, and the emerging view of regions as fluid, relational spaces (Allen & Cochrane, 2007). In this, the contrast between traditional urban hierarchies and evolving relational urban networks has become central to the debate, a dynamic that Harrison and Growe (2014) refer to as the territorial/relational divide. CRFS might

bring successful contributions to this, because it encompasses agricultural zones and the presence of food industries that are vital to the region's food supply. In particular, Short Food Supply Chains (SFSCs) might play a crucial role in shaping the city-region by directly impacting its economic structure (Gonz´alez-Azc´ arate, Cruz-Maceín, Bardají, & García-Rodríguez, 2023). By reducing the gap between where food is produced and consumed, SFSCs help protect and support local agriculture in areas surrounding urban centers, defining the boundaries of the city-region. This approach, when integrated in CRFS, leads to a more connected region, where agricultural production and urban needs dialogue with success, strengthening local economies and fostering tighter links between rural and urban areas (Millard, et al., 2022).

Nonetheless, according to FAO, although the assessment of the unique territorial processes to consider is crucial, the definition of boundaries is not fully relevant at the beginning; indeed, as stated by FAO (2023), "the initial boundaries may subsequently be revised as more data emerges" (ibid., 6).

Finally, the challenge lies not only in determining the physical boundaries but also in developing governance structures capable of spanning the innovative different administrative, political, and sectoral divisions, that could emerge. Indeed, since food systems exist across multiple jurisdictions, finding an appropriate governance framework might also mean changing existing structures to enable better integration and collaboration across regions. This realignment requires a careful balance between maintaining existing policies and geopolitical interests and building new, flexible systems that can bypass traditional boundaries. The need for comprehensive coordination across sectors and geographies can create tensions, but it is essential if aiming to ensure an effective CRFS, really capable of fostering cooperation between rural and urban actors to create food governance (Roosendaal, et al., 2020).

2.1.3. Food systems approach

Secondly, via the CRFS approach, FAO intends to stimulate the achievement of more sustainable food systems. In saying so, FAO affirms that they must concurrently yield positive outcomes across three pivotal dimensions: economic, social, and environmental (FAO, 2023; Maye & Duncan, 2017). Economically, it means stimulating profitable activities undertaken by each participant or support service provider within the system. The different activities should benefit diverse stakeholders, regarding, par example, wages for laborers, tax revenue for governments, profits for enterprises, and cheaper food purchases for consumers (Cirone, et al., 2023).

On the social front, a sustainable food system is characterized by equitable distribution of economic value-added, with particular attention to marginalized groups. Crucially, activities within the food system should contribute to the promotion of vital socio-cultural outcomes on several levels, finally leading to resilient and sustainable food systems.

In terms of environmental considerations, sustainability is achieved if the impact of food system activities on the natural surroundings diminishes (Thomas, Alpha, Barczak, & Zakhia-Rozis, 2022). This encompasses a broad evaluation of biodiversity, water resources, soil health, the well-being of animal and plant species, carbon emissions, water usage, food wastage, and the presence of harmful substances (FAO, 2018).

The second pillar relates the sustainability of food systems to the concept of resilience; yet there exists a lack of clarity concerning this mutual relation. In detail, food systems are resilient if they can endure disruptions without compromising food security, incorporating built-in redundancy, where various components can replace one another to absorb stresses and shocks (Carey, Larsen, Sheridan, & Candy, 2016). Also, the resilience feature is evident if the food system is adaptable, capable of recovering quickly from crises, and able to adjust to evolving circumstances.

When combined with the principles of sustainability, such a system would have several key features: it would be able to source food from multiple geographical areas, without relying on single powerful suppliers; it would have diversified supply chains that include both large- and small-scale production systems, utilizing a variety of distribution methods, including both commercial and community-based sources (Dubbeling, Carey, & Hochberg, 2016).

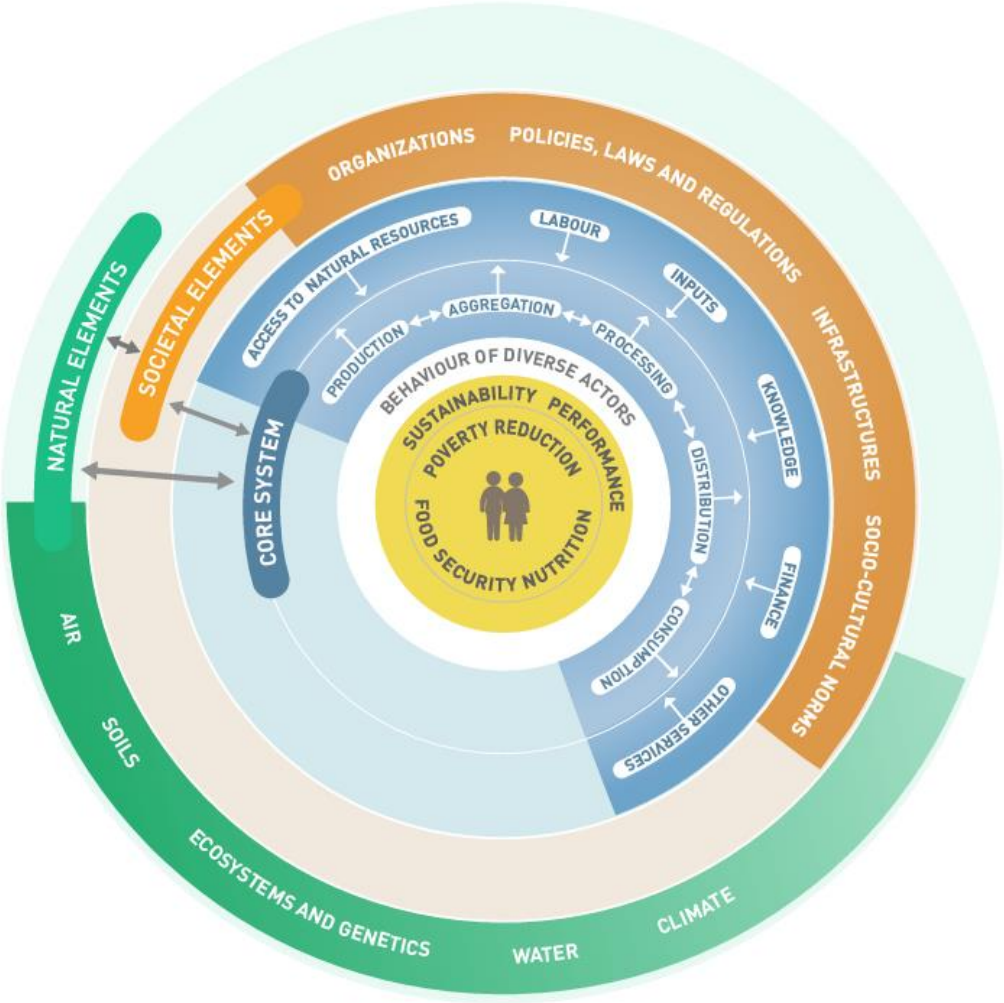

Figure 5: The wheel of Sustainable Food System
Source: FAO, (2018), *Sustainable Food Systems: concept and framework*, FAO.

Additionally, a sustainable and resilient food system would harness waste streams, such as wastewater and food waste, for production purposes, and it would create synergies across different policy goals, such as improving access to healthy food and generating employment opportunities (Dubbeling, Santini, Bucatariu, Vogt, & Eisenbeiß, 2016). Ultimately, the system would be people-centered, ensuring that individuals benefit from better access to nutritious, sustainable food and meaningful engagement with the food system as active participants (Levkoe & Sheedy, 2017).

Figure 5 provides a visual representation of the targeted FAO's Sustainable Food System, displaying it in concentric circles. At the furthest borders, the climate and environmental issues stand as pivotal. At the circles' core, it lies the theme of

poverty resolution and food security, which are also critical aspects to address in food systems' governance. This underlines the significance of considering social aspects within the framework of resilient and sustainable food systems.

By placing food security at the heart of the system, it emphasizes the fundamental need to ensure that all individuals have consistent access to sufficient, safe, and nutritious food. This passes through a full transformation of food systems, requiring addressing both the scale and the depth of needed changes (Roosendaal, et al., 2020). It requires more than improving current practices or refining relationships: as affirmed by van Bers et al., (2016), the transformation shall entail social-ecological-technical drivers as well. This can relate, on one side, to a reconfiguration that cuts across sectors and scales, aiming at creating new intersections. On the other side, in terms of depth, this transformation might go beyond merely optimizing the existing practices and rather implying a redefinition of what is considered right and just, establishing new norms and values that form the foundation of a reimagined food system (Wigboldus, Brouwers, & Snel, 2020). In other words, this is not just about changing the way in which things are done, but about changing the entire framework that defines how the system operates (Roosendaal, et al., 2020).

It is relevant to underline that food security is conceived as totally inserted within the co-commitment of "diverse actors", meaning that it is a primary responsibility of all parts of the food systems (FAO, 2023). This implies investigating the power relations and structural inequalities that exist within the CRFS context. Indeed, few powerful actors often exert significant influence on how the food system functions, shaping its structure in ways that can reinforce inequality and injustice (Duncan, Levkoe, & Moragues-Faus, 2019). For a successful transition to sustainable food systems, it is important to address these power imbalances and find ways to establish a more just and equitable system (Roosendaal, et al., 2020). By doing so, it is possible to ensure that all stakeholders, particularly marginalized groups, have an active role in shaping the future of food systems, promoting a fair transformation. For this reason, it is important to understand how a participatory inclusive governance process should be set up.

2.1.4. Multistakeholder engagement and participatory governance

Finally, the CRFS approach is expected to rely on a highly participatory process to engage all pertinent stakeholders (FAO, 2023). CRFS places a strong emphasis on the network of actors involved in food governance, rather than solely focusing on the territorial framework of the food system. This actors-driven perspective shall enable a more dynamic and flexible system that connects various stakeholders and

spaces (ibid.). While some critiques highlight the complexities of managing city-regions, the emphasis on networks in CRFS governance is perceived as an advantage (Battersby & Watson, 2020; Jessop, Brenner, & Jones, 2008). Rather than being constrained by rigid final definitions, the network approach fosters greater adaptability and inclusion.

It is clarified that, across the government capacity, what is pivotal is the participation expansion. This allow for more diverse voices to participate in decision-making processes and ensures that UFP are responsive to the needs of different communities, adopting a bottom-up perspective. Indeed, it is argued that contemporary governance no longer operates within rigid territorial boundaries (Harrison & Growe, 2014). Instead, it functions through more flexible and negotiable political arrangements that evolve from networks of relationships, which extend beyond established regional borders (Allen & Cochrane, 2007). This shift moves away from the hierarchical, tightly defined notion of urban regions toward a more networked perspective, where governance is shaped by connections that cross territorial lines (Battersby & Watson, 2020).

The composition and diversity of stakeholders involved in CRFS varies according to the specific city-region under consideration (ibid.). Indeed, although some may perceive specific groups of stakeholders to be always pertinent, regional contexts differ a lot; hence, it is not possible to define the composition *a priori*. Rather, it is necessary to determine who qualifies as a strategic stakeholder (Roosendaal, et al., 2020). Surely, it is relevant to compose governance structures that are tailored to reflect local relevance and priorities (Harper, Shattuck, Holt-Giménez, Alkon, & Lambrick, 2009). Ensuring that the relevant stakeholders are strategically involved in these governance frameworks is essential, as their participation helps building trust, fosters collaboration, and creates a shared understanding of the challenges and opportunities (Roosendaal, et al., 2020).

The selection process is not simple, because several forces shall be accounted, and they require both vertical (between local, regional, national, and supranational institutions) and horizontal (between public- private-civil societies) collaborations (Neuman & Hull, 2009; Axinte, Mehmood, Marsden, & Roep, 2019). Furthermore, as defined by Roosendaal et al., in-systems interactions can occur in "three directions: upward (international level), downward (to local level) and outward (civil society and non-state actors)" (2020, p. 11).

Cooperative processes, that involve different and multiple stakeholders, hold the potential to empower local governments and policymakers in making well-informed decisions; nevertheless, this multitude of actors necessitates careful negotiation and deliberation to achieve optimal outcomes (Arthur, Sanderson,

Tranter, & Thornton, 2022). Indeed, while such a diverse variety of actors can offer substantial benefits, it is compelling to understand that, managing the inherent diversity of interests, poses significant challenges in terms of feasibility (Axinte, Mehmood, Marsden, & Roep, 2019). For this reason, specific research concerning the food system's actors involvement shall be carried out, primarily dealing with two crucial tasks: the stakeholder mapping, which entails dialoguing with these subjects to connect them, and the visioning, aimed at creating consensus and bottom-up knowledge concerning the systems' specifics and its potential changes (FAO, 2023).

Behind the research, a larger acknowledgement shall be consistent: the principle of stakeholder engagement is closely tied to the concept of "resistant governance", which advocates for shifting power into the hands of small food producers, social movements, and consumers (Hospes & Brons, 2016). This approach emphasizes the importance of empowering vulnerable groups too, to create more equitable and sustainable food systems, rather than merely making them more relevant in the framework of dominant capitalist food systems. By giving these key actors a greater role in decision-making, resistant governance seeks to challenge existing power dynamics and promote a food system that is driven by fairness, sustainability, and local control.

The key strength of CRFS is its ability to offer a flexible yet structured way to bridge gaps in governance. While UFP may differ from city to city, the common thread that binds them is the intention to connect and create synergies between different public domains of food governance (Wiskerke J. S., 2009). This focus on collaboration across spaces and sectors makes the CRFS a potentially successful model to globally respond to the hypermodern food systems driven by neoliberal market fundamentalism. In other words, as mentioned by van Osch & Archontaki (2023), CRFS might mark the emergence of the alternative food geography advocated by Wiskerke, which should foresee "new relations between the state/public sector, the market and civil society" (2009, p. 376).

2.2. A critical theory examination

The CRFS approach has gained progressive attention, becoming one of the most important pillars in the recent debate on UFP, aiming to connect sustainable food systems with regional areas connotated by the presence of larger and smaller urban centers. As mentioned before, CRFS offers a more comprehensive perspective than others because, in addition to the physical description of food systems, it incorporates a consideration of the regional dimension with a particular focus on governance aspects (Tecco, Bagliani, Dansero, & Peano, 2017).

Before delving into the specific application of CRFS, it is essential to start by establishing a clear understanding of the concept of "city-region". This foundational step is crucial, as the notion of city-region gives a very specific spatial connotation, but it concerns much beyond its primary meaning; therefore, it is fundamental to investigate where it emerged and what meanings it still produces.

At first, it is helpful to initiate the process by relying on the knowledge produced by Rodriguez-Pose, given that he is the primary reference of one of CRFS' fundamental texts; indeed, Blay-Palmer et al., define city-region as the critical lens for reading processes that occur at the space between cities and nations' sphere of relevance (2018), extracting it from the larger tradition of studies on regional and economic geography.

For what concerns the protagonist of this reflection, the city-regions, Rodriguez-Pose affirms that they

> "tend to coincide with relatively large cities or with systems of medium-sized cities in close geographical proximity, that articulate the economic and social developments of suburban, periurban, and rural hinterlands. This interaction between an urban core and its semi-urban and rural hinterland is the essence of the city-region" (Rodrìguez-Pose, 2008, p. 1025).

The definition is rather clear: it focuses on a specific urbanized area highlighting its inter-relations with the surrounding environments. Nonetheless, Rodrìguez-Pose does not limit his analysis to this definitional sentence; rather, he affirms that, "despite its increasingly widespread use, there is no commonly accepted definition of what a city-region is" (Rodrìguez-Pose, 2008, p. 1027). This sentence is not given per se; rather, it is the product of reflections that the author develops standing upon previous work, on which he relies to problematize the concept of city-region underscoring its use in the place of other more specific terms (Parr, 2005). The city-region approach is often mis-used with other complementary concepts that emerged towards the end of the 90s and addressed those areas that were characterized by the presence of important urbanized agglomerations and relevant surrounding rural hinterlands (ibid.).

In detail, the beginning of the new millennium witnessed an explosion of different terms that were meant to describe the mentioned spaces; each of them had a specific connotation. Some talked about "world cities" (Hall, 2001), and some addressed "global cities" (Sassen, 2001); the sprawling of different names and extensions, contributed by the usage of several different qualifiers, although used for similar purposes, led to a significant size bias to the final concept of city-region (Rodrìguez-Pose, 2008), which is evident in the theorization of CRFS too. The

ambiguous application of the term city-region has given rise to its application for a wide array of territorial units or combinations at the sub-national level. These include, but are not limited to, metropolitan areas, urban clusters, agglomerations, and other similar spatial entities that exhibit varying degrees of urbanization and economic integration (Ache, 2000).

The complexity of this designation arises from the fact that city-regions can assume diverse forms and functionalities depending on specific geographical, historical, and socio-economic contexts (Scott A. J., 2022). In some instances, they may represent highly integrated and interconnected situations, while in others, they might display more fragmented and localized manifestations (Harrison, 2010).

Nonetheless, it is important to note that this phenomenon is not confined to any region or continent; rather, city-regions have become competitive economic frameworks of urban landscapes on a global scale (Parker & Harloe, 2015). Consequently, they seem to have lost some of their distinctiveness, given the ubiquity and extensive interconnectivity of the term. In other words, these urban entities, regardless of the terminology it is employed to describe them, have become pervasive features of the modern socio-economic landscape (Scotti, 2012). Rather than consisting of cities surrounded by regions, in strict terms only, they are becoming more curious political and economic entities where, although the fundamental component of a larger city, surrounded by a region, is evident, it is difficult to clearly define their combination.

In general, geographical literature affirms that they now serve as crucial links for the interplay of production, trade, and financial interactions, acting as intermediaries between their immediate national economies and the overarching global system (Rossi, 2017). Additionally, they sometimes overcome national connections and function as economic bridges among different areas in terms of economic growth and investments (Scott A. J., 2022).

As a long tradition of scholars outlines, city-regions can be seen as a “mosaic” (Scott A. J., 1998) or “archipelago” (Veltz, 1996) of numerous interconnected nodes that sometimes dialogue and cooperate, sometimes fight and struggle to obtain major economic power; the constant feature is the ceaseless nature of these processes.

In this context, Brenner and Theodore’s insights provided a foundation for understanding the evolving landscape of these frameworks (2002). Their work allowed to insert the emerging role of city-regions as economic poles in the post-Fordist era: on one side, they emerged as economic actors; on the other side, they consisted of neoliberal experimentations.

Concerning the first feature, from the global perspective, cities started to face a growing geo-economic relevance that was marked by financial volatility, speculative capital flows, strategic global maneuvers by major multinational corporations, and intensifying competition between different regions (Swyngedouw, 1992). In this context of intense disorder, several administrators and policymakers on a local level raised their efforts to adapt local environments to heightened levels of economic unpredictability and even tried to gain advantage of this condition (Jones & Ward, 2002).

While taking part to this new competitive world, aimed at incentivizing investments and job opportunities by relying on extremely localized perspectives, urban agglomerations began market poles of economic competition. Simultaneously, next to the explicit choice of "marketizing" urban frameworks, the scaling back of national welfare state programs and intergovernmental systems has imposed substantial fiscal limitations on cities (Haeley, 2011), resulting in significant reductions in budgets at a time when local social issues and conflicts where escalating in tandem with the consequent need of economic restructuring (Brenner & Theodore, 2002).

Regarding the second characteristics, on the local level, neoliberal initiatives have been directly integrated into urban policy frameworks and cities were transformed into neoliberal experiments towards surrounding hinterlands (Harding, 2007). Territorial conflicts emerged in the shape of local economies discrepancies due to the imposing of shock therapies approaches involving deregulation, privatization, liberalization, and heightened fiscal restraint (Jessop & Stones, 1992). These initiatives were descriptive of a profound transformation within the framework of local and regional governance, which evidently led city-regions to become arenas of new exclusive economic processes (Scott A. J., 2022).

This fragmentation emerges as the consequence of the often-unplanned expansion of the urban periphery, where neighboring municipalities are assimilated into the expanding geographic scope of the city-region. In other words, where some municipalities grow more largely than others, the neighboring towns tend to be assimilated to the largest ones. Consequently, the political landscape of city-regions is typically characterized by numerous municipal governments, each with a strong inclination to prioritize their localized concerns, where a larger municipality possesses a role of advantage and, implicitly or explicitly, expresses it at the detriment of the broader regional community.

Evidently, the critique does not concern the improved governance capacity due to the reduced level of local fragmentation; what the discipline acknowledges as problematic regards the consequent dysfunctional patterns of intermunicipal

competition that do not allow to carry out participatory and inclusive development processes (Moisio, Jonas, Koch, Lizotte, & Luukkonen, 2020).

Although processes concerning city-region installment occurred rather transversally everywhere in the post-World War II era, it is relevant to underline that its impacts were more profound whereas colonial legacies persisted, even after decolonization. Countries that were lately conceived as "economically disadvantaged" experienced a crucial phase of urban expansion without any prior attention to local conditions, due to the large attractiveness that characterized their markets. Export-oriented strategies, international subcontracting, and foreign direct investment rapidly allowed these larger urban hubs to actively participate in the new capitalist landscape (Raiser & Volkmann, 2007), at the cost of an outrage growth that evidently led to severe inequalities and disparities (Scott A. J., 2022).

In the Global South, urban and regional planning was driven by the logics of mega-cluster city-regions to encourage the process of corridor or cluster urbanization (Smit, Musango, Brent, & Kovacic, 2017); meant to stimulate the raise of powerful economic areas, these corridors foresaw the creation of lines of cities self-intersected with the purpose of installing pivotal city-regions nodes (Roy, 2011). "McKinsey and other global consultancies now aggressively promote the creation of city mega-clusters to respond to urbanization as an "opportunity for economic growth" (Datta, 2017, p. 7). The emerging situation resulted in a framework where not only new cities were built with the specific purposes of multiplying the urbanization impact; moreover, they exactly meant to accelerate urbanization of city-regions, by replicating the paradigm for which creating territories that host multiple minor cities, strongly connected to a major one, was profitable, incrementing a belief which found its roots in Western perspectives over urban environments' evolution (Rapoport, 2015).

Nonetheless, unlike high-income nations, while Global South city-regions aim to establish self-sufficiency, their effectiveness is constrained by larger economic policies and sectoral priorities, often focused on exports, that very rarely align with local needs. This issue is compounded by the limited financial and institutional support that local governments receive in many regions, which limits their flexibility and responsiveness (Tacoli, 2023).

In sum, these neoliberal urban policy experiments have a twofold objective. Firstly, they transform urban spaces establishing the ground for market-driven economic expansion. This underscores a shift towards prioritizing economic growth as a central urban development goal. Secondly, and perhaps more critically, they serve to cater to the consumption practices of the elite. This raises critical questions

concerning the potential consequences of such policies on marginalized communities and the overall socio-economic fabric of the city.

Although the Global South cities are not the focus of this work, the problematic condition experienced by this context is relevant to the outline that, in the end, the relationships between cities and their surrounding areas shall be increasingly seen as critical to understanding how cities function within a larger territorial framework and which connections they hold with similar contexts. More in detail, for the city-region concept to serve as a useful lens for addressing complex challenges like food, it is hard to rely on this knowledge, if taken for granted; rather it is essential to interrogate the underlying assumptions behind its adoption.

While the city-region definition can initially suggest a functional and integrated relationship between cities and rural areas, the mentioned debate in the field of regional economic development and planning has highlighted its limitations and the socio-spatial inequalities it can mask.

Therefore, although the city-region perspective often presents urban and rural spaces as neatly interconnected, its reflections deal with a far more complex situation. There are significant tensions related to governance, resources distribution, and power imbalances in and across city-regions. Moreover, the boundaries of these spaces are also not always clear-cut, leading to challenges in policymaking and coordination. Furthermore, the notion that urban centers should drive rural development does not see the distinct processes and needs of rural areas, potentially reinforcing rather than resolving inequalities.

Ironically, the neoliberal orientation of city-regions appears to align well with the interpretation of food systems I have previously outlined, particularly in viewing them as chains dominated by specific actors and processes that reinforce an unequal socioeconomic structure. Rather than genuinely nurturing global populations, these systems prioritize resource extraction from distant spaces, serving primarily to expand the profits of a few. Yet this apparent fit is deeply problematic.

By embracing the market-driven ethos of city-regions, there is a risk of narrowing food systems' governance toward an alignment with economic priorities, sidestepping the deeper systemic changes needed for a truly inclusive and sustainable approach.

Moreover, significant critiques challenge the feasibility of confining complex, multi-dimensional processes, such as food systems, within a single, integrated urban space. As Healey observed, the attempt to capture "critical economic, social, political, and environmental relationships" within a unique urban framework has become highly problematic (Healey, 2009, p. 832). The overlapping nature of these

relationships suggests that, while spatially defined city-regions offer spatial dimensional clarity, they may simultaneously lose the fluid, multi-scalar dynamics that defy their purely integrated spatial model. In other words, simply stating that a "city-region", as a unit of reflection in the context of food systems, is pertinent, may be null.

Finally, the flexible and ambiguous nature of this area's boundaries requires a closer look at how the city-region is spatially and conceptually framed for the specific purpose of installing the CRFS initiative. Otherwise, according to Battersby and Watson, the "model is misleading and falls into the local trap identified by Born and Purcell" (2019, p. 514). Here, the local trap theory suggests that objectives and strategies are confused, treating localization as an end rather than as a pathway to achieving broader goals of sustainability and justice (ibid.).

The lack of clear territorial delineation, especially considering the intention of creating blurred boundaries of regions, makes it difficult to fully understand the scope and scale of CRFS, raising concerns about how to best integrate diverse actors and spaces within a cohesive governance structure in the framework of city-regions.

3. The City-Region Food System through a PRISMA

Given the complexities of the city-region's dimension of CRFS, it is important to examine whether this theoretical definition can be successfully integrated into discussions about food systems.

CRFS, with its food-related territorial dynamics, stimulates the understanding that interactions between urban and rural are crucial, but falls short in taking into consideration the information that geography released in this context. Hence, the question is: how does the City-Region Food System approach integrate the knowledge given by the city-region perspective?

To explore this further, I consider it necessary to conduct a Systematic Literature Review to understand whether the CRFS framework engages meaningfully with the complexities of the city-region concept. This review can help determine if the application of the city-region to food systems is aware of the precedent knowledge, or if it contains oversights.

The review followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method (Page, McKenzie, Bossuyt, & al., 2021), as likely done elsewhere (Gori & Castellini, 2023). This method is widely recognized for ensuring a systematic review's quality, transparency, and replicability, thanks to its checklist that guides the process through multiple transparent phases. PRISMA also enhances the clarity of the review by including a flowchart that details each step, from identifying and

screening articles to determining their eligibility and inclusion in the final analysis (Tab. 6).

To conduct the literature search, two databases were selected: Web of Science (WoS) and Scopus. These platforms were chosen because they are widely recognized for hosting a vast collection of high-quality, peer-reviewed publications, and they cover the largest range of multidisciplinary topics. To identify relevant articles for the analysis, the keywords "City-Region* Food System" were searched.

Database	Search String	No. of Results
Scopus	TITLE-ABS-KEY (city-region* AND food AND system) AND (LIMIT-TO (DOCTYPE , "ar"))	111
Web of Science	TITLE-ABS-KEY (city-region* AND food AND system) AND (LIMIT-TO (DOCTYPE , "ar"))	110

Table 6: Search strategy

Source: Author's elaboration

3.1. Search strategy

As visible in Figure 6, the selection process of the relevant literature followed specific stages; the most important ones were screening and eligibility. As illustrated in the provided figure, the process began with an initial identification of 221 records from two databases: Scopus (n = 111) and Web of Science (n = 110). First, duplicate records were removed, which reduced the sample to 135 articles.

Then, the remaining records were assessed by their title and abstract to determine their relevance to the research scope; in particular, they underwent a screening phase based on specific inclusion criteria. Articles were selected if they met the following conditions: (a) they focused on both food systems and city-region topics; (b) they did not mention the Global South as the specific field of research.

Concerning the criteria (a), the need regards exploring how literature addressed the interconnectedness of urban and rural dynamics within the framework of food

systems; on the other side, the criterion (b) is driven by the desire to bring forth knowledge from contexts that share similarities with the one at the heart of this research[19]. This focus does not imply that food systems or city-region research from other contexts is irrelevant. Instead, my choice depends on the aim of conducting a highly effective SLR by maintaining a coherent and tightly aligned body of research.

Papers that did not meet the outlined criteria were excluded, resulting in the removal of 54 articles.

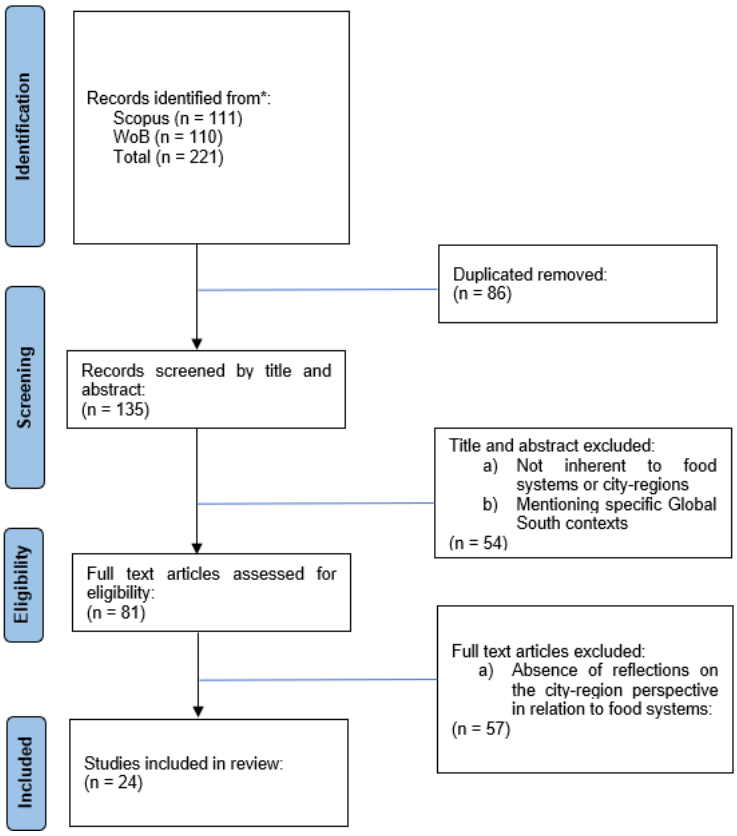

Figure 6: The literature review developed according to the PRISMA strategy
Source: Author's elaboration on PRISMA 2020 Checklist available at: https://www.prisma-statement.org/prisma-2020-checklist

Following this, 81 full-text articles proceeded to the eligibility stage, where a more detailed evaluation was conducted. Each paper was reviewed to ensure it contained relevant reflections on city-region perspectives within food systems. Papers were considered relevant if some theoretical reflections on the

[19] See Chapter IV for further information.

conceptualization of city-regions, in the context of food systems' understanding, were available. At this point, 57 articles were excluded as they lacked the necessary focus on the city-region framework in the context of food systems.

The final sample consisted of 24 studies that met all the criteria and were therefore included in the analysis.

3.2. The criteria behind the sources' selection

At this stage, the analysis of the selected research articles is guided by the aforementioned key question: (a) how does the City-Region Food System approach integrate the knowledge given by the city-region perspective?

To address these questions, the selected articles are organized into an Excel table that captures all relevant information. The data extracted from the articles and included in the table are: (1) Title; (2) Authors; (3) Year of publication; (4) Source title (journal); (5) Main topic; (6) Secondary topic; (7) Reflection on city-regions; (8) Key extracts. This structured organization of the dataset facilitated the management of the research and greatly simplified the analysis of the results.

The analysis is structured into two distinct sections for a clear and thorough understanding. Section 3.3.1 provides detailed information on specific elements from the selected studies, including the main research themes, the year of publication, and the number of case studies examined. This section lays the foundation for understanding the scope of the research and the academic context in which the studies taken into consideration were carried out.

Section 3.3.2 offers a focused and in-depth analysis of how the concept of the city-region is addressed within the literature on CRFS. This section critically examines the reflections that are brought to support the use of the city-region approach in food systems' understanding, if adopting the CRFS perspective. Hence, the final purpose consists in exploring how various studies had critically conceptualized the adoption of the city-region approach in the context of CRFS.

3.3. How does the CRFS acknowledge the city-region's theory?

3.3.1. An overview of the literature

The selected works are categorized based on their exploration of key themes related to the CRFS framework. These themes were identified by analyzing how the studies address critical issues within this context. Seven distinct categories emerged from the review:

2. Food system's governance
3. Food supply and distribution
4. Sustainability
5. Urban agriculture
6. Urban-rural linkages
7. Foodshed
8. Agroecology

Table 7 provides a comprehensive overview of the topics discussed in each study. It is important to note that these categories often overlap, as many papers address multiple facets at once. For instance, an article focused on food system's governance might also explore sustainability and urban-rural linkages, or other themes too.

Main Topic	Frequency	References
Food system's governance	8	(Arthur, Sanderson, Tranter, & Thornton, 2022; Dansero & Nicolarea, From practices to policies: Constructing food spaces; [Dalle pratiche alle politiche: costruire gli spazi del cibo], 2016; Donald, 2008; González-Azcárate, Cruz-Maceín, Bardajf, & García-Rodríguez, 2023; Lever & Sonnino, 2022; Maye, 'smart food city': Conceptual relations between smart city planning, urban food systems and innovation theory, 2019; Nunes, 2017; Blay-Palmer, et al., 2018)
Food supply and distribution	6	(Armendáriz, Armenia, & Atzori, 2016; Berner, Derler, Rehorska, Pabst, & Seebacher, 2019; Blay-Palmer

		& Donald, 2006; Cardoso & Domingos, 2023; Jensen & Orfila, 2021; van der Gaast, van Leeuwen, & Wertheim-Heck, 2020)
Urban-rural linkages	3	(Weerabahu, Samaranayake, Dasanayaka, & Wickramasinghe, 2022; T., G., D., K., & M., 2014; Battersby & Watson, 2019)
Sustainability	2	(Cirone, et al., 2023; Saci & Berezowska-Azzag, 2021)
Urban agriculture	2	(Marino, Curcio, Felici, & Mazzocchi, 2024; Feldmann, et al., 2023)
Foodshed	2	(Ilieva, Empowering local food connections for resilient city-regions. Planning through foodsheds or terroir?, 2012; Sylla, Swiader, Vicente-Vicente, Arciniegas, & Wascher, 2022)
Agroecology	1	(Vaarst, et al., 2018)

Table 7: Thematic categorization of the articles
Source: Author's elaboration

In cases where a paper involves more than one theme, it is classified under only one category, avoiding any exploration of other potential additional areas. This distinction, therefore, while not definitive and merely reflecting my interpretation, should be viewed as an effort to highlight the primary area of research where the theoretical examination of the city-region in CRFS has been carried out; hence, it is not a final categorization; rather, it means to understand what contribution is given by each field of research.

As visible in Table 7, the most frequently explored topics are food system governance, followed by food supply and distribution, urban-rural linkages, sustainability, urban agriculture, and foodshed.

The city-region concept emerges within these discussions as a framework linking urban and rural areas. In food system governance, city-regions are explored

in terms of how policies integrate these spatial connections. For food supply and distribution, city-regions highlight the importance of shorter supply chains that bridge urban and rural systems. The concept is central to urban-rural linkages, emphasizing their role in strengthening food flows across different landscapes. City-regions also appear in sustainability discussions, focusing on localized food systems that address environmental, social, and economic dimensions. In urban agriculture, city-regions highlight the integration of food production within urban spaces. Lastly, in foodshed studies, city-regions emerge as the key to defining geographic areas that serve urban populations' nourishment sustainably.

Concerning the year of release of the selected research, it is relevant to underline a steady increase in research on the topic over time. Initially, the number of publications remained low, with only one study published per year for a decade.

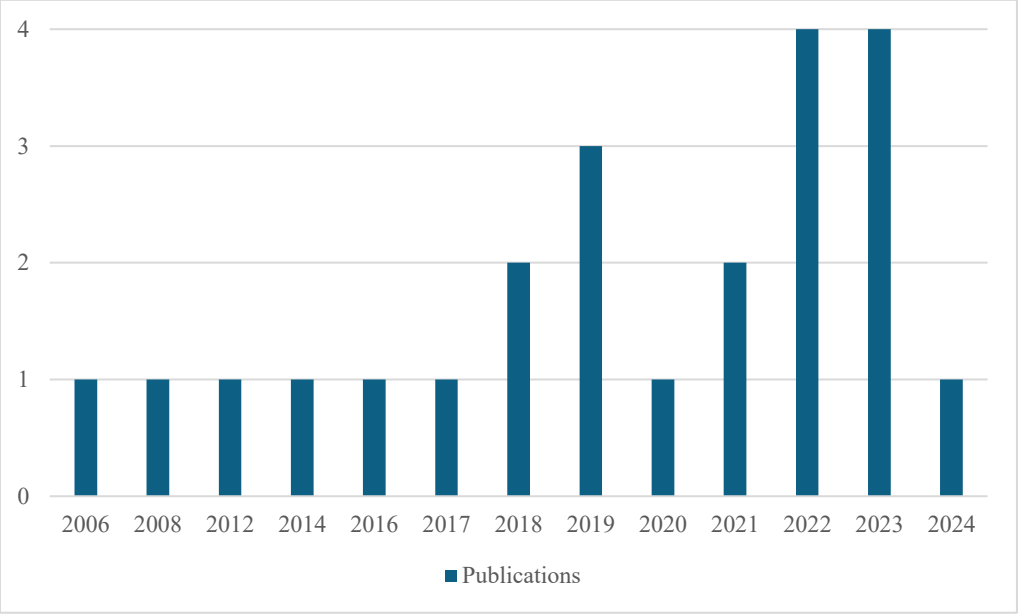

Figure 7: The growth of research concerning City-Region Food System (2006-2024)
Source: Author's elaboration

However, in the last years, there has been a noticeable rise in research activity, with a clear peak in the most recent period. This upward trend indicates growing academic interest and a heightened focus on the topic, especially in the last few years. This is clearly related to the fact that, since FAO released the first works over CRFS, a significant momentum affirmed[20].

[20] Publications in 2024 are few due to the writing of this work in the same year.

Moreover, 4 publications only focus on case studies, and concern the opportunities of CRFS' application to Leeds (United Kingdom), Lisbon (Portugal), Gatz (Austria), and Colombo City (Sri Lanka). 20 publications are entirely or partially theoretical, which is particularly interesting. This suggests that much of the current research in the field might be dedicated to developing conceptual models and frameworks that successfully ground the CRFS approach in a thoughtful understanding of its potential implications.

Therefore, it is now relevant to explore the specific reflections that have been carried out concerning the city-region framework as a context for CRFS.

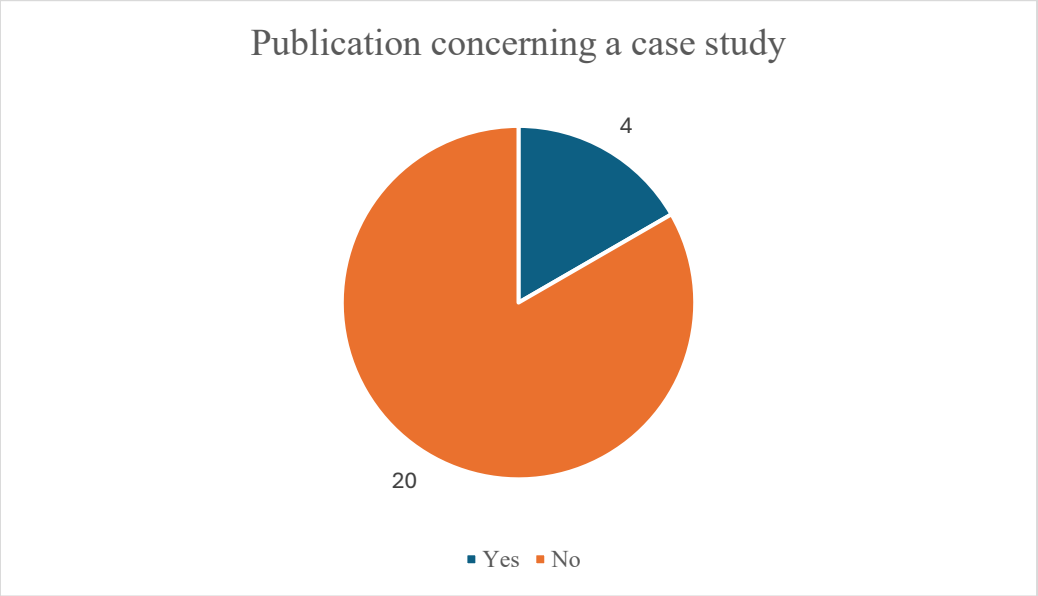

Figure 8: The number of articles that concern case studies (2006-2024)
Source: Author's elaboration

3.3.2. Emerging different interpretations

Articles are now newly categorized according to the way in which they address the city-region concept (Table 8); hence, each of the following terms' grouping gathers the different ways by which the city-region is applied to CRFS in the selected research; the term is chosen in the body of words of a specific article and then, whereas a similar application is evident, the articles are grouped under the same word, even if the author does not use the identical term, but a similar definition.

Unlike what has been done above, the categorization now acknowledges that articles can fall into multiple categories simultaneously, allowing for a deeper

exploration of the blurred conceptualization of the city-region within CRFS. This approach aims to clarify conceptual ambiguities, by outlining the multiple definitions that are adopted in literature.

Presenting the results, it emerges that the city-region is interpreted as a normative concept: it is discussed as a transformative approach to foster larger improvements in food systems.

Then, it is understood as an analytical concept in studies focusing on understanding and assessing complex interactions between urban and rural areas, particularly in food system governance and supply. These studies use the city-region approach to examine interdependencies in CRFS.

Third, the city-region emerges as a socio-ecological system: this perspective highlights how city-regions consist of networks and spaces of interaction between humans and environmental elements, particularly around sustainability and agroecology, emphasizing the interconnectedness of social and ecological dimensions.

Fourth, the city-region is conceived as a scale; it focuses on the geographic and operational boundaries of food systems, especially regarding urban-rural linkages and foodsheds, stressing the importance of the city-region as a functional scale of operation.

Finally, the city-region is conceived as a process. It is explored in studies analyzing how the urban context has emerged as featured by a city and its unique region.

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Main Topic	**Frequency**	**References**
Normative concept	16	(Arthur, Sanderson, Tranter, & Thornton, 2022; Battersby & Watson, 2020; Blay-Palmer & Donald, 2006; Blay-Palmer, et al., 2018; Cardoso & Domingos, 2023; Forster, Santini, Edwards, Flanagan & Taguchi, 2014; González-Azc árate et al., 2023; Lever & Sonnino, 2022; Saci & Berezowska-Azzag, 2021; Dansero & Nicolarea, 2016; Vaarst, et al., 2018; Maye, 2019; Ilieva, 2012;

		Donald, 2008; Feldmann, et al., 2023; Nunes, 2017)
Analytical concept	10	(Battersby & Watson, 2020; Berner, Derler, Rehorska, Pabst, & Seebacher, 2019; Blay-Palmer, et al., 2018; Dansero & Nicolarea, 2016; Forster, Santini, Edwards, Flanagan, & Taguchi, 2014; Gonz´alez-Azc´ arate, Cruz-Maceín, Bardají, & García-Rodríguez, 2023; Jensen & Orfila, 2021; Lever & Sonnino, 2022; Ilieva, 2012; Nunes, 2017)
Socio-ecological system	9	(Arthur, Sanderson, Tranter, & Thornton, 2022; Armendáriz, Armenia, & Atzori, 2016; Cirone, et al., 2023; Lever & Sonnino, 2022; Marino, Curcio, Felici, & Mazzocchi, 2024; Saci & Berezowska-Azzag, 2021; Sylla, Swiader, Vicente-Vicente, Arciniegas, & Wascher, 2022; Vaarst, et al., 2018; González-Azcárate, Cruz-Maceín, Bardajf, & García-Rodríguez, 2023)
Scale	6	(Armendáriz, Armenia, & Atzori, 2016; Maye, 2019; Sylla, Swiader, Vicente-Vicente, Arciniegas, & Wascher, 2022; van der Gaast, van Leeuwen, & Wertheim-Heck, 2020; Weerabahu, Samaranayake, Dasanayaka, & Wickramasinghe, 2022; Nunes, 2017)
Process	4	(Arthur, Sanderson, Tranter, & Thornton, 2022; Cirone, et al., 2023; Marino, Curcio, Felici, & Mazzocchi, 2024; van der Gaast,

	van Leeuwen, & Wertheim-Heck, 2020)

Table 8: Categorization of the CRFS-related articles according to the interpretation of city-regions

Source: Author's elaboration

3.3.3. Normative concept

The most widely adopted conceptualization of the city-region in the context of CRFS is as a normative concept. According to Turner, a normative concept is "a special realm of fact that validates, justifies, makes possible, and regulates" (2010, p. 1). This perspective, in the field of CRFS, is clearly articulated by Battersby, who states,

"The city region is therefore presented as […] a normative concept: a city-region food systems approach aims to improve the linkages between urban areas and their rural hinterland and between consumers and nearby food producers to create social, economic, and environmental benefits" (Battersby & Watson, 2019, p. 500).

In this framework, the city-region immediately emerges as a paradigm which is adopted to foster systemic changes, helping to enhance the understanding of the complex spatial relations that cut across urban and rural areas, with the specific purpose of transforming them (Lever & Sonnino, 2022; Blay-Palmer, et al., 2018).

Others add that the city-region approach contributes to addressing broader challenges that affect both urban and rural areas, offering a more sustainable model for the relationship between cities and their surrounding regions (Gonz´alez-Azc´arate, Cruz-Maceín, Bardají, & García-Rodríguez, 2023). Hence, they consider city-regions as a transformative continuum, emphasizing rural-urban connections through social, functional, and agroecological interactions that link activities within the food system (Cardoso & Domingos, 2023). Forster et al., further emphasize that optimizing the full suite of food system outcomes at a city-regional level offers numerous benefits in terms of multiple issues' connections; according to the authors, some of these benefits are still being discovered and cataloged (2014). Their work is meant to display that the city-region context can strengthen urban-rural linkages and contribute to a more resilient, sustainable food system; although a precise investigation of the approach is not evident, according to the authors, the city-region can support local food economies but also strengthen social and ecological relationships between urban centers and their rural surroundings (ibid.). A similar position is adopted by Feldmann et al. (2023), whose reflections define

the city-region as meant to thrive a shift in food production by encouraging producers to tailor their products to meet local urban market needs, enabling direct sales, promoting shorter supply chains, and fostering closer connections between producers and consumers.

Moreover, Lever and Sonnino shed light on the intricate nature of the conventional food system, where conflicting aims among various actors, institutions, and policies often lead to inefficiencies and systemic dysfunction, bringing the innovative contribution given by the city-region approach in providing transparency (2022). Here, the city-region emerges as the critical node of the intersection of urban-global governance and urban-rural development, serving as a dynamic and negotiated zone of transformation (Dansero & Nicolarea, 2016). This space becomes the context where food justice-related outcomes are addressed more effectively, leveraging the strengths and challenges of both urban and rural areas (Nunes, 2017).

The city-region approach in CRFS acknowledges the interconnectedness of these regions, using governance structures that span local, regional, and global levels to foster sustainable development and equitable food systems (Donald, 2008). Additionally, Maye argues that the city-region framework encourages the development and implementation of a more integrated and holistic approach to urban food systems planning (Maye, 'smart food city': Conceptual relations between smart city planning, urban food systems and innovation theory, 2019). This integrated approach not only aligns various stakeholders' efforts but also promotes collaboration across sectors, offering a coordinated and sustainable vision for food system governance (Battersby & Watson, 2019). The city-region, in this conceptualization, is not just a geographical or economic unit, but a space for experimenting innovative processes of participatory governance.

Finally, the city-region shall serve as a platform for rethinking the governance, making it a powerful tool for exploring complex relationships and systematic problems within food systems, stimulating "different traditions and epistemologies on how food systems are governed" (Arthur, Sanderson, Tranter, & Thornton, 2022, p. 12). Through this lens, the city-region approach helps to address issues related to urban-rural linkages, resource distribution, and policymaking, offering a more cohesive and efficient framework for managing food systems and solving the critical challenges of sustainability and resilience.

3.3.4. Analytical concept

The city-region emerges also as an analytical framework, particularly in examining the widening "disjunction" between urban centers and the rural

territories. The city-region framework serves as a lens to critically assess the flows of resources and their direction (Battersby & Watson, 2019, p. 500).

The city-region concept, as Battersby and Watson point out may act as a tool to decode the dependencies and power imbalances between urban and rural frameworks. Rather than seeing these areas as distinct zones, the city-region "is therefore presented as an analytical concept to try to explain the relationship between urban areas and their surrounding regions" (Battersby & Watson, 2019, p. 501). This perspective is meant to highlight the mutual influences between urban demands and rural resources allocations, with food production and ecosystem services at the focus of the analysis. Ilieva, quoting the work of Steel (2009), further encapsulates this vision of the city-region model, suggesting that food becomes "a lens through which to see the connectedness of things" (Steel, 2009, p. 21; Ilieva, 2012). This perspective underscores the city-region not only as a site to analyze the production and consumption but as a dynamically connected space where food weaves social, economic, and ecological relationships together, bridging the analytical and normative conceptualizations.

Blay-Palmer argues that the city-region approach is critical for identifying the shared pressures of complex spaces, focusing on climate stress, soil degradation, and water scarcity, which transcend administrative boundaries (2018). By integrating these areas into a shared analytical space, the city-region model encourages a reframing of food systems as intersected with broader ecological cycles, which no single urban or rural community can manage alone (Forster, Santini, Edwards, Flanagan, & Taguchi, 2014). This holistic approach not only challenges traditional urban-rural divides but also advocates for cooperative frameworks that recognize shared vulnerabilities and interdependencies. Others highlight that the city-region approach maps resources' flows, fostering innovation through a detailed understanding of these circulations (Gonz´alez-Azc´ arate, Cruz-Maceín, Bardají, & García-Rodríguez, 2023). By spotlighting these flows, the city-region framework allows for more strategic interventions, where innovations can be tested, scaled, and adapted in other regions, creating a network of interlinked solutions that promote sustainable practices on a broader scale.

Lever and Sonnino argue that the city-region serves as a "prism" through which the often-competing demands of various food system actors can be critically examined (2022). CRFS exposes the tensions between rural producers seeking fair compensation and sustainable practices and urban consumers accustomed to low-cost, readily available goods. It also sheds light on policy disparities that can exacerbate these divides, finally possibly advocating for a holistic approach that balances economic interests with social and environmental priorities (ibid.).

The city-region concept might also embrace a vision of the territory as a "foodshed" capable of supporting its population with locally sourced food, within a roughly 100-mile radius (Dansero & Nicolarea, 2016). This concept of the foodshed, with its defined yet adaptable boundary, means to acknowledge what food-related dependencies exist in a specific framework. In this view, the city-region holds the analytical power useful to uncover the latent potential for local food self-reliance, strengthening food systems and reducing dependencies on global supply chains.

3.3.5. Socio-ecological system

The city-region is often understood as a "territorially integrated node of a socio-spatial architecture", reimagining and intensifying the ties between cities and the surrounding frameworks as systemic (Lever & Sonnino, 2022, p. 2020). In this conceptualization, "cities are embedded in wider systems, which are ecosystems regions where human and ecological spheres interact making a single system" (Armendáriz, Armenia, & Atzori, 2016, p. 3). Analyzing the city-region as a socio-ecological entity, overcomes traditional environmental approaches that often misrepresent these domains by treating human and ecological elements as separate spheres (ibid.).

As Saci and Berezowska-Azzag elaborate, this vision of the city-region as a socio-ecological system is founded on the continuous flows of people, goods, resources, and ecosystem services between the urban core and its surrounding landscapes (Saci & Berezowska-Azzag, 2021). Recognizing and fostering these flows enables the city-region to function as a cohesive, balanced system, where human and ecological realms support one another symbiotically (ibid.). "By bringing such interdependencies to the fore, disconnections between cities and their rural hinterlands may be reduced, leading to balanced policies that support fairer distribution of projects across such landscapes" (Arthur, Sanderson, Tranter, & Thornton, 2022, p. 12). Clearly, this requires a sophisticated understanding of the interconnected feedback mechanisms that define its structure and functionality, particularly within food systems (Vaarst, et al., 2018; Sylla, Swiader, Vicente-Vicente, Arciniegas, & Wascher, 2022). As Armendáriz, points out, a framework that maps these feedback loops and the core components driving the food system helps reveal the relational dynamics and adaptive capacities inherent within the city-region (2016).

City-regions, as sites of food system sustainability, also exemplify the complexity of intersecting supply chains, pathways of impact, and a broad array of stakeholders whose roles extend across multiple spatial and social layers (Cirone,

et al., 2023). Cirone et al. emphasize that addressing these intricacies demands a break from the conventional globalized production paradigm, advocating instead for a more localized, holistic view of sustainability which the city-region approach can better provide (2023).

A deeper understanding of city-regions as socio-ecological systems also requires examining the interplay among socio-spatial dynamics, political agendas, and economic strategies (Lever & Sonnino, 2022). These elements collectively shape the city-region's evolution, underscoring the importance of an integrated approach that can account for their complex mutual influences (Gonz´alez-Azc´ arate, Cruz-Maceín, Bardají, & García-Rodríguez, 2023). Others, although they do not conceive the city-regions as the system per se, suggest that integrating agroecological principles into the pursued city-region food system can prompt a profound transformation, reorganizing material flows, social relations, and economic networks within the city-region, which becomes the paradigm of reflection (Marino, Curcio, Felici, & Mazzocchi, 2024).

3.3.6. Scale

Some research interprets the city-region as a matter of scale, particularly when examining urban food systems and their interactions with rural and peri-urban landscapes. This approach frames the city-region as a boundary-setting device within which the complexities of urban and rural interdependencies can be managed holistically (Armendáriz, Armenia, & Atzori, 2016). By defining food systems at the city-region scale, the literature argues for a level that bridges the local demands of urban centers with the production capacities and ecological resources found in surrounding rural areas. "The city region was the most appropriate scale to develop and implement an integrated and holistic approach to plan urban food systems" (Maye, 'smart food city': Conceptual relations between smart city planning, urban food systems and innovation theory, 2019, p. 22).

What emerges from multiple sources is that, whereas the city-region is meant as a scale it becomes critical not per se; rather, it may consist in appropriate tool to bring systemic changes. Research suggests that it is fundamental for UFP's purposes because it captures the full spatial dynamics of food systems, from production to consumption. A core aspect of this scalar approach is that it reveals the extent of food systems as multi-layered networks that require planning and policy to operate within functional boundaries (Weerabahu, Samaranayake, Dasanayaka, & Wickramasinghe, 2022).

Those who adopted this perspective also debate the practical challenges of defining the city-region boundaries, noting that it is both necessary and complex to

determine perimeters that reflect resource flows and interactions. Once again, many explore how city-regions often span multiple administrative, ecological, and infrastructural zones, including "municipalities, rivers, mountain ranges, and watersheds" (Sylla, Swiader, Vicente-Vicente, Arciniegas, & Wascher, 2022, p. 2). This variability complicates the use of rigid geographic boundaries, calling for a more flexible and context-sensitive approach to setting the city-region scale. This scalar flexibility is critical to ensure that UFP policies align with the actual spatial and functional needs of each city-region.

Finally, in this framework, some scholars caution that a narrow focus on the city-region scale risks the "local trap", criticizing the belief that confining food systems to a regional scale inherently leads to sustainability (van der Gaast, van Leeuwen, & Wertheim-Heck, 2020). Van der Gaast et al. emphasize that while the city-region scale is essential, it should not be seen as isolated (2020). Effective UFP must critically assess how this scale interacts with national and global networks, recognizing that resilience depends on both regional self-reliance and broader connectivity.

3.3.7. Process

"As a result of the globalization process, city-regions represent major places of agglomeration" (Cirone, et al., 2023, p. 89). City-regions, significantly shaped by globalization, have emerged as spaces of aggregation of goods, resources, and economic activities. According to authors who adopted this perspective, city-regions operate as strategic nodes within global networks, acting as conduits for regional economic competitiveness.

This consideration strongly embeds its authors within the long tradition of studies concerning city-regions as critical outcomes of 20th century economic processes. Yet, their significance now extends far beyond the purely economic; they are also complex arenas where social dynamics play out and where diverse stakeholder groups found themselves coexisting. The city-region emerged as transcending previous purely urban boundaries, creating a new geographic construct that encompasses a wider sphere of ecological and social interactions (Marino, Curcio, Felici, & Mazzocchi, 2024).

According to Arthur et al. (2022), who quote the work of Eraydin (2011), city-regions can be understood either as products of globalization or as outcomes of the endogenous social dynamics that shape them from within. In other words, they can be seen as the condensation of financial, technological, and human capital aggregation, on one side. On the other side, they can be shaped by internal social movements and bottom-up dynamics that shift attention from purely economic

objectives to an array of goals encompassing environmental sustainability, social justice, and cultural vitality. Such dynamics suggest that city-regions are not only recipients of global forces but are also redefined by the active participation of local communities pushing for greater inclusivity in the governance process (Arthur, Sanderson, Tranter, & Thornton, 2022).

Finally, understanding the historical context of second-tier cities and their surrounding regions is also vital to grasping the city-region as a complex socio-spatial process, as van der Gaast et al. have explored (2020). Historical patterns of economic and social development inform contemporary structures, providing a basis for understanding how these spaces respond to external pressures and internal demands. Examining this background reveals how distinct economic, political, and social experiences shape each city-region's trajectory and underscore the ways in which local histories influence current strategies for addressing globalization's impact.

In response to globalization, city-regions are far more than economic engines; they are evolutive processes which condense in entities where global forces and local dynamics converge. City-regions embody a multifaceted approach to development, one that aligns with sustainable food systems, participatory governance, and a commitment to enhancing quality of life for all inhabitants. (Marino, Curcio, Felici, & Mazzocchi, 2024).

3.3. A problematic finding

The PRISMA-based systematic literature review entailed 24 articles selected after a throughout assessment; it shows that current research on CRFS interprets city-regions in several ways: as a process, as a scale, as an analytical concept, as a socio-ecological system, and most prominently as a normative concept.

When seen as processes, city-regions are understood as the result of the larger globalization of the last century, partially aligning with the more traditional geographical perspectives over this approach. As scales, they are adopted to define the dimension at which the CRFS approach shall exist. The analytical concept emerges according to some research that defines the city-region approach as the clear framework of examination of the relevant features of the food systems. Then, in the socio-ecological system view, city-regions are directly considered the complex integration of human and natural processes, entailing the CRFS approach as a specific component potentially more focused over food-related issues. Finally, the normative concept dominates the literature, casting city-regions as idealized models that shall be actively responsible for the installation of sustainable food systems.

A curious aspect of the current research on CRFS is that, while much of the literature does not actively engage with the economic foundations traditionally associated with city-regions, mentioned above when discussing how geography debated this framework (Rodrìguez-Pose, 2008; Scott A. J., 2022), the CRFS' literature nonetheless implicitly acknowledges earlier geographical works. In detail, it reflects the previous understanding of city-regions as more complex entities, existing in limited connection with other similar contexts. Although this evidence could be biased due to the very partial engagement with the previous geographical studies, considering that almost no quotation was found in the analyzed work, yet it showcases a rich intention of dealing with the city-region areas without taking them for granted.

Still, the PRISMA research displays that theoretical issues exist, considering many works' tendency to believe that the city-region extension is inherently significant to enhance transformation. Indeed, in believing that pre-defined geographical boundaries are possible to establish, a four-folded problematic universal localism emerges (Sonnino & Coulson, 2020).

The food security challenges are not solely about the lack of food, and, consequently, they cannot be ensured by an improvement of the producers-consumers continuum only; rather, they are deeply rooted in structural inequalities, particularly in the unequal access to land and labor (Tacoli, 2023). In this framework, Mostafavi's warns against the dangers of quantitative planning that tends to miss what lies behind numbers; in particular, he affirms that an overly quantitative approach can dangerously obscure our "relationship with the qualitative value of things" (Mostafavi, 2010, p. 3; Ilieva, 2012).

Secondly, in the globalized context that nowadays characterizes food (Jennings, Cottee, Curtis, & Miller, 2015), which rarely involves smaller-scale producers, informal actors, and a focus on unprocessed, raw foods, evident limitations exist for what concerns tackling issues like restricted access to labor, land, income, and opportunities within a purely local framework. As the ongoing capitalist food systems become more entrenched and rely on distant spaces, it is hardly possible to locally address structural barriers within a globalized system that tends to centralize control and diminish local agency. As showcased by studies concerning the metropolitan area of Leeds, which is set at almost 15 km from the city center, it is unlikely to achieve complete self-sufficiency in food production to meet the nutritional demands of its population (Jensen & Orfila, 2021). The research highlights a notable gap between what the Leeds region can produce and the dietary needs of its growing urban population. While there are efforts to optimize local production, it still relies heavily on external food sources.

Third, the problematic feature behind CRFS' works, and CRFS par extension, lies not only in the adoption of the city-region approach without considering the way it has been conceived; rather, the main issue regards the downsizing of the CRFS capacity to stimulate the development of effective UFP. Indeed, while CRFS might bring applicable knowledge and meaning to contexts that display a high degree of localization, it struggles to prove worth in contexts where food systems align more closely with the long-globalized supply chains of food.

The latter reflection leads to a final implication within the adoption of the CRFS approach: even if CRFS frameworks are designed with a local focus that entails the larger food-related processes that might occur, geographic realities often reveal overlapping and interdependent territories among multiple neighbour city-regions, challenging the feasibility of a self-contained system. In this framework, it is relevant to mention Arciniegas et al.'s work, that showed the case of Copenhagen, where the city's proximity to the coast and its Swedish border means that the CRFS analysis could extend into Swedish territory (2022). The boundaries of a single city-region, if set at fixed distant radius, are rarely isolated and risk intersecting with neighboring city-regions, leading to shared landscapes and resources. This territorial overlap creates interaction zones that cannot be confined to one city-region without affecting others.

4. The City-Region Food System: practice

Building on the knowledge produced by the Systematic Literature Review, a problematic condition emerges. While the vision of CRFS offers a significant framework to install more sustainable food systems, it is not possible to deny that, regarding the application, the controversial aspects of the city-region theoretical background have not been sufficiently investigated and are fully subject to the critiques mentioned before.

Moreover, the strong emphasis put over the beneficial opportunity of installing arbitrary City-Region Food Systems, does not capture the complex and dynamic realities of contemporary food systems because on one side it might not respect the actual boundaries of relevance; on the other side, it can be highly subject to the researcher's biased choice.

Given these premises, the approach of CRFS displays highly problematic features in theory. For this reason, it is relevant to conduct a focused empirical investigation concerning the CRFS' application, by reviewing the specific FAO's selected case studies where the CRFS model has been adopted. The analysis covers a range of geographical contexts, exploring how different city-regions were

interpreted, paying particular attention to the spatial structure of the city-region component within the CRFS framework.

Clearly, alongside the dimension of territoriality and city-regions, this review investigates the consideration of the other dimensions too. On one side, it is addressed the matter of food systems approach, questioning how the different stages of food production, distribution, and consumption were addressed; on the other side, the dimension of multistakeholder engagement and participatory governance is investigated too, searching for what methodology was developed to expand the participation and the involvement of local actors.

Following FAO's contexts of intervention, the cities taken into consideration are Colombo (Sri Lanka), Lusaka and Kitwe (Zambia), Medellín (Colombia), Quito (Ecuador), Toronto (Canada) and Utrecht (the Netherlands), Kigali (Rwanda), Antananarivo (Madagascar), Melbourne (Australia)[21].

4.1. Reviewing some case studies

The selection process for the relevant case studies relied primarily on the FAO database, where documents related to CRFS' case studies were identified and reviewed. In total, 10 case studies were examined: for 8 of them, full-scale assessments called "synthesis reports" were available and utilized, while for the remaining 2 cases, Antananarivo and Kigali, due to the unavailability of the reports, "factsheets" served as the source of information. Table 9 presents the framework of investigation.

Document	Case	Reference
Synthesis Report	Toronto, Melbourne, Lusaka, Quito, Kitwe, Colombia, Medellìn, Utrecht	(Miller & Blay-Palmer, 2018; Murphy, Carey, & Alexandra, 2022; RUAF & FAO, 2019; Andino, et al.,

[21] As mentioned by Melbourne's case authors, the context "was not a formal participant in the CRFS Programme. However, it built on the FAO-RUAF CRFS approach and methodology" (Murphy, Carey, & Alexandra, The resilience of Melbourne's food system to climate and pandemic shocks, 2022, p. 8). Moreover, it is considered among the other cities at https://www.fao.org/in-action/food-for-cities-programme/pilotcities/wherewework/fr/

		2021; FAO, 2018; FAO, 2018; Haenen, Renting, Dubbeling, & Hoekstra, 2018)
Factsheet	Antananarivo, Kigali	(FAO, 2021; FAO, 2021)

Table 9: Cases of CRFS application considered in this review
Source: Author's elaboration

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The data gathered was systematically organized within an Excel table, capturing key details for each case study. These details included: case study, year, population, administrative entity, administrative extension (detail of the administrative bodies), extension (ha), methodology of city-region definition, methodology of food system study, methodology of stakeholder and governance's study.

To ensure a rigorous and coherent review, no other document was considered[22]; therefore, in the cases of Antananarivo and Kigali information concerning the methodology of study the food system and governance is missing.

4.2. Applied City-Region Food System

The results are structured into two distinct sections to ensure a clear analysis. Section 4.2.1. presents an overview of the context in which the CRFS approach was applied. This section provides a detailed account of the specific settings from the selected case studies, highlighting the geographical, demographic, and administrative elements, and offering a foundation for understanding the diverse environments in which the CRFS framework was implemented.

Section 4.2.2 delves into an in-depth discussion on how the three core dimensions of the city-region food system were examined across case studies. This analysis critically explores the methodologies used to investigate these dimensions, providing insights into how each aspect was addressed within the context of CRFS.

[22] Concerning the spatial extension of city-regions, hectares were not available on the reports. Therefore, they consist of the results of calculations made starting from the available data.

The aim of this section is to assess the approaches taken in evaluating food systems, and engaging with stakeholders, first offering a thorough exploration of how the city-region concept is operationalized in the context of CRFS research.

4.2.1. Overview of the case studies

Each CRFS' city-region emerges with distinct boundaries, sometimes shaped by local governance frameworks, some others by demographic pressures, and other times by geographical considerations.

To explore the relationship between population size and the geographic size of city-regions, I presented the data on a scatterplot to visualize potential correlation. The graph was designed to highlight whether larger populations correspond to larger territorial extensions and to identify any notable deviations from this trend. As visible in Figure 9, while the relationship is not perfectly proportional, the data reveal a clear trend where city-region size generally increases with population size.

For instance, Utrecht in the Netherlands, forms a relatively compact city-region, in a framework called U10, encompassing ten municipalities with a combined area of 54,500 hectares (Haenen, Renting, Dubbeling, & Hoekstra, 2018); similarly, the Colombo District in Sri Lanka includes 13 Divisional Secretary's Divisions, covering 69,900 hectares, although its population is much larger (FAO, 2018).

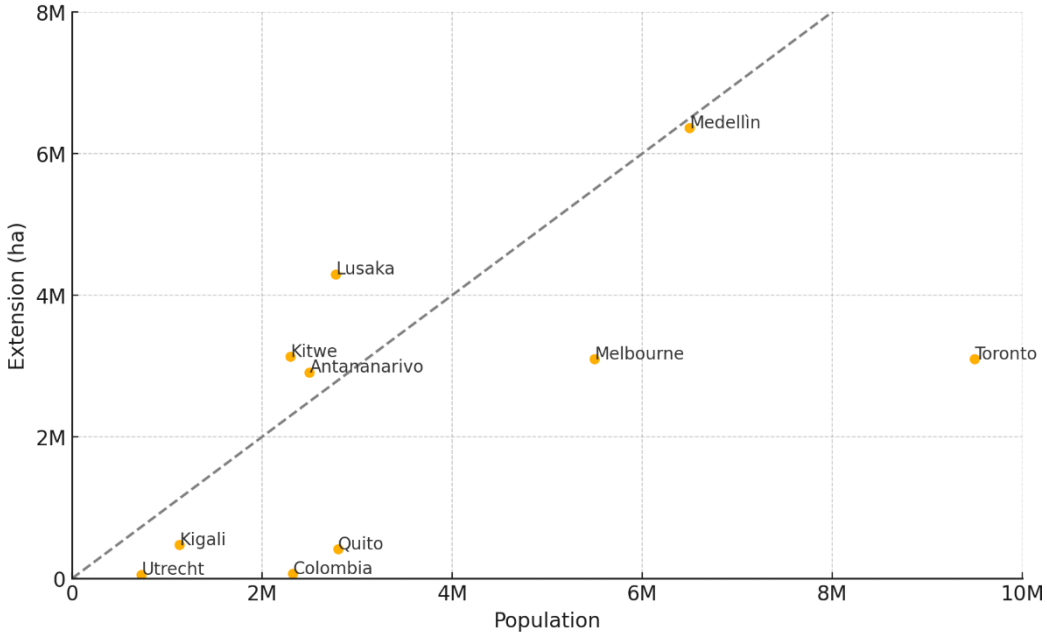


Figure 9: Correlation between Population and City-Region Extension (ha)
Source: Author's elaboration

Conversely, larger city-regions like Toronto and Melbourne extend across significant metropolitan and peri-urban areas, incorporating multiple regions or districts (Miller & Blay-Palmer, 2018; Murphy, Carey, & Alexandra, 2022). The Greater Golden Horseshoe in Toronto spans 3.1 million hectares, like the Greater Melbourne area that covers 3.11 million hectares, including the core city and nine surrounding areas. Similarly, Kitwe and Lusaka, in Zambia, cover 3.13 million and 4.3 million hectares respectively (FAO, 2018; RUAF & FAO, 2019).

In the case of Antananarivo (FAO, 2021), the city-region encompasses both urban and rural municipalities, and, although it does not mention the specific surface, it is possible to esteem that it covers 2.9 million hectares, or roughly half the area of the Antananarivo province. Medellín presents another extensive example, involving five subregions and five corregimientos across 31 municipalities, covering a total of 6.36 million hectares (FAO & RUAF, 2019). On the other hand, Quito offers a more constrained approach, with the city-region defined by 65 parishes (32 urban and 33 rural), covering 421,200 hectares, which accounts for 44.6% of the broader Pichincha province (Andino, et al., 2021). In Kigali, the city-region includes multiple districts such as Kamonyi and Rwamagana, extending over 476,400 hectares (FAO, 2021).

These examples demonstrate a wide variety of sizes and spatial definitions. While, as mentioned above, the NUA's definition of a city-region often envisions an area within a 100 km radius from the urban center, in practice, this guideline is never taken into consideration. In some cases, like Utrecht and Colombo, city-regions are more compact. In others, such as Medellín and Lusaka, the city-regions extend far beyond this radius to encompass vast hinterlands and peripheral communities, possibly reflecting specific socio-economic linkages across larger territories.

4.2.2. The empirical applications of the city-region dimension

The methodologies used to define the city-region across the ten case studies showcase diverse approaches constructed on specific local contexts, blending administrative boundaries, food flows, economic considerations, and governance frameworks.

Bearing in mind the five understandings outlined above, none of the ten city-regions explicitly conceptualizes this dimension as a processual or socio-ecological system. Rather, a group of cases primarily mobilizes a normative conception of the city-region, in which territorial boundaries are suggested by the researchers to support the possible CRFS' intervention. This is evident in Utrecht, Toronto,

Medellín, Melbourne, and Quito, where the city-region is delineated in ways that align with existing governance networks, policy frameworks, or intervention capacities, privileging administrative coherence.

A second group of cases predominantly adopts an analytical conception of the city-region, using it as an interpretative construct to describe pre-existing food flows, production areas, and spatial dependencies without presupposing an explicit area of meaning. Lusaka, Kitwe, Kigali, Antananarivo, and Colombo exemplify this approach, as their definitions emphasize functional relations between urban centers and surrounding territories based on supply dynamics, land use, and demographic patterns.

About scale, all cases adopting a normative conception of the city-region partially engage with scalar considerations too, insofar as the definition of the city-region entails the selection of an administrative perimeter. In these cases, scale functions primarily as an implicit organizing principle, rather than as an explicit object of reflection. Only Quito and Kitwe seem to articulate a more explicit scalar reasoning through the adoption of multi-ring and concentric zonation models,

Analyzing all contexts more detailly, Utrecht based its definition on municipal boundaries and connectivity levels, emphasizing the pre-existing interdependence among municipalities within the U10 region, as well as their existing collaboration through a network enabling joint policy actions. Moreover, the interest expressed by the network's cities to deal together with the matter of food, confirmed the relevance of the territory (Haenen, Renting, Dubbeling, & Hoekstra, 2018). Kigali also emphasized administrative boundaries, integrating the city districts and neighboring districts. The latter were selected based on food flows, recognizing the critical role of supplying the city to be part of the city-region (FAO, 2021). Similarly, Lusaka defined its city-region based on food flows, administrative reach, and land use, incorporating production zones and areas under city jurisdiction (RUAF & FAO, 2019).

Colombo focused on population density and administrative jurisdictions, ensuring that denser areas like the city benefit from surrounding regions as food suppliers. More detailly, "the rationale is that less dense areas of the region would act as suppliers to the highly populated city of Colombo" (FAO, 2018, p. XI).

Quito utilized a dual-ring approach, with an inner ring encompassing the urban and adjacent rural parishes of the Metropolitan District, practically composing the city-region, and an outer ring extending to the broader Pichincha province, reflecting growing conurbation trends (Andino, et al., 2021). Similarly, Kitwe established three concentric zones: a core region defined by the city itself, a peripheral region encompassing the broader Copperbelt Province where most food

is produced, and an external region contributing additional food supplies (FAO, 2018).

Antananarivo brings together inter-municipal cooperation through an association of municipalities, a common urban planning under a unique master plan, the integration of areas central to agricultural processing and food industries (FAO, 2021). Toronto's methodology was more data-driven and focused on policy relevance and data availability across multiple dimensions, ensuring the definition to align with pre-existing frameworks of possible intervention (Miller & Blay-Palmer, 2018). Medellín adopted a specific set of criteria, meant to prioritize municipalities based on agricultural production and supply contributions, proximity, potential for agricultural expansion, and institutional capacity to support governance (FAO & RUAF, 2019).

Finally, Melbourne's specific methodology was not detailed, but, looking at its composition, Greater Melbourne and 9 surrounding shrines, it is possible to affirm that jurisdictional boundaries were adopted (Murphy, Carey, & Alexandra, 2022).

4.2.3. Cases' methods of food systems assessment

The methodologies adopted to study the food systems in the analyzed city-regions reveal a combination of qualitative and quantitative approaches, in accordance with local priorities and available data.

Utrecht's study relied heavily on secondary research to address key research questions about food production, distribution, consumption patterns, and waste management within the city-region; whereas any important data were not available, they were not collected (Haenen, Renting, Dubbeling, & Hoekstra, 2018).

Colombia employed a focused approach, selecting measurable indicators through stakeholder discussions to investigate the following priority areas: food waste and losses, food security and safety, value chain management, and natural resource management in the context of climate change (FAO, 2018). Kitwe applied a structured, indicator-based methodology too, selecting indicators to monitor agriculture (16), food processing and distribution (14), and environmental concerns (9). This approach revealed gaps in sectoral data and involved adapting indicators to the local context through discussions with stakeholders (FAO, 2018).

In Quito, the analysis involved a comprehensive review of databases, literature, and statistics to identify critical issues and conduct a SWOT analysis, culminating in the formulation of local priorities for a food policy (Andino, et al., 2021).

Toronto used food flow mapping and primary and secondary research to analyze key fresh food types, stakeholder interviews to address sustainability challenges, and a broader examination of policy gaps and resilience against potential shocks

like climate change (Miller & Blay-Palmer, 2018). Melbourne's methodology focused on a desktop review of food system policies and mapping risks at different government levels to assess resilience (Murphy, Carey, & Alexandra, 2022).

Lusaka's study incorporated primary data collection to develop three targeted case studies on "sustainable Production and Resilience of Production Systems (case study I); Food Processing, Supply and Distribution System (case study II); Consumption, Food Security and Nutrition (case study III)" (RUAF & FAO, 2019, p. 5), forming the basis for further project phases.

Medellín combined descriptive evaluations of secondary data with participant observation and stakeholder workshops to contextualize the agri-food system, integrating insights from local institutions and public officials (FAO & RUAF, 2019).

4.2.4. The challenge of participatory governance

The methodologies for multistakeholder engagement and participatory governance across the city-regions reflect the diverse circumstances of each case particularly well. Indeed, some cities carried out initial stakeholder analysis for example, while many others did not. Nonetheless, all contexts relied on the knowledge that was developed in the food system's study, although some carried out inclusive policy development processes already within the study of the system

In Utrecht, five multi-stakeholder workshops were organized under the Food Smart Cities Programme, to identify four thematic priorities, regional food systems, healthy urban living, urban agriculture, and food governance. These themes were explored in depth with stakeholders, resulting in a SWOT and sustainability analysis and specific policy proposals (Haenen, Renting, Dubbeling, & Hoekstra, 2018).

Colombia employed a detailed stakeholder analysis, engaging a wide array of participants, including government officials, private sector representatives, NGOs, and academia, through key informant interviews and focus groups. These participatory methods enabled scenario-building exercises to assess the impact of policy interventions and prioritize actions, which culminated in three policy briefs validated during stakeholder workshops (FAO, 2018). Similarly, in Quito, the approval of the Agri-Food Charter initiated an extensive participatory process involving 57 meetings, 16 workshops, and 14 technical interviews, leading to an actionable plan aligned with MUFPP guidelines (Andino, et al., 2021).

In Toronto, eight key policy recommendations were produced from the food system's study; they were successfully refined to develop scenarios addressing risks and challenges. These scenarios were tested with focus groups and then treated as

a floor of debate for stakeholders to advance detailed plans and allocate resources (Miller & Blay-Palmer, 2018).

Melbourne, facing COVID-19 restrictions, implemented a co-design approach through virtual workshops with government, industry, and civil society participants. These workshops facilitated collaboration "participants were asked to work in cross-sector teams (involving stakeholders from local and state government departments, industry and civil society groups) to identify strategies to strengthen the resilience of Melbourne's system" (Murphy, Carey, & Alexandra, 2022).

Differently from others, Kitwe established a Multi-Stakeholder Task Team (MTT) that categorized participants by themes and mandates, creating a "knowledge-sharing platform" that included government, civil society, academia, and private sector actors (FAO, 2018, p. 2). Over four meetings, MTT reviewed and validated reports; the fourth meeting was designed to approve the overall CRFS mapping.

In Lusaka, the stakeholder analysis employed the Net-Map method, a participatory tool combining social network analysis, stakeholder mapping, and power dynamics assessment. This approach allowed participants to visualize and discuss the roles and influences of various actors in the city's food system. Towards the conclusion of the assessment phase, stakeholders participated in a policy-planning and scenario-building workshop. Four thematic working groups were formed based on expertise and interest to identify interventions and develop actionable strategies. Each strategy included detailed activities, roles for stakeholders, timelines, cost estimates, and potential funding mechanisms (RUAF & FAO, 2019).

In Quito, the food system's assessment informed the formulation of strategic pillars for the agri-food policy, which underwent extensive technical and social discussion to institutionalize the policy framework.

Key milestones included the drafting and signing of a food chart and the formation of a local Pact. A communication strategy was implemented to support the pact, and a detailed strategy and action plan were developed to strengthen the agri-food system. Priority indicators for the agri-food strategy were identified, culminating in the creation of a resilience strategy for Quito's agri-food system, ensuring a robust framework for implementation and sustainability (Andino, et al., 2021).

4.3. Similar goals but different trajectories

The review explored how the CRFS approach has been applied across ten diverse case studies, revealing the varied ways in which the city-region concept and the

other core dimensions, food systems approaches and multistakeholder engagement and participatory governance, have been operationalized. The analysis highlighted a highly variable framework, where the definition and implementation of CRFS differ significantly based on local administrative structures, governance priorities, food system characteristics, and socio-economic contexts.

At its core, the city-region is substantially conceived as a spatial framework that involves cities and surrounding spaces that hold significant relations with the major urban center. In particular, the methodologies explored in the case studies illustrate a common trajectory: the city-region identification is grounded in the need to address specific food system challenges yet respecting administrative jurisdictions. Some put more emphasis on the latter (e.g., Kigali, Utrecht), others on the food flows (e.g., Lusaka, Kitwe), and others on the socio-economic linkages (e.g., Antananarivo, Medellín). Cities might adopt data-driven approaches (e.g., Toronto), while others rely on stakeholder collaboration to establish functional definitions (e.g., Quito). However, what is notably evident is the intention to bridge territories that can effectively nourish urbanized contexts, yet a strong decision to respect jurisdictional boundaries is evident.

A clear connection to the historical and theoretical roots of city-regions as understood in economic geography is definitively absent.

Nonetheless, considering that the FAO's application of CRFS emphasizes flexibility and locally constructed frameworks, favoring a process that allows territories to self-imagine and self-acknowledge their unique interrelations rather than imposing a rigid structure, the cases are successful. Therefore, interestingly, while many boundaries align with formal administrative jurisdictions, they are generally more fluid, respecting resources flows rather than strictly adhering to spatial planning frameworks. All cases demonstrate that governance structures, whether formal or informal, shall be still subjected to the unique conditions of the context, partially aligning with the more theoretical basis given by geography.

CRFS adopts the "normative" understanding mentioned before; it does not impose a unique dimension; rather, it simulates local contexts to figure out what unique city-regions they possess according to the unique processes that characterize the spatial framework, as suggested by FAO (2023).

In practice, boundaries emerge as purely conceptual, with empirical cases showcasing the need to define perimeters based on the actual flows of resources, especially food, rather than matching a fixed distance. Therefore, the CRFS approach, rather than being a rigid or prescriptive model, represents a valuable tool for understanding the unique characteristics of each context.

For this reason, much of the cases' effort has been put into understanding what processes of CRFS should be understood and what methods should be used. The investigation highlighted several key dimensions critical for understanding and improving these systems: production, distribution, consumption patterns, waste management, environmental sustainability, and resilience to shocks. To effectively address these areas, a combination of data-driven methods and participatory processes emerged as essential.

The contribution of CRFS is significant because it helps to consider elements of the urban food system that were previously difficult to integrate. Indeed, some components might obviously lie outside the administrative boundaries of the urban framework but still fall within the relevant system (Kasper, Brandt, Lindschulte, & Giseke, 2017).

Above all, this flexibility enables CRFS to incorporate the key characteristics of food production, even when it occurs beyond traditional city limits. Food production and distribution are consistently central, with an emphasis on understanding supply chains, local agricultural capacity, and processing infrastructure. Here, private sector actors are increasingly recognized for their potential to enhance the sustainability and resilience CRFS (Dubbeling, Carey, & Hochberg, 2016). Traditionally, the contribution of small farms and family-run businesses, other than large retail companies, was extremely limited. CRFS, instead, acknowledges that these entities are often concentrated in and around city-regions, finally implying their contribution is necessary to the development of successful UFP (Jennings, Cottee, Curtis, & Miller, 2015).

Methodologies in food systems studies often rely on indicator-based frameworks and data mapping to monitor trends and identify gaps. Consumption patterns and food security are also prioritized, with studies using secondary data analysis and targeted data collection to capture health concerns, nutritional trends, and waste flows.

Then, mapping food flows, in combination with other resources, emerged as a vital tool for understanding how city-regions function. This approach allows cities to visualize the connections between urban centers and surrounding rural areas, helping to identify vulnerabilities and opportunities for resilience. Cities also integrate policy and risk assessment into their methodologies, using reviews of existing policies and scenario-building exercises to address challenges like climate adaptation and governance.

According to the CRFS approach, cities and their surrounding regions shall engage in collaborative planning processes that ultimately lead to the improvement and sovereignty of the local food system. Participatory methods play a critical role

in bridging data with action. Stakeholder engagement ensures that local contexts, priorities, and governance structures inform the analysis and subsequent strategies. Workshops, focus groups, and collaborative discussions are commonly used to validate findings, prioritize interventions, and develop policies.

Especially concerning the participation and co-design of these policies, what emerges is a highly rich framework. Many cities embedded participatory processes directly into their assessments, allowing stakeholders to identify priorities, validate findings, and shape policy frameworks. This integration ensured that governance approaches were rooted in both technical evidence and local insights, finally including vulnerable actors within the food system's planning, like small-scale producers, informal traders, migrant workers, as well as low-income and marginalized communities (Blay-Palmer, et al., 2018).

Another notable trend is the flexibility of participatory methods, which adapt to logistical and contextual challenges. Approaches like scenario-building, virtual co-design workshops, and thematic working groups illustrate how participatory governance fosters collaboration while addressing systemic complexities. These methods emphasize not just consultation but also stakeholder involvement in planning and decision-making. The strengths lie in aligning governance practices with the realities of food systems, fostering a sense of ownership among diverse actors, and enabling city-regions to develop policies that are both evidence-based and contextually relevant.

All applicable methods and approaches to the installation, investigation and planning of CRFS and other food governance tools are briefly displayed below, in Tab. 10, to provide a clearer picture of the available knowledge.

Dimension	Applicable method
Territoriality and city-regions	Geographical and administrative considerations: 1. Municipal boundaries and connectivity levels to emphasize local interdependencies. 2. Administrative boundaries define jurisdictional limits and governance responsibilities. 3. Policy relevance to ground the identification of city-regions in actionable governance frameworks. Functional and spatial considerations:

	4. Food flows to identify critical supply routes and connections between urban centers and rural areas. 5. Land use, incorporating production zones and areas under city jurisdiction to align spatial planning with food system needs. Demographic considerations: 6. Population density to ensure that food systems address both urban and rural population dynamics.
Food systems approach	Secondary Research 4. Food production, distribution, consumption patterns, and waste management within the city-region. 5. Emphasis on food waste and losses, food security and safety, value chain management, and natural resource management. Methodologies for analysis: 5. Indicator-based methodologies 6. Review of databases, literature, and statistics Analytical and policy tools: 1. SWOT analysis 2. Desktop review of food system policies and risks Participatory and contextual approaches: 1. Descriptive evaluations of secondary data combined with participant observation and stakeholder workshops. 2. Reports from institutions.
Multistakeholder Engagement and Participatory Governance	Collaborative identification of priorities: 1. Multi-stakeholder workshops were used to identify key thematic priorities 2. Priority indicators for the agri-food strategy were collaboratively established to guide decision-making and focus efforts. Participatory analysis and engagement tools: 3. Stakeholder analysis employed the Net-Map method, a participatory tool that combines social network analysis, stakeholder mapping, and power dynamics assessment.

	4. Informant interviews and focus groups provided qualitative insights.
Scenario planning and decision support:	
	5. Scenario-building exercises were conducted to assess the potential impact of policy interventions and to prioritize actions based on stakeholder input.

Table 10: Comparative display of adopted methods for CRFS implementation
Source: Author's elaboration

Critiques, such as Battersby and Watson's caution against the "local trap," are valid in highlighting the risks of overemphasizing localization at the expense of broader interconnectedness (2019). The concern that CRFS might narrowly confine food systems within artificial boundaries, excluding critical regional, national, or global linkages, is surely important. However, the reviewed empirical cases demonstrate that CRFS is rarely implemented in isolation or as a rigidly localized model. Instead, the city-region approach often integrates local, regional, and other peripheral connections, acknowledging that food systems operate across scales.

In this way, CRFS can also overcome the critique of Born and Purcell by avoiding considering the local as inherently better. The city-region dimension I addressed pragmatically, as a tool to navigate and address the on-ground real characteristics of food systems, in good and bad features. The emergent key is that, while CRFS provides a valuable means of organizing and understanding food systems, its effectiveness lies in its integration with broader scales and objectives. For instance, methodologies that prioritize food flows or stakeholder engagement address interactions that extend beyond predefined geographic perimeters, without any preference toward the local.

Moreover, allowing each context to self-determine the city-region size, CRFS counterbalances the risk of the local trap by emphasizing functionality and context-specific solutions against an idealized notion of locality. By treating CRFS as a work strategy rather than a finite goal, city-regions focus on using the framework to achieve specific objectives which entail the local, but do not necessarily end with it.

Notwithstanding its pragmatic appeal, the city–region food system concept continues to operate with a tenuous theoretical scaffold. It lacks a coherent ontological definition of the "city–region" beyond a pragmatic catchment area, leaving its boundaries methodologically fuzzy and its epistemological basis ambiguous. As a result, discussions often collapse into enumerations of "best

practices" rather than critical interrogations of the structural basis that link urban and peri-urban areas for the better management of food systems.

A more rigorous research agenda problematizes the scale and scope of the city–region: is it a clear entity defined by administrative borders, a functional space delineated by commodity flows and commuting patterns, or a relational network constituted by actors' coalitions? Each possibility implies different techniques of work, that must be theoretically justified rather than adopted ad hoc. By confronting these questions head-on, it means not only to map the complex spatial features of food systems but also to challenge the normative assumptions about CRFS, resilience and equity that have underpinned much of the literature.

Ultimately, the city-region in the context of CRFS offers a way to reimagine governance dynamics, acting as a "territorially integrated node of a socio-spatial architecture" (Sonnino & Coulson, Unpacking the new urban food agenda: The changing dynamics of global governance in the, 2020, p. 13), aimed at installing different urban-rural linkages, overcoming the governance conflicts. This reconfiguration is seen in the reviewed literature as a critical tool for addressing the complexity of urban food systems and resolving their systematic issues (Arthur, Sanderson, Tranter, & Thornton, 2022). As a platform for investigation, CRFS does not claim to be a self-contained solution but rather a means to connect territorial dynamics in the making of clear and substantial UFP.

5. Synthesis

This Chapter primarily explored the contributions given by the city-region knowledge to the conceptualization of CRFS, with a specific focus on the role played by the geographical dimension of city-regions, examining their consideration within critical urban geography.

Successively, through a Systematic Literature Review, (SLR) carried out with PRISMA, I analyzed the ways in which the CRFS framework engages with the concept of city-regions. The review revealed a notable gap: many scholars working within the CRFS context fail to engage with the established literature on city-regions. Moreover, to provide a more profound investigation, the Chapter also displayed a review of cases. It concerned the ten contexts where FAO implemented or stimulated an implementation of the CRFS approach.

This Chapter has shown that the City-Region Food System framework constitutes a useful analytical and operational reference for UFP, provided that specific conceptual refinements are introduced, particularly regarding its territorial dimension.

On this basis, the thesis now adopts a tripartite structure that addresses the three core components of the CRFS framework through distinct yet interconnected analytical steps. Building on this foundation, Chapter IV responds to the need for a more robust conceptualization of territory and territoriality. Chapter VI investigates the food systems approach. Chapter VII, answering to the Sub-RQ 3, then focuses on governance, examining how territorial grounded knowledge of the food system informs participatory arrangements and policy-making processes. Together, these chapters operationalize the City-Region Food System framework and collectively address the RQ 1 introduced earlier.

IV. Territoriality and city-region

1. Introduction

The previous Chapter highlighted the complexity surrounding the application of the city-region concept in CRFS literature. While the notion of city-regions has been widely used as a spatial reference for food systems planning, its theoretical grounding remains weak, particularly due to a limited engagement with the geographical scholarship that has historically shaped the concept. The analysis revealed that, despite the increasing adoption of city-regions in food governance discourses, there is a lack of systematic reflection on the theory's troubled implications. This gap raises critical concerns about the foundations upon which city-regions are being defined within the CRFS framework and whether they can effectively serve as meaningful spatial entities for food planning.

If city-regions are pivotal within CRFS strategies, a clear methodological foundation for their understanding is necessary. This Chapter, therefore, examines the structural components that should underpin a city-region's definition in the CRFS context. Specifically, it engages with the concepts of territoriality and scale, exploring how these concepts influence the spatial organization of food systems and the governance mechanisms that structure urban-rural food relations.

The first part of the Chapter is dedicated to the concept of territoriality, understanding its contribution in defining city-regions. This discussion seeks to determine how different forms of territoriality affect the understanding of city-regions. Following this, the focus shifts to the concept of scale, examining how it has been conceptualized in geography and whether it can serve as a guiding principle to spatialize CRFS' city-regions.

Building on these reflections, the Chapter moves toward a pragmatic objective: the development of an analytical toolkit for assessing city-regions in the CRFS framework. This involves identifying key criteria that can be systematically applied to evaluate the suitability of different territorial extensions. The proposed toolkit is intended to bridge the gap between theory and practice, ensuring that CRFS contexts are defined according to empirical evidence and not to observer's comfort.

Finally, the analytical framework is tested within Turin's possible city-region layouts, applying the developed criteria to a set of territorial extensions. This process allows for a critical examination of how different scales respond to the

structural requirements of a CRFS and ultimately identifies which territorial configuration best aligns with the theoretical and functional demands of a city-region food system, particularly in the context of Turin.

2. The territoriality in the CRFS conceptualization

The City-Region Food System (CRFS), while focusing on the idea of the city-region, also introduces the concept of "territory" as a key dimension. In particular, in affirming the "territoriality and city-regions" pillar, the *Building sustainable and resilient city region food systems--Assessment and planning handbook* does not give significance to the city-regions only (FAO, 2023); rather, it acknowledges the component of a territorial perspective as a lens to understand how the city-region shall be comprehended. This choice is rich with meaning. Indeed, while the city-region highlights physical and functional connections between urban centers and their rural surroundings, the "territoriality" aims at resisting reduction to static boundaries and embracing the connections that exist within the framework, without focusing on the spatial and policy-sectoral distinctions only (Rodrìguez-Pose, 2008).

More in detail, if dealing with food systems, it is important to acknowledge that several processes, while they are surely embedded in specific resources, like soil, water, climate, they are also nodes in broader networks of exchange and interdependence (Jessop, Brenner, & Jones, 2008). The CRFS perspective points to this understanding, affirming the role of territories to grasp what unique processes contribute to contour rural, urban, and peri-urban dynamics regarding food. What emerges is a complex geography where food-related phenomena become strongly entangled with the economic systems, cultural identities, and political frameworks (Joassart-Marcelli, 2022).

At its core, territory deals with the relational understanding of food systems, focusing more on local interactions, and less on sectoral boundaries (Tecco, et al., 2018). Through this lens, territory is a site of negotiation, that contests the dichotomy between city and region, revealing the porous and mutually constitutive nature of the urban-rural environment.

Yet, the invocation of territory is not without tension (Paasi, et al., 2022). It means challenging dominant spatial logics, particularly those that operate clearly distinguishing an urban and a rural framework. It strongly insists on understanding contextual events that are attuned to the heterogeneity of food systems. It finally gives relevance to the existence of processes that give meaning to spaces; in other words, it focuses on the occurrence of "territoriality", which provokes reflections on power; particularly, it contributes to investigate who creates the territory, whose

interests are foregrounded, and whose voices are excluded in the processes of territorial governance. In this sense, territory becomes a stage for intersecting struggles over resources, identities, and imaginaries (Urso, 2021).

CRFS, by being centered on territoriality, opens to interrogate how food systems can respond to the intersecting challenges of climate change, socio-economic inequality, and urbanization, adopting a perspective that clearly focuses on the relationship between people and space.

Territory, then, shall not be interpreted merely as a spatial definition tool but as the creative lens to support the normative construction of city-regions. It becomes a way of seeing and acting, that calls for the dismantling of silos in governance, and the re-centering of human-nature links in the pursuit of enlarged understanding of local processes, particularly the ones leading to sustainable food systems. In the framework of CRFS, territory is less a solution and more a question, inviting to rethink what it really means to situate food systems within the spatial planning of cities and surrounding regions.

Finally, if territoriality emerges as the process that contributes to the understanding of the city-region perimeter, yet the distinct constructions of territory and city-region pose questions over the possibility of fully integrating them. The city-region delineates mutual bilateral interdependencies, while territoriality engages with the dynamic processes, relationships, and practices that happen in these spaces with meaning. Where do boundaries align with realities, and where do they diverge? How do spatial structures remain coherent amidst fluid cultural and ecological exchanges? The city-region offers a clear perimeter, but the territory interrogates the socio-ecological and historical layers that enrich this framework.

To go to the root of the term is to confront the multiplicity and relationality of space. It is to acknowledge that food systems are embedded in territories where boundaries are not static but negotiated, and where connections are continuously redefined. In this light, territory becomes a conceptual lens through which to understand the interplay between space, power, and practice within CRFS, demanding a deeper exploration of how the spatial dimension of CRFS' city-region shall be installed.

2.1. Territoriality: an interpretive lens between its multiple meanings and the contribution of the Italian geography

Territoriality is not a static or universal concept but rather a dynamic and context-dependent phenomenon that reflects the articulated relationship between society and space (Stojanovic, 2017). From the very early reflections over this topic, it is

relevant to recall the works of Edward Soja (1971), who describes territoriality as a behavior tied to the spatial organization of influence, wherein territories are shaped by those who occupy and define them. He argues that territoriality impacts human behavior across all social levels and is influenced by cultural and historical contexts, rather than being solely an instinct (Raffestin, 2012). While it is often meant as a matter of exclusivity and control, when grounded in the notion of private ownership, Soja cautions against overly simplistic analogies between human and animal territoriality (ibid.). Instead, he emphasizes that human territoriality is a cultural and behavioral construct, evolving historically and geographically, with boundaries not necessarily aligned with precise lines on the ground; mostly, it consists of "a primary basis for the political organization of space" (Antonsich, 2017, p. 2).

More detailly, according to others, it represents a human spatial strategy deliberately employed to influence or control resources and populations by controlling defined areas (Sack, 1986). Sack frames territoriality as an exercise of power, inherently tied to social relations and deeply embedded in social practices and processes. This perspective affirms that territories are not natural entities; rather, they are socially produced under specific conditions to achieve finite ends (Delaney, 2005). In this context, regions are manifested as the strategic delineation of boundaries that communicate territorial control and, consequently, power over prescribed spaces and inhabitants. Such boundaries establish a clear separation between those "inside" and "outside", reinforcing authority and signaling control. Territories are created through territoriality and, through their classification of space and their role in constructing borders, function as an instrument for the enforcement of authority (Storey, 2018).

As immediately visible, a significant variety of perspectives exist when meant to deal with this very articulated and fragmented concept; for this reason, rather than adopting a unique and final definition of territoriality, to fully grasp what truly lies behind this concept, I consider essential to revisit the components of the theoretical tradition from which territoriality emerges.

While Anglophone geography has often privileged this kind of statist understanding of territory, focusing on sovereignty and control, Francophone geography offers a markedly different perspective. Indeed, it affirms that, if there exists the explicit design of power expression only, then, all territories are pure manifestations of subjugations (Raffestin, 2012). With its emphasis on the cognitive relations between a group of people and the space they inhabit (Nunes, 2017), the French conception of *territoire* has emerged as a predominantly social and symbolic concept. Obviously, the legal-political connotation of territory as space divided and

possessed by political authority is not absent in non-Anglophone geography. However, the leading figures of this other approach have generally preferred to explore territoire and *territorialité* beyond their connections to the matter of administration and control (Lévy, 2010; Di Méo, 2014; Debarbieux, 2020). Within this perspective, territory is theorized as a cultural space of belonging, imbued with symbols, also considering single and plural memories of communities, and ecological relationships (Antonsich, 2017); Raffestin defines the territory by relying on Lefebvre's definition of a "social space to designate a `production that which makes a community from an ecosystem that is apportioned to it" (2012, p. 126; Lefebvre, 1974; Giunta, 2020).

This interpretation keeps territories distinct from the political dimension, favoring instead an understanding related to an everyday production of them (Antonsich, 2017), which as Moscovici observes, can embody a state of nature partially or fully reconfigured by human labor, where multiple forces, are finally brought together into a cohesive system (Moscovici, 1968). Territory thus becomes a spatial manifestation of culture, where informational resources and symbolic systems mediate the relationship between humans and their surroundings (Lotman, 1985). Also, according to Deleuze and Guattari (1988), territory is not a static and mere container of facts, but a living construct shaped by the overlapping flows of interior, exterior, and intermediary *milieus*.

> "There is a territory precisely when milieu components cease to be directional, becoming dimensional instead, when they cease to be functional to become expressive. There is a territory when the rhythm has expressiveness. What defines the territory is the emergence of matters of expression" (Deleuze & Guattari, 1988, p. 315).

Milieus represent systems of interaction, integrating internal and external dimensions. They encompass an interior realm of elements and substances, an external sphere of materials and conditions, intermediary zones of boundaries and transitions, and additional annexes such as energy sources and sensory inputs (ibid.). These layers communicate and influence one another, forming a complex and interconnected whole (Hillier, 2023, p. 234). "Every milieu is vibratory, a block of spacetime constituted by the periodic repetition of the component" (Deleuze & Guattari, 1988, p. 313). This "rhythm" shapes identities by combining movements across time and space, forming something entirely new and distinct with every iteration (Philippopoulos-Mihalopoulos, 2016).

However, while rhythm helps organize individual milieus against chaos, it prompts the larger urgence of clarifying if a single melody links all milieus. Deleuze

and Guattari propose that this organizing principle is territory (ibid.). Territory provides the spatial and temporal structure necessary to link multiple milieus, forming a cohesive yet dynamic system that integrates their differences while allowing them to interact and coexist (Deleuze & Guattari, 1988).

This understanding highlights the dual role of territory according to a non-authoritarian interpretation of it: as a site of identity and belonging, and as a dynamic, yet connected, system open to transformation, shaped by the flows of meaning and materiality, rhythms, that engage human and non-human worlds (Raffestin, Space, territory, and territoriality, 2012).

What should not be taken for granted are the continuity and the steadiness of this bond. Indeed, the mentioned reciprocity is not static (Dansero & Dematteis, 2023). Changes in spatial, temporal, and human scales impose new relationships between societies and living spaces. There exists a transformation in the territories changed by human interactions, which is surely not without friction (Magnaghi, 2017). Here, territoriality becomes crucial: it does not act as an expression of human power; rather it consists of an understanding of space, tracing the coordinates of the installation of territories per how they are lived by human beings throughout time.

Indeed, due to all possible events that occur over a territory, this subject changes and experiences new shapes of reality. This is defined as Territorialization-Deterritorialization-Reterritorialization (TDR) process (Raffestin, 2012). As Raffestin and others explain, it truly reveals the fluid nature of territorial modifications (1984). If territorialization represents the dynamic process through which abstract spaces are transformed into meaningful territories via both material and symbolic actions, such as boundary-making, naming, and governance (Deleuze & Guattari, Mille plateaux, 1980; Raffestin, 2012), territoriality is therefore not merely the dissemination of traces, but a continuous engagement with the identity, meaning, and the materiality of created spaces (Raffestin, 1984). It embodies a plurality of feelings, each shaped by the actors involved and the power dynamics at play. Often, one territoriality dominates due to the influence of more powerful actors, yet others persist, interwoven within the same space.

This leads to acknowledge that territories stand out of a naturalistic randomness. Rather, they emerge as the complex product of material realities and social practices, affirmed time by time. Territory is not a passive stage but as an active, relational construct where physical space, human agency, and strategic collaboration intersect. Within this framework, territory assumes the role of a mediating platform where local actors, economic interests, government entities, and technical institutions coexist, dialogue and negotiate their interactions in a multi-lived landscape (Salone & Segre, 2012). Such a creation of territory enables it to

function as "a collective actor, a social and political actor possessing autonomy and strategies" (Bagnasco & Le Galès, 1997, p. 25).

If as affimed by Magnaghi, "prima ancora che un insieme di oggetti fisici il territorio è l'insieme delle azioni volte a produrlo nel tempo lungo della storia"[23] (Magnaghi, 2020, p. 128-29), the actions of these actors truly design the territory itself, even if there is not a collective willingness to.

To explore this interplay between local actors and territorial resources within a specific milieu, emphasizing the critical roles of proximity, sense of place, and territorial identity, it is relevant to recall the concept of the Territorial Local System (SLoT)[24], as proposed by Dematteis and Governa (2005). Within this interconnected system, actors can be understood as a cohesive entity, continuously shaping and redefining the territorial identity and functionality of the system (Magnaghi, 2010).

Yet, this model is not a static interpretation of territory and its boundaries, unlike other perspectives discussed thus far. Rather, it represents a *positive* understanding of the network of actors engaged in reciprocal interactions, also considering their behaviors shaped by their relationships with the local environment or milieu (Salone & Segre, 2012). Consequently, it is significant to address this model because, despite being partially, or totally, sidelined in recent Italian geographical traditions, it anticipated the role that the city-region interpretation, in the CRFS framework, would fulfill: to delineate what territories' characteristics should be taken into consideration if aiming at mastering them through a specific planning process.

This consideration is timely, as "le carenze, o per lo meno le insufficienze, della interpretazione della dimensione territoriale dello sviluppo locale" persist (Dansero, Dematteis, & Governa, 2004, p. 110)[25]. These shortcomings, first identified two decades ago, continue to raise two interconnected issues. As expressed by Dansero, Dematteis and Governa, three of the pillar authors within the SLoT framework, on one hand, there is an insufficient theoretical reflection on key concepts that are relevant to planning (Governa, 2005). On the other hand, there is a marked difficulty in translating principles and theoretical reasoning into coherent and actionable investigative methodologies (Dansero, Dematteis, & Governa, 2004).

[23] territory is, before all else, the ensemble of actions aimed at producing it over the long arc of history.

[24] In order to give coherence to the usage of this approach, I will not use "TLS" as an acronym; rather, I will use the Italian original version "SLoT", which stands for "Sistema Locale Territoriale".

[25] "deficiencies in the territorial interpretation of local development".

The SLoT model succeeded where others have faltered because it focused on describing the relationships between social interaction, local territorial potential, governance, and development (ibid.). In other words, by giving a relational understanding to the continuum that bonds what exists and what can become, on territory, the SLoT presented itself as the creative tool to carry out inclusive sustainable realistic planning.

Yet, the present reflection does not aim at reaffirming the SLoT model. Especially acknowledging its multiple problematic contextualities, well debated by Governa (2014), I do not mean to rely on the SLoT model to construct the framework for understanding the CRFS' city-region; rather, the key point that I intend to retrieve from this model formulation consists in its understanding of territoriality as a stemmer for local development, in the dynamic connection between society and territory forged through a long-term, interactive process. Programs and initiatives that deal with this co-evolutionary dynamic can achieve substantial benefits both in sustainability and legitimacy. These gains are not only a result of local actors' actions but also derive from the strategic valorization of the unique potential of the local milieu (Dansero, Dematteis, & Governa, 2004).

Therefore, the SLoT model highlights how this innovative territoriality is characterized as "active" and "positive", and plays a mediative, symbolic, cognitive, and practical role, between the materiality of places and the social actions that drive transformation and local development, which truly matter for this work.

Before closing this paragraph, I wish underlining that not all sources utilized here are relevant per se, but rather because, taken together, they have helped shaping an understanding that cannot be fully grasped without engaging with the broader and complex body of reflections developed across various geographical schools of thought.

Indeed, adopting this active interpretation of territoriality is possible only by understanding the larger knowledge at stake. At this point, territory evolves into a mutating but integral component of the development process. It is no longer seen as a passive stage where development policies simply occur; rather, it becomes the foundation.

2.2. The territorial component of food systems

In short, territoriality, territorialization, and territory are thus deeply interrelated yet distinct: territoriality regards the human engagement with space; territorialization materializes this engagement; and territory represents the dynamic and evolving result of these processes (Tanca, 2023).

This understanding is particularly helpful for the purposes of this work because it provides a valuable framework to describe the processes shaping food systems. As previously argued, the second half of the 20th century saw communities to progressively disconnect from food production sites, weakening the territorialization of production that had historically underpinned the person-territory bond (Lazzeroni, Berti, Bruno, & Rossi, 2023). This period marked a significant phase of deterritorialization driven by capitalist market logics, leading to a profound disconnection between producers and consumers. Yet, in recent years, attention has shifted to the reterritorialization of food systems (Dansero & Pettenati, 2018), nourished by a sensitive carefulness toward relocalization of agro-food chains and a growing desire among consumers and local communities to reconnect with production spaces (Liu, 2024).

Here, territoriality lies at the heart of understanding how bonds between food and space take place. This analytical perspective aligns closely with the observations of Kneafsey et al. (2021), who illustrate how food traverses and binds multiple scales, revealing the reciprocal nature of spatial practices and territorial relationships in shaping the very essence of territories. By examining how food both shapes and is shaped by territorial dynamics, Kneafsey et al highlight the role of food systems in describing how territoriality exists throughout time.

Dansero and Puttilli, standing on Dematteis' understanding of territoriality (2007), analyze the role of Alternative Food Networks (AFNs) offering a pragmatic perspective on the contribution of territoriality in the context of food and space (Dansero & Puttili, 2014). According to Dansero and Puttilli, three levels of reflections are relevant. The first level is the spatial dimension, which considers how actors' relationships are structured across geographical scales, from local to global, with focus on the organization of AFNs in space, regarding the physical distance among subjects. The second is the resource dimension, which examines how material and immaterial territorial resources are activated to support the strategic goals of those involved. The third is the social dimension, focusing on the interplay of relations among actors, exploring how their collaborations multiply territorial resources and advance mutual objectives in the context of AFNs' subjects that resist traditional market logics.

This framework offers the possibility to address territoriality as a foundational mechanism not only for understanding AFNs but for comprehending the complexities of the food systems jointly. Indeed, it clarifies the concept of territoriality across three critical dimensions, spatial arrangements, resource mobilization, and social interactions, revealing how a systemic reflection over food might integrate disparate elements into cohesive and transformative strategies. In

its stead, this innovative understanding of territoriality emerges as an active, generative force that embeds potential of transformation into the food system.

"Feelings of collective identification are grounded in the possibility of unlocking/revealing a sense of belonging (or belongingness) through a 'process of collective identification' that, by means of symbolism and agency, mediated by 'territoriality', transforms place attachment into an anchor of identity" (Fanfani & Rovai, 2022, p. 204-205).

This stimulant analysis strongly displays the opportunities that could emerge considering territoriality as a protagonist in the process of territorial food systems understanding. In detail, territoriality plays a crucial role in creating the aforesaid "anchor of identity" through a process of collective identification mediated by symbolism and agency. Within this framework, indeed, the food system is not fixed; rather, it contains the possibility to be re-imagined as a collective vision for the future, a strategic scenario that deals with Magnaghi's idea of projecting territory which consists in

> "costruzione coerente di un'immagine di trasformazione complessiva e di lungo periodo del luogo, [… che] assume necessariamente un carattere multidisciplinare dal momento che tratteggia uno scenario di trasformazione che indica i valori costitutivi del nuovo modello di sviluppo sostenibile: è dunque un progetto culturale, socio-economico, territoriale e ambientale"[26] (Magnaghi, 2001, p. 46-47).

This framework strongly resonates with the theoretical reflections of the SLoT model mentioned above, especially if considering its juxtaposition to the matter of food, as developed by Tecco et al. in the so-called FoodSLoT (2017). While avoiding the risks of a niche discussion, this reasoning is essential to recognize that defining a city-region with normative significance for constructing a CRFS, requires an understanding of territory as a dynamic system of relationships with a kind of territoriality that strongly mirrors the one suggested by Dansero and Puttilli. In other words, it should be composed by the actions of local actors, who, through self-organization and interaction across scales, activate networks, valorize resources, and build capacities in the context of food (Tecco, Bagliani, Dansero, & Peano, 2017). A theoretical contribution to this pursuit has been achieved by relying

[26] "the coherent construction of an image for the comprehensive and long-term transformation of a place, [which] necessarily assumes a multidisciplinary character as it outlines a transformation scenario that identifies the constitutive values of a new sustainable development model. It is thus a cultural, socio-economic, territorial, and environmental project"

on the concept of urban bioregion (Dansero & Dematteis, 2023; Matarán Ruiz, Fanfani, Sánchez Contreras, Ángel, & Aguilar, 2025), explicitly adopted with the aim of spatially comprehending what connects territorial processes, uncovering opportunities to mobilize the territory as a collective actor in the design of sustainable food systems.

Indeed, urban bioregions are conceived as systems that are originally defined by their morphological and functional relationships (Magnaghi, 2014). These entities are not defined by external decisions but are instead characterized by four key components: economic (local territorial systems), political (self-governance of living and production spaces), environmental (territorial ecosystems), and habitation (functional and living spaces for cities, towns, and villages). They range in scale from local ecosystems to watersheds, coastal areas, urban regions, and landscapes. Important physical aspects include accessibility, functional and ecological complexity, and diverse physiographic and hydrographic systems. The complex interrelationships between coastal and inland areas, plains, valleys, and urban-rural networks further emphasize their intricacy (Magnaghi, 2019).

These systems hold the goal of sufficiency by aiming to close resources' cycles at the local level. However, the ambition of gaining full local autonomy is inherently constrained (Butelli, forthcoming), because, although successful in their intention, bioregions still exist within a relational global space, that necessitates to acknowledge two dilemmas: the ecological limitations of exploiting local resources on one side; and the ethical and political challenges posed by the reliance distant goods, on the other side (Dansero & Dematteis, 2023). These tensions expose the dual nature of the bioregional model. While it calls for sustainable local practices, it must also grapple with the realities of global interdependence.

Smartly, Magnaghi envisions bioregions as connected nodes in a "bottom-up globalization" network, in a way that emphasizes cooperative exchanges among regions to overcome local constraints. Yet, this vision is fraught with challenges. How can local autonomy coexist with global solidarity, if city-regions are born in competition, as discussed before?

The urban bioregion, therefore, emerges as a paradigm that is both inspiring and demanding. It urges us to reconsider territory not as a static or isolated entity but as a dynamic and relational construct that harmonizes local sustainability with global accountability. By rethinking territorial systems through this lens, urban bioregions prompt a transformative shift from extractive practices to mutual interdependence, prioritizing ecological integrity and social responsibility, over competition.

Although not fully explored, the complexity of the urban bioregion concept, as proposed by the territorialist school in relation to food systems (Poli, 2023; Fanfani

& Rovai, 2022), is surely rightful and rich, and far surpasses the reductive interpretations often adopted by CRFS practitioners (Dansero & Dematteis, 2023), who limited their exploration to the adoption of geographical qualifiers to perimeter food systems, without fully understanding their meaning, as already mentioned before.

The bioregion can concur in shaping the CRFS framework: in identifying an optimal city-region, the CRFS approach could be positively enriched by the integration of the profound insights already advanced by bioregional theory (Matarán Ruiz, Fanfani, Sánchez Contreras, Ángel, & Aguilar, 2025). The bioregional model displays an understanding of organized local linkages far beyond the city-region's ones.

With reference to Poli's work concerning the role of the city within the urban bioregion (2023), a relevant framework of reflection emerges for providing contribution to the perimeters-setting pursued by CRFS. This target is pursued by relying on four interconnected components, each contributing to the overall larger territorial synergy.

These components consist of the bioregional dimension, at first, which also mirrors the concept of a foodshed, discussed above. The condition of proximity which addressed the peri-urban, polycentric context that surrounds the city and includes agricultural and forestry territories and water systems. This also fosters a collective sense of self-governance, encouraging communities to recognize the ecological equilibriums and gain responsibility toward them.

Third, there is the bioregional public space which connects urban fronts and marginal spaces through nodes and networks, supporting coexistence between productive activities, environmental stewardship, and social interaction (Parham, 2015).

Finally, the bioregional city, which connotates the urban dimension, focuses on reorganizing urbanized areas into new centralities with public spaces, structuring buildings, and proximity services, all interconnected by an ecological network that weaves biodiversity and living systems into urban settings (Poli, 2023).

The integration of urban bioregion principles into the conceptualization of CRFS' city-regions responds to the oversimplification that characterizes the initial definition. Particularly the notion of fixed, clear-cut boundaries fails to accommodate the fluid, relational nature of modern regions, as highlighted by Allen and Cochrane in their critique of static regional models (2007), especially those facing the re-territorialization attempts in the pursuit of more sustainable human-nature relationships. This tension, mentioned also by Harrison and Growe (2014),

underscores a deeper epistemological divide that must be bridged to create effective and equitable regional strategies.

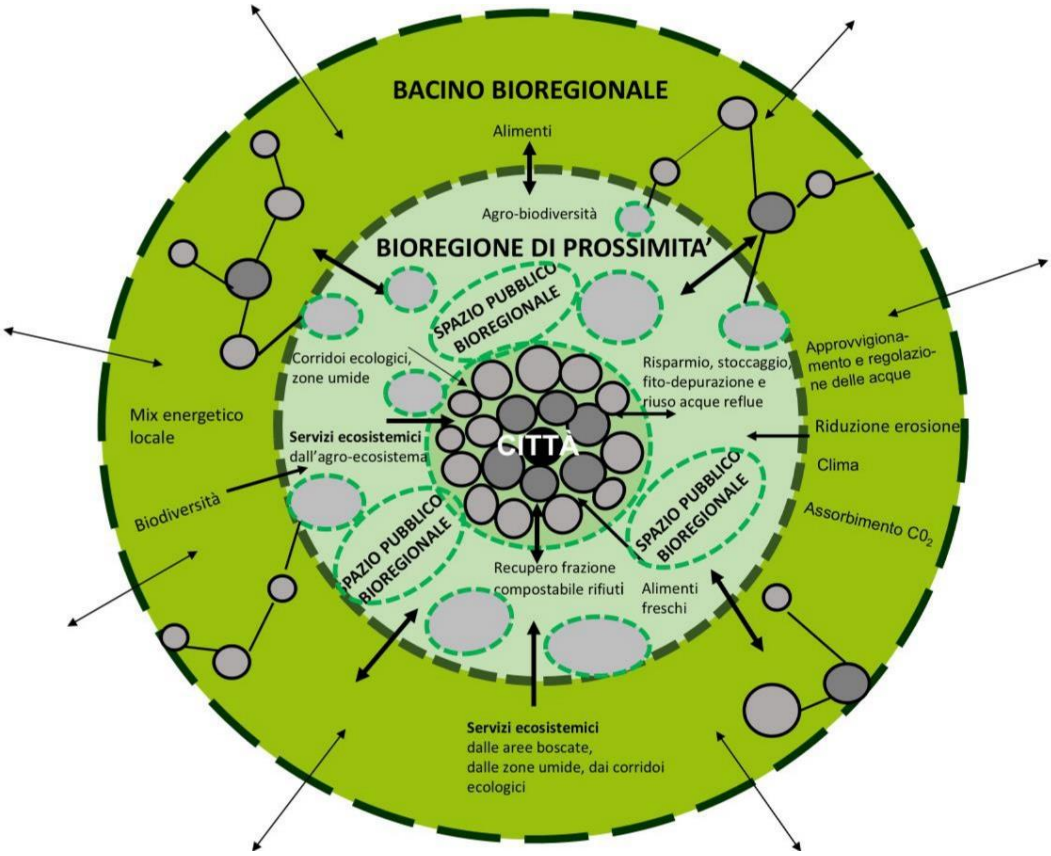


Figure 10: The Urban Bioregion
Source: Poli D., 2023, La città come nodo della rete eco-territoriale della bioregione urbana, in Magnaghi (eds), *Ecoterritorialismo*, p. 151.

The urban bioregion model consists of a context where territoriality could become the leverage to enhance an innovative local development. In detail, at its core, the urban bioregion dismantles the dichotomy of urban and rural, proposing instead a continuous, interdependent system of socio-ecological networks. Unlike traditional city-regions that often prioritize urban centers as engines of development, the bioregion recognizes the intrinsic value of territories as wholes, emphasizing their role in sustaining ecosystems, cultural practices, and resource cycles (Magnaghi, 2014).

The city-region and the urban bioregion possess contrasting yet convergent paradigms of spatial development. The city-region, grounded in an *etic* framework of blurred rational exploration, prioritizes economic development and city-centered governance, at the expense of regional ecological integrity (Schurch, 2018). This control-oriented model thrives on proximity and scale but risks becoming unsustainable and detached from the human and environmental systems it inhabits. Conversely, the urban bioregion adopts an *emic* lens, focusing on the interplay of local culture, ecology, and history. It emphasizes the sense of belonging, between communities and their natural settings, offering a territoriality that counterbalances the homogenizing tendencies of globalization (ibid.). In this way, the bioregion not only addresses the limitations of traditional city-regions but also redefines the purpose of territorial governance itself. It envisions a system where territories are not just administrative spaces but active participants in shaping sustainable development (Proskina, et al., 2023). This approach suggests that local actions, be they resource management, cultural preservation, or urban planning, must be nested within larger networks of solidarity and cooperation that extend beyond geographical proximity (Magnaghi, 2019); in other words, they hold the understanding of global complexity.

In essence, if considering that every archipelago of cities and regions can be a city-region, as has often been the case in practice, only certain city-regions hold substantial value for what CRFS prospects. At its core, the normative construction of a city-region gains real significance only when it moves beyond administrative demarcations and incorporates a deeper understanding of the active territoriality, as per how proposed by the bioregional model. City-regions holding a bioregion configuration are no longer arbitrary designations, but dynamic frameworks that embrace ecological, social, and governance dimensions, giving equal relevance to the rural and urban spaces in a synergistic relationship.

Finally, it is important to acknowledge that the reliance on bioregion knowledge might generate some misunderstanding concerning the semantic use of city-region in the framework of CRFS' installment. Nevertheless, it strongly retains its relevance. I do not intend to suggest the city-region definition dismission, especially because the cases presented before showcase more place-based understanding of that geographical dimension; rather, it is worth incorporating the territorial understanding rooted in the urban bioregion framework in the CRFS' city-region definition.

3. Problematizing the city-region size: a critical examination of possible scales

Building on the previous discussion, where it was affirmed how the contribution of territorial understandings within the city-region framework can bring significance through the concept of active territoriality, also considering the bioregional dimension as a platform of interconnections rich in meanings, it is now essential to turn to the critical question of what extension is relevant for the city-region's size.

As previously argued, the CRFS model has disrupted traditional conceptions of city-regions by giving normative meaning to the extension of urban centers and their surrounding rural hinterlands. This approach allowed for a flexible understanding of food systems. However, it did not account for the complexity of the reflections behind city-region theory. The debate on CRFS did not manage to address it, especially leaving unsolved the crucial yet elusive component of *scales*.

The concept of scale should be pivotal to CRFS governance, as also Rosendall recalls "the formal and informal processes, structures, and rules through which decisions relevant to the CRFS are made, implemented, and enforced at various levels and scales" (Roosendaal, et al., 2020, p. 13).

Indeed, the regional approach within food systems offers significant advantages to call for a relocalization of food, but determining the optimal extent for achieving greater sustainability remains contested. Furthermore, the interconnected nature of regional, national, and global food networks complicates any strict categorization of food as effectively regional. This recalls the need to critically engage with the concept of scale, particularly in light of Born and Purcell's caution against the local trap (2006). "To avoid [it], the ideal scale and reach of the CRFS to other regions, nationally and globally, need to be critically assessed" (van der Gaast, van Leeuwen, & Wertheim-Heck, 2020, p. 5). In this sense, the metropolitan scale, often identified as optimal for structuring local food systems (Brand, 2017), requires a deeper examination to understand its composition and functionality, particularly in the service of CRFS objectives.

This is essential to move beyond the simplistic rhetoric of local and instead critically assess the practical and ethical implications of relocalizing food systems (Dansero, Pettenati, & Toldo, 2017). For example, how much of the food consumed in a territory should realistically originate locally? Moreover, how large should CRFS be to withstand global shocks, such as climate events or economic disruptions? Finally, what governance structures can support relocalization without

reproducing regional inequalities or excluding trans-local networks essential to food security?

3.1. Constructing scales

Thus, the question of how large a city-region should be for fulfilling the purposes of CRFS emerges as more than a matter of static spatial distances or arbitrary metrics. Rather, it implies understanding what contributes to the extension of the city-region, and, therefore, at what significant scale it should exist. Although debates over the concept of scale are now affirmed rather substantially, they emerged with meaning only in the last decades; indeed, it was previously addressed as a matter of physical dimension only. Significantly, Peter Haggett conceptualized scale as a quantifiable measure of geographic extent, spanning from the minuscule to the planetary (2001). However, he contended that geographers primarily operated within a more confined spectrum, ranging from the globe largest extension to the neighborhood size. Within this span, scale was often treated as a rigid, hierarchical classification of spatial dimensions.

Taylor was among the first to challenge the empiricist conception of scale by embedding an urban-to-global scalar hierarchy within Wallerstein's world-systems model (Taylor, 1981). Nonetheless, only some very early reflections from Jonas successfully and clearly highlighted the persistent conflation of abstract and metaphorical conceptions of scale, warning that while categories such as "local", "urban" or "global" are often treated as self-evident, they function as broad abstractions of scale that require deeper scrutiny (Jonas, 1994). Howitt similarly critiqued the tendency to reify scales as fixed entities, cautioning that this approach risks obscuring the processes that actively construct them (Howitt, 1998).

In brief, while examining the evolution of geographical theories related to scales, it is important to present a further insight: the inherent tension between fixity and fluidity in scale conceptualization is unavoidable (Moore, 2008). Here, an outstanding contribution comes from Swyngedouw, who argues that scales are, indeed, not fixed spatial attributes but dynamic outcomes of interactions, processes, and actions (1997). Scales emerge as inherently relational and only acquire meaning by understanding them in relation to the existing interscalar networks.

"Each geographical scale is constituted through its historically evolving positionality within a larger relations grid of vertically 'stretched' and horizontally 'dispersed' sociospatial processes, relations and interdependencies" (Brenner, 2001, p. 605-606).

Scale should not be treated as a self-evident category; it is better understood as a property rising out of social and political dynamics. It is either contingent and strategic and depends on the way in which actors navigate socio-spatial relations. Instead of assuming that scale is static, those who must comply with the notion of scale should critically examine how it is produced first, and operationalized to structure governance second, particularly where multiple scales intersect and redefine one another.

In this framework, Brenner warned against the overextension of scalar terminology, arguing that geographers often subsume distinct formations, such as places, territories, and networks, under the rubric of scale, leading to what he termed "analytical blunting" (Brenner, 2001), where scale becomes a catch-all category for spatial differentiation (Moore, 2008). Following Moore's reflections, geographers tend to refer to scale in the place of more significant terms (ibid.). Nonetheless, the implicit and uncritical adoption of the concept of scale is not without consequences.

The so-defined "politics of scale" highlights how scales are actively produced and contested through power struggles, with economic globalization illustrating how governance functions previously concentrated at the national level have been rescaled to local and supranational institutions (Smith, 1984). In other words, scales are created for the purpose of installing a more undisputed governance.

Moore displays how (2008), aiming at solving this critical debate, some propose abandoning the notion of scale as a pre-existing or hierarchical structure, advocating instead for a flat, site-based ontology (Marston, Jones, & Woodward, 2005). Here, scale does not longer exist as a term, and it is rather understood through diverse, interconnected practices and relations rather than fixed levels. This perspective challenges top-down interpretations of spatiality, emphasizing how interactions unfold organically rather than being predetermined by rigid categories such as "local," "regional," or "global."

However, critics argue that rejecting scale altogether may lead to biased understanding of existing power asymmetries that shape governance, economic flows, and political struggles; in detail, it would lead to "an impoverished understanding not only of the power relations that inhere in scale, but of the power relations that inhere in the intersections of diverse spatialities with scale" (Leitner & Miller, 2007, p. 121).

Although an established tradition of geographers pursues the path set above, as MacKinnon suggests (2010), the focus should not be on dismissing scale as an analytical category but rather on examining how different actors strategically use and reshape scalar structures to serve their interests. This approach, termed "scalar politics", acknowledges both the inherited and contested nature of scale,

recognizing that spatial arrangements are historically produced, institutionally embedded, and yet constantly renegotiated (Jones III, Leitner, Marston, & Sheppard, 2016),

!arguing that it is often not scale per se that is the prime object of contestation between social actors, but rather specific processes and institutionalized practices that are themselves differentially scaled" (MacKinnon, 2010, p. 22-23).

The distinction between the politics of scale and scalar politics lies in the essence of scale as either a structural constraint or a strategic tool. Brenner, drawing from a structuralist and Marxist perspective, argues that scales are not pre-existing natural categories but are produced and continuously reshaped by dominant economic forces (MacKinnon, 2010). The capitalist system, according to Brenner (2001), builds and edits scales to optimize its operations, decentralizing responsibilities to enhance competition among territories and facilitate profits' accumulation. Thus, scales consist of historically fluid yet systemically determined constructions, boldly operating in favor of dominant actors.

MacKinnon, while acknowledging Brenner's contributions, critiques the rigidity of this vision and proposes a more agent-centered approach. He argues that scales are not merely imposed from above but are also actively reconfigured from below. Rather than treating scales as fixed spatial hierarchy, MacKinnon suggests a relational understanding of them: they are mobilized by different groups to serve different interests. Power, in this sense, is not only top-down but can also emerge bottom-up, as grassroots movements, local governments, and civil society actors negotiate and reshape scales in pursuit of their goals.

The fundamental difference between the two perspectives lies in the structure versus agency reflection: while Brenner sees scale as an instrument of systemic power exercising, MacKinnon interprets it as a flexible and contested space of action. This debate highlights the tension between treating scales as an external framework imposed on social processes and recognizing it as an evolving terrain of political struggle and strategic maneuvering. By shifting from a fixed hierarchical conception to a more relational understanding, MacKinnon's approach opens possibilities that attempt to dismiss political-economic perspectives as inherently totalitarian[27], instead arguing that scales emerge as effects of both capitalist restructuring and social practice, balancing materialist and discursive perspectives. MacKinnon's concept of scalar politics integrates insights from political economy

[27] See Chapter VII for a deeper understanding of the limits of capitalist power in food systems.

and poststructuralism, offering a dynamic approach to scale, based on four elements (2010).

First, scalar politics reframes scale not as the focus of political struggles, but as a dimension of broader political projects, in contrast with Brenner (2001). Rather than assuming scale as a predefined structure, it emerges as a strategic tool to also exert influence over other domains (Mansfield, 2005). Second, it highlights the strategic use of scale by actors, organizations, and movements (Jonas, 1994), emphasizing how scalar classifications are strategically addressed to legitimize certain political agendas. States, for instance, construct official scalar hierarchies that can either reinforce or suppress political claims; however, these classifications can be challenged, reshaped, or subverted through political action (Gonzalez, 2006). Third, it underscores the role of inherited scalar structures that contributed to shaping contemporary political possibilities. While poststructuralists emphasize the fluidity of space (Massey, 2005), political economy approaches stress how historical sedimentation conditions future transformations (Brenner, 2001; Jones, 2009). MacKinnon integrates these perspectives, arguing that scale is neither entirely open nor fully determined, but constantly reworked through interactions between pre-existing structures and emerging political projects.

Finally, he examines the creation of new scalar arrangements at the intersection of historical structures and political agency (Jessop, 2001). Political actors do not operate within static scales; rather, they actively reshape them. Once established, these arrangements gain a relative autonomy, influencing possibilities.

Therefore, being careful not to ignore Leitner and Miller's arguments according to which inherited scalar structures do not preclude transformative politics but instead contribute to shape the terrain on which struggles unfold (Leitner & Miller, 2007), and considering Smith's warnings that dismissing scale altogether risks obscuring real power asymmetries (Smith, 2015), the present work acknowledges the need to balance historical structure with social agency and fixity with fluidity. While poststructuralist critiques have effectively challenged rigid, hierarchical conceptions of scale, structuralist perspectives remind us that power relations are embedded in historically produced spatial frameworks.

A productive way forward lies in treating scale as one spatiality among many rather than as an all-encompassing framework, recognizing its interactions with networks, flows, and topologies while still accounting for the material effects of scalar arrangements (Jones III, Leitner, Marston, & Sheppard, 2016). In fact, while scale may not be an inherent feature of space, it remains a social and political construct, bearing opportunities, constraints, and margins of contestation (Sisson, 2021).

3.2. A definition of scale in the framework of food systems

The previous section provided the framework to examine the concept of scale for the purposes of this work, addressing the considerations that shape its understanding. Building on this, the focus now shifts to the relationship between scales and CRFS to explore how those different perspectives on scale influence the comprehension of CRFS's size, scope, and role, while highlighting the complexities involved in determining their effective extension. Indeed, if, as mentioned above, the attempt to delineate city-regions based solely on spatial-economic criteria risks oversimplifying their complexity and overlooking the broader socio-political and environmental forces at stake, when the issue intersects the CRFS' perimeter, the situation worsens.

Concerning this matter, it is necessary to take a step back; in 2017, Dansero, Pettenati, and Toldo posed a fundamental question: which reflections on scale could give meaning to the governance of food systems? At that time, their inquiry primarily concerned the role that the urban framework should play in relation to food systems' governance. The authors once again affirm that this scale is not a neutral or fixed concept but one deeply embedded in the ways food systems are understood.

To explore this issue, they developed a threefold reflection on scale, identifying three crucial ways in which scale contribute to understanding the governance of food systems (Dansero, Pettenati, & Toldo, 2017). At first, "scale as an amplitude and extension of a phenomenon": one of the primary ways to assess the relevance of the urban scale is by considering the concentration of population and economic activities within a given area. This perspective emphasizes how food systems deal with urbanization processes creating a complex web of interactions that link urban centers with their surrounding rural areas and, in many cases, global supply chains. In particular, given the limited power that municipal governance possesses over far extended food systems, it is hardly possible to develop in-cities contained food policies.

Second, "scale of skills": the urban scale retains significance because it encompasses specific sectoral competencies essential for food governance, which exist in proximity and find alignment within the local government. Therefore, although not all processes can be governed at the urban scale due to the supply chains' length, it is possible to deal with a valid number of activities: public food catering, the regulation of the spatial distribution of commercial activities and food logistics (including retail and wholesale markets), and land use planning for various forms of urban and peri-urban agriculture at once.

Finally, “scale as a product of action”. Perhaps, the most dynamic and politically meaningful aspect of scale is its role as a construction that emerges within the action of government. Given the complexity of food flows, UFP rarely act over fixed scales; rather, when policymaking takes place, the development of UFP actively contributes to setting up new scales of meaning. By defining the urban-metropolitan area as the reference point for food planning, policymakers effectively create a new scale of action.

Looking back at the precedent reflections, it becomes clear that the authors did not only provide a valuable framework for critically understanding the crucial role of scale’s comprehension in the framework of food systems but, with the third dimension, they also anticipated a crucial shift in governance thinking: scale as a product of action. In other words, the effort put to establish effective policies, UFP in the present scenario, does not simply adapt to existing scales; rather, it actively contributes to shape the most appropriate level for addressing food-related challenges. The key point is that this process does not simply take place within a predefined scale, it actively constructs a new one.

This pillar is particularly relevant in a context where, as mentioned above, the concept of scale, and the urban scale in particular, is increasingly questioned as a fixed framework for spatial analysis (Bolocan Goldstein, 2014). Therefore, if we acknowledge that UFP increasingly moves beyond municipal borders and, because of CRFS, must entail the broader territory into consideration, what role does scale assume? If we extend this line of thinking, considering the CRFS as the new reference point for food governance, three additional critical elements might emerge:

- Scale as territorial structure and cohesion. The interactions between urban and rural areas are fundamentally functional rather than purely administrative. These interactions encompass economic transactions, food flow logistics, population shifts, and the distribution of resources, all of which collectively shape the food system’s structure beyond municipal boundaries (Tecco, Bagliani, Dansero, & Peano, 2017). Accurately identifying and analyzing these functional connections is essential for formulating policies that address the actual dynamics of territories in terms of their real interconnections.
- Scale as environmental and socio-spatial interdependencies. Scale is defined by the environmental connections that bond urban and rural areas. They are related not only due to the networks of interest, but also depending on the complex hydro-geomorphological and environmental systems, which

deal with the urban and agroforestry settlement patterns. This requires a systemic approach to acknowledging the co-evolution of various elements of the urban bioregion, thereby enhancing territorial assets as common grounds that contribute to the comprehensive management of city-regions' physical dimensions (Magnaghi, 2014; Poli, 2023).

- Scale as governance and inter-municipal cooperation. If, as mentioned above, the complexity of CRFS' perimeter requires governance approaches that go beyond fixed administrative boundaries, the division of responsibilities across different governmental levels often hinders valid and truly possible policy integration and implementation. Implementing these governance structures, such as metropolitan coordination bodies, regional partnerships, or multi-stakeholder platforms, can enhance policy coherence and efficiency by aligning with the practical dynamics of food systems, but this occurs only in the context of a clear and distinguishable governance level. What urges is the creation of intermediate levels that facilitate the installation of the UFP (Zerbian, Adams, Dooris, & Pool, 2022).

Following this threefold interpretation of the concept of scale in the framework of CRFS' city-region understanding, scale is no longer created as the most powerful size for the local economic development, like before; instead, it emerges as the product of a new, expanded, and multi-scalar territoriality, distinguished by the central role of participatory public space at the territorial scale (Poli, 2014). Here, MacKinnon's scalar politics finds resolution: rather than being constrained by rigid scalar classifications, the CRFS' scale is primarily understood because of the context-specific bonds that tie the urban-rural framework; then, the natural links that interconnect the region contribute to setting a perimeter that strongly respects the real interdependencies. Finally, the scale resulted to be co-created in synergy with social units in which the citizens of the bioregion can understand and control the decisions that affect their lives (Berg, 1978).

Following Bookchin's socio-ecological and the municipalist perspective, strong emphasis is indeed placed on self-governance as an essential condition for the very existence of the bioregion, and city-region, per the reflection that is carried out here (Bookchin, 1979). Hence, instead of functioning as mere administrative layers within a top-down structure, these scales become new spaces for decision-making and policy coordination (Pettenati & Toldo, 2018). This shift leads to the development of multi-scalar frameworks, where each scale plays a distinct yet equally essential role, ensuring more effective and interconnected policy actions while respecting their specific areas of competence (Santangelo, 2005).

3.3. Setting the CRFS scale

Having established three distinct spatial configurations that contribute to defining a relevant scale for a city-region aiming to function as a CRFS, the next step is to move beyond a purely theoretical identification of scale. It is essential to ask what criteria, based on the previous reflections, could possibly support the selection of effective scales for CRFS.

In the preceding Chapter, key elements identified by the FAO for defining a CRFS' city-region were outlined. These elements included connected municipal boundaries that are critical in ensuring local interdependencies, thereby allowing them to govern the operational dynamics of food production, distribution, and consumption across urban and peri-urban areas. Additionally, administrative boundaries describe governance jurisdictions, determining the institutional responsibilities over UFP enforcement and consequential management. However, these administrative delineations alone are insufficient.

Moving beyond, functional and spatial factors critically shape the definition of the CRFS. Considering a perimeter with relevant food flows is essential for tracing key supply routes and connections between urban centers and adjacent agricultural zones, thereby revealing the systemic pathways and potential vulnerabilities in food logistics. Concurrently, land use planning must integrate both production areas and urban-controlled zones, fostering a cohesive approach that aligns agricultural practices with urban development strategies. Finally, demography-related analyses are necessary to ensure that UFP are responsive to the needs of urban and rural populations both quantitatively and qualitatively.

However, these criteria alone are not sufficient. Given the complexity of bioregional dynamics, urban-rural relationships, and municipal synergies, as addressed so far, it is essential to move beyond a static view of territory and embrace the active territoriality where the first is not just a passive stage for policies but an active force shaping and being shaped by real processes. Rather than a fixed space where policies unfold, territory now emerged as a living system where governance interacts with environmental and economic processes. Recognizing this interplay allows for adaptive, place-based strategies, ensuring food systems are not only administratively coherent but also ecologically and socially embedded.

Defining the exact size and boundaries of a city-region remains complex, as no single criterion fully captures its fluid, interconnected nature. However, by distilling key elements, it is possible to move beyond theory and develop practical frameworks.

Therefore, the present work intends to explore possible criteria that, given the reflections carried out so far, emerge as significant to acknowledge whether selected scales for the CRFS' installation embody validity. Tab. 11 presents the possible relevant criteria for sizing.

Territorial structure and cohesion	1. Presence of a single main urban core, secondary urban clusters, and surrounding rural production areas, holding longstanding relations. 2. Compliance with the Functional Urban Area (FUA) definition as per OECD guidelines. 3. Existence of logistical infrastructure (e.g., markets, transport networks, and food hubs).
Environmental and socio-spatial interdependencies	4. Integration of ecological assets, including green infrastructure and water resources. 5. Population density along the urban-rural continuum. 6. A significant foodshed that might ensure food self-sufficiency.
Governance and inter-municipal cooperation	7. Existence of relevant administrative boundaries that facilitate governance and coordination. 8. Availability of sufficient food-related data, covering production, distribution, and consumption.

Table 11: Criteria for the CRFS' city-region assessment
Source: Author's elaboration

3.3.1. Territorial structure and cohesion

A well-functioning CRFS requires a clearly defined spatial structure connecting urban centers with their surrounding rural areas in a coherent and functional way. The presence of a main urban core alongside secondary urban clusters and external large rural production zones ensures that food supply chains can be regionally integrated, rather than relying on distant imports (1. Presence of a single main urban core, secondary urban clusters, and surrounding rural production areas, holding longstanding relations) (van der Gaast, van Leeuwen, & Wertheim-Heck, 2020).

This structure fosters short food supply chains, supports local producers, and strengthens food security by reducing dependency on external sources.

However, territorial continuity alone is not always necessary; what matters is that the system's functional connectivity, meaning that food-related goods and services can flow efficiently between urban and rural areas, even if the region is not geographically compact (Carson, Carson, & Argent, 2022). Ensuring that a CRFS aligns with recognized Functional Urban Area (FUA) definitions, OECD in the present case, allows us to consider a territory that respects the fundamental relationships occurring on a significant number of ecosystem classes and consequential opportunities (2. Compliance with the FUA definition as per OECD guidelines) (Gottero & Cassatella, 2019). In detail, the guidelines suggest that four steps concur in shaping a FUA,

"1) Identify an urban centre: a set of contiguous, high density (1,500 residents per square kilometre) grid cells with a population of 50,000 in the contiguous cells; 2) Identify a city: one or more local units that have at least 50% of their residents inside an urban centre; 3) Identify a commuting zone: a set of contiguous local units that have at least 15% of their employed residents working in the city; 4) A functional urban area is the combination of the city with its commuting zone" (Dijkstra, Poelman, & Veneri, 2019, p. 5).

Finally, the functionality of connections also depends on the existence of logistical infrastructure. This is just as critical as food production itself. Without efficient transport networks, wholesale markets, and food hubs, food cannot move effectively between rural producers and urban consumers; therefore, a specific consideration of food-related logistics is relevant to determine if the CRFS is possible (3. Existence of logistical infrastructure, including markets, transport networks, and food hubs). A strong food logistics system, particularly one that appreciates and considers local food, ensures reduced food loss, lower transportation costs, and increased access to fresh, better controlled locally sourced products (van Dooren, Leseman, & van der Meulen, 2021).

3.3.2. Environmental and socio-spatial integration

A truly sustainable and resilient CRFS must integrate both human and ecological factors into its design. Therefore, first, the distribution of population along the urban-rural continuum must be considered because it directly affects food needs, infrastructure needs, and land use planning (4. Population density along the urban-rural continuum) (Sylla, Swiader, Vicente-Vicente, Arciniegas, & Wascher, 2022). Regarding this, the crucial information to retrieve concerns the distribution of the

population within the targeted area, particularly considering the need to balance urbanized areas and productive lands.

Additionally, bearing in mind what is stated above concerning the importance of ecological assets connection, it is crucial to figure out what natural relations exist within the selected city-region. In other words, aiming at conceiving city-regions that hold the bioregional framework per how conceived by Magnaghi (2019), green infrastructure, water resources, forests, and wetlands, must be actively integrated into the city-region sizing process not only in terms of spatial consideration, but as the result of a calculation of necessary distinct types of surfaces for the wellbeing of the CRFS (5. Integration of ecological assets, including green infrastructure and water resources) (Fei, et al., 2023). Natural infrastructure is crucial to consider for two reasons: first, it allows us to set up a city-region perimeter that respects the ecological limits and connections of the area; second, environmental resources provide essential ecosystem services, such as soil fertility, water retention, and climate resilience, all of which are critical for sustainable food production. Ensuring that food systems operate within ecological limits not only enhances sustainability but also protects biodiversity and mitigates environmental degradation, creating a food system that is both productive and regenerative.

Then, a significant foodshed, one that allows the city-region to source a substantial portion of its food locally, helps ensure that food production and distribution remain regionally embedded, rather than dependent on global supply chains (6. A significant foodshed that might ensure food self-sufficiency). While complete self-sufficiency is rarely possible, and not always desirable a priori, in the contemporaneous globalized food system, sufficient local foodshed capacity can stimulate resilience and enhance food security (Karg, et al., 2016).

3.3.3. Governance and inter-municipal cooperation

For CRFS to function effectively, the key pillar regards the governance structures, which must be well-defined, capable of coordinating across different levels of administration, and put in the position to develop effective UFP. The alignment of food systems with administrative boundaries is crucial, as fragmented governance can create inefficiencies in policy implementation; in particular, it is necessary to bear the possibility to easily coordinate multiple municipalities over the implementation of specific UFP (7. Existence of relevant administrative boundaries that facilitate governance, coordination,) (Krähmer, Battisti, Berti, Bruno, & Dansero, 2024).

Effective governance is impossible without reliable data on food production, trade, logistics, and consumption patterns. Access to comprehensive food-related

data enables evidence-based decision-making, helping policymakers understand supply and demand dynamics, identify vulnerabilities, and design targeted interventions (8. Availability of sufficient food-related data, covering production, distribution, and consumption) (Dubbeling, et al., 2017). Moreover, the data shall cover the entire territory taken into consideration; indeed, "where impact data are available, these data principally refer to urban households and food security, while data for rural household livelihoods, preservation of rural agricultural areas, improvement of ecosystem conditions and services, and effects on sales of rural land are still often lacking" (Dubbeling, Santini, Bucatariu, Vogt, & Eisenbeiß, 2016).

Without strong governance structures and reliable data, even the most well-planned food system strategies risk failing due to poor implementation and lack of coherence considered the realities of the food system.

4. The spatial extension of Turin's City-Region Food System

The study first established a comprehensive understanding of the city-region concept, examining its evolution within geographical theory and its relevance when considered through the lens of territoriality. This dual perspective allowed for the identification of key characteristics that define a city-region as a spatial and functional unit. Consequently, a fundamental inquiry emerged regarding the scale at which a city-region should be delineated to serve as a viable framework for CRFS development, finally allowing us to set up the criteria that can contribute to understanding the most effective size of CRFS' city-region.

It is now relevant to delve into the possible extension of Turin's CRFS.

4.1. Comparing local, municipal, and regional scales

As a starting point for this analysis, the research embarks on a comprehensive evaluation of the Turin's city-region within the framework of CRFS, with the central aim of determining which scale is best suited to support and advance the core objectives of a CRFS approach.

In conducting this spatial assessment, the research examines multiple existing territorial delineations that represent varying extensions of Turin's city-region. These include both administratively defined areas, and broader spatial configurations that have been considered within urban and regional planning discourses. Indeed, as mentioned above, the significant scale where installing UFP is possible and relevant, might need to be entirely new, because UFP-related scale

emerges as a product of the action; nevertheless, given the peculiar context of Turin, where some processes concerning the development of UFP are already occurring[28], it is worth nothing that an evaluation of the mentioned two typologies of scale is strongly significant. Among other information, it is necessary to recall that the Functional Urban Area (FUA) of Turin has been already calculated elsewhere, and is here taken into consideration (Gottero, Larcher, & Cassatella, 2023; Tecco, et al., 2018).

The study evaluates several territorial scales, now presented in growing size, beginning with Turin's first belt (TFB), which includes the immediate suburban municipalities directly connected to Turin, and does not constitute a governance level. It then extends the assessment to the Turin Metropolitan Area (TMA), which is not a governance level too, but encompasses a significant functional region characterized by suburban expansion and regional economic integration, the extent of which was determined in precedent research (Gottero, 2016). Other spatial dimensions include the *Ambito di Integrazione Territoriale* (AIT) of Turin, which represents territorially integrated areas recognized for their socio-economic and infrastructural interdependencies, leaded by a major urban center (RegionePiemonte, 2024); CollinaPo Man And Biosphere Reserve, that comprises 86 municipalities including Turin and several other municipalities from the southern part of the area, toward the northern, and including the hills on the East. Corona Verde, which is a spatial project focused on green infrastructure and ecological connectivity in the peri-urban circle of Turin (Cassatella, 2013).

The study further examines the Metropolitan City of Turin as a possible layer; it consists in the governance structure that extends in between the municipalities' level and the region and includes the intial urban-rural continuum. Some research already considered this level as potentially significant for the CRFS' setting; therefore, the present work will rely on that knowledge too (Krähmer, Battisti, Berti, Bruno, & Dansero, 2024). Then, the wider Regione Piemonte is also considered given its strong governance capacity and its control over some food-related policy fields. Lastly, the research considers the *Industrial Triangle*, a historically significant economic region linking Turin, Milan, and Genoa, assessing whether its territorial dynamics play a role in shaping regional food distribution networks.

[28] See Chapter I

Scale	Municipalities (n.)	Area (ha)	Population (n.) (2016)
TFB	23	59,935	1,401,468
TMA	39	85,912	1,537,790
AIT	41	89,456	1,499,702
CP	86	170,913	1,5135,75
CV	93	164,918	1,7618,94
CMTO	312	682,950	2,2409,16
PR	1180	2,540,137	4,348,298
IT	3007	6,162,102	/

Table 12: Comparison of surface, municipalities and population of the possible CRFS' city-region extensions of Turin

Source: Author's elaboration

By analyzing these different spatial levels, in relation to the nine different criteria, as visible below, the research ensures that the assessment is not constrained by pre-existing administrative frameworks but instead identifies the most functionally coherent and strategically relevant city-region scale for CRFS development.

The table will be populated by evaluating the validity of each criterion across the different city-region scales. The scale that meets the highest number of criteria will be identified as the most functionally suitable area for the CRFS implementation.

Criteria	**TFB**	**TMA**	**AIT**	**CP**	**CV**	**CMTO**	**PR**	**IT** [29]
1. Presence of a single main urban core, secondary urban clusters, and surrounding rural production areas, holding longstanding relations.								
2. Compliance with the Functional Urban Area (FUA) definition as per OECD guidelines.								
3. Existence of logistical infrastructure.								
4. Integration of bioregional ecological assets,								

[29] Turin First Belt, Turin Metropolitan Area, Ambito di Integrazione Territoriale, CollinaPo, Corona Verde, Metropolitan City of Turin, Piedmont Region, Industrial Triangle

including green infrastructure and water resources.								
5. Population density along the urban-rural continuum.								
6. A significant foodshed that might ensure food self-sufficiency.								
7. Existence of relevant administrative boundaries that facilitate governance and coordination.								
8. Availability of sufficient food-related data, covering production, distribution, and consumption.								

Table 13: Structure of cross-check analysis of Turin CRFS' city-region
Source: Author's elaboration

4.2. Methods

This research is based on secondary data collection to assess the spatial structure of Turin's city-region in the context of CRFS development. The study relies on datasets provided by the institutional bodies IRES Piemonte[30], ISTAT and Chamber of Commerce, which offer key information on demographic distribution, land use, food production, and economic activities. Additionally, geospatial data are sourced from Geoportale Piemonte, ensuring the integration of official territorial datasets in shapefile format, helpful for a precise data-driven spatial analysis.

Therefore, the fundamental aspect of the research is the visual representation of spatial information using GIS; these serve as interpretative cartographic models, facilitating the structured assessment of urban-rural interdependencies, governance mechanisms, and infrastructural arrangements. Yet, it is acknowledged that territorial demarcations are inherently constructed and subject to methodological constraints (Casti, 2005).

In this framework, it is also important to understand that secondary datasets sourced from IRES, ISTAT, and Geoportale Piemonte, inherently embed institutional biases and classification constraints that shape the exact representation of reality. As a result, the spatial outputs generated through QGIS are not interpreted as definitive territorial delineations but rather as methodologically structured approximations that facilitate a critical examination of the potential CRFS layers (Schuurman, 2002).

[30] https://www.ires.piemonte.it/ ; https://www.istat.it/ ; https://geoportale.igr.piemonte.it/cms/

The analysis is carried out through a comparative color-coded assessment, visible in Tab. 13, systematically evaluating the multiple territorial extensions for Turin against the structured set of criteria relevant to the creation of a CRFS. Each territorial scale is assessed based on its degree of alignment with these criteria, allowing for a progressive elimination of less suitable configurations. This methodological approach highlights the relative strengths and weaknesses of each city-region option.

4.3. An exploration of Turin's CRFS

The following section presents the results of the analysis conducted to evaluate the most suitable scale for Turin's CRFS city-region. The results are structured to compare the various territorial extensions taken into consideration hereby. Each potential spatial extension is evaluated individually against the nine criteria developed in the methodological framework, allowing for a criterion-by-criterion assessment of how each scale responds to the spatial, functional, governance, and environmental dimensions required for the CRFS development.

4.3.1. Presence of a single main urban core, secondary urban clusters, and surrounding rural production areas, holding longstanding relations

The first criterion, which evaluates the presence of a single main urban core, secondary urban clusters, and surrounding rural production areas holding longstanding relations, serves as a foundational requirement to assess the spatial coherence of any potential CRFS for Turin. Applying this criterion requires an in-depth reading of both the land cover patterns and the territorial organization. Figure 11 displays the Corine Land Cover (2022) data, and the multiple spatial extensions previously identified.

Within smaller-scale configurations, such as the TFB or the TMA, there is clear evidence of a compact spatial structure organized around a primary urban core, Turin, with a relatively well-defined series of smaller urban clusters forming a ring of settlements. These secondary clusters, including municipalities like Rivoli, Collegno, Moncalieri, and Chieri, maintain high levels of connectivity to the core city. This extension, characterized by high-density artificial surfaces progressively giving way to peri-urban and rural areas, suggests a relatively rooted intact urban-rural transition, where the flows and connections might have been established over time, forming stable spatial relations that fit well with the expectations of the first criterion. At these more localized scales, the spatial structure largely retains a functional spatial coherence where the urban system, the supporting secondary

clusters, and the surrounding agricultural areas contribute to a single urban-rural territorial system.

As the spatial scale expands to the entire PR, the spatial organization begins to diversify significantly. While Turin retains its role as the core, the broader regional landscape displays a more polycentric structure, with the emergence of intermediate urban poles, such as Novara, Alessandria, and Cuneo. These cities, although secondary within the regional framework, act as primary cores within their respective sub-regional contexts, weakening the clear hierarchical primary position of Turin across the entire regional scale. Nevertheless, even at this larger scale, it is possible to identify a spatial gradient radiating from Turin, where levels of urban concentration gradually decrease and give way to productive rural areas, especially along the Po Plain and within the areas historically linked to Turin's provisioning systems. Although this larger scale begins to introduce complexities in terms of territorial cohesion, there is still a recognizable tendency toward a regional system in which Turin plays a gravitational role, supported by a constellation of secondary urban clusters and extensive agricultural areas that hold potential for integration into a regionalized CRFS.

The situation changes entirely when the analysis is extended to the level of the Industrial Triangle, connecting Turin with Milan and Genoa. As already discussed in the chapter before, this does not align with the logic of a single-core framework. Instead, it corresponds to a historically and functionally fragmented macro-region, where at least three independent metropolitan cores, each with its own spatial logic, infrastructural networks, and economic functions, coexist within the same space. Although bonded by a common past of industrial development, this fragmentation inherently disrupts the possibility of identifying a single coherent food system radiating from a primary core. This territorial complexity reflects the presence of highly differentiated systems, each embedded in their own regional hinterland, generating conditions where spatial processes are more probably context-dependent and therefore difficult to frame within a unified CRFS logic. The absence of a singular urban core surrounded by secondary clusters linked to a defined agricultural hinterland makes the Industrial Triangle incompatible with the spatial logic required by the first criterion.

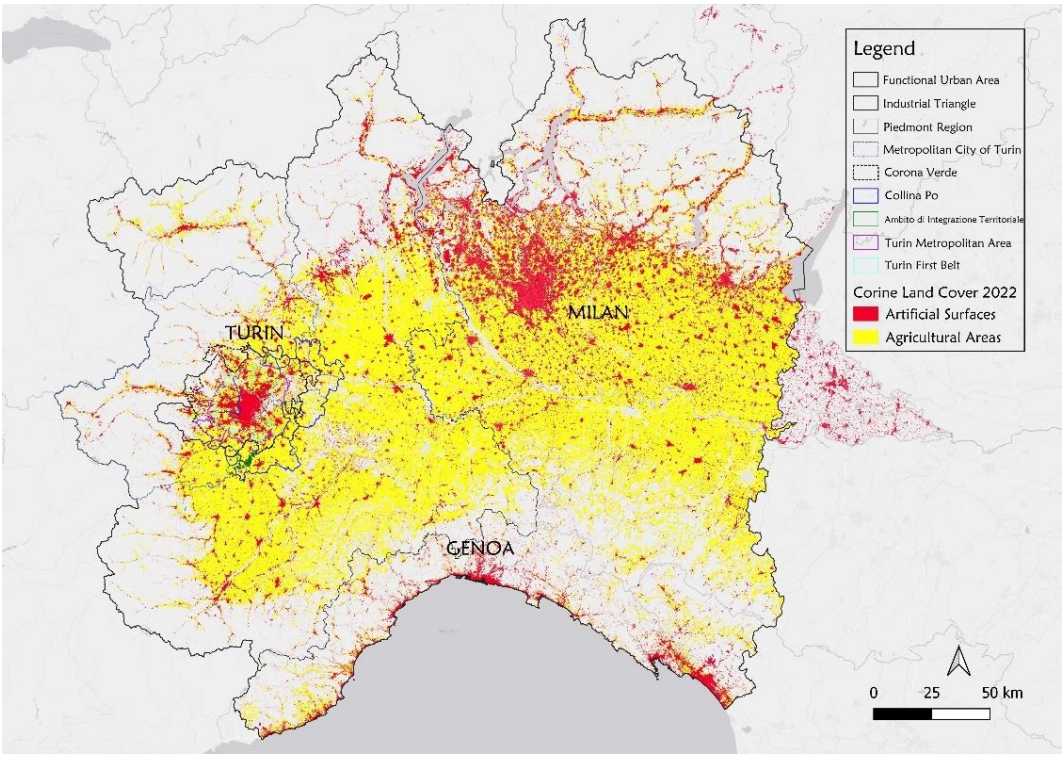


Figure 11: The Industrial Triangle city-regions representation
Source: Author's elaboration on the data of Corine Land Cover (2022)

This structural limit reinforces the decision to concentrate the spatial evaluation on the RP and its sub-regional configurations. Within Piedmont, despite the presence of multiple secondary cities, the map clearly illustrates how the territorial structure is centered on Turin as the primary core, with secondary urban nodes largely maintaining functional connectivity to the Turin system. The spatial distribution of agricultural land in proximity to these urban areas further reinforces the potential for an integrated urban-rural food system, with the agricultural landscapes maintaining a role in possibly serving the food demand of both the urban core and the intermediate towns. This scale retains a level of cohesion that is analytically compatible with the requirements of the first criterion, thereby justifying the focused attention on this level.

4.3.2. Compliance with the Functional Urban Area (FUA) definition as per OECD guidelines.

The second criterion concerns the compliance of each proposed spatial configuration with the FUA definition established by OECD guidelines.

Figures 12-13 offers a spatial representation of Turin's FUA, which appears as a relatively compact agglomeration encompassing the *Città di Torino* itself along with its immediate peri-urban municipalities, where significant functional interdependencies with the core can be empirically observed.

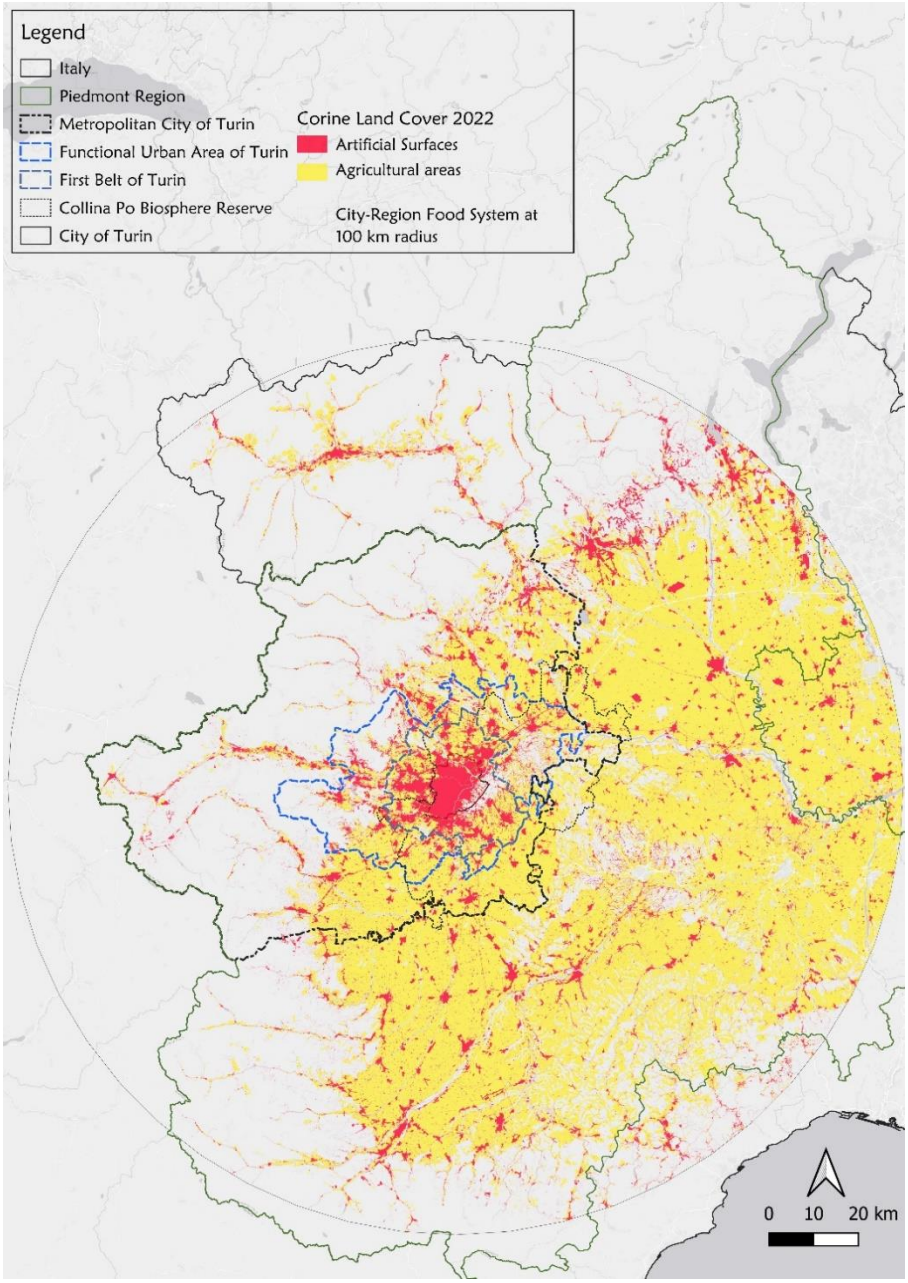


Figure 12: Potential Turin's city-regions at the Piedmont Region's scale
Source: Author's elaboration on the data of Corine Land Cover (2022)

A first observation regards the clear spatial mismatch between the extent of the FUA and the much larger boundaries of RP and CMTO. Indeed, Turin's FUA is confined to a territorially limited area where strong functional relations between the core city and surrounding municipalities are meaningful. Conversely, the broader regional scale includes a series of urban poles, which are characterized by their own localized functional systems, with limited and contextually dependent interactions with the Turin core. This confirms that the spatial extension of RP exceeds the analytical validity of the FUA concept when applied to a single metropolitan-based functional system, rendering the entire region too broad to match this criterion (Figure 13).

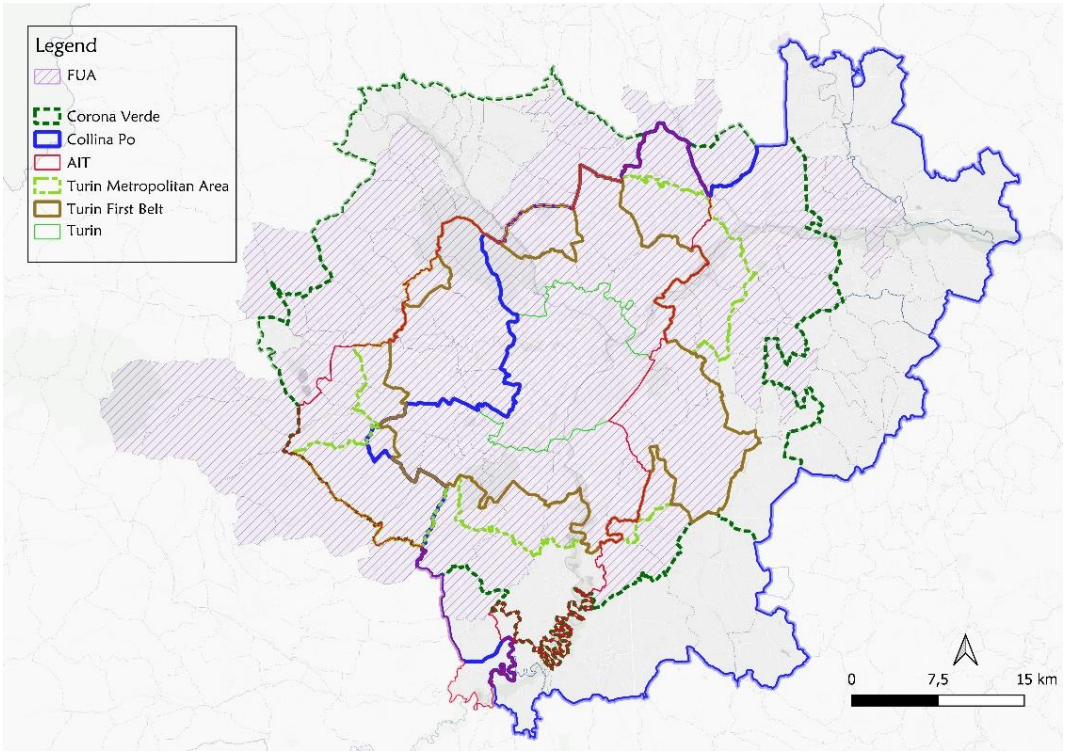


Figure 13: A comparison of Turin's FUA and its potential city-regions
Source: Author's elaboration

This spatial discrepancy necessitates a recalibration of the potential CRFS framework towards more functionally cohesive spatial units. In particular, the boundaries of TMA, CV, CP emerge as a more analytically consistent and methodologically appropriate scale.

They all encompass the entire Functional Urban Area of Turin while also integrating adjacent rural and peri-urban areas.

4.3.3. Existence of logistical infrastructure

The criterion concerning the existence of logistical infrastructure, specifically the presence of transport networks and roads, requires a targeted spatial assessment of the infrastructural density across the potential configurations for the Turin's city-region.

Figure 14 shows a clear concentration of high-density road networks within Turin and its surrounding first belt municipalities. This area presents a well-structured and functionally continuous system, where radial and ring-shaped road networks directly connect peri-urban productive zones.

On the eastern side of TMA, the presence of the *Collina Torinese* and the broader hilly system associated with CP introduces a degree of spatial discontinuity within the otherwise regular infrastructural pattern. While road access for vehicles is ensured across this area, the hilly morphology results in a lower density of direct routes and a more fragmented spatial organization of transport links.

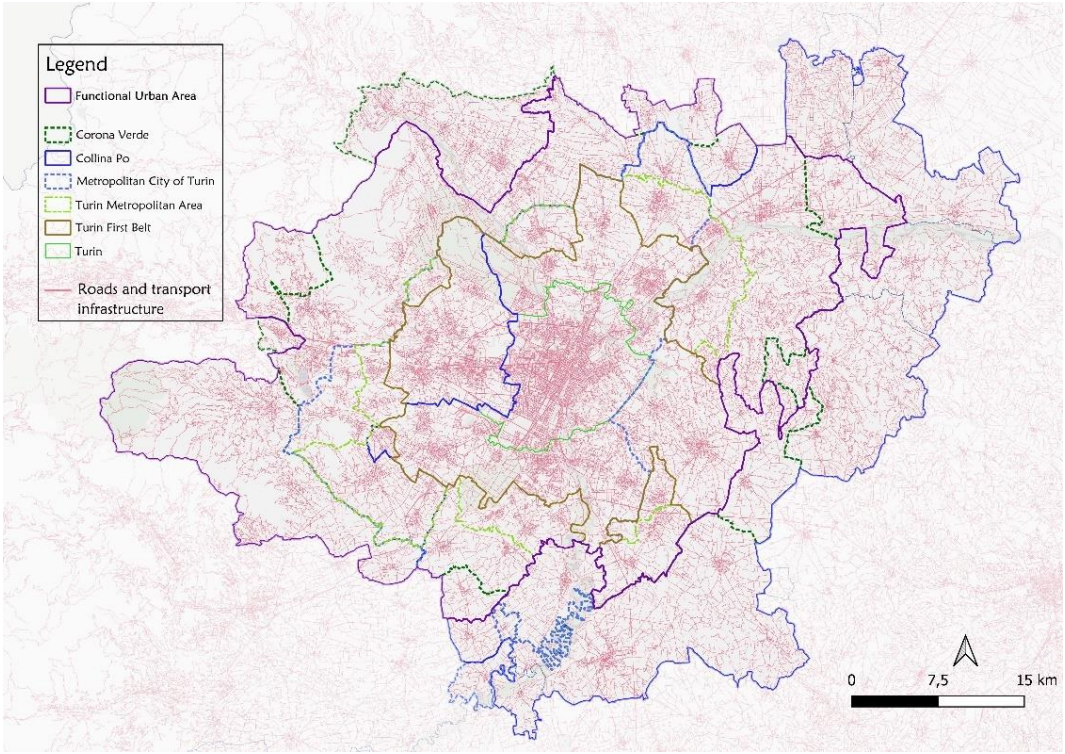


Figure 14: Roads and transport infrastructure in potential Turin's city-regions
Source: Author's elaboration on the data of Geoportale Piemonte

This does not represent an absolute barrier to the local food system logistics, but it introduces a structural difference compared to the flatter western and southern sectors, where infrastructural density and continuity are far higher, allowing for greater flexibility. The distinction matters not so much in terms of basic accessibility, since all areas remain reachable by vehicles, but rather in terms of understanding whether a given territory maintains strong functional and territorial connectivity to the core of the system. High-density infrastructural zones enable frequent, diversified, and efficient flows between production, processing, and distribution nodes, while areas with lower infrastructural density tend to rely on a more limited set of routes, reducing logistical flexibility and increasing the dependence on external distribution channels.

This is particularly significant when analyzed against the physical and morphological constraints of the territory. Figure 15 highlights the orographic structure of the hilly and pre-alpine sectors located in the eastern and southern areas of Turin, where CP is located. This territorial discontinuity, characterized by steep slopes and a relatively sparse road network, generates a natural barrier that has implications for both the spatial continuity of the food system and the territorial cohesion of the city-region. In practical terms, the morphology of CP might reduce the connections of the food system, limiting the efficient movement of goods between the plain and the hilly areas.

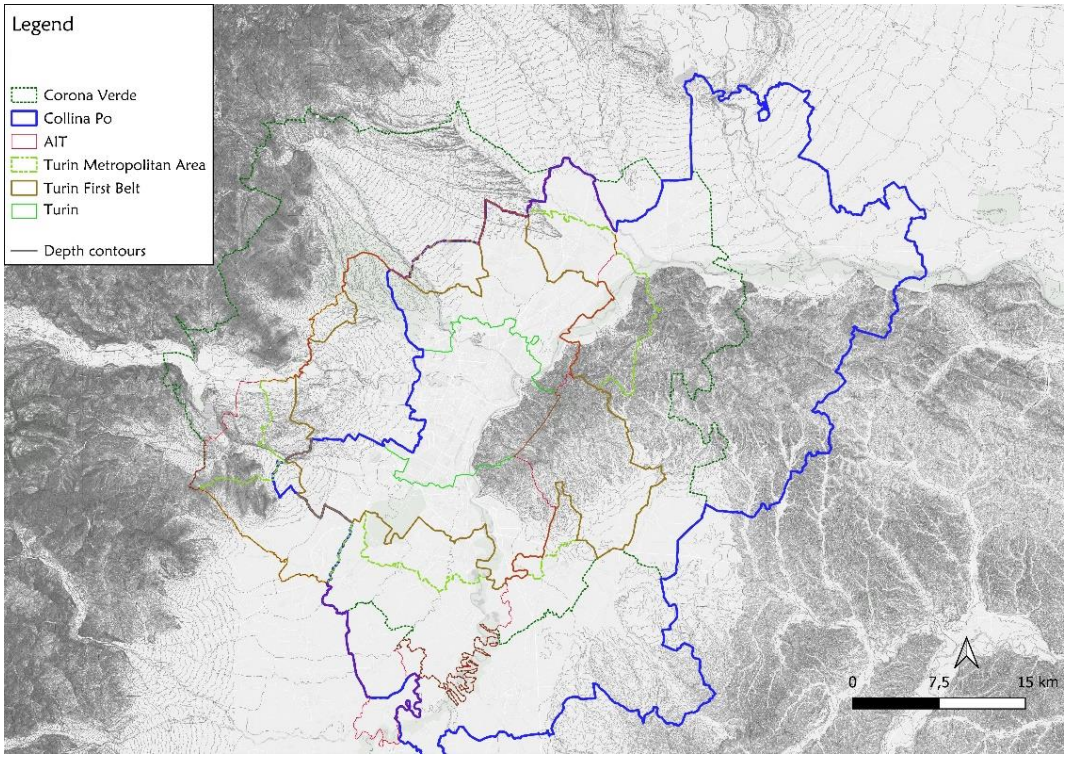


Figure 15: Depth contours of potential Turin's city-regions
Source: Author's elaboration on the data of Geoportale Piemonte

However, when this constraint is considered in relation to the logistical food hub density (Figure 16), a more complex logic emerges. Despite the physical discontinuity imposed by the hilly structure, the regional-scale food logistics does not end at the boundaries of the plain. Rather, it extends beyond the hills, being well connected with two distinct corridors. These are the two most important highways of the region and directed toward the northeast and southeast of the CP area linking the latter to the East of Piedmont and, consequently, to the rest of the North of Italy.

This comparison highlights a critical reflection for the spatial definition of CRFS. If CRFS is conceived strictly as a territorially contiguous system, rooted in spatial proximity and direct infrastructure connectivity, then the orographic barrier posed by CP strongly limits its inclusion within the core city-region configuration. However, if CRFS is instead understood as a spatially polycentric system, in which urban-rural food flows are mediated not only by proximity but also by large-scale infrastructural corridors (Figure 16), then the territories beyond the hills become relevant, particularly in relation to their functional connection to regional food logistics.

While CP does not exhibit high infrastructural density, its proximity to pivotal corridors, particularly in the southern and eastern zones of CMTO, ensures its successful inclusion in the larger transports network. This position might allow the area to act as a buffer zone supporting metropolitan food logistics. Moreover, the presence of infrastructure beyond the eastern hill ridges, represented by the two corridors, underscores that the morphological constraints imposed by the terrain are partially mitigated by the availability of roads.

This information confirms the importance of interpreting CRFS not simply as a limited container, but as a territorial system defined by the relations between multiple factors, namely physical boundaries, infrastructure, etcetera. The hills are not excluded from CRFS; they represent a transition area where proximity-based flows gradually give way to corridor-mediated flows.

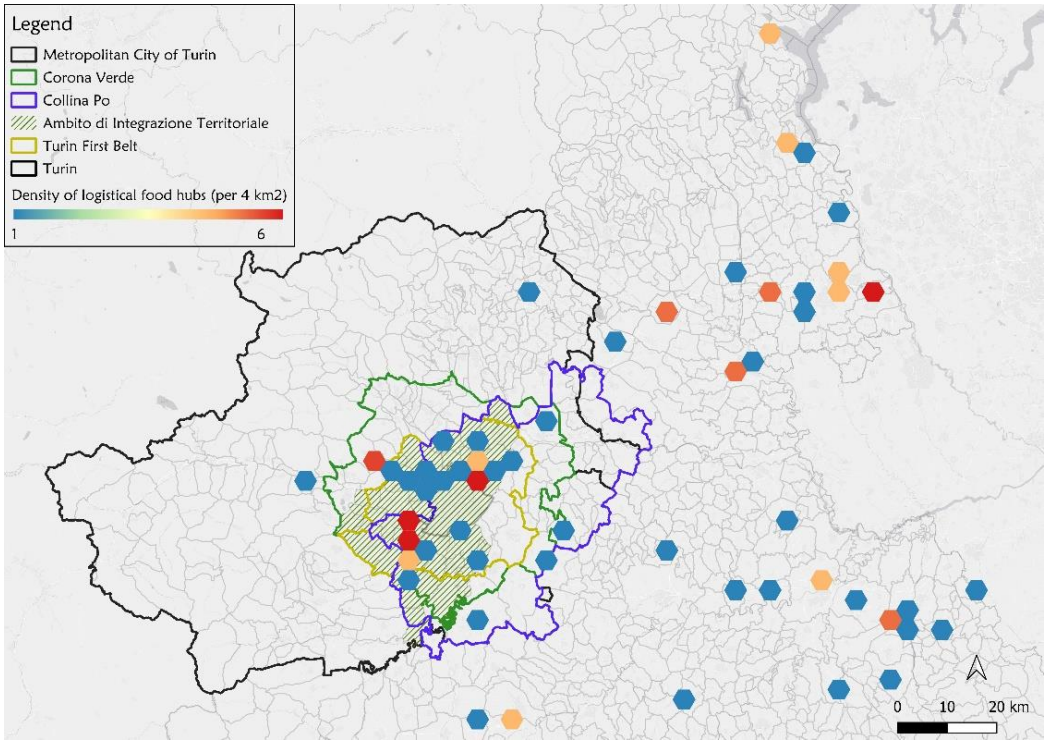


Figure 16: Distribution of logistical food hubs across potential Turin's city-regions
Source: Author's elaboration on the data of Google Maps

4.3.4. Integration of bioregional ecological assets, including green infrastructure and water resources

The criterion concerning the integration of ecological assets, including green infrastructure and water resources, requires a detailed spatial analysis of the extent, distribution, and functional role of natural and semi-natural areas within the

potential CRFS' city-region of Turin. Figure 17, based on Corine Land Cover (2022), shows that the northern and western sectors of the CMTO, especially in pre-alpine and alpine contexts, are characterized by large, continuous forested and seminatural areas. These territories are marginal in terms of direct food production for Turin's food provisioning system, but play critical ecological roles, particularly for hydrological regulation, biodiversity conservation, climate mitigation, and soil wellbeing.

With a closer look to the densely built areas, regarding TMA and TFB, a progressive fragmentation of ecological assets is evident and depends on the dispersion of seminatural areas. This spatial fragmentation introduces a challenge for maintaining ecological continuity, especially where urban sprawl has historically endangered natural corridors.

The Po River corridor and its associated rivers system emerge as an important ecological structure, extending from the core urban area of Turin and surrounding municipalities, toward peri-urban and rural zones. This ecological infrastructure, that combines water courses, habitat provision, and agriculture, performs a dual role within the prospective CRFS. On the one hand, it surely sustains agricultural productivity, particularly for irrigated crops and livestock production in plains. On the other hand, it also constitutes a rich framework of ecological connectivity, linking urban, peri-urban, and rural zones into a singular bioregion. The alignment between these ecological nexuses and the food system processes strengthens the rationale for holding the Po River at the center of Turin's CRFS.

The CP extension strongly suggests the possibility of a highly integrated ecological-agricultural system; the natural ecosystem, the productive farmland, and the built areas are all spatially interwoven within a unique ecological framework.

In contrast, CV, although conceived as a highly ecological project, exhibits a more partial and uneven integration with areas relevant to food production. Its focus regards greenways, landscape connectivity, and ecological corridor restoration, with less direct emphasis on food planning. Nevertheless, its role as an ecological and landscape framework for the northwestern peri-urban area of Turin could support agroecological transition processes, particularly where farmland is already embedded within the larger ecological structure.

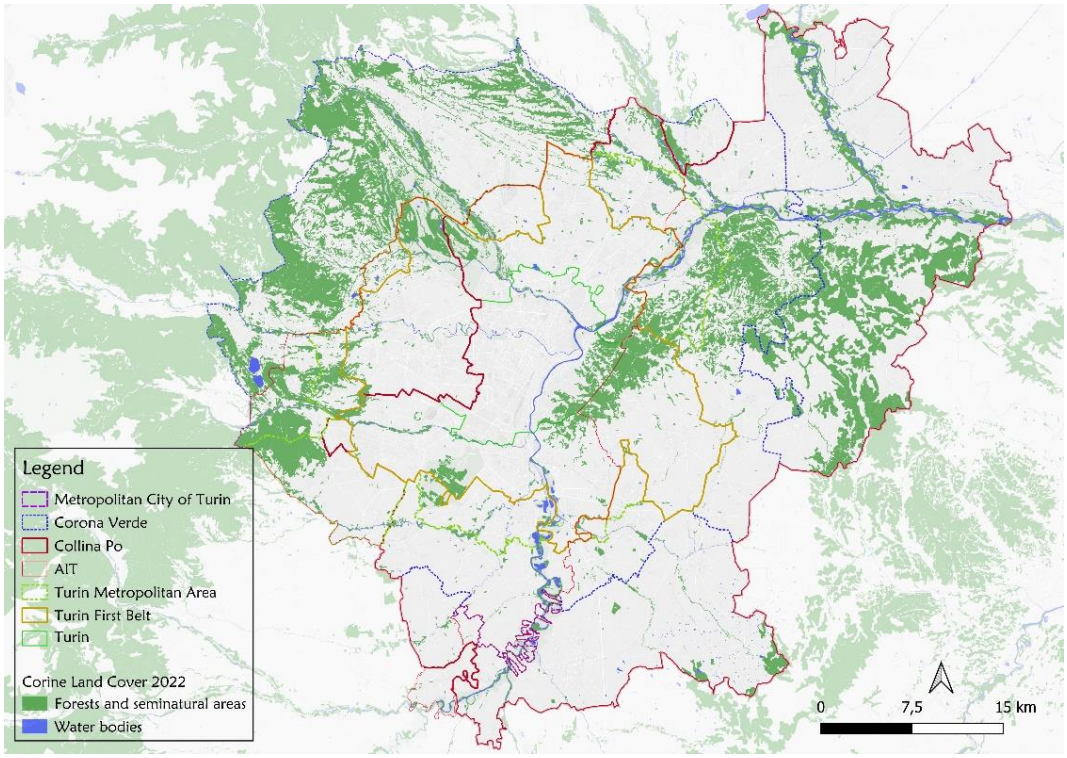


Figure 17: The ecological system of Turin's city-regions
Source: Author's elaboration on the data of Corine Land Cover (2022)

4.3.5. Population density along the urban-rural continuum

The criterion concerning population density along the urban-rural continuum requires not only a quantitative evaluation of demographic distribution, but also, and mostly, a spatial analysis of how settlement structures and built environments evolve from the urban core to peripheral rural areas. The map depicting population per building in 2016, displayed in Figure 18, offers a clear representation of these dynamics, avoiding the aggregation effects that commonly affect census-based population density calculations. By focusing on the population housed within each building, this representation enables a direct spatial reading of demographic intensity at the scale of the built environment.

The spatial distribution shown in the map confirms that the highest population densities are strongly concentrated within the central municipality of Turin, where the most compact urban fabric corresponds to highly populated residential buildings, frequently exceeding 1500 inhabitants per km^2.

TFB presents a substantial reduction in population density per building, despite maintaining a dense and continuous built fabric. Here, numbers often fall into the

10 to 50 inhabitants per building range, indicating a progressive demographic thinning without a corresponding reduction in the extent of built-up land; indeed, the built environment remains particularly high, indicating intense levels of land consumption.

As the analysis moves outward into TMA, the decline in population density becomes even more pronounced, especially in the peripheral municipalities that lie beyond the core urban-rural interface. In these areas, which belong to the pre-alpine foothills and the western and northern sectors, population density frequently falls below 2 inhabitants per building, indicating a more fragmented system.

Within CV, population patterns confirm the dual condition of peri-urban spaces, with higher densities concentrated near infrastructural corridors and lower densities prevailing in the remaining areas. CP, however, presents a distinct demographic profile. Although population density here is generally low, it does not correspond to a dispersed suburban fabric; rather, it depends on a network of small and medium-sized towns interwoven with agricultural land and natural areas. This spatial articulation reflects both the historical rural character of CP and the constraints imposed by the hilly terrain, which has limited large-scale residential development.

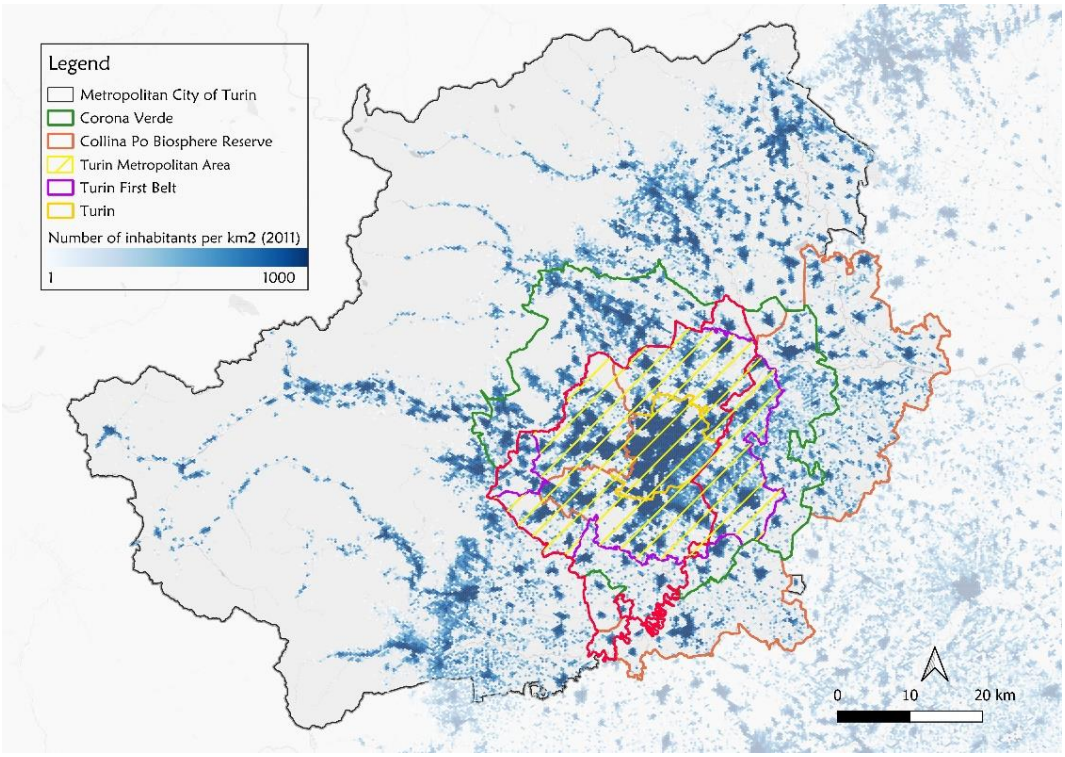


Figure 18: Population distribution in Turin's city-regions
Source: Author's elaboration on the data of Geoportale Piemonte (2016)

4.3.6. A significant foodshed that might ensure food self-sufficiency

In determining what potential foodshed could nourish the city-region of interest, Figure 19 provides a spatial representation of the relationship between local food production capacity and local food demand across the diverse territorial units of Piedmont.

The net balance (Production - Consumption) was computed for each municipality, and the resulting values were visually represented using a color scale, as defined in the legend, to indicate areas of surplus or deficit[31]. It highlights how large portions of the region, particularly in the alpine and pre-alpine zones, as well as in several marginal rural areas, exhibit a structural imbalance between supply and demand.

This territorial differentiation underscores that many peripheral areas of Piedmont, particularly those with low population densities and limited agricultural productivity, are only weakly connected to the provisioning needs of the Turin metropolitan area. Such areas, while undoubtedly relevant to broader regional food planning and agri-environmental strategies, lack the functional proximity and

[31] The methodology used to determine the foodshed was developed as part of a separate research project named "PRIN Emplacing Food" undertaken in collaboration with colleagues from the Atlante del Cibo di Torino Metropolitana. It is important to recognize that this analytical framework was not created in isolation but draws directly on that ongoing work.

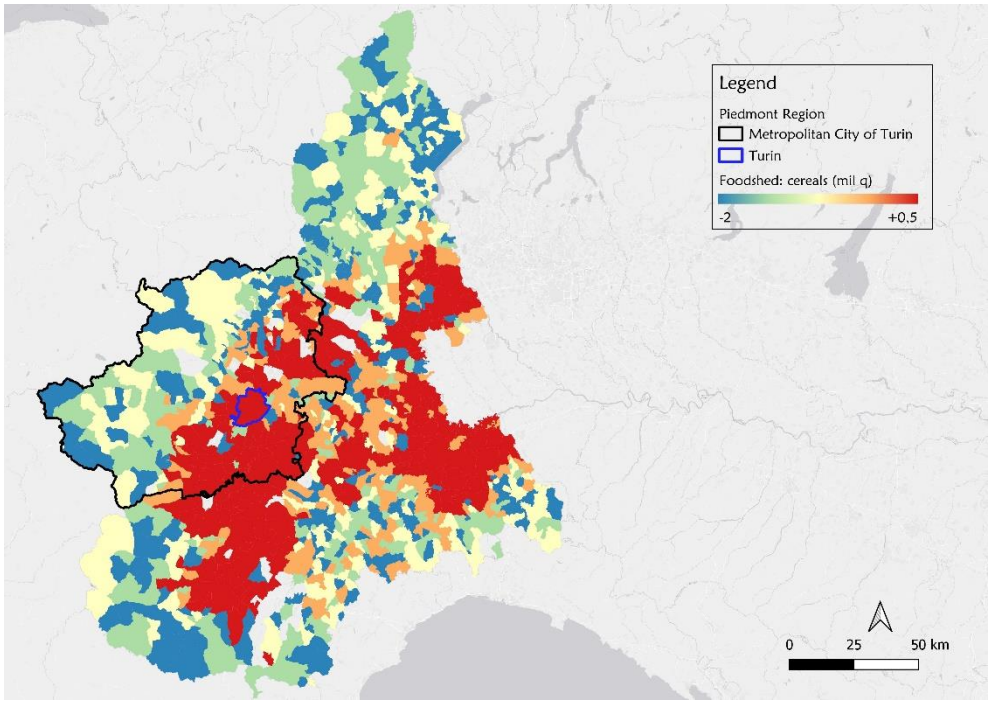
A special acknowledgement goes to Professor Marco Bagliani, who passed away prematurely, and researcher Rebecca Chairello, whose study and analysis have made a significant contribution to the design of this methodological approach.

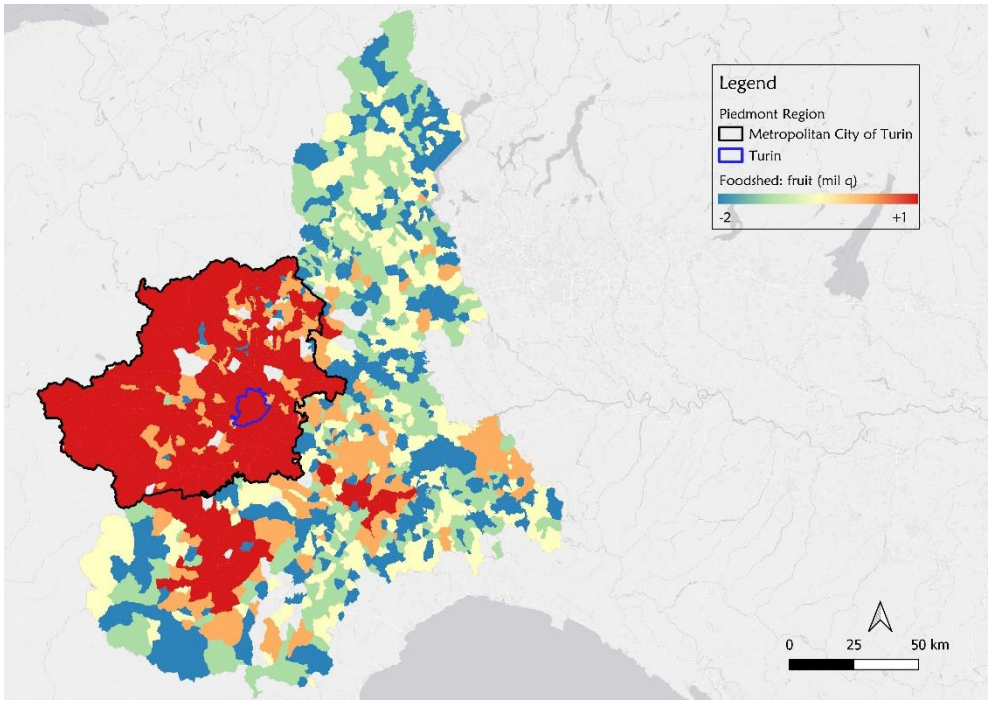
The quantitative assessment unfolded in three sequential stages: evaluation of dietary consumption, estimation of agricultural production, and comparison between the two. For consumption, the study drew on the European Food Safety Authority's IV-SCAI survey from 2016–2017, which records Italian diets across five age cohorts in grams per person per day. These figures were updated to 2023 by applying the Italian National Institute of Statistics (ISTAT) consumer price indices for laborers' and employees' households (excluding tobacco) and trends in average monthly household expenditure for the period 2016–2023. This adjustment assumes that changes in household food expenditure are proportional to changes in quantities consumed. Because the IV-SCAI dataset includes processed foods, those items were converted back into their raw agricultural equivalents using conversion factors and yield tables from the FAO. The resulting consumption model applies uniformly across Italy; regional differences are not captured and could be the subject of future refinement. Finally, the consumption quantities were translated into the cultivated area potentially required to meet demand, offering a basis for comparison with actual available farmland.

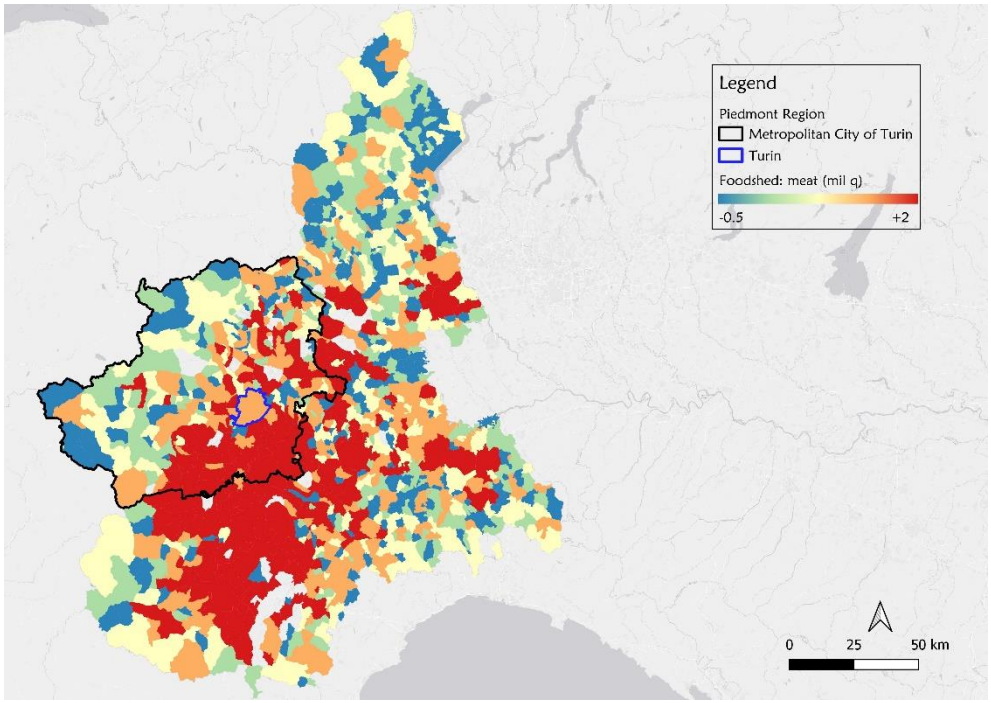
The production analysis focused on Piedmont and assembled data at the municipal level. Crop outputs were calculated by multiplying average yields per hectare (for 2023) by the utilized agricultural area reported in the regional Anagrafe Agricola Piemonte data warehouse. Crops were grouped into eight macro-categories, cereals, industrial crops, pulses, olives, vines, tubers, vegetables and fruit, to align with national agricultural classifications. Animal production was estimated using the Sistema Informativo Veterinario, selecting animals originating from Piedmont farms regardless of where they were slaughtered. Output for each species was obtained by multiplying the number of animals by their average live weight and carcass yield. Data on milk and egg production came from the Anagrafe Agricola Piemonte and the Italian Livestock Breeders Association, supplemented by FAO yield coefficients. The analysis did not differentiate between organic and conventional production methods; it depicts current conditions rather than potential shifts in farming practices. Because Piedmont has no marine coastline, its fish harvest is minimal, but river and lake catches were included using data from the veterinary information system.

integrated urban-rural linkages required to be considered part of a Turin-centered food system. This spatial evidence strongly supports the progressive narrowing of the analytical focus, emphasizing the importance of identifying more functionally coherent spatial units that demonstrate direct connectivity to the metropolitan food demand and distribution system.

The spatial logic revealed by the map is particularly relevant in the plains and lower hills surrounding Turin, where local food production and consumption appear to be more balanced, indicating the presence of territorial dynamics more compatible with a localized food system serving the metropolitan area. These zones of relative production-consumption equilibrium correspond spatially to FBT, CMTO, and CP. This territorial alignment is highly significant, as it confirms that the core-periphery system surrounding Turin, encompassing both peri-urban productive areas and environmental conservation zones, operates as a spatially and functionally cohesive foodshed. Within this system, local production is not only quantitatively relevant but also functionally linked to urban consumption patterns, forming a spatial continuum where urban demand, peri-urban production, and rural provisioning chains interact directly.




Legend
Piedmont Region
Metropolitan City of Turin
Turin
Foodshed: fruit (mil q)
-2
+1
0
25
50 km


Legend
Piedmont Region
Metropolitan City of Turin
Turin
Foodshed: meat (mil q)
-0.5
+2
0
25
50 km

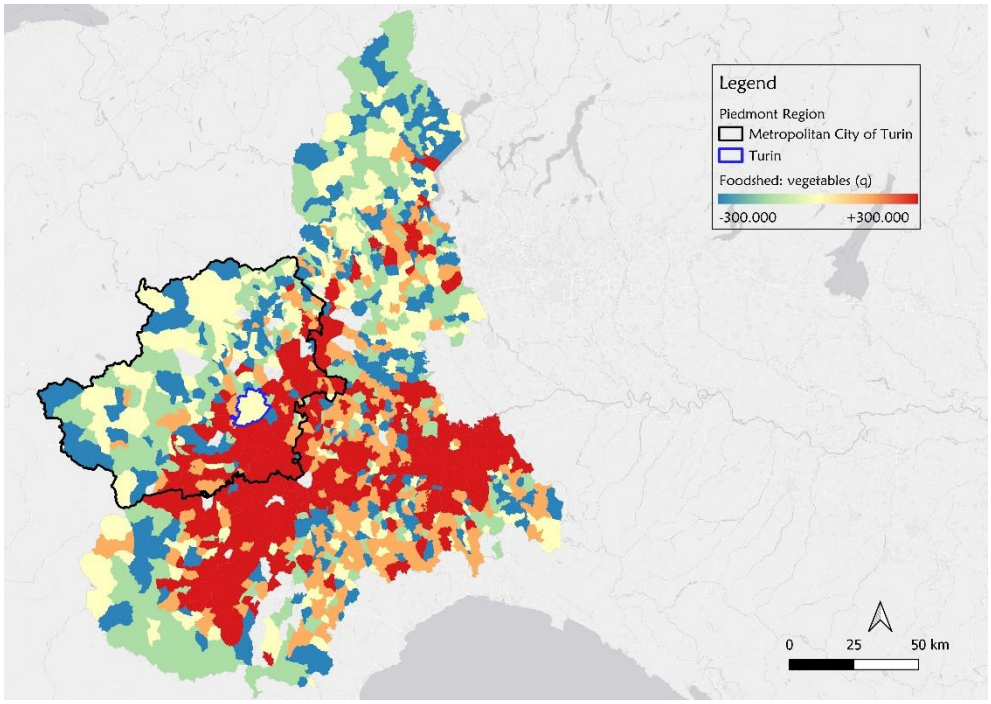


Figure 19: Possible foodshed of four products in Piedmont
Source: Author's elaboration on the data of Prof. Marco Bagliani and Dott. Rebecca Chiarello (2022)

4.3.7. Existence of relevant administrative boundaries that facilitate governance and coordination

The assessment of the existence of relevant administrative boundaries that facilitate governance, and coordination requires an examination of the formal powers, institutional roles, and governance capacities of the different spatial entities of interest (Figure 20).

CMTO, established in 2015 as part of Italy's broader metropolitan reform process (Law 56/2014), represents the only formally constituted administrative body among the spatial configurations under evaluation, above the single municipalities, which hold most of the ordinary planning power. As a second-tier local authority, CMTO holds planning powers across a set of functions, including territorial planning, environmental management and large-scale infrastructure coordination. However, the actual scope of its authority is limited in practice by both budgetary constraints and the persistence of strong municipal autonomy, particularly in sectors such as local economic development, land use, and other sectoral policies likewise food-related ones (Fanizza, 2014). In the CMTO context,

the Metropolitan Strategic Plan[32], provides a coordinative framework that involves food too, but it does not translate into direct regulatory powers over sectoral policies like food or agriculture, which remain largely fragmented across individual municipalities and other sector-specific bodies at the regional level.

TMA, while spatially closer to the functional extent of core-periphery interactions, lacks any formal administrative standing. It exists primarily as a discursive and analytical construction, used in regional planning documents to describe the urban system surrounding Turin, but without any dedicated governance mechanism or institutional body capable of coordinating policy actions across municipalities. This obviously limits its operational relevance for food governance processes, despite its spatial coherence from a functional perspective.

AIT represents a further layer of territorial articulation within the Metropolitan City framework, but it does not possess separate administrative powers. Instead, it serves as a technical grouping of municipalities, based on purely speculative suggestions, designed to facilitate voluntary cooperation on cross-municipal issues such as mobility, environmental management, and service provision.

The same discourse applies to TFB, which is not governed by any dedicated inter-municipal body. It remains a descriptive spatial category used in both mobility and land-use planning, but without an institutional layer capable of coordinating cross-sectoral policies such as food governance.

CV, despite its relevance as a strategic ecological infrastructure project, does not possess a permanent governance body capable of coordinating cross-municipal governance responsibilities. It remains a project-based framework, dependent on periodic funding and temporary governance arrangements, rather than a stable institutional layer capable of sustaining long-term policy coordination across municipalities.

The discourse varies if dealing with CP; unlike CMTO, it is not a fully independent administrative body but a voluntary inter-municipal organization, led by *Ente di gestione delle Aree protette del Po piemontese*. Its governance model is polycentric and participatory, bringing together local municipalities around shared objectives of landscape conservation, sustainable development, and cultural heritage protection.

While CP has no legal authority to directly regulate land use or economic activities across the entire territory, it holds the possibility to stimulate inter-municipal dialogue and foster collaborative initiatives. Its role is therefore of

[32] http://www.cittametropolitana.torino.it/speciali/2024/metropolimontana/dwd/PSM_19_07_2024_ConfMetr.pdf

momentum-giving rather than directive; it creates the conditions for horizontal governance processes that encourage municipalities to coordinate their actions, particularly where landscape, agriculture, and local economies intersect.

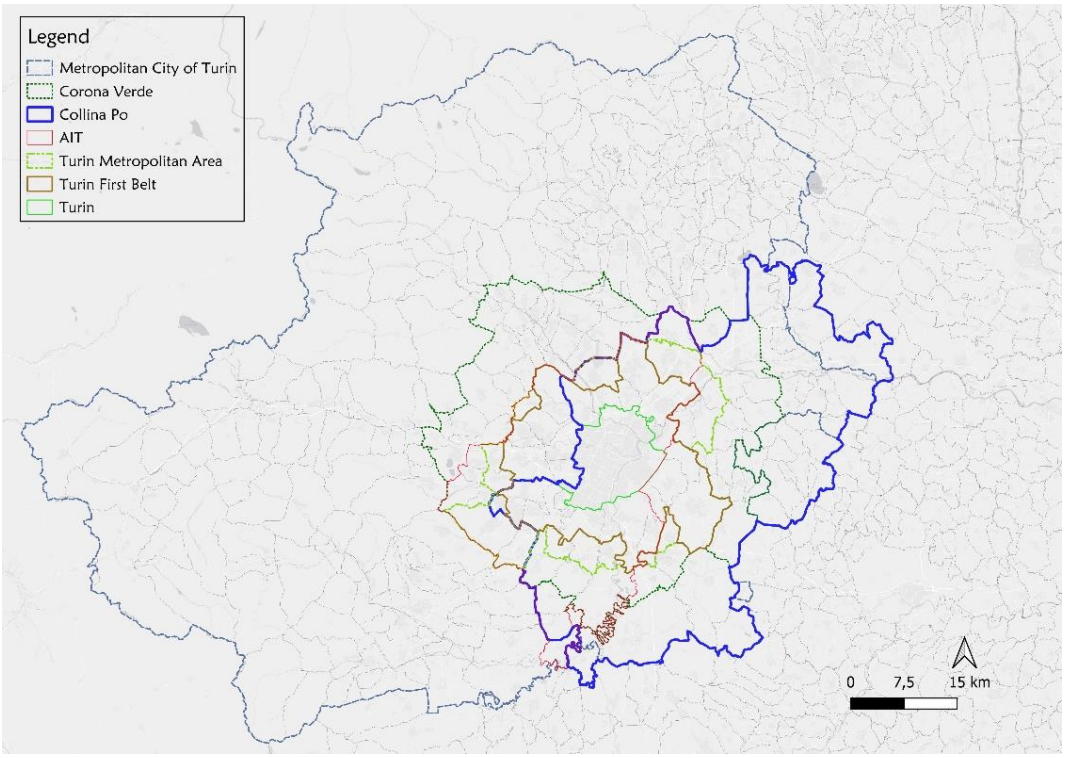


Figure 20: The overlapping public authorities in the context of Turin's city-regions
Source: Author's elaboration

4.3.8. Availability of sufficient food-related data, covering production, distribution, and consumption

In the case of Turin and its potential city-region extensions, the availability of food system data benefits from a highly structured public-sector data framework, where multiple institutions are responsible for data collection and dissemination.

The *Camera di Commercio* plays a fundamental role in monitoring economic activities within the agri-food sector, providing critical insights into the structure and operations of agricultural businesses, food processing industries, and wholesale distribution networks. Access to this data, while public in nature, often requires formal requests; however, it remains relatively possible to obtain data.

Moreover, national and regional statistical bodies, such as ISTAT and IRES, contribute significantly to providing fundamental data, with periodic surveys and sectoral reports offering detailed information on land use, production volumes,

employment, and consumption patterns. These datasets, being publicly managed, ensure a degree of transparency and accessibility, further supporting their integration into CRFS planning.

Additionally, there is the *Geoportale Piemonte*: it is a public geospatial data repository that contains datasets covering agricultural land use, environmental data, and infrastructural networks.

Moreover, the *Anagrafe Agricola Regionale*, managed by Regione Piemonte, provides detailed records on farms and agricultural enterprises, other than farm owners' data.

The integration of these diverse public data sources ensures that food system analysis can be conducted at all relevant territorial scales, from the Piedmont level down to the local one. However, data reliability and detail vary with scale. At the regional level, datasets tend to be more available but are highly aggregated; this limits their applicability for specific interventions and decision-making.

Conversely, at the metropolitan and municipal levels, data resolution improves significantly, although there is a lower number of possible information to collect.

4.4. Among multiple possibilities, CollinaPo

The previous section presented the results of the city-region analysis relevant to understanding the potential CRFS of Turin, evaluating multiple territorial possibilities. The color-coded approach allowed for a progressive elimination of less suitable configurations, highlighting the relative strengths and weaknesses of each possible city-region.

The Industrial Triangle was the first to be excluded due to its clear incompatibility with fundamental re-established CRFS' principles, such as the presence of a single dominant urban core and a functionally cohesive food system. Shortly thereafter, the Piedmont Region was ruled out, as its vast scale diluted the relevance of urban-rural food system interactions specific to Turin, incorporating territories with fundamentally different food system dynamics. Moving further into the analysis, other territorial units were assessed in increasing detail, revealing that no single extension fully meets all criteria. Instead, the evaluation demonstrated that while certain arrangements failed to meet key requirements, no lower-level territorial unit emerged as the singularly most effective choice. Instead, the results indicate that each extension presents both strengths and limitations, meaning that multiple city-region definitions could be considered viable depending on strategic priorities

Nonetheless, among the others, CollinaPo is significant in responding, at least partially, to the largest plethora of criteria. Rather than being the only possible or

inherently superior configuration, CollinaPo presents a balanced and pragmatic option, effectively integrating urban and rural food system processes while maintaining a feasible scale for governance and planning. As visible in Tab. 14, CollinaPo satisfies important structural criteria for identifying the city-region of Turin's CRFS, especially by incorporating the city as its dominant urban center and a network of peri-urban municipalities and agricultural landscapes that have historically contributed to the provision of food in the area. CollinaPo is still functionally connected to the Turin metropolitan food economy, in contrast to larger territorial levels like the Piedmont Region or the Industrial Triangle, which comprise several urban centers with unique economic structures that complicate food system coherence. This ensures that the linkages between urban and rural areas remain manageable, within an eventual UFP.

CollinaPo's location within a recognized economic and functional perimeter in line with the OECD definition is confirmed by the fact that it is nearly entirely contained within Turin's Functional Urban Area (FUA).

In terms of the food system, CollinaPo encompasses an agricultural landscape that remains strongly integrated within Turin's food supply chains, contributing to a possibly high degree of food self-sufficiency that reinforces food security. While the Turin Metropolitan Area and the First Belt of Turin also contain relevant agricultural areas, they face greater urbanization pressure and land fragmentation, limiting agricultural viability. Conversely, the broader Piedmont Region includes extensive agricultural zones, yet many of these areas are oriented toward different markets.

The presence of food-related logistical infrastructure further supports CollinaPo's selection. Although it does not represent the highest-density logistical area within the region, it connects Turin's city-region to the Eastern parts of Italy. Despite the hilly morphology of the area, which introduces some spatial discontinuities in physical connectivity, the broader logistical map indicates that beyond the hills, major -food distribution corridors ensure continued integration into regional food flows. This suggests that while the terrain presents certain constraints, these do not significantly disrupt the functionality of CollinaPo as part of the metropolitan food system.

Governance feasibility is also an important consideration. Unlike the Metropolitan City of Turin, which has formal planning and administrative authority, CollinaPo functions as an inter-municipal coordination entity rather than a governing body. This means it does not have direct jurisdiction over policy-making efforts, but has the capacity to facilitate cooperation between municipalities, promoting joint initiatives that possibly enhance urban-rural food system

integration. This flexible governance model, though lacking centralized regulatory control, allows for participatory approaches to food planning that can encourage inter-institutional collaboration.

Demographic and ecological considerations further reinforce CollinaPo's relevance. The analysis of population density along the urban-rural continuum indicates a progressive transition from high-density urban areas to peri-urban and rural settlements, ensuring continuity in food-related exchanges, a factor often missing in broader regional structures where demographic discontinuities are more pronounced.

Additionally, CollinaPo includes significant ecological assets, integrating forested areas, river systems, and protected landscapes within the Corona Verde network. This enhances the sustainability and resilience of the food system by preserving ecosystem services that support agricultural production. The combination of food system integration, infrastructural connectivity, governance feasibility, data availability, and ecological sustainability suggests that CollinaPo represents a logical and manageable choice for structuring Turin's CRFS. While it is not the only possible framework, it offers a scale that allows for effective CRFS' discussion, UFP development, and monitoring in a way that remains territorially integrated and operationally feasible.

Criteria	TFB	TMA	AIT	CP	CV	CMTO	RP	IT[33]
1. Presence of a single main urban core, secondary urban clusters, and surrounding rural production areas, holding longstanding relations.								
2. Compliance with the Functional Urban Area (FUA) definition as per OECD guidelines.								
3. Existence of logistical infrastructure.								
4. Integration of bioregional ecological assets, including green infrastructure and water resources.								
5. A significant foodshed that might ensure food self-sufficiency.								

[33] Turin First Belt, Turin Metropolitan Area, Ambito di Integrazione Territoriale, CollinaPo, Corona Verde, Metropolitan City of Turin, Piedmont Region, Industrial Triangle

6. Population density along the urban-rural continuum.								
7. Existence of relevant administrative boundaries that facilitate governance and coordination.								
8. Availability of sufficient food-related data, covering production, distribution, and consumption.								

Table 14: Assessment of Turin CRFS' city-region
Source: Author's elaboration

The evaluation of Turin's possible city-region extensions for CRFS development is further validated through a comparative analysis with existing literature on CRFS. As demonstrated in Figure 21, initially presented in Chapter III, the CollinaPo extension aligns with other international city-region constructions, reinforcing the relevance of the identified scale within broader planning discourses. With a population of 1,487,669 inhabitants and an area of 172,000 hectares, CollinaPo falls within a range of CRFS sizes like others.

This correspondence confirms that the selection of CollinaPo is not biased, considering that it follows a recognized pattern of CRFS that has been conceptualized and implemented in different contexts.

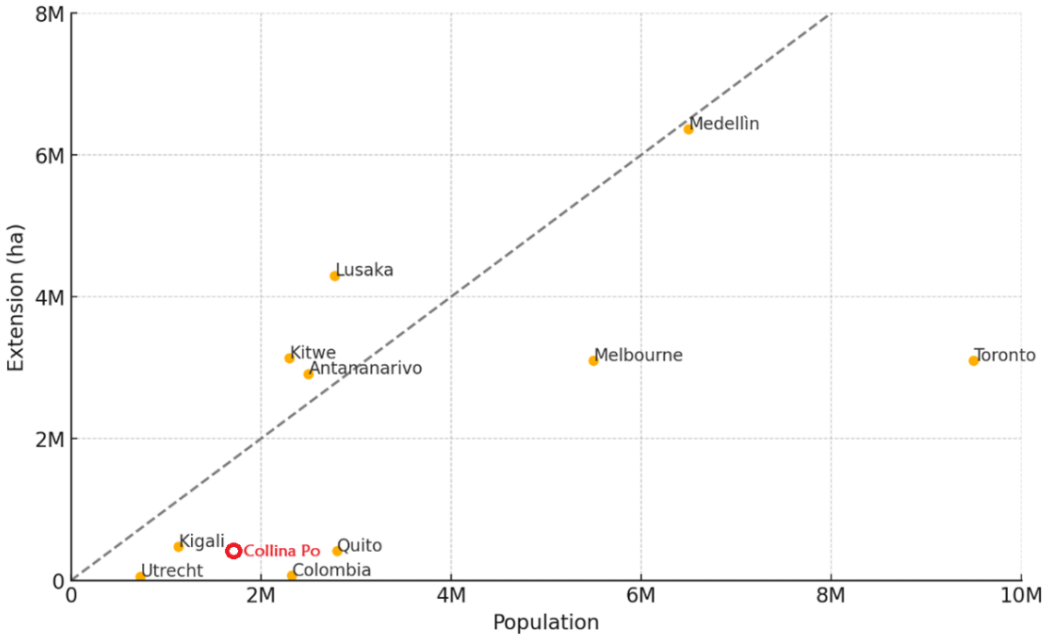


Figure 21: CollinaPo's extension tested against other CRFS' city-regions identified by FAO

Source: Author's elaboration

Beyond the empirical confirmation of a spatially relevant CRFS framework for Turin, this study offers a broader theoretical foundation for the identification of city-regions in food system planning.

The methodological approach adopted hereby, based on a structured, criteria-driven evaluation, ensures that city-region selection is not arbitrary but rather grounded in functional, infrastructural, and governance-based considerations. By testing multiple scales and assessing their capacity to meet a structured set of criteria, this work refines the understanding of how CRFS spatial boundaries should be delineated based on functional integration rather than pre-existing administrative units. This perspective directly engages with the innovative conceptualization of CRFS, discussed above, bringing the idea that these entities should emerge from territorial logic, and therefore adhere to the processual and systemic understanding of the city-region dimension, rather than be imposed through administrative convenience.

In particular, aiming at responding to the important critics developed by Battersby and Watson in affirming that "the idea of the city region in planning have been ignored, and the food-policy field has been led into the 'local trap'" (2019, p. 515), the primary contribution of this work is the demonstration that new opportunities to identify city-region scales exist and regard the condition for which they should not be treated as fixed spatial constructs but rather as the result of processual territorial dynamics.

The study shows that the selection of a CRFS extension is inherently a product of socio-political negotiation, infrastructure development, and ecological interdependencies, rather than a simple mapping exercise based on predefined jurisdictional limits.

In the end, the choice to adopt the CollinaPo Biosphere Reserve as the spatial lens through which to investigate and synthesize the CRFS of Turin is not neutral, nor could it be. As widely acknowledged in cultural geography, every spatial delimitation inherently includes and excludes.

Territorial frames are never exhaustive or definitive; they are always partial (Dematteis, 2002). Space is not a fixed container, but rather a relational and dynamic fabric, continually made and remade through social practices, institutional arrangements, symbolic representations, and material infrastructures (Cosgrove, 1998). This understanding rejects any claim to absolute spatial objectivity, recognizing instead that all boundaries, CollinaPo included, are the result of historically contingent and politically loaded processes. Yet, this does not

undermine their value. On the contrary, the strength of such negotiated territories lies in their openness: they remain contestable, redefinable, and thus operationally fertile. In this perspective, CollinaPo becomes not a comprehensive totality, but a productive interface, capable of mediating between scales, actors, and policy domains, and thus facilitating the development of a CRFS approach toward the installation of possible UFP.

Furthermore, while previous CRFS research has largely focused on developing possible UFP within a pre-defined city-region, this study enhances the analytical tools available for defining the very scale at which a CRFS should operate. This passage is particularly relevant as it means finding a way out the immobility that often constrains the creation of UFP. Indeed, if they are developed over territories that do not reflect the necessary territorial conditions, their transformative implications are few. In sum, although it does not exist a "best" territory where to act, there always exists a "pertinent" territory where it is relevant to work, by relying on the words of the Italian School of Territorialism.

The process undertaken in this study demonstrates that CRFS scales must be understood as the outcome of an evolving interplay between governance structures, infrastructural networks, ecological assets, and food system flows. In this sense, CRFS should not be seen as static entities but as governance tools that adapt to the socio-economic and spatial realities of their respective territories.

5. Synthesis

This Chapter has undertaken a theoretical examination of the spatial foundations of CRFS' city-regions, focusing on territoriality and scale as key structuring elements. The analysis has demonstrated that territoriality must be understood as an active process rather than a static attribute, with the bioregional perspective emerging as a critical framework for assessing how natural assets and sociopolitical agency intersect within spatial systems.

Building on this theoretical grounding, the research developed a structured set of assessment criteria designed to evaluate potential city-region configurations. The comparative analysis assessed multiple possible territorial extensions for Turin's city-region, including the Industrial Triangle, Piedmont Region, Metropolitan City of Turin, *Corona Verde*, CollinaPo, Turin Metropolitan Area, *Ambito di Integrazione Territoriale*, and the Turin First Belt.

The empirical evaluation identified CollinaPo as a particularly relevant spatial organization for Turin's CRFS development.

SECOND PART. PLANNING URBAN FOOD POLICIES

V. The emergence of CollinaPo

1. Introduction

Having assessed the potential extension of Turin's city-region and having taken into consideration the territorial dimension of CollinaPo, before carrying out its food system analysis, it is important to understand in detail what are the specific features of this context.

This Chapter provides an exploration of the institutional, conceptual and territorial framework within which the UNESCO Man And Biosphere Reserve CollinaPo operates, situating it within the broader context of UNESCO initiatives and the Man and the Biosphere (MAB) Programme.

The discussion begins with an examination of UNESCO's role in defining international frameworks for sustainability and conservation and highlights selected programs that share conceptual and operational synergies with the MAB Programme. Then, it addresses the principles and objectives of the MAB itself, with particular attention to its distinctive approach to governance. In this context, the functioning of Biosphere Reserves is examined, with emphasis on the specific mechanisms behind their funcitoning.

The Chapter proceeds to undertake a classification of CollinaPo in detail, outlining its spatial structure, its governance system and its socio-ecological features. Particular attention is given to how CollinaPo has emerged as a territorial project that unites protected areas, municipalities and multiple stakeholder groups under a shared vision of sustainable development.

2. The Man And Biosphere Reserve Programme across the conservation programs of UNESCO

To successfully interpret the significance of the CollinaPo case study for the purposes of this work, it is necessary to make an important clarification concerning the overall framework of CollinaPo's existence as an innovative governance layer. In detail, although the Turin's city-region identification led to consider CollinaPo Man And Biosphere Reserve, prior carrying out descriptive and empirical analysis centered on the area's food system and its characteristics, a specific focus must be put over the role of the Man And Biosphere designation (MAB). Indeed, while the mentioned elements will be taken into consideration lately, they can be fully understood only if accounting for the full scope of CollinaPo's acknowledgment under the MAB Reserve designation.

This entails more than a technical recognition or classificatory evaluation of the environment's characteristics only: it implies understanding the integration of the site into a larger framework that brings forth specific functioning regarding innovative co-evolution processes of human and ecological systems. In fact, developed by UNESCO in 1971, *Man and Biosphere* Reserves are global scientific initiatives that promote the sustainable relationship between humans and the environment (UNESCO, 2017). More precisely, the MAB Programme consists in a scientific framework which does not intend to impose fixed limits to the natural resources and spaces' exploitation; rather, it means to boost a different operational setting where the concept of "sustainable development" should be addressed and researched.

This program exists alongside a broader constellation of UNESCO-led initiatives aimed at safeguarding natural and cultural heritage. Each of these programs operates according to different objectives and criteria; yet all share a commitment to the integration of conservation and human wellbeing.

What becomes analytically relevant at this stage is the comparative reading of these frameworks, meaning to understand what specific distinctions exist throughout UNESCO's conservation models and, therefore, what specific opportunities Man and Biosphere Reserves bring forth.

2.1 UNESCO's conservation frameworks: a short assessment of relevant programs

UNESCO, the *United Nations Educational, Scientific and Cultural Organization*, has long served as a key-actor in the development of global policies

for the preservation of cultural and natural heritage. Established in the aftermath of World War II with the mandate to promote peace and international cooperation through education, science, and culture (Bryson, 1946), UNESCO marked its beginning with the 1972 *Convention Concerning the Protection of the World Cultural and Natural Heritage*, stating the existence of sites of universal value (Gfeller & Eisenberg, 2016). From this, UNESCO expanded its focus to include a range of instruments and programs. These initiatives are now strongly grounded in the recognition of the interdependence between ecological integrity, cultural identity, and human development, with a focus over the role of networks and knowledge-sharing (Omolewa, 2007).

Without aiming to undertake a full-scale assessment of UNESCO's goals evolution, it is highly relevant to acknowledge how, rather than pursuing a singular objective, UNESCO now articulates multiple, complementary frameworks that, on one side, carry out a plurality of conservation strategies; on the other side, they pragmatically reflect different understandings of what it means to protect heritage across geographical, ecological, and sociopolitical contexts (Duedahl, 2016). This diversification is synthetized by the five structured "Sectors" that delineate the organization's comprehensive framework for action: Education, Natural Sciences, Social and Human Sciences, Culture, and Communication, and Information (Pettenati, 2019). The engagement with these sectors paved the way for developing an authentic constellation of programs capable of responding to this rich number of needs.

Among the others, for the purposes of this work, it is important to take into consideration those that share a significant amount of features and purposes with the MAB Programme (Du & Girault, 2018)[34]. World Heritage Convention (WHC)[35], the UNESCO Global Geoparks (UGGp)[36], and the Global Network of Learning Cities (GNLC)[37] are now addressed referring to their governance, institutional frameworks, and effectiveness, with the aim of lately situating the MAB Programme within the broader architecture of UNESCO.

2.1.1. World Heritage

The 1972 *World Heritage Convention* was established to ensure the protection of cultural and natural heritage of "outstanding universal value" (UNESCO, 1972,

[34] For the full list of "Lists and Designations" of UNESCO, refer to https://www.unesco.org/en/lists-designations

[35] https://whc.unesco.org/en/convention/

[36] https://www.unesco.org/en/iggp/geoparks/about

[37] https://www.uil.unesco.org/en/learning-cities

p. 2), framing these sites as integral to the shared legacy of humanity (Pettenati, 2019). The Convention advances the principle that certain places possess value that transcends national significance, thereby warranting international recognition and collective responsibility for their conservation (Rodwell, 2012).

Through a standardized process of nomination, experts evaluation, and periodic monitoring, the Convention provides a framework for identifying and safeguarding such heritage (Jokilehto, 2006), which shall entail both the World Heritage site and a buffer zone, a surrounding area that, while not inscribed for its own value, serves to shield the site from external threats.

Nevertheless, although UNESCO assesses the validity of the Heritage site, the responsibility over its conservation efforts falls into local authorities' scope. This task should not occur as an isolated attempt, but as part of a broader objective: the long-term safeguarding of the value through integrated and adaptive management (Leask & Fyall, 2006). Indeed, while strict protection is essential, the Convention emphasizes that conservation must coexist with sustainable development strategies that respect the heritage's cultural and ecological integrity (World Heritage Centre, 2017). The requirement for comprehensive management plans, formalized since the *Budapest Declaration* of 2002[38], reflects this vision, aiming to guide both conservation efforts and the socio-economic valorization of sites (Ferroni, 2012).

Nonetheless, some acknowledge persistent gaps between designation and successful management, particularly for what concerns natural sites (Allan, Kormos, Jaeger, & et al., 2017). Many are considered to be inadequately treated, often compromised by pressures such as climate change, tourism, and insufficient national support (Landorf, 2009). Indeed, while the Convention's legal architecture provides a foundation for international cooperation and visibility, its capacity to secure long-term conservation outcomes is uneven and contingent on local implementation and resources (Pettenati, 2019). Their strategic role is often weakened by their lack of formal authority within local governance and absence of clear and aware competences (Eze & Siegmund, 2024). Without such legal and institutional embedding, many plans struggle to effect tangible change on the ground. This is particularly evident in contexts like Italy, where guidelines encourage integrating heritage management with regional development, yet monitoring reveals persistent gaps between planning and implementation (Bertini & Delmonte, 2012).

Nonetheless, the World Heritage stands as a foundational instrument in global conservation policy, and still recurs as the most successful one, having

[38] https://unesdoc.unesco.org/ark:/48223/pf0000125796

institutionalized the principle that certain cultural and natural assets belong to humanity. Its widespread adoption has practically established a normative reference for heritage protection, that has probably much left to say yet.

2.1.2. Global Geoparks

To fully understand UNESCO Geoparks' contribution, it is primarily important to acknowledge that geological heritage long remained peripheral in international conservation agendas, gaining recognition only in recent decades (Girault, 2019). Particularly, some affirm that, a substantial appreciation for geology in conservation, has a very recent date of birth: the *1991 International Declaration of the Rights of the Memory of the Earth*. This event was pivotal in reframing geology as a cultural and scientific legacy, evoking a global duty to preserve the planet's geo-history. As noted by Jones (2008), this declaration provided the conceptual basis for the future Geoparks initiative, positioning geodiversity as both a subject of conservation and a resource for education and sustainable development.

Formally established in 2015 under the International Geoscience and Geoparks Programme (IGGP), UNESCO Global Geoparks are defined as

> "single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development. Their bottom-up approach of combining conservation with sustainable development while involving local communities is becoming increasingly popular" (Global Geoparks Network, 2021, p. 2).

Given that prior attempts to install geoparks were already in place, the current governance of UNESCO Global Geoparks was shaped by discussions in 2013 aimed at formalizing the program within UNESCO while preserving its flexible structure (Du & Girault, 2018). The debate arose partly from concerns about the unequal global distribution of geoparks and the need for stronger institutional support. Several governance options were considered, but the idea of maintaining the informal status quo or formalizing the program as an NGO was dismissed, given the mix of governmental and non-governmental actors involved (ibid.).

The preferred solution was to integrate the program into UNESCO with a lightweight administrative framework, ensuring formal oversight without compromising the existing bottom-up approach. This passage is crucial, as an important conceptual foundation of the UNESCO Global Geoparks Programme lies in the rejection of tokenism in site selection (Cleal, Thomas, & Batten, 2001; Gray, 2004). This principle was notably advanced by the earlier geo-lists, which

emphasized that geological heritage should not be represented by a few emblematic locations chosen for their fame or visual appeal (Wimbledon, et al., 2000). Instead, the objective was to establish scientifically robust inventories capable of representing the full breadth of geodiversity across territories. The Geosites' initiative encouraged geologists to contribute to national registers through comparative evaluation, ensuring that selections emerged from methodological rigor rather than symbolic choices (Erikstad, 2008).

As of 2025, the UNESCO Global Geoparks network comprises 229 sites across 50 countries (UNESCO, 2025). While the program's sites have increased, their significance lies beyond their conservation acknowledgement; it also involves the recognition of geo-heritage as a field of action within sustainability agendas. Indeed, Geopark status has supported sustainable tourism, reinforced community identity, and contributed to local employment (Lee & Jayakumar, 2021).

Yet the program lacks a systematic framework to assess long-term and comparative outcomes globally, a limitation that UNESCO itself has acknowledged (UNESCO, 2019). This issue is further compounded by the symbolic power of the UNESCO label, which enhances the visibility of territories, improves the expectations of local populations, and draws the interest of diverse economic actors, often with competing priorities (Tebaa & Bouhrouf, 2019).

Especially in newly designated areas, this creates tensions in aligning conservation objectives with economic aspirations, and managing these dynamics remains a critical governance challenge. Similar concerns have emerged in other UNESCO frameworks, where the prestige of designation can generate local complexities that outpace institutional capacities to regulate them effectively (Pettenati, 2019).

2.1.3. Global Network of Learning Cities

The Global Network of Learning Cities (GNLC) is a UNESCO initiative launched in 2013 to boost an "international policy-oriented network providing inspiration, know-how and best practice" (UNESCO, 2025).

Coordinated by the UNESCO Institute for Lifelong Learning (UIL), the GNLC operates on a voluntary basis, formalized through the city's endorsement of the *Beijing Declaration on Learning Cities* [39] framework (Valdes-Cotera, et al., 2015). Rather than a treaty-based program, the GNLC consists of an open network without a specific governance: UIL functions as the secretariat, while cities are responsible

[39] https://unesdoc.unesco.org/ark:/48223/pf0000226755

for adopting the requested policies. This approach is particularly interesting because it favors broad engagement by ensuring flexibility; nevertheless, it also raises concerns about the overall success because the depth of institutional commitment and the uneven capacity among cities to translate participation may substantially influence the results (Pryima, Yuan, Anishenko, & Petrushenko, 2017).

By 2023, the network had grown to include 356 member cities across 79 countries, representing over 400 million people (UNESCO, 2025). A distinct feature of the GNLC is its ambition to move cities beyond an assessment of current conditions toward a forward-looking vision of what education and learning could achieve. As Dobson and Pakgratis argue, the network is

> "progressive in its ambitions, moving participants from an understanding of the status quo of the existing situation to an acknowledgment and pursuit of what might be possible in a forward-looking, visionary sense, i.e. the is of knowledge moving towards the ought of possible knowledge" (Pagkratis & Dobson, 2024, p. 50).

This aspirational dimension situates the GNLC as not merely a policy exchange forum but as a catalyst for reimagining the role of education in urban governance. This occurs in a larger comprehensive framework where the GNLC provides what Pryima et al., consider the theoretical bases and practical tools necessary to enhance the opportunities of a learning city (2017). These are crucial for cities aiming to create a socio-cultural environment that maximizes the educational potential of all actors within the urban system.

Yet, the network's capacity to enforce or systematically monitor these ambitions remains limited. Progress reports are self-assessed, and the network lacks a comprehensive evaluation framework to measure long-term impacts across diverse political, social, and economic context; as Pakgratis and Dobvos affirm "the result would be in our view a somewhat rigid and limited understanding of impact and practices" (Pagkratis & Dobson, 2024, p. 58).

Surely, unlike other UNESCO initiatives oriented towards the protection of cultural or natural heritage, the GNLC is fundamentally a networking platform, designed to facilitate the exchange of experiences and policy approaches among cities (Atchoarena & Howells, 2021). It does not claim to be a conservation program. Its core function lies in disseminating ideas, fostering dialogue, and enabling peer-learning, rather than in implementing binding commitments to safeguard places.

Clearly, the transformative capacities are quite limited, because the outcomes are dependent upon voluntary engagement and the variable initiative of participating cities. Yet, this condition should not be interpreted as inherently

unsuccessful; rather, it stands on the specific intention of the program (Preece, 2017). More detailly, while the GNLC effectively mobilizes normative guidance and knowledge exchange, its impact is suggested to depend on the political will and resources of its members. Some cities, therefore, actively leverage the network to reshape education policy and social development, while others engage more symbolically, with limited follow-through (Németh, Issa, Diba, & Tuckett, 2020).

2.1.4. A small comparison

Despite their belonging to the UNESCO umbrella, the World Heritage Convention, the UNESCO Global Geoparks, and the Global Network of Learning Cities diverge markedly in governance, scope, and modes of action, while collectively bringing forward the organization's missions.

These three programs exemplify UNESCO's conservation strategy transformation, but each articulates a fundamentally different interpretation of its targets, how it is governed, and who the principal agents of change should be.

These differences are now compared across four different dimensions: objective, limits, international engagement and governance. As visible in Tab. 15, at their core, these programs are not distinct in objectives only, but represent different epistemologies of intervention: the World Heritage Convention anchors its mission in the preservation of cultural and natural singularities deemed of Outstanding Universal Value; Global Geoparks root their work in the dynamic interdependence of geoscientific knowledge and local economies; the GNLC deals with human capital in cities, asserting that the continuous cultivation of learning capacities is the essential infrastructure of sustainable urban spaces.

The limits of each program, however, expose the fragility of these paradigms when confronted with uneven political, economic, and institutional realities. The World Heritage Convention, despite its juridical strength and near-universal ratification, reveals a structural disjunction between international recognition and local enforcement. Sites inscribed on the World Heritage List are often celebrated symbolically yet remain vulnerable to the very global dynamics, tourism, urbanization, climate change, that the designation seeks to resist (Pettenati, 2019).

The Convention strongly relies on the presumption that national governments possess both the will and capacity to translate inscription into protection, a presumption increasingly invalidated by empirical observation, especially due to the lack of local population involvement (Di Giovine, 2015). Geoparks, while more agile in integrating conservation with local development, lack a global apparatus capable of systematically assessing whether their practices truly advance sustainability rather than inadvertently commodifying geological heritage. The

GNLC, by design, avoids binding commitments altogether, embracing a voluntary network model where the success hinges on local political willingness.

Program	Objective	Limits	International Engagement	Governance
World Heritage Convention	Protect cultural and natural sites of Outstanding Universal Value (OUV) as humanity's heritage.	Uneven protection across sites; exposed to climate change, mass tourism, and weak local management.	Limited direct interaction between sites; coordination through the World Heritage Committee and reporting mechanisms.	Centralized governance via the World Heritage Committee; local governance by national authorities with formal management plans and legal protections.
UNESCO Global Geoparks	Conserve geological heritage while promoting education and local sustainable development.	No comprehensive global impact assessment; site quality varies; risk of unsustainable tourism without effective governance.	High interaction through the Global Geoparks Network with regular exchanges, peer evaluations, and joint initiatives.	Mixed governance: participatory local management with community involvement; UNESCO oversight via the Global Geoparks Council.
Global Network of Learning Cities (GNLC)	Promote lifelong learning to support sustainable urban development and social inclusion.	Not a conservation programme; highly dependent on local political will; lacks standardized monitoring.	Strong collaboration among cities through thematic clusters, conferences, and structured peer learning.	Light governance: coordinated by UIL; cities self-govern via municipal strategies rooted in lifelong learning principles; progress is self-assessed.

Table 15: Comparison of three UNESCO programs (WHC, UGG, GNLC)

Source: Author's elaboration

International engagement within these programs further showcases these asymmetries. World Heritage sites rarely function as a network of interrelated actors; their global visibility as a paradigmatic framework does not equate to

internal connections among sites. Their principal interactions remain mediated by the intergovernmental Committee and periodic reporting, reinforcing a vertical logic of governance. In contrast, the Global Geoparks Network and the GNLC institutionalize horizontal collaboration as a core mechanism, not an auxiliary benefit. Geoparks actively release peer reviews, joint projects, and knowledge-sharing platforms, fostering a sense of collective belonging and mutual accountability that is more absent in the World Heritage system (Zouros, 2016). Similarly, GNLC cities engage through thematic clusters, regional coalitions, and biennial conferences that facilitate transnational learning (Németh, 2020). Yet, in both cases, the interaction is not uniformly transformative; a successful collaboration thrives in contexts with existing capacities can deal with the complexities of dialoguing with different realities on a larger scale.

Governance structures across the three programs reflect these divergences in both philosophy and practice. The World Heritage Convention foresees a centralized, state-centric governance model where global decisions are filtered through national frameworks. The assumption is that states are the guarantors of heritage stewardship, an assumption increasingly strained by subnational realities and transnational pressures. Geoparks introduce a hybrid governance structure where local participation is formalized and periodically audited through UNESC's oversight, creating a feedback loop between local practices and international standards. The GNLC operates at the opposite end of the spectrum: its governance is decentralized to the point of being almost absent, coordinated lightly by the UIL without any formal enforcement or auditing mechanisms.

Considered together, these programs reveal an underlying tension within UNESCO's conception of sustainability, shaped by differing views on the nature of value, the role of authority, and the purpose of intervention. The World Heritage Convention is built on the premise that certain cultural and natural sites possess intrinsic and universal significance that must be safeguarded from transformation. Here, sustainability depends on temporal permanence, and the responsibility for protection is given to nation-states.

Global Geoparks and the Global Network of Learning Cities advance a different understanding. For them, the value is not fixed but emerges from the relationships between people, places, and knowledge systems. The two programs rely on governance models that highly stimulate cooperation, but in flexible terms. They conceptualize sustainability as an evolving process of adaptation, where learning and negotiation are pivotal components, even close to the conservation itself.

Some may contend that comparing these initiatives is misguided, given their distinct thematic mandates. However, the juxtaposition illuminates the plurality of

strategies that UNESCO deploys to navigate the challenges of conservation and development. By setting these models side by side, it becomes clear that sustainability within UNESCO is not a uniform goal but a composite of diverse approaches, each privileging different dimensions of value and possibilities.

This perspective therefore does not judge the goals of each program; instead, I am raising a more specific question about UNESCO's capacity to accommodate such divergent logic within a single institutional framework. The World Heritage Convention seeks to freeze value in time, protecting what is deemed exceptional. Geoparks support negotiated forms of development where heritage and progress can co-exist. The GNLC frames sustainability as an open-ended process, defined by the capacity to adapt through continuous learning.

What is at stake here is not simply a diversity of instruments, but a deeper divergence in how sustainability itself is understood. Across these programs, sustainability alternately means preservation, managed change, or adaptation. UNESCO does not reconcile these meanings into a single normative framework; instead, it operates as an institutional space in which contrasting temporalities and rationalities of sustainability coexist without being fully integrated.

It is in light of this comparison that the pivotal question emerges: what other role is destined to the *Man And Biosphere* program?

2.2. The Man And Biosphere programme

Prior to the formal establishment of the *Man And Biosphere* Programme[40], a foundational call was released for an international program of research on mankind and biospheres, that would both follow up on and extend the work of the International Biological Programme (Hadley, 2006). From the outset, the envisioned program was to be international in scope, interdisciplinary in structure, and explicitly attentive to the specific environmental and developmental challenges faced by countries in the Global South, initially (ibid.).

It was conceived primarily as a scientific initiative aimed at advancing the understanding of human-environment interactions; therefore, while the term "biosphere reserves", with an accent on conservation, appeared as early as 1970 in the Programme's foundational documents, the sites were initially intended solely for research and monitoring, not for environment protection purposes (Bargheer, 2016).

[40] "Man And Biosphere" is now referred to as "MAB"

The shift toward conservation emerged during the first meeting of the MAB International Coordinating Council in 1971, which focused on the reframing of biosphere reserves as logistical sites for long-term research, training, and education; in other words, although conservation was not explicitly manifested, it was brought forth by the incorporation of newer duties to the definition of "reserves". By mentioning research and monitoring, also for education purposes, conservation was implicitly addressed as a substantial pillar of MAB structures (Hadley, 2006). More pragmatically, the Council recommended that participating countries designated representative areas of their major ecosystems as biosphere reserves, thus laying the groundwork for their evolution into concrete spaces of sustainable development testing, that could possibly be transnationally compared and assessed (Bargheer, 2016).

Considering this innovative, but highly unclear, framework, complexity was evident. To fully grasp the contribution that this program could have, it is relevant standing on a compelling work of Michel Batisse, one of the principal architects of the *Man and the Biosphere* (MAB) Programme, who, in the early years of the program's birth, offered a prescient diagnosis of the epistemic deficits impeding the rational management of natural resources within the broader framework of sustainable development.

In a formulation that remains remarkably current, Batisse argued that while infrastructure interventions, foreseeing physical interventions, such as irrigation systems and hydroelectric dams, had historically aimed to address pressing developmental needs, the emerging priority in contemporary contexts was to embed long-term environmental into the very architecture of development processes, also considering socio-cultural aspects of wellbeing (Batisse, 1980). This reflection was not entirely new; the program expressed itself to be needed for

"the rational use and conservation of the resources of the biosphere and for the improvement of the global relationship between man and the environment; to predict the consequences of today's actions on tomorrow's world and thereby to increase man's ability to manage efficiently the natural resources of the biosphere" (UNESCO, 1979, p. 1),

finally foreseeing critical MAB's duties (Hadley, 2006, p. 264).

Crucially, what else Batisse identified, were three structural impediments related to the application of environmental knowledge. First, knowledge that could be operationally relevant often exists but remains unavailable to decision-makers and practitioners in usable or actionable forms. Second, existing knowledge is frequently sectoral and fragmented, making it inadequate for addressing the

multidimensional and integrated nature of real-world environmental challenges. Third, there is a persistent insufficiency of detailed understanding concerning specific resources, ecosystems, and the interactions among environmental components, thereby undermining the possibility of informed and systemic intervention (Batisse, 1980).

Through these visionary reflections, Batisse was going to state the key pillar of the program: it should not consist of a pure conservation initiative, nor as a research-oriented framework only, but as an innovative intersection, in the shape of a knowledge-generating tool and, especially, governance-enabling mechanism too. Operated under the aegis of UNESCO, MAB should be conceived as an instrument to address precisely the gaps mentioned above; by fostering interdisciplinary research, facilitating the translation of science into policy, and promoting adaptive management practices across scales, MAB should consist of much more than a protection designation only.

The program thus aims to facilitate the interplay between ecological systems and socio-economic processes, encouraging interventions that mitigate negative environmental impacts while reinforcing beneficial ones. In this sense, sustainability is understood not as a fixed end state, but as an ongoing, adaptive learning process (Purwanto, Nugroh, Setiawan Achmadi, & Munawaroh, 2020). Within this framework, BRs serve as privileged sites for interdisciplinary experimentation and multi-actor collaboration. They promote the active involvement of local communities in shaping shared projects and in generating situated and integrative knowledge (Camporese & Claudi, 2021). This approach is a curious departure from purely scientific models of conservation, as they are placing value above participatory processes of understanding and broader awareness-raising programs, they also maintained high scientific contribution.

Within a socio-ecological perspective, conservation becomes a collective responsibility, enacted through co-design practices that engage institutions, citizens, and territorial stakeholders across multiple levels of governance. MAB reserves, that are recognized "for their value to conservation through providing the scientific knowledge, skills and values to support sustainable development" (Bridgewater, Phillips, & Green M., 1996, p. 142), thus position themselves as advanced laboratories for innovation in integrated heritage management.

Nonetheless, precisely because of its ambition to reconceptualize the relationship between human societies and ecological systems, the title *Man and the Biosphere* has been addressed to present some conceptual and semantic tensions. The first concerns the dualistic logic implied by the formulation, which positions "man" as external to the biosphere, rather than embedded within it (Hadley, 2006).

This risks undermining the program's foundational objective of advancing a systemic understanding of humans as integral components of ecological processes. A more consistent formulation, as debated by Hadley, such as *Man in the Biosphere*, would have better reflected this orientation (ibid.).

A second critique addresses the use of "man" as a generic term for the human species (Bargheer, 2016). Though in line with mid-twentieth-century linguistic conventions and defended on etymological grounds (Poore, 2000), this terminology has been increasingly problematized for its exclusionary implications, particularly within feminist and postcolonial scholarship (Hadley, 2006)[41].

Acknowledging the problematic features of MAB's name does not exhaust the critical engagement with the program's conceptual trajectory. It is important to recognize that both the program and its original design are products of their historical moment, shaped by the epistemological and linguistic conventions prevailing at the time of their inception. Also, as stated above, at the time of its inception, MAB was not clearly oriented toward the establishment of reserves or protected areas, for example.

Overall speaking, indeed, there has been a transformation of the program that occurred throughout the decades. Aside from the launch of the program, the first transformation took place within the Minsk Conference of 1983, that produced the Minsk Conference Action Plan[42]. Here, participants first emphasized the need for BRs to serve as demonstration areas for sustainable development.

After that, the Sevilla Strategy of 1995[43] paved the way for the installation of a plurality of meanings behind MAB's designation. Yet, many of the most important goals of BRs, per how they are meant today, occurred with the Madrid Action Plan (2008–2013)[44], which introduced the concept of BRs as experimental sites for testing integrated approaches to sustainability. This marked an important shift from earlier conservation-oriented frameworks toward a more systemic engagement with social, economic, and ecological dimensions.

In 2015, then, the adoption of the Lima Declaration and Action Plan (2016–2025)[45], further consolidated this approach, expanding the operational scope of BRs and reinforcing their role as platforms for multi-stakeholder governance, knowledge co-production, and territorial resilience.

[41] Some propose interpreting the "M" in the "MAB" programme as standing for "Mankind" rather than simply "Man", emphasizing its more inclusive meaning.

[42] https://npshistory.com/publications/mab/OPN_BR_21.pdf

[43] https://unesdoc.unesco.org/ark:/48223/pf0000262500

[44] https://unesdoc.unesco.org/ark:/48223/pf0000163301

[45] https://unesdoc.unesco.org/ark:/48223/pf0000381215

Finally, the Hangzhou Declaration and Action Plan (2025–2035), adopted during the Fifth World Congress of Biosphere Reserves in 2025, entails the previous plans and envisions a new trajectory: it not only updates the programmatic tools of the MAB network but also responds to contemporary global challenges of climate crisis and socio-economic inequalities at once. Indeed, a central emphasis is placed on bridging natural and social sciences, promoting transdisciplinary approaches that jointly consider culture, innovation and governance.

The Hangzhou strategy explicitly positions BRs as "beacons of coexistence" between humanity and nature, aligning with other international agreements including the Kunming-Montreal Global Biodiversity Framework and the UN Sustainable Development Goals.

The ultimate information to underline regards the MAB's vision of sites as spaces of experimentation for more sustainable human–nature relations[46]. This is why, somewhat unexpectedly, some reserves cover vast expanses of wilderness, while others are limited to relatively small territories (Reed, 2019).

In general, they are now 759 designated sites across 136 countries, and all vary in terms of focus, on terrestrial, marine, and coastal ecosystems, in terms of population densities, including more or less urban and rural contexts, in terms of purposes: some deal mostly with nature, some others address built environments primarily (UNESCO, 2025).

2.2.1. Understanding a Biosphere Reserve

At this point in the discussion, it becomes essential to examine how a Biosphere Reserve[47] is formally established. Given the significant diversity in their territorial organization the question arises as to what, at a foundational level, makes a territory relevant to become a BR. In other words, what common institutional and functional architecture underpins this designation, despite its contextual flexibility.

In general terms, a BR must demonstrate the capacity to fulfil three fundamental, equal, and mutually complementary functions:

> "(1) Conservation – conservation of natural and bio-cultural diversity
> (2) Development – support for sustainable economic and social development and cultural diversity

[46] The full list of existing Biosphere Reserves is available at: https://www.unesco.org/en/mab/map?hub=66369

[47] "Biosphere Reserves" are now referred to as "BRs"

(3) Logistic support – support and promotion of model projects, training and education for sustainable development, research and monitoring linked to nature conservation and sustainable development at the local level, while taking into account national and global scales" (UNESCO, 2021, p. 15).

This equal weighting of conservation, development, and logistic support is particularly curious in the environment protection framework because it breaks with hierarchical models that isolate ecological goals from social realities. It rejects the logic of trade-offs from purposes of development and conservation, proposing instead that sustainability emerges only when these functions reinforce one another (Bruno & Giaccaglia, 2024). Conservation must be socially viable, development must sustain ecological limits, and knowledge must guide policy-making processes (Bargheer, 2016). The program's complexity, therefore, lies not only in how these functions interact, but in where they are made to converge.

To qualify as a BR, an area must meet seven criteria, expressed within the *Statutory framework of the World Network of Biosphere Reserves*[48], that aim at sizing spaces where it is meaningful to deal with the three-targets balance[49]. Among

[48] Prior to this, the 1984 Action Plan, emerging from the 1983 Minsk Conference, represented the first attempt to standardize operational protocols, though its scope remains less documented. The Madrid Action Plan (2008–2013) subsequently recalibrated the framework with measurable outputs and monitoring systems. This was superseded by the MAB Strategy 2015–2025, establishing a strategic alignment with UNESCO's medium-term objectives, and the Lima Action Plan 2016–2025, which delineated specific operational actions to implement the Strategy. A new strategic cycle, encompassing the 2026–2035 Strategy and Action Plan, has been adopted at the 5th World Congress of Hangzhou.

[49] Criteria of Biosphere Reserves, as defined by Art. 4 of Statutory framework of the World Network of Biosphere Reserves

General criteria for an area to be qualified for designation as a biosphere reserve:

1. It should encompass a mosaic of ecological systems representative of major biogeographic regions, including a gradation of human interventions.

2. It should be of significance for biological diversity conservation.

3. It should provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale.

4. It should have an appropriate size to serve the three functions of biosphere reserves, as set out in Article 3.

5. It should include these functions, through appropriate zonation, recognizing:

(a) a legally constituted core area or areas devoted to long-term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives;

(b) a buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place;

(c) an outer transition area where sustainable resource management practices are promoted and developed.

6. Organizational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and carrying out the functions of a biosphere reserve.

7. In addition, provisions should be made for:

(a) mechanisms to manage human use and activities in the buffer zone or zones;

(b) a management policy or plan for the area as a biosphere reserve;

(c) a designated authority or mechanism to implement this policy or plan;

the others, it is worth mentioning the first criteria, which states that BRs must encompass a mosaic of ecological systems and a gradient of human interventions, from minimal to more intensive. This aspect is particularly intriguing, as it emphasizes the correlation between human presence and natural conservation, requiring both human interventions, like urbanized areas but also agricultural fields, and natural spaces where significant biodiversity is present (UNESCO, 2020). Here, the principle of ecological representativeness emerges as pivotal. A BR must reflect key dimensions of biological diversity at a given scale, serving as a proxy for larger ecological systems. Representativeness may be framed in terms of ecoregions (Olson & Dinerstein, 2002), biomes (Margules & Pressey, 2000), or bioregions (Rutherford, Mucina, & Powrie, 2006). It may also refer to specific vegetation types, ecosystems, or habitat complexes. Overall speaking, the purpose is to ensure that, within a national or transnational network, a significant range of specific ecological variation is pictured and maintained (Pool-Stanvliet, Stoll-Kleemann, & Giliomee, 2018).

It clearly emerges that BRs' designation criteria do not simply define eligibility. They give operational form to a complex vision of sustainability which, rather than establishing fixed ecological zones, assumes that protection cannot be achieved through separation, of nature from society, or fully separated use, but through the coordination of differentiated purposes and, therefore, spaces.

Aside from the criteria contained in the fundamental *Statutory Framework*, technical oversight is provided by the *Technical Guidelines for Biosphere Reserves* (TGBR), a dynamic tool meant to offer methodologies for site nomination, periodic review, governance optimization, zonation design, and monitoring protocols.

In relation to this, on the ground, BRs are shaped according to a three-layer zonation. This consists of three distinctive areas that refer to different levels of conservation standards; they are the core area, the buffer zone, and the transition area (UNESCO, 2020). The core area, the innermost zone, shall be legally dedicated to biodiversity conservation and scientific research, providing the upmost protection for ecological processes and its most proximate parts. Surrounding the core space, the buffer zone acts as a protective cushion for the inner parts; while allowing non-nature conservation related activities too, they shall carefully align with the reserve's sustainability goals. This zone is a space for experimentation, research, and education, meaning to demonstrate how human practices undertaken in a sustainable way can possibly contribute to the conservation of ecosystems; hence, although some buildings and agricultural fields take place in the buffer zone,

(d) programmemes for research, monitoring, education and training (UNESCO, 2020, p. 4).

they should not exceed in terms of dimension and impact. Finally, the outermost transition area focuses on fostering sustainable development within the surrounding communities (UNESCO, 2021).

This tripartite zonation must be understood not as a static land-use schema, but as an operational framework; by instituting graduated spaces of intervention, the structure creates the preconditions for controlled experimentation. It enables the coexistence of conservation purposes with human activities, thereby supporting processes of improvement on a plurality of levels. Critically, BRs are indeed designed to function as local laboratories for testing sustainable practices, with the explicit aim of producing knowledge, models, and institutional forms that can be transferred or scaled to broader regional contexts (Reed, 2019).

This conservation strategy advancement is particularly compelling if considering that few other programs provide such a comparable framework for global improvement. As mentioned by Dabard et al., "the World Network of Biosphere Reserves provides ample opportunities for knowledge co-production about a wide array of sustainability issues and for contributing to global scientific debates with place-based insights" (2024, p. 2078).

2.2.2. The Italian scenario

Between 1977 and 2025 Italy has been designated with twenty-one Biosphere Reserves under UNESCO's Man and the Biosphere Programme[50]. The BRs spans alpine, fluvial, metropolitan, rural and coastal systems, across half of the Italian regions. In theory, this mosaic of sites allows for a nation-wide implementation of the MAB Programme's pillar. Yet, Italian BRs too often face difficulties in producing effects (Bruno & Giaccaglia, 2024).

As studied elsewhere, zonation is prepared and mapped, with limited innovative impact on the territories concerned. The spatial logic of the triad is ecologically coherent, not least because it overlays pre-existing, legally binding designations such as parks and nature reserves that already secure significant landscape protection. Nevertheless, the everyday handling of core, buffer and transition areas is frequently unattached from planning instruments (Ramella, et al., forthcoming). The result is a perfunctory application: the map exists, but its leverage on operational governance remains weak. The reason is due to a persistent disjunction at the heart of Italian MAB implementation: the gap between the program's strategic purpose and the institutional realities of territorial governance.

[50] See https://www.mase.gov.it/portale/le-aree-mab-in-italia

Italy rests on two grammars that rarely communicate. On one side stands ordinary planning, the statutory and hierarchical apparatus of municipal PRG or PRGC, provincial or metropolitan PTCP or PTM, and the regional PTR and PPR, all embedded in national codes. This regulatory framework is designed for landscape protection through procedural certainty and therefore sets parameters ex ante and optimizes compliance rather than innovation.

On the other side sits special planning, that is, strategic and orients toward vision, experimentation and cross-sector integration, but rarely directs regulatory force over land use. In theory, special planning should provide direction and innovation that ordinary planning then translates into rules. In practice, path dependence and compartmentalized administrative routines make the coupling intermittent.

Within this setting, the MAB tripartition is conceived as an enabling device for innovative governance but frequently arrests at static territorial designation with little transformative ownership. Rather than reconfiguring human–nature relations, zones risk ossifying prior hierarchies of land use and administrative rationalities (ibid.).

The frequent alignment of MAB perimeters with pre-existing administrative boundaries erodes the transformative potential of BRS. Within the Italian order, MAB's ambitions for projected sustainable development dissipate into abstract guidance that rarely translates into something new. The problem is most visible in transition areas. Designed as interfaces between protected cores and broader socio-economic landscapes, they are often treated as residual territories, marginal in governance and symbolic in function. At most, they can benefit from the participation in the designation, below a purely marketing perspective.

3. The CollinaPo Man And Biosphere Reserve

Having outlined the core principles and mechanisms of the MAB Programme, and its limits in the Italian scenario, the present section turns to the applied case study that both exemplifies these concepts in practice and is also selected for this research.

Located in Piedmont Region, Italy, CollinaPo Biosphere Reserve encompasses not only natural landscapes but also the major city of Turin, other than several smaller municipalities. More detailly, it spans a broad and heterogeneous territory that includes 86 municipalities across four provinces: the Metropolitan City of Turin, and the Provinces of Alessandria, Asti, and Cuneo. This extensive and variegated landscape forms a socio-ecological system where natural environments, urban settlements, and agricultural areas coexist in a complex, fragmented, but interdependent, configuration.

This unique area, which hosts all the protected zones that were part of the former Protected Areas of the Po River in Turin and some regional Parks (Erice, 2016), was targeted as a BR due to its interesting position at the crossroads between urban development, biodiversity conservation, and the well-being of the region's inhabitants.

Indeed, being also known as an "Urban MAB", CollinaPo faces growing challenges in addressing targets of environmental protection next to others concerning the human actions' sustainability. Figure 1 displays the area of CollinaPo and its three-layers zonation.

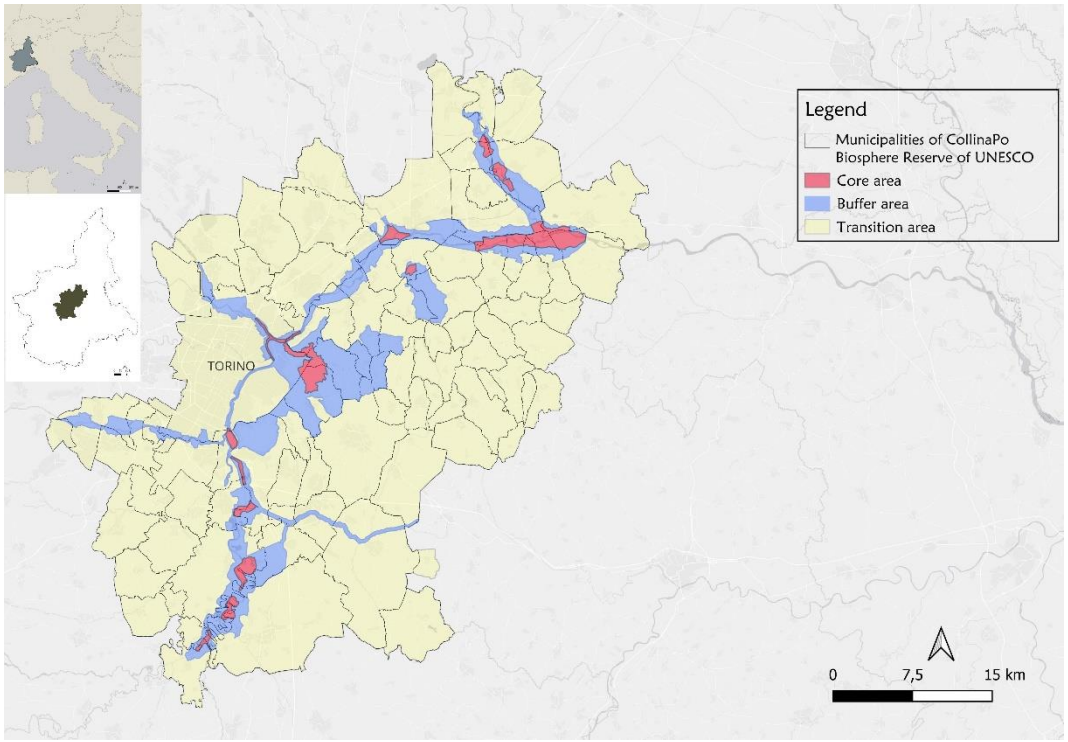


Figure 1: MAB UNESCO CollinaPo Biosphere Reserve and its zonation[51]

Source: Author's elaboration based on data from MAB UNESCO Biosphere Reserve CollinaPo

The BR's total area spans 171,233 hectares. The areas are organized as follows: at first, CollinaPo includes 14 Core Zones, covering a total of 3,853 hectares, which correspond to the entirety of the former protected areas along the Po River. Surrounding these core zones the Buffer Zone is located, encompassing 21,161 hectares of adjacent river and hillside regions. Beyond this, there is the Transition

[51] The Figure is numbered according to the first display, at page 18.

Area, spanning 146,219 hectares, which comprises the remaining urban and rural areas that are not subject to protection (SiTi, 2016). This richly diverse region is divided into nine homogeneous macro-areas that embrace the municipalities that compose the BR, and each macro-area is led by a municipality[52].

To understand how CollinaPo deals with the three functions that must be accomplished, it is helpful to rely on the official application document called *Biosphere Reserve Nomination Form*[53]. This document was provided in fulfilment of the MAB application in 2016 and explains a wide range of specifics concerning the area, also setting the fields of planning intervention.

Concerning the conservation function, the document explains that CollinaPo includes 17 Sites of Community Importance (SCI)[54], which include 14 habitats recognized for their ecological importance, with three considered priority habitats. Most of these sites are found along the Po River in the Turin area, where the landscape is characterized by alternating riverbeds and riparian forests, creating a diverse environmental mosaic. This diversity supports a wide range of fauna, including species that thrive in wetland environments. In the hilly regions, the SCIs are marked by a mix of forests, meadows, and cultivated lands, leading to high biodiversity levels supported by the presence of multiple ecosystems (SiTi, 2016).

Regarding the function of development, the *Nomination Form* describes buffer and transition zones of CollinaPo to be notable for their agricultural activities, which are conducted with a strong emphasis on environmental protection.

---

[52] Rondissone: Cigliano, Crescentino, Mazzè, Rondissone, Saluggia, Torrazza Piemonte, Verolengo, Villareggia

Casalborgone: Berzano San Pietro, Casalborgone, Castagneto Po, Chivasso, Cinzano, Lauriano, Monteu da Po, Rivalba, San Sebastiano da Po, Tonengo

Brozolo: Brozolo, Brusasco, Cavagnolo, Morasengo, Verrua Savoia

Settimo Torinese: Borgaro Torinese, Brandizzo, Caselle Torinese, Leinì, San Benigno Canavese, Settimo Torinese, Venaria, Volpiano

San Mauro Torinese: Castiglione Torinese, Gassino Torinese, San Mauro Torinese, San Raffaele Cimena

Torino: Torino

Pino Torinese: Andezeno, Arignano, Baldissero Torinese, Chieri, Marentino, Montaldo Torinese, Pavarolo, Pino Torinese, Riva presso Chieri, Sciolze

Castelnuovo Don Bosco: Albugnano, Buttigliera d'Asti, Capriglio, Castelnuovo Don Bosco, Mombello di Torino, Moncucco Torinese, Moriondo Torinese

Aramengo: Aramengo, Cocconato, Passerano Marmorito, Pino d'Asti, Cerreto d'Asti, Piovà Massaia

Orbassano: Beinasco, Bruino, Nichelino, Orbassano, Rivalta di Torino

Moncalieri: Cambiano, Moncalieri, Pecetto Torinese, Santena, Trofarello

Carignano: Candiolo, Carignano, Castagnole Piemonte, La Loggia, Lombriasco, None, Osasio, Piobesi Torinese, Vinovo, Virle Piemonte

Pralormo: Carmagnola, Casalgrasso, Poirino, Pralormo, Villastellone.

See more information at https://www.parcopopiemontese.it/pagina.php?id=81

[53] No other official document concerning the status of CollinaPo is available; only independent research has been produced and it will be analyzed separately.

[54] A Site of Community Importance (SCI) is a conservation area defined by the European Community Directive No. 43 of May 21, 1992 (92/43/EEC).

Moreover, these areas do not only provide food for Turin and nearby communities but also seem to host a large array of cultural activities, which range from educational programs for children to major public events. Additionally, there are significant initiatives focused on the preservation and enhancement of the area's environmental landscape.

The unique biogeographical position of the hills of CollinaPo, acting as a bridge between continental and sub-Mediterranean environments, combined with its complex morphology and varying exposures, creates numerous microclimates within the area. These microclimates support a diverse range of fauna and flora species. On the north-facing slopes, typically mountainous and microthermal species can occasionally be found, while the warmer slopes are home to thermophilic species, sometimes of a sub-Mediterranean nature (SiTi, 2016).

The document also states what technical pillars stand behind the conservation and development functions, mentioning what constitutes the logistical support. According to the Nomination Form, Turin possesses a crucial role not only because of the institutional facilities that it hosts, but also because of the numerous centers for research and education, including the University and Polytechnic of Turin, as well as companies in innovation and sustainable development, that are there. Moreover, the existence of the former *Ente di Gestione delle Aree Protette del Po e della Collina Torinese*, which is specifically deputed to assess and improve the wellbeing of the area, shall further support the efforts to promote education, scientific research, and environmental monitoring.

Finally, it is presented the governance structure of CollinaPo, which holds a complexity that reflects the institutional framework of its territory. The BR does not have an autonomous legal identity; instead, it functions within the framework of pre-existing regional and municipal institutions.

The *Ente di Gestione delle Aree Protette del Po e della Collina Torinese* served as the lead coordinator and was responsible for the legal and administrative oversight of the MAB candidacy process. The buffer zone was defined through a combination of regional environmental protections, including hydrological risk management areas and landscape conservation constraints, while the transition area encompassed 86 municipalities selected based on shared planning experiences and participation in cooperative territorial initiatives, despite the absence of formal conservation obligations.

The current coordination model foresees the *Ente di Gestione delle Aree Protette del Po* as primarily responsible, but also comprises an Assembly of Signatories, acting as a political steering committee, an Executive Committee that brings together representatives from the nine defined macro-areas, and a Technical

Secretariat formed by staff of the Park Authority, the Metropolitan City of Turin, and the Royal Parks system. This operational framework is already in place and actively functions as a coordination tool. Additionally, specific registers have been established to engage the third sector, educational institutions, and community-based monitoring actors.

However, despite these mechanisms, as mentioned above, the Reserve does not possess direct policy-making authority. All spatial planning and land-use decisions remain fully under the jurisdiction of the municipalities, which operate through their General Urban Development Plans. Higher-level strategic orientation is provided by the *Regione Piemonte* and the four relevant Provinces through planning tools such as the Regional Territorial Plan, the Regional Landscape Plan, and four Provincial Territorial Coordination Plans.

Environmental oversight within the core zones is the responsibility of the Park Authority, which also manages a unified Area Plan specific to the Po river corridor. Additional sectoral competencies are distributed among multiple agencies such as the River Basin Authority, the Interregional Agency for the Po (ADBPO), cultural heritage superintendencies, and others.

Recently, a Memorandum of Understanding has been established among the five UNESCO Biosphere Reserves along the Po River[55], with the supervision of ADBPO, and was formalized in the shape of a *Protocollo di Intesa* in April 2024 (Figure 22). This instrument does not introduce new legal competences but provides a meta-institutional framework for coordination, with the Po River Basin Authority acting as technical secretariat. Through this arrangement, the Po River Reserves commit to harmonizing their Action Plans, sharing data and best practices, and developing joint projects on crucial issues of hydrogeological risk, biodiversity restoration, and climate resilience.

The Protocol thus creates an operational interface that links otherwise fragmented planning regimes, enabling the Reserves to function collectively as a strategic governance corridor along the river, without infringing on municipal or regional competences. Yet, a key limitation therefore remains the voluntary nature of Reserves' governance. Without a binding legal framework, the BRs rely entirely on the willingness of municipalities and the other responsible actors to put their goals into action.

This model is further challenged by the instability inherent in local electoral cycles. Municipal administrations in Italy change every five years, but elections do not occur simultaneously across jurisdictions. As a result, the composition of those

[55] Monviso Biosphere Reserve, CollinaPo Biosphere Reserve, Ticino Val Grande Verbano Biosphere Reserve, Po Grande Biosphere Reserve, Delta Po Biosphere Reserve.

governing the Reserve is frequently altered, affecting the continuity of political support and administrative engagement. This dynamic has already impacted CollinaPo over the past decade, with several transitions in participation among municipalities.

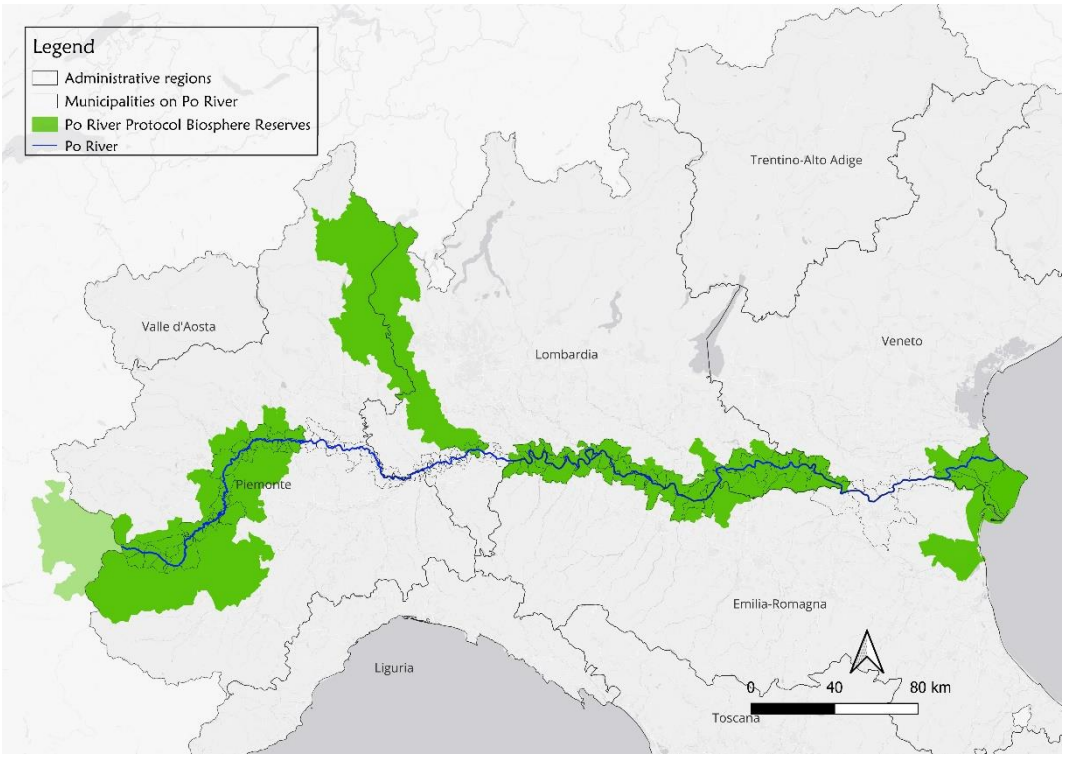


Figure 22: The five Po River Biosphere Reserves

Source: Ramella, L., Giaccaglia, E., Costa, M., Massaro, P., Paseri, M., Perroni, M., . . . Bruno, R. (forthcoming). Overcoming fragmentation in ecosystems management: the innovative spatial planning tool of the River Po's Biosphere Reserves Protocol. In S. Partey, E. Aschenbrand, & M. Reed, *Catalyzing biodiversity conservation and social transformation - evidence from UNESCO Biosphere Reserves*. Venice: UNESCO.

3.1. The classification of CollinaPo

The study of the CollinaPo Biosphere Reserve is based on an integrated methodological framework structured along two main lines of inquiry: the spatial classification of the territory and the demographic and socio-economic study of the population. The approach is designed to reconstruct a comprehensive and multi-scalar reading of the BR, drawing exclusively on secondary data, systematically collected from the sources presented in Chapter I.

This analytical framework is articulated through four thematic domains, organized under two primary axes: spatial classification and demographic classification. The spatial axis is divided into two sub-categories. The first focuses on the physical and environmental structure of the territory, integrating data on morphology and hydrography, soil capability (based on land suitability for productive uses), ecological connectivity through identified corridors, and the spatial distribution of environmental risks. The second concerns the functional organization of land and infrastructure, including current land use patterns, the territorial configuration of primary infrastructures, and the delineation of protected areas and regulatory perimeters.

The demographic axis is also structured in two dimensions. The first addresses demographic trends, considering absolute and relative population distribution, age cohorts, structural indicators such as dependency ratios, and spatial variations in life expectancy. The second focuses on socio-economic parameters, including labor market indicators, sectoral employment structures, and income levels, with attention to internal disparities and metropolitan influences.

Spatial Classification	**Demographic Classification**
1) Physical and Spatial 1. Morphology and hydrography 2. Soil capability 3. Ecological corridors 4. Air quality 5. Environmental risks	3) Demographic trends 1. Population distribution 2. Age 3. Population structure 4. Life expectancy
2) Land Use and Infrastructure 1. Land use 2. Main infrastructure 3. Parks and protected areas	4) Socio-Economic 1. Employment rates 2. Types of employment 3. Income levels

Table 16: The CollinaPo classification

Source: Author's elaboration

3.1.1. Physical and spatial classification

The morphology of the CollinaPo Biosphere Reserve is defined by a rich interplay of topographic structure and hydrographic organization. The BR's general orographic framework has been previously outlined (see Chapter IV), with the

representation of the contour lines that delineated the altimetric gradients separating the Po River plain from the adjacent hilly systems and the initial reliefs of the pre-Alpine front.

A more detailed understanding of CollinaPo's physical stratification is provided through the combined analysis of slope intensity and hydrography represented in Figure 23. This cartographic visualization employs a gradient of color to indicate slope steepness, ranging from low (blue) to high (red), also displaying the main water courses that traverse the area. The northern sector of the BR, aligned along the Po River, is predominantly characterized by flat alluvial plains with minimal slope. These geomorphological conditions, coupled with the high agricultural potential of alluvial soils, have historically facilitated both cultivation and urbanization (Rotelli, 1973).

In contrast, the southern and southeastern portions of the reserve are defined by a more varying landscape, where slopes increase with the density of the fluvial network. This sector corresponds to the aforementioned *Collina di Torino*, a hilly formation shaped by long-term fluvial erosion and tectonic uplift, giving rise to a fragmented mosaic (Negri, 1904).

The hydrographic system, comprising the Po River and its network of tributaries, plays a pivotal role in structuring ecological connectivity within the reserve. Indeed, this network is not limited to the main river course but includes a dense framework of secondary channels, minor streams, and irrigation canals that permeate the area (IRES, L'irrigazione in Piemonte, 1974).

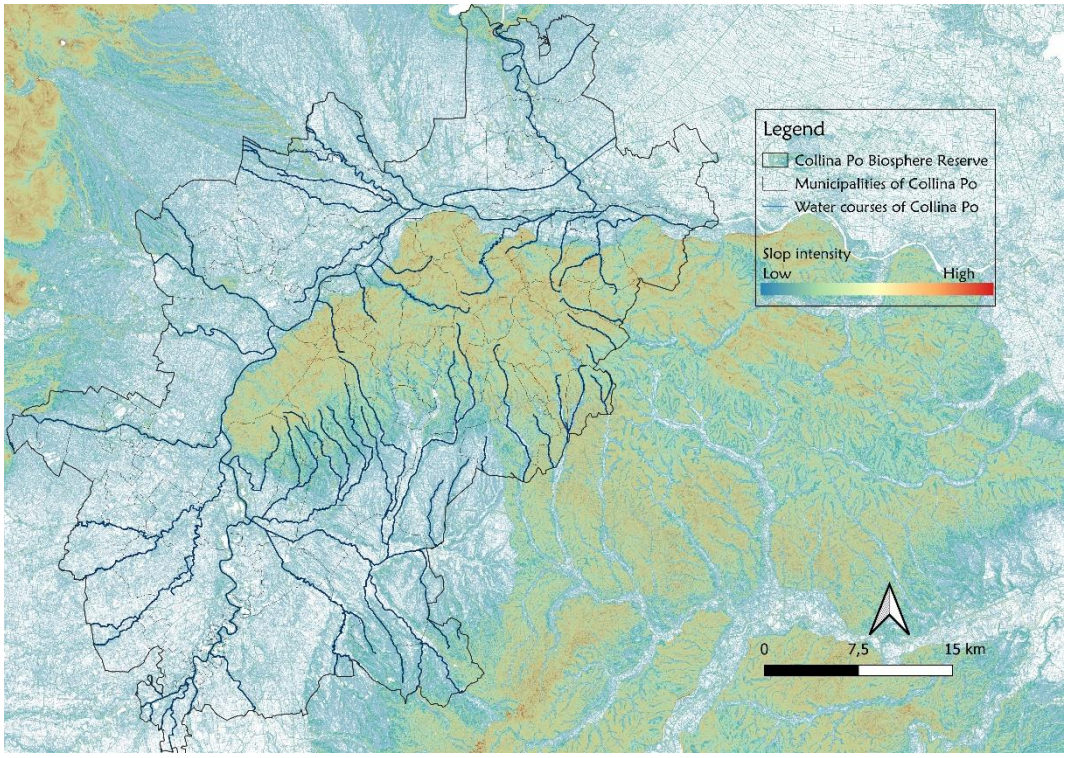


Figure 23: Slop intensity and water courses in CollinaPo Biosphere Reserve
Source: Author's elaboration based on data from Geoportale Piemonte

These delineate natural corridors that sustain habitats continuity and possibility for animals to move, serving as critical infrastructure for biodiversity in a landscape otherwise subject to strong anthropogenic fragmentation. Comparing Figure 23 and Figure 24, it is visible that the hydrographic network is closely integrated with the ecological framework of the CollinaPo Biosphere Reserve. Three major ecological areas are evident. The first one is located in the norther part and is defined by the Po River course (light green); a dense network of tributaries extends southward, partially overlapping with other ecological areas and extensive forests and seminatural areas identifying the second large ecological area (dark green).

Ecological nodes (cyan) are distributed along the hydrographic system, highlighting the spatial correlation between watercourses and biodiversity focal points.

The bands of ecological connections (yellow) correspond largely to fluvial corridors and adjacent lowlands. Other ecological corridors (brown dashed lines) and corridors of ecological discontinuity (pink dotted lines) intersect the water network, indicating structural connections and fragmentation thresholds.

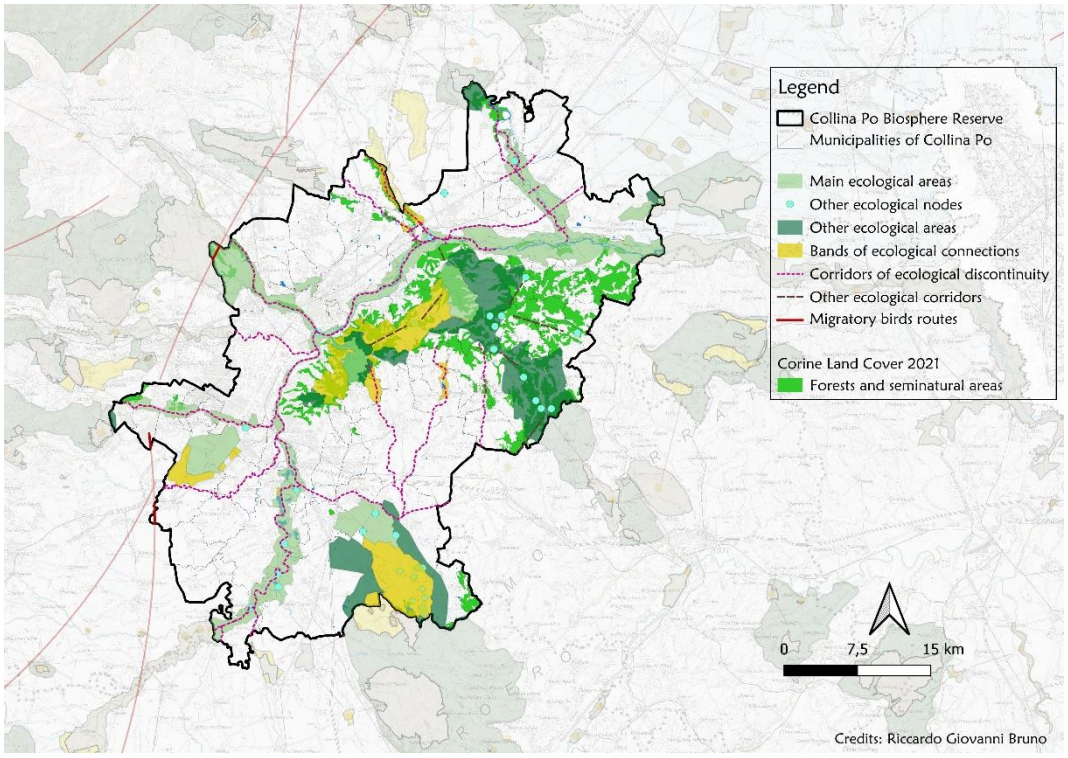


Figure 24: The ecological framework of CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte

The spatial distribution of forest types (Figure 25) further clarifies the ecological composition intersecting the hydrographic system. Oak forests (dark green) are concentrated along the central hilly ridge, corresponding to the densest ecological cores identified in Figure 24. In contrast, poplars (light green) and willows (light brown) predominantly align with the Po River and its tributaries, closely following the riparian corridors.

Black locust (medium green) and reforestation areas (light blue) are scattered mainly along the lower slopes and floodplains, often adjacent to hydrographic channels and agricultural matrices.

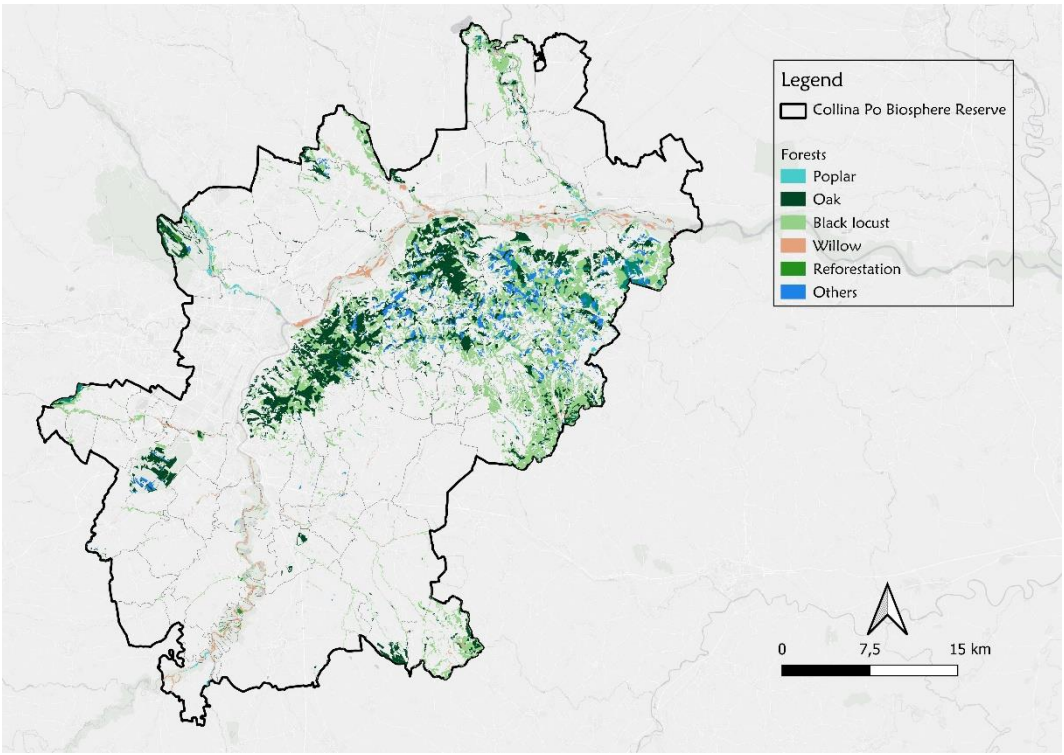


Figure 25: The forests of CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte

An integrated reading of Corine Land Cover (2022) and the High Nature Value Farmland & Forests (HNVF, CSR 2023–2027, IPLA) classification, available in Annex A, shows a clear gradient: along the Po and its tributaries, riparian forests and wetland/alluvial habitats form a high–very high HNVF backbone (classes 4–10) delivering connectivity, flood attenuation and microclimate regulation; the eastern hills (macro-areas 11–12–16–17) are dominated by forest and agro-forestry matrices with similarly high values; the southern and south-western plains (3–4–8–9) exhibit intensive arable/forage systems with low HNVF (0–4) and scattered remnants of naturalness.

Artificial surfaces create a continuous urban belt, fragmenting corridors, sealing soils and producing heat-island effects, especially at river crossings and hill-plain interfaces. Major water bodies and riparian strips remain the structural spine of connectivity but are locally compressed between urban fabric and intensive farmland, heightening risks of diffuse pollution and loss of buffer vegetation.

Where present and continuous, high-nature farmland elements, permanent grasslands, hedgerows, tree lines, mixed orchards sustain pollinators, biological control and groundwater recharge, if sparse, landscape resilience declines[56].

The concentration of soils of classes I and II along the Po River corridor and its tributary floodplains reflects not only the geomorphic history of sediment deposition but also showcases the persistent availability of water and nutrients, that historically favored both agricultural exploitation and the development of specific riparian vegetative assemblages.

The prevalence of poplar stands, willow formations, and reforested areas in these zones, evidenced in the previous Figure 25, is a direct consequence of these soil properties, which provide high soil fertility.

As the terrain transitions from fluvial plains to the hilly and submontane sectors, there is a notable shift towards classes IV to VI, characterized by poorer, shallower, and often stonier soils with variable permeability and increased slope gradients.

These conditions impose significant limitations on cultivation, historically redirecting land use towards forestry, pastures, or marginal agricultural practices. Consequently, these areas coincide with the dominance of oak forests and black locust woodlands, whose edaphic requirements and ecological strategies are better suited to these constraints.

The marginal soils of class VII, represented in orange, delineate the reserve's most fragile geomorphological contexts, typically steep, erosion-prone slopes with minimal agricultural value and reduced vegetative cover.

[56] Full cartographic evidence supporting this diagnosis is provided in the Annex B.

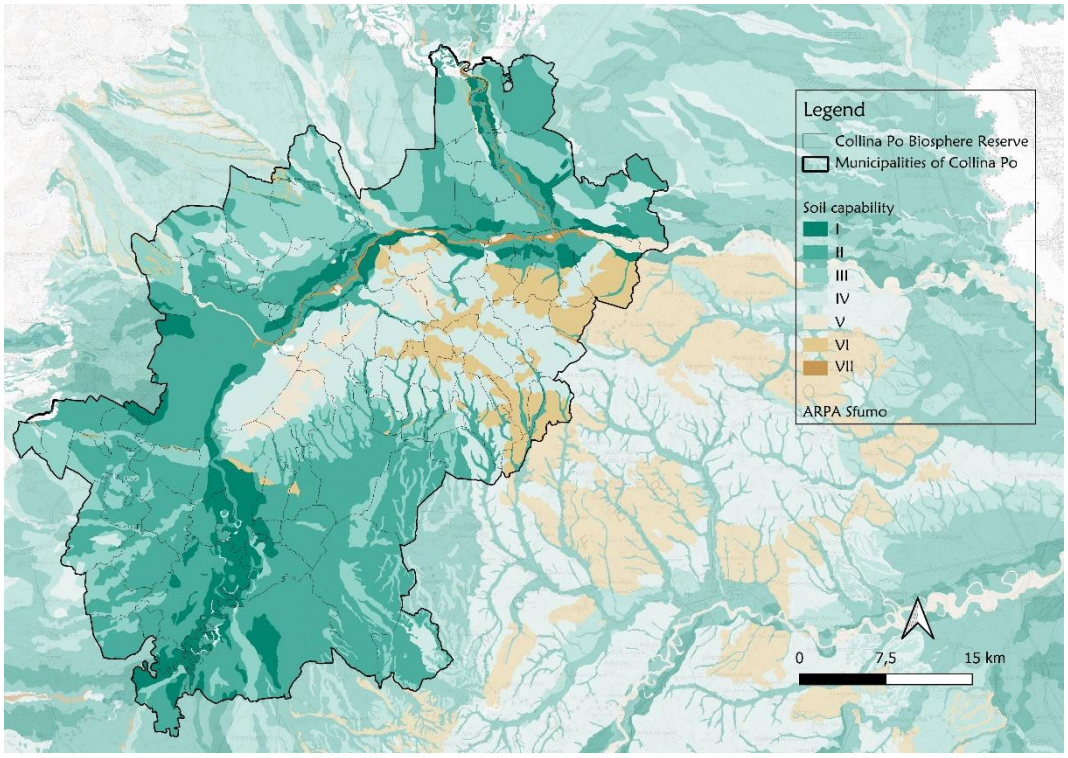


Figure 26: The soil capability of CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte

Specific attention is deputed to the air quality which, in Turin and in surrounding municipalities, has been a critical issue for the last decades. The sequence of maps in Figure 27 illustrates the temporal evolution of annual mean PM2.5 concentrations within the CollinaPo Biosphere Reserve over a fifteen-year period (2008–2023).

Each map represents interpolated municipal-scale data classified into five concentration intervals, ranging from low (<9.2 µg/m³) to very high (>36.8 µg/m³) levels, allowing a comparison of air quality trends in relation to the BR's territorial structure. In 2008, the reserve and its surrounding areas exhibit widespread critical conditions, with large portions exceeding the European and WHO guideline thresholds. By 2013, a moderate yet visible improvement occurs, reflected in the attenuation of extreme values across most of the reserve. Still, a persistent hotspot remained in the metropolitan core.

The 2023 map depicts a marked overall decrease in PM2.5 levels across the CollinaPo system, with most municipalities now falling within the guideline range or below. Nonetheless, a residual concentration persists in the central basin, again aligning with the Turin urban agglomeration, which continues to act as a structural emitter despite regional-scale improvements.

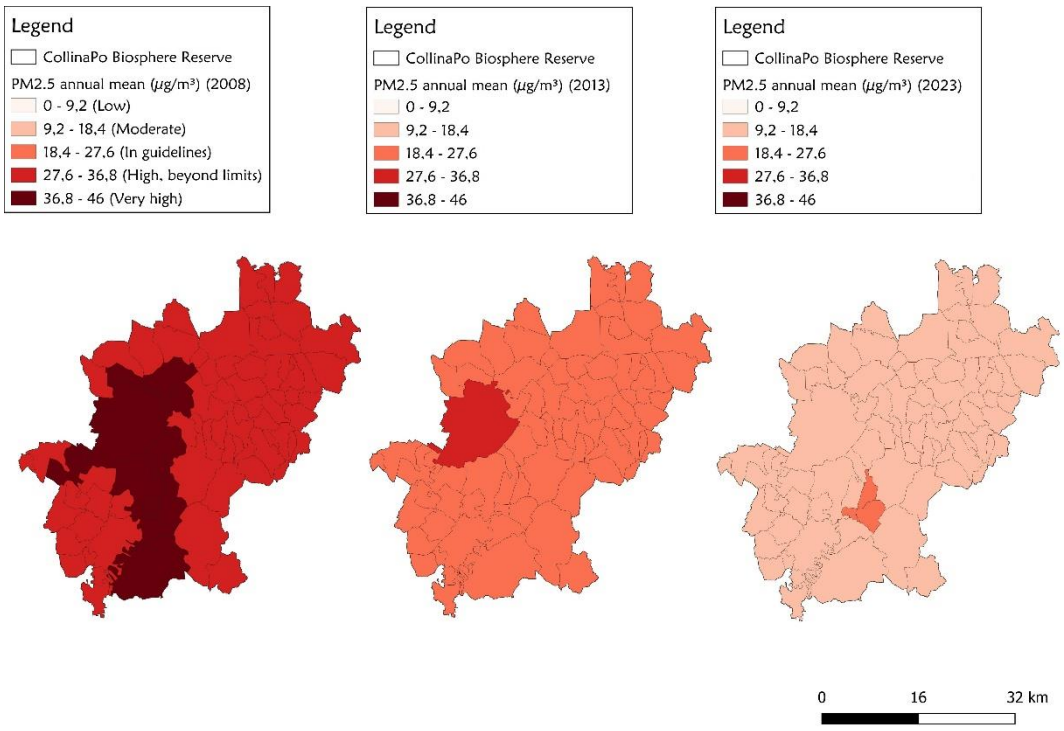


Figure 27: The air quality of CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte

The hydrographic system, comprising the Po River and its tributaries, remains the principal structuring axis for ecological connectivity within the CollinaPo Biosphere Reserve. However, the interaction between this dense fluvial network and the geomorphology of the area presents an overall fragility too, displayed in multiple environmental risks.

As visible in Figure 28, which maps the recorded hydrological and geological hazard events across the reserve, a pronounced clustering of flood events is evident. The concentration of heavy rainfall events in proximity to landslide-prone zones underscores the close coupling between climatic stressors and geomorphological responses in the landscape.

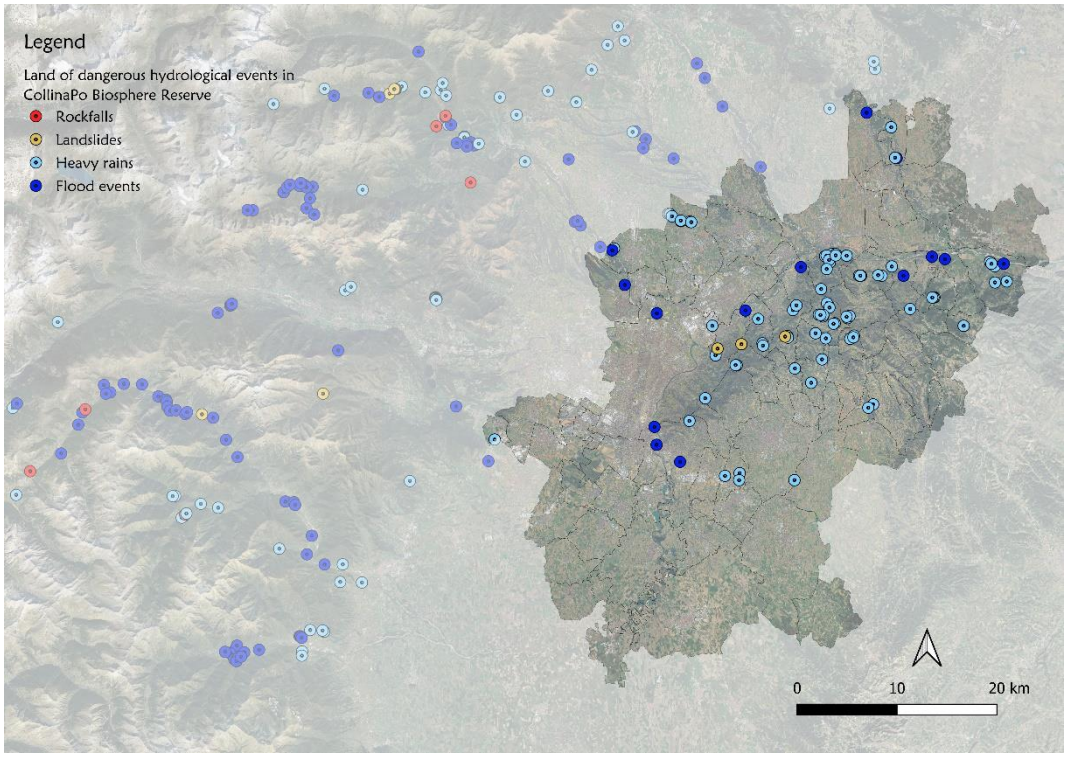


Figure 28: The hydrological events of CollinaPo (up to 2023)
Source: Author's elaboration based on data from Geoportale Piemonte

The spatial distribution of landslide susceptibility within the BR (Figure 29) reveals a stark concentration of high-risk zones along the central hilly belt. This area corresponds directly to the main ecological core and overlaps with sectors previously identified with soil capability classes IV to VII, where slope steepness, lithological features, and localized hydrological pressures converge to exacerbate instability.

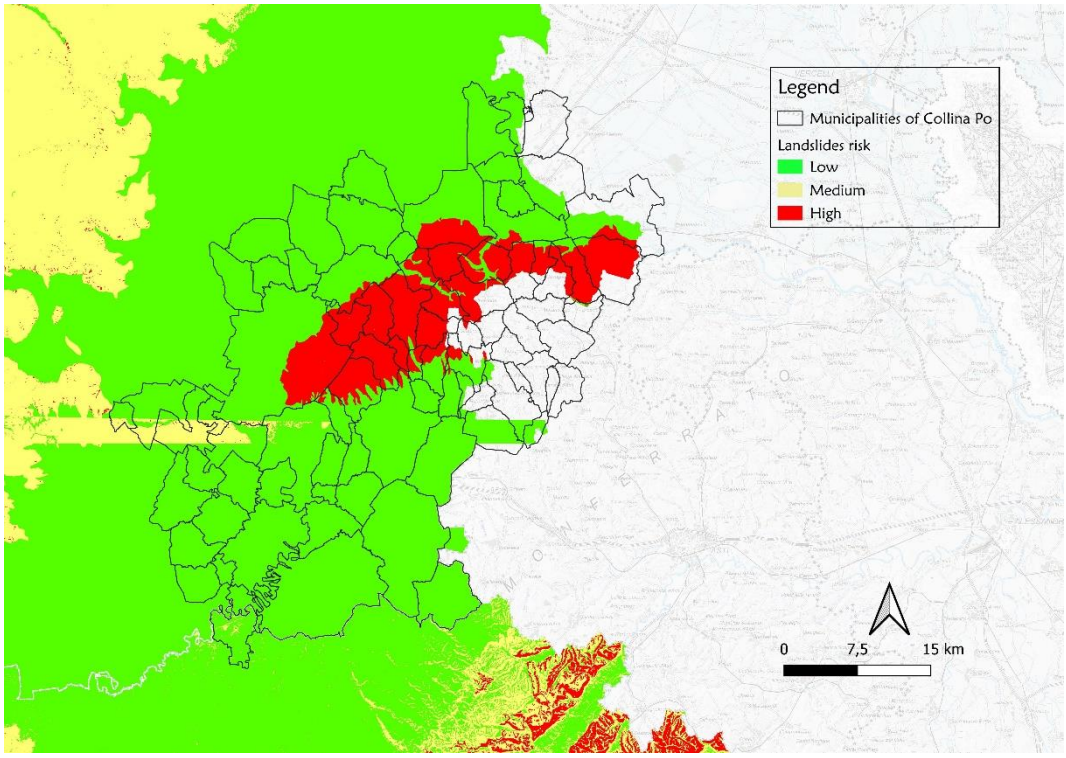


Figure 29: The risk of landslides in CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte[57]

Finally, it is relevant to address also the risks of wildfires because, as visible in Figure 30, fire events are notably concentrated in the same hilly sectors already marked by high landslide susceptibility.

Wildfires have occurred with significant frequency in the last two decades, with clusters of recent events indicating a persistent and possibly intensifying vulnerability. The recurrence of fires in these areas contributes to a well-documented feedback cycle of degradation: the immediate loss of vegetative cover reduces root cohesion, weakening slope stability, while post-fire soil hydrophobicity accelerates surface runoff during rainfall. This sequence amplifies the likelihood of erosion and landslides, generating cascading effects that can lead to long-term geomorphological destabilization.

[57] The map does not display a significant number of municipalities located in the hilly area. This depends on a lack of data within the original source, available at: https://www.geoportale.piemonte.it/geonetwork/srv/ita/catalog.search#/metadata/arlpa_to:07.04.05-D_2020-06-10-12:00

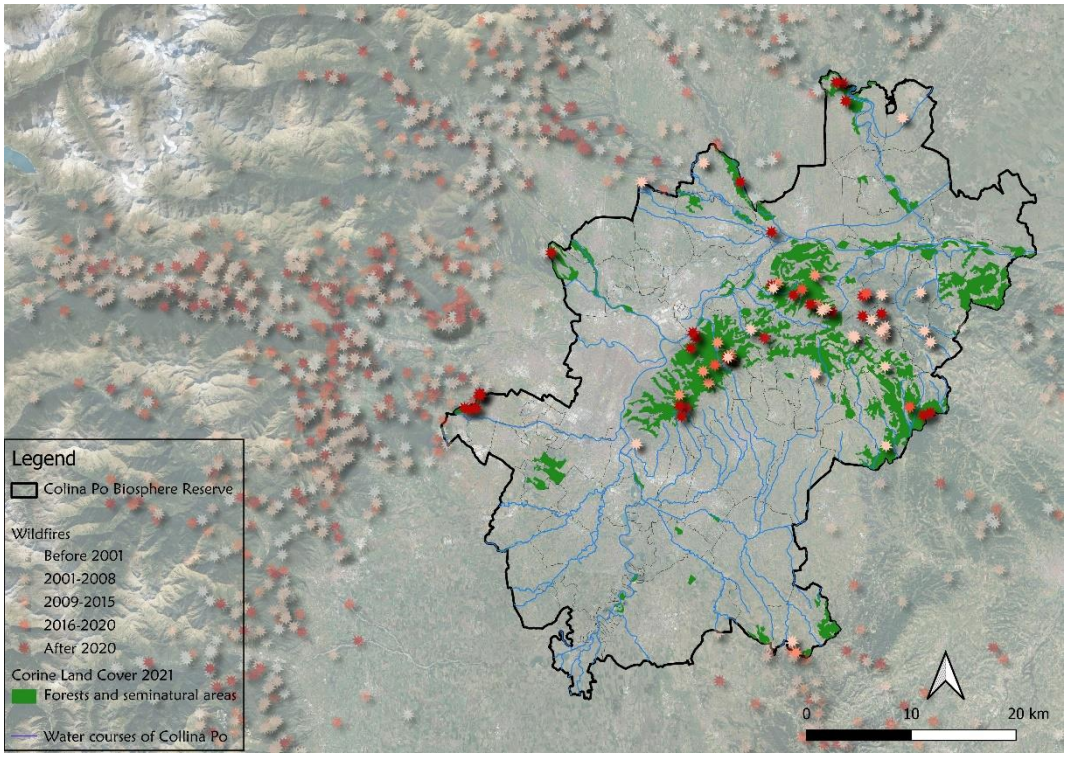


Figure 30: The wildfires in CollinaPo (up to 2022)
Source: Author's elaboration based on data from Geoportale Piemonte

3.1.2. Land use and infrastructure classification

The second relevant framework of spatial classification concerns the land use and infrastructure within the CollinaPo Biosphere Reserve, focusing on the spatial organization of land cover and the dynamics of land use change.

The current configuration of CollinaPo's land cover is depicted in Figure 31, based on the Corine Land Cover (2022) dataset. The territorial mosaic reveals a clear spatial articulation between artificial surfaces, agricultural areas, forests and seminatural spaces, and water bodies.

The western sector of the BR and its immediate surroundings are dominated by artificial surfaces (in red), corresponding to the metropolitan area of Turin and the principal urban nuclei of the Piedmontese plain. Urban development is strongly concentrated along the axis of the Po River and the main transportation corridors, forming a continuous urban belt that exerts visible pressure on the ecological systems of the western mountains.

Agricultural areas (in yellow) constitute the dominant land use outside cities, extending extensively across the plains to the south and north of the BR.

In contrast, the eastern and southern portions of CollinaPo, along with the central hilly ridges, are characterized by the presence of forests and seminatural areas (in green). This component occupies a substantial part of the reserve and forms the primary ecological continuum for biodiversity.

Water bodies (in blue), while covering a limited surface area, play a critical ecological role. As seen in Figure 23, CollinaPo's hydrography is pivotal in the ecological wellbeing of the area.

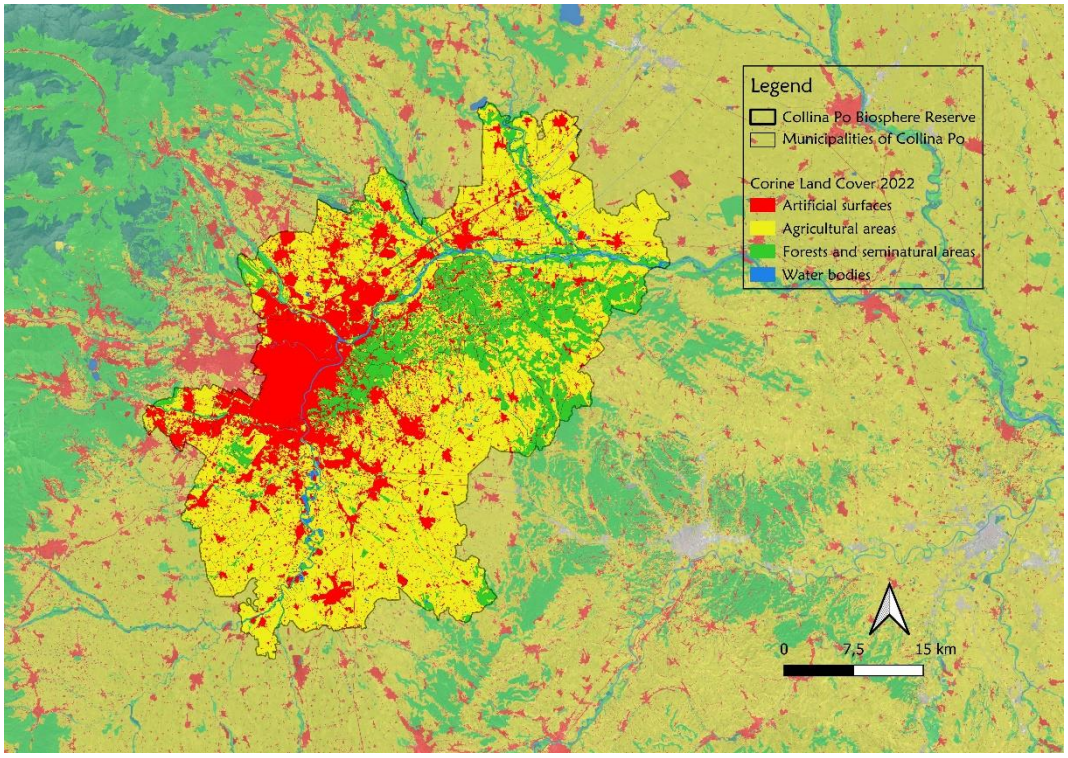


Figure 31: The land use of CollinaPo
Source: Author's elaboration based on data from Corine Land Cover (2022)

From 2000 to 2022, CollinaPo BR shows a pronounced shift toward urban land uses. What began as a landscape largely dominated by croplands progressively transitioned to a more built environment, accelerated after 2012 by new infrastructure and peri-urban expansion around Turin.

By 2021–2022, settlement growth consolidated and densified, with steadily eroding the agrarian fabric. In parallel, forest and semi-natural patches, once concentrated along hill ridges and the Po corridor, contracted and became more fragmented, indicating diffuse urban encroachment and a weakening of ecological cores.

Throughout two decades, the results of this urbanization and infrastructural sprawl are highly evident. Figure 32 spatially isolates the variation of artificial surfaces between 2000 and 2022. The map overlays the extent of built-up areas as of 2000 (in white) with the expansion recorded up to 2022 (in red), offering a clear visualization of the urban growth footprint across the CollinaPo Biosphere Reserve and its municipalities[58].

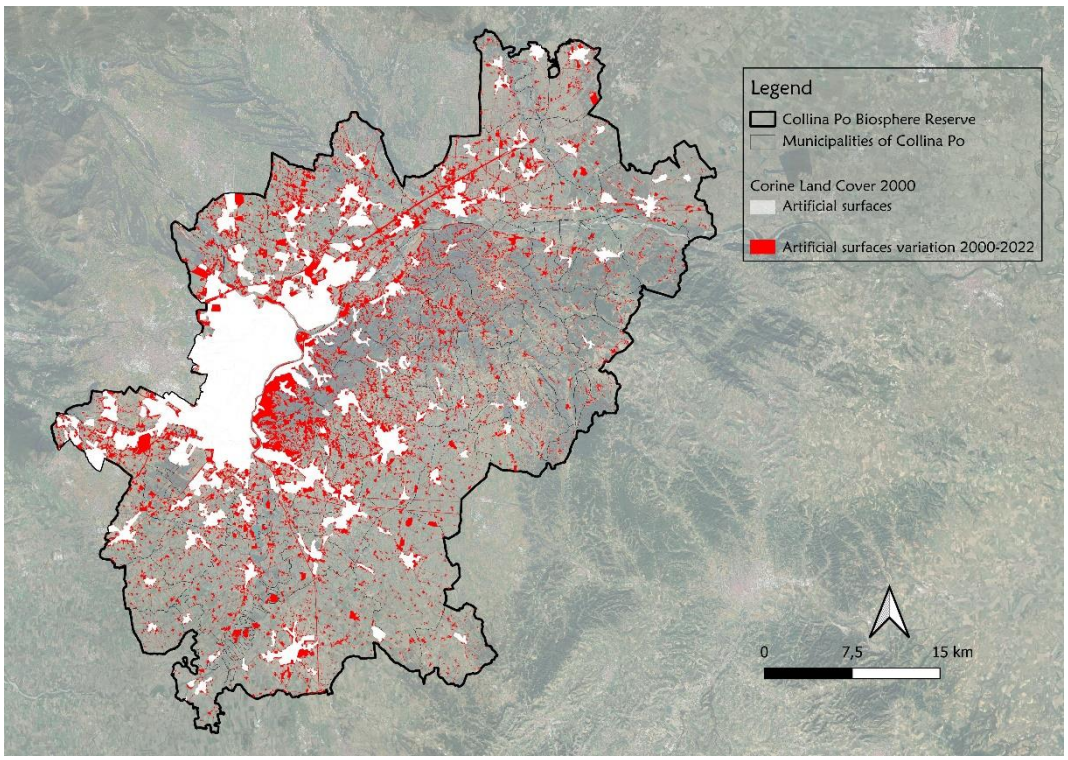


Figure 32: Soil consumption in CollinaPo (2000-2022)
Source: Author's elaboration based on data from Corine Land Cover (2000; 2022)

Among the various forms of land consumption highlighted in the previous analyses, it is essential to emphasize the specific role of transport infrastructure as both a driver and an amplifier of territorial transformation within the CollinaPo Biosphere Reserve.

Figure 33 illustrates the spatial configuration of road and railway networks, which exhibit a dense and hierarchical pattern radiating from the metropolitan

[58] Some infrastructural developments, particularly roads, industrial zones, and small settlements, might appear less prominent or only partially represented in the earlier datasets, not due to their recent creation, but rather owing to limitations in the resolution and classification accuracy of previous Corine Land Cover datasets. These limitations should be considered when interpreting temporal comparisons, as some land use changes might have been underrepresented in past data.

center of Turin. The infrastructural fabric is particularly intense along the Po River and in the western sector of the reserve, where urban expansion and industrial development have historically co-evolved with mobility infrastructures.

Conversely, the eastern hills remain comparatively less featured by infrastructures, a condition partly dictated by geomorphological constraints but also reflective of a relative persistence of seminatural systems.

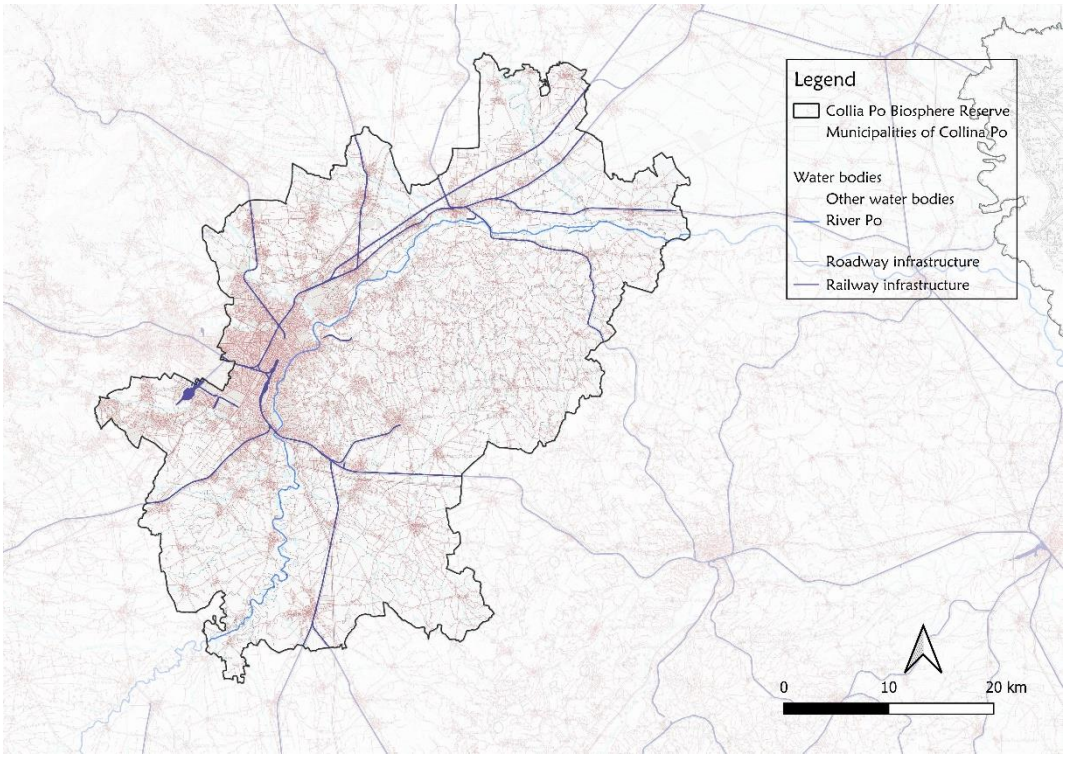


Figure 33: Railway and roads infrastructure in CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte

The implications of this framework are further compounded when considering the public transport network, visualized in Figure 34 through the density of bus stops per square kilometer. The distribution evidences a pronounced centrality of Turin, where the highest densities ensure widespread coverage and mobility opportunities. However, this provision thins out rapidly with increasing distance from the urban core, revealing a substantial deficit of public transport services in peri-urban, rural, and hilly municipalities within the reserve. Such disparities reinforce patterns of automobility dependence, particularly in ecologically sensitive areas where low service provision coincides with higher landscape vulnerability.

The infrastructural and transport asymmetries observed thus not only structure the spatial logic of urban expansion but also condition the intensity and spatial reach

of the building pressures, with direct repercussions on the integrity of ecological networks and the resilience of the reserve's landscape systems.

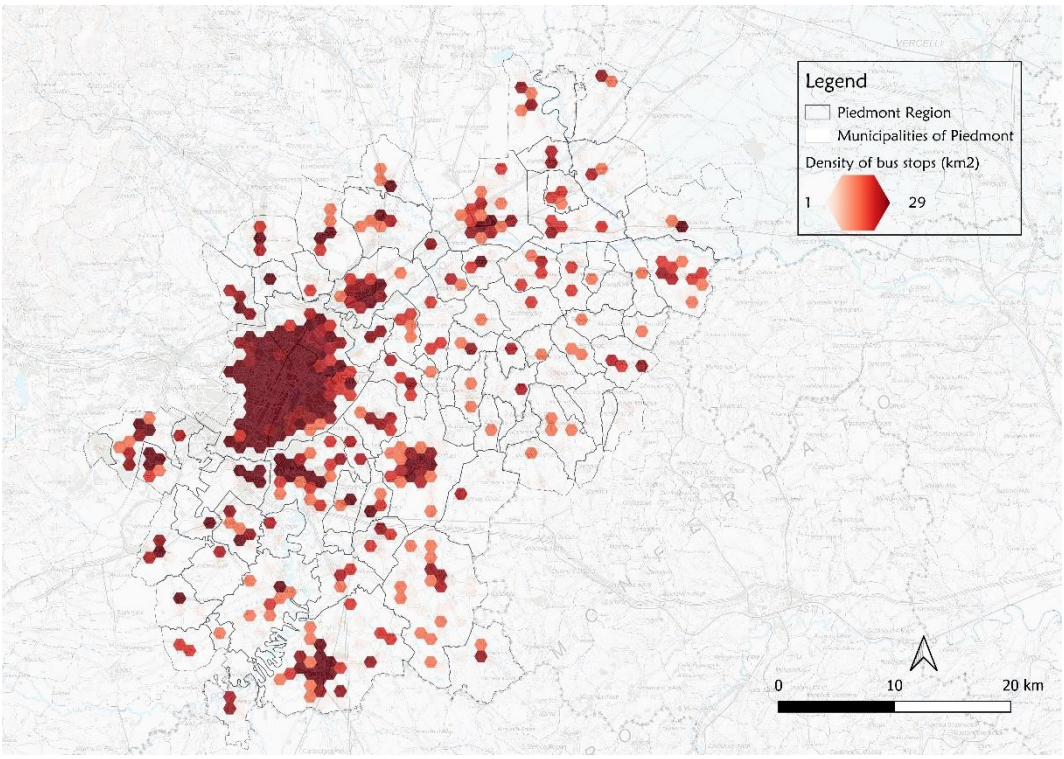


Figure 34: Density of bus stops in CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte

Finally, also considering that has been said above in the present Chapter, the conservation framework within the CollinaPo area is defined by a complex stratification of protection regimes that articulate at European, national, and regional scales.

As shown in Figure 35, this framework is structured primarily around the Natura 2000 network, established under the Habitats (92/43/EEC) and Birds (2009/147/EC) Directives, which delineate Sites of Community Importance (SCI/ZSC) and Special Protection Areas (SPA/ZPS) respectively. These designations introduce binding conservation requirements aimed at safeguarding habitats and species of European relevance, imposing constraints on land use that directly affect the planning and management of the reserve's territory.

At the national and regional levels, additional layers of protection are instituted under L.R. 2009/19 of the Piedmont Region, which defines the governance of protected areas, and under Law 394/1991, which formalizes the establishment of national and regional parks. The regulatory architecture is complemented by the

Cultural Heritage and Landscape Code (D.Lgs. 42/2004), which imposes further landscape conservation measures, particularly in areas of recognized environmental and historical value.

Therefore, BR is inscribed within a broad conservation system, aligning its core, buffer, and transition zones with existing statutory protections but without introducing additional regulatory constraints per se. The MAB designation is significant not because it replaces pre-existing legal protections, but rather because it situates them within an integrated vision of conservation and sustainable development.

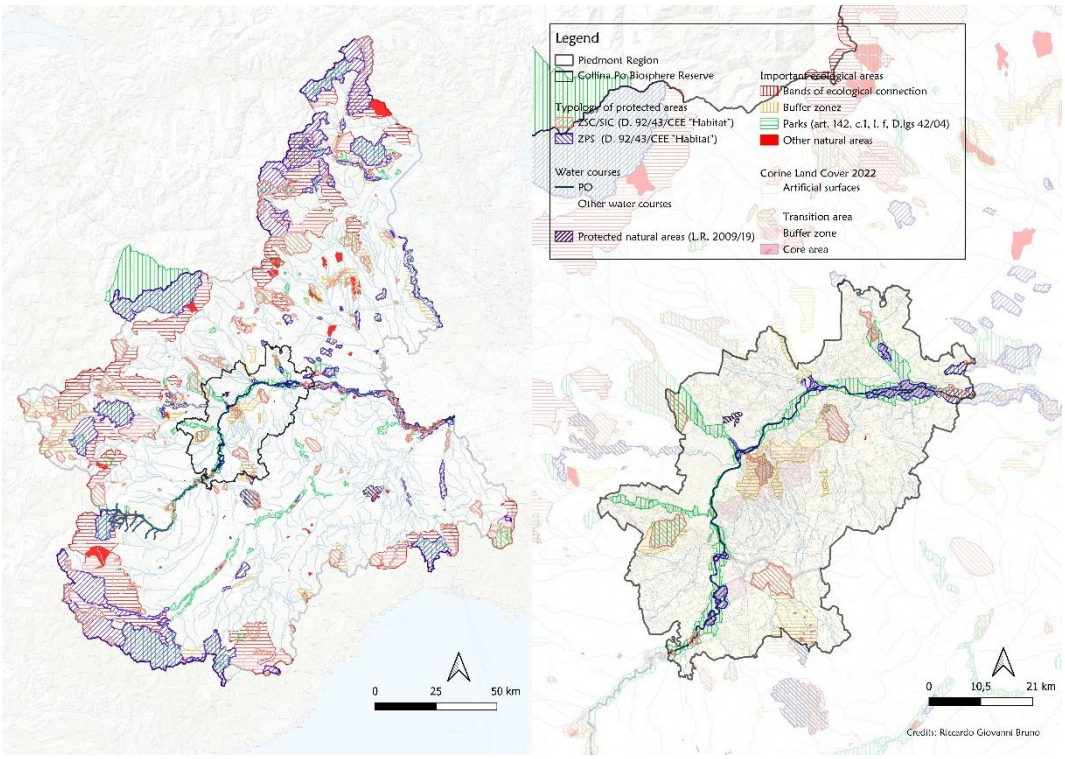


Figure 35: Parks and conservation programs in CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte

3.1.3. Demographic trends classification

The second group of classification concerns the demographic trends; to address this information, it is helpful to rely on the data produced by ISTAT.

Table 17 provides a comparative account of the demographic structure and dynamics of the provinces intersecting the CollinaPo BR, referring to the years 2002 and 2024[59].

The first panel (a) presents the Population age structure, capturing the distribution of the resident population across the three canonical age brackets: 0-14 years, 15-64 years, and 65+ years. The data reveals a progressive ageing of the population across all provinces. The share of people aged 0-14 has marginally but consistently contracted between 2002 and 2024, with Turin declining from 12.2% to 11.5%, while Vercelli reaches only 10.9% in the latter year. Simultaneously, the proportion of the 65+ cohort has expanded significantly, particularly in peripheral provinces: in Turin, from 20.0% to 26.4%, and in Vercelli, from 23.6% to 28.0%. This is coupled with a reduction in the working-age population (15-64 years) across all provinces, most notably in Turin, where it decreases from 67.8% to 62.1%. These shifts denote a structural transformation in the demographic profile, leading to a contraction of the productive age base and a corresponding increase in the share of elderly residents.

The second panel (b) reports on Population structure indicators, quantifying the implications of these age shifts through the Total Dependency Ratio, the Ageing Index, and the Average Age. The Total Dependency Ratio, which measures the number of dependents per 100 working-age residents, has increased across all provinces, indicating a mounting demographic burden on the active population. For Turin, the ratio rises from 47.4 to 61.0, while in Asti it reaches 62.9 in 2024, up from 55.9 in 2002. More striking is the trajectory of the Ageing Index, defined as the number of elderly residents per 100 youths. The index escalates sharply, particularly in Vercelli and Asti, both exceeding 240 in 2024, while Turin records 228.9, compared to 164.1 in 2002. The Average Age of the population follows this trajectory, increasing by approximately 4 years in all provinces, with Vercelli recording the highest at 48.8 years in 2024.

The final panel (c) presents Life expectancy at birth, disaggregated by gender. Between 2002 and 2024, male life expectancy has increased by approximately 4-5 years across all provinces, while female life expectancy has risen by 2-4 years. In Turin, male life expectancy grows from 77.4 to 81.9 years, and female from 83.1 to 85.7 years. Similar gains are registered in Cuneo, Asti, and Vercelli, aligning these territories with broader regional and national trends driven by healthcare improvements, socio-economic development, and lifestyle changes.

[59] Although the Metropolitan City of Turin encompasses most of the municipalities within the BR, the inclusion of all relevant provinces is necessary to ensure analytical completeness in the demographic assessment.

Taken together, these data delineate the contours of a profound demographic transition, characterized by population ageing, the contraction of youth group, and increased longevity.

Province	Population Age Structure as of January 1st 2025 (a)					
	2002			2024		
	0-14 years	15-64 years	65+ years	0-14 years	15-64 years	65+ years
Torino	12,2	67,8	20,0	11,5	62,1	26,4
Vercelli	11,4	65,1	23,6	10,9	61,1	28,0
Cuneo	13,4	65,3	21,3	12,6	62,4	25,1
Asti	11,6	64,2	24,3	11,3	61,4	27,3

Province	Population Structure Indicators as of January 1st 2025 (b)					
	2002			2024		
	Total Dependency Ratio	Ageing Index	Average age	Total Dependency Ratio	Ageing Index	Average age
Torino	47,4	164,1	43,8	61,0	228,9	47,8
Vercelli	53,7	207,3	45,4	63,7	256,5	48,8
Cuneo	53,1	159,6	43,6	60,3	199,6	46,7
Asti	55,9	209,2	45,7	62,9	241,9	48,3

Province	Life expectancy at birth (c)			
	2002		2024	
	Male	Female	Male	Female
Torino	77,4	83,1	81,9	85,7
Vercelli	76,3	81,3	80,4	84,7
Cuneo	76,7	82,4	81,7	85,6
Asti	76,9	82,8	80,9	85,6

Table 17: The demography of Provinces relevant to CollinaPo

Source: Author's elaboration based on data from ISTAT (2024)

Concerning CollinaPo's inhabitants, the area hosts almost 1,5 million people (ISTAT, 2024). The spatial distribution of the resident population in the BR (Figure 36) reveals a markedly polycentric settlement structure, characterized by a steep demographic gradient anchored on the metropolitan core of Turin, also following what was said in the previous Chapter.

The highest concentrations of population align with the urban fabric of Turin and its contiguous municipalities, forming a dense demographic agglomeration that coincides with the urban-industrial axis of the area.

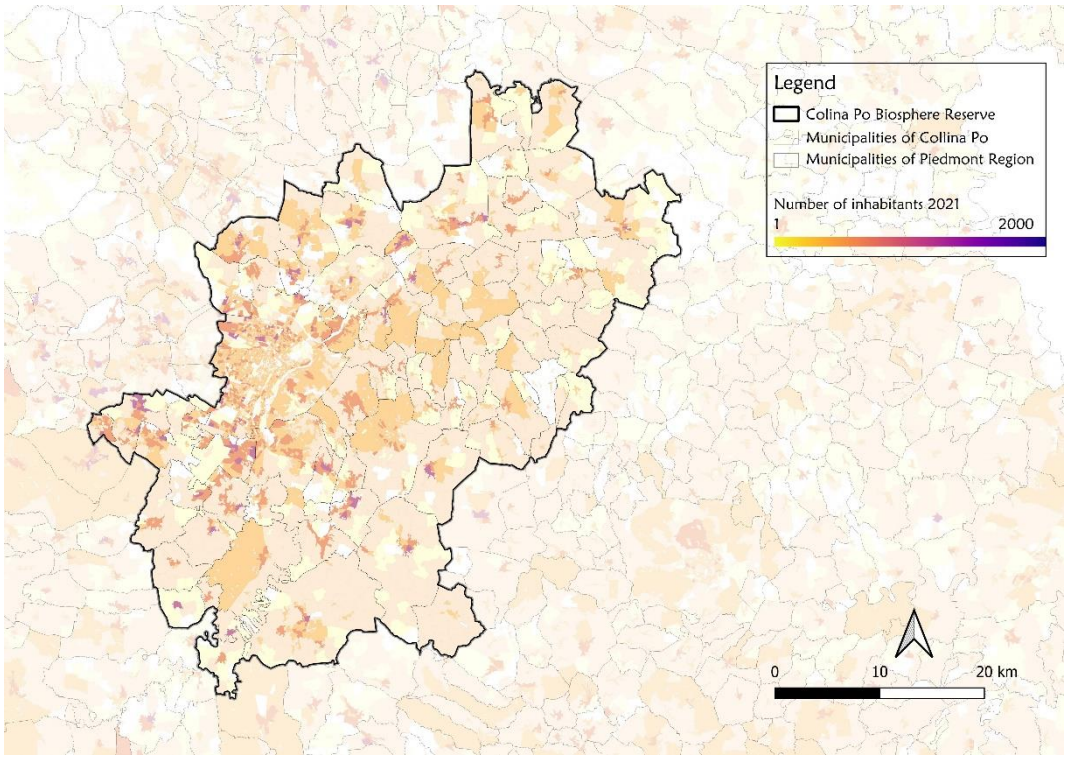


Figure 36: The population distribution in CollinaPo
Source: Author's elaboration based on data from ISTAT (2021)

The gradient of population density decreases progressively with distance from Turin, transitioning into the peri-urban space characterized by intermediate-density settlements, and further into low-density rural and hilly municipalities, particularly in the eastern and southern sectors of the BR.

The population rarefaction in these municipalities reflects not only geographical factors but also demographic regimes marked by aging populations and stark emigration rates. Indeed, although peripheral areas correspond spatially with zones

of increased topographic complexity and accessibility constraints, larger demographic trends are in place.

As represented in Figure 37, net internal migration presents a sharp concentration of positive balances in the metropolitan municipality of Turin, where the largest net inflows of residents from other Italian municipalities, not CollinaPo's ones only, are recorded. Several municipalities in the southern and western plains also show moderate positive balances, yet the trend is far less marked. In contrast, the hilly and marginal sectors of the reserve, especially in the eastern areas, are characterized by net negative internal migration, evidencing an overall loss of residents due to out-migration. While the data does not trace the precise origins and destinations of these movements, the occurrence of negative balances in these sectors reflects how these areas are particularly exposed to population decline and demographic contraction, tending to marginalization in regional development trajectories.

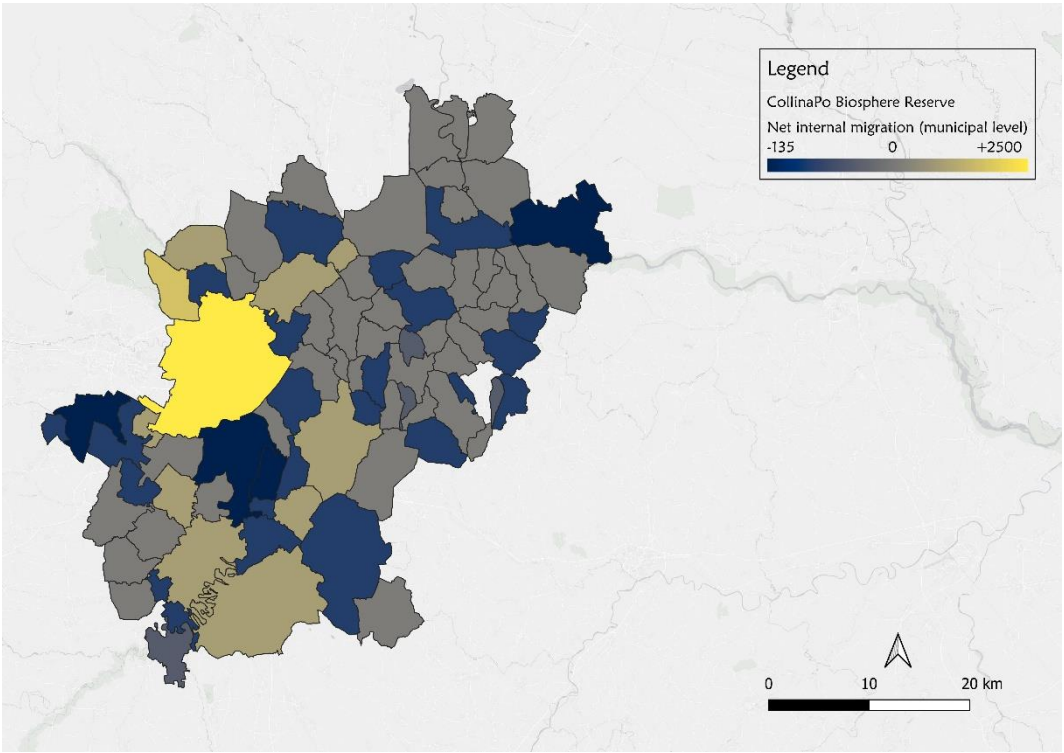


Figure 37: Net internal migration in CollinaPo (2015-2023)
Source: Author's elaboration based on data from ISTAT

The pattern of net foreign migration (Figure 38) is even more polarized. Turin alone accumulates a substantial positive balance, standing out as the primary entry point for international migrants within the BR. Surrounding municipalities register

either negligible gains or negative values, with the foreign presence concentrated almost exclusively in the urban core.

This organization underscores the role of Turin as a migration hub, where labor markets, educational institutions, and service infrastructures converge to attract and retain foreign populations. Peripheral and rural municipalities, by contrast, show a limited capacity to attract international migrants, a condition that further entrenches their demographic vulnerability.

Together, these dynamics define a spatial polarization of demographic growth, where both internal and foreign migration reinforce the centrality of the metropolitan area while peripheral sectors remain locked in processes of demographic decline.

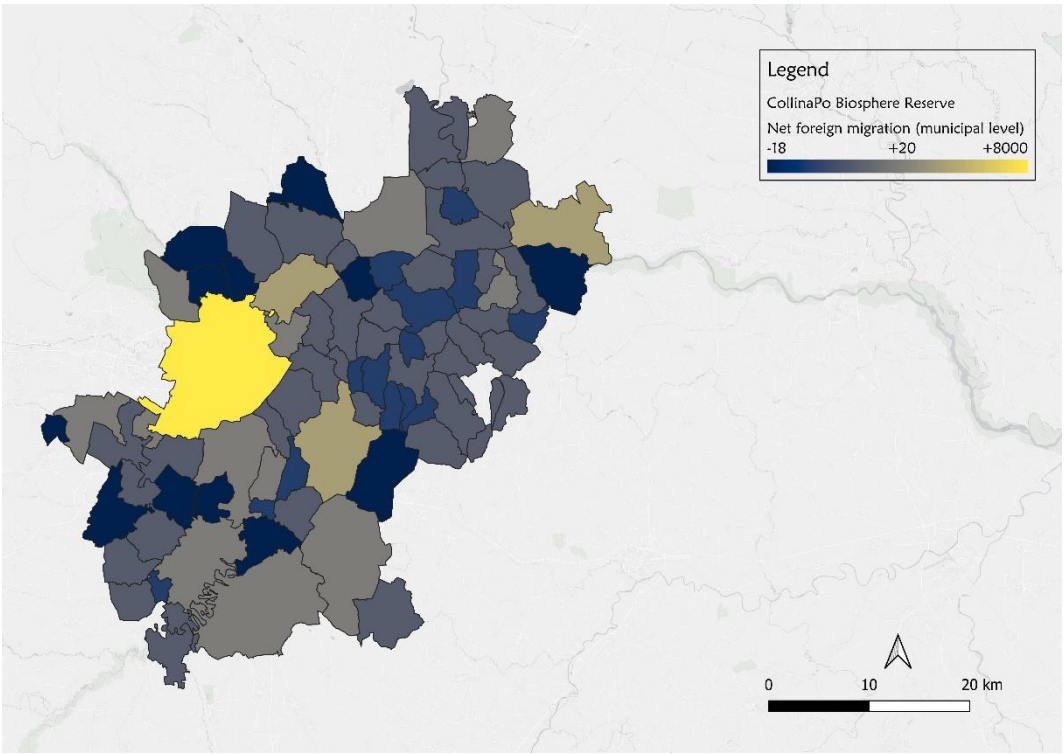


Figure 38: Net foreign migration in CollinaPo (2015-2023)
Source: Author's elaboration based on data from ISTAT

3.1.4. Socio-economic classification

Concerning the demographic classification, it is also relevant to take into consideration employment data.

The spatial distribution of employment rates within CollinaPo exhibits a distinct and internally differentiated pattern, as illustrated in Figure 39. The map presents

the employment rate for the year 2022, calculated as the share of the working-age population (15-64 years) that is employed in each municipality. The values range between 47% and 67%, with darker shades of blue indicating higher employment rates, while lighter tones, including yellows, correspond to lower levels of employment.

Loew employment rates are seen in the municipalities located in the hilly areas, if compared to the urban and peri-urban ones, that are closer to the city of Turin. While this spatial disparity could be superficially interpreted as indicative of weaker local labor markets, such an inference would be reductive without accounting for the demographic profile of the area inhabitants. Indeed, the resident population is composed of older individuals, a condition that, while not directly altering the denominator of the employment rate (calculated on the 15-64 age cohort), diminishes the absolute number of working-age residents within these territories. Considering that the active population declines in both relative and absolute terms, due to demographic ageing and youth outmigration, few individuals remain available.

This demographic composition is further intertwined with the functional specialization of these municipalities, which are not industrial poles or high-skilled labor demanding.

The limited diversification of the local economic framework, with a predominance of small-scale agricultural activities and low-density service provision, offers few employment opportunities capable of anchoring the working-age population *in situ*. Moreover, a significant share of the employed population is integrated into the labor markets of the Turin metropolitan area but remains statistically invisible within the employment rates of their municipalities of residence.

In this light, the discussed employment rate describes not only the economic framework, but also the deeper socio-demographic and territorial processes that shape the BR.

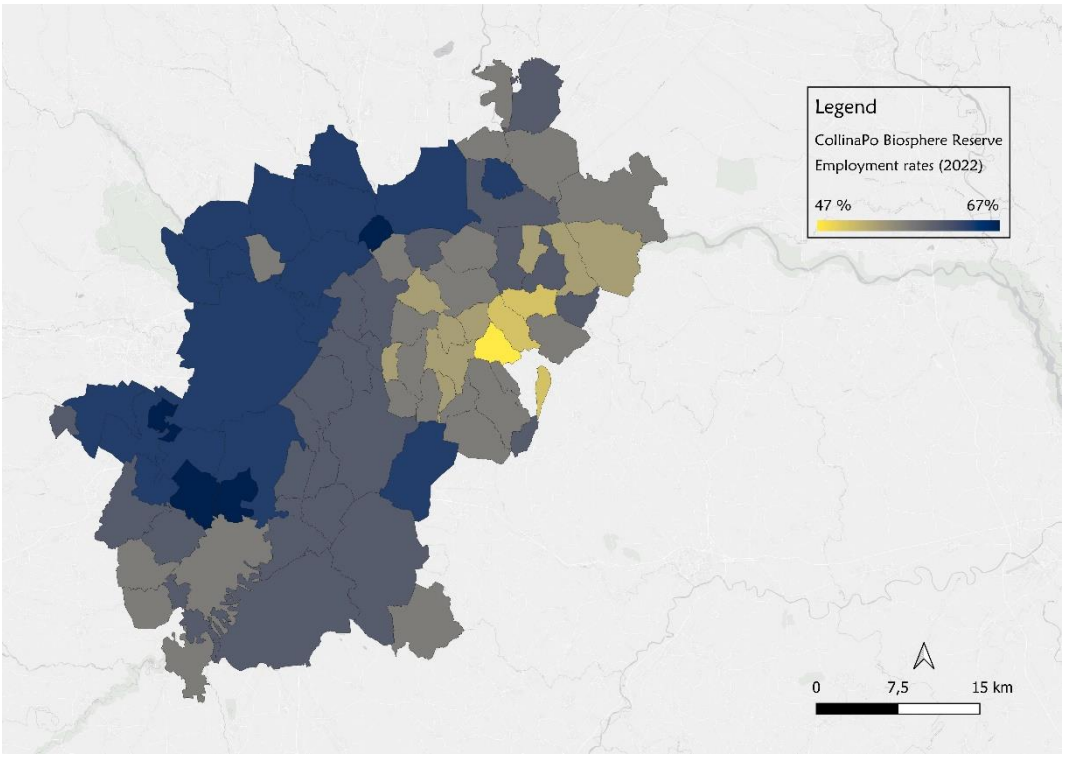


Figure 39: Employment rates in CollinaPo
Source: Author's elaboration based on data from IlSole24Ore (2022)

The sectoral distribution of employment across the Provinces intersecting the CollinaPo Biosphere Reserve, as presented in Figure 40 and based on data from ISTAT, reveals a pronounced regional asymmetry in both the absolute volume of employment and the nature of economic specialization.

Turin's area overwhelmingly concentrates employment across all sectors, reflecting its role as the principal metropolitan centre and the economic core of the region. The services sector, in particular, accounts for the largest share of employment, with nearly 680,000 employed individuals in Turin's province only, significantly exceeding those recorded in Cuneo, Vercelli, and Asti.

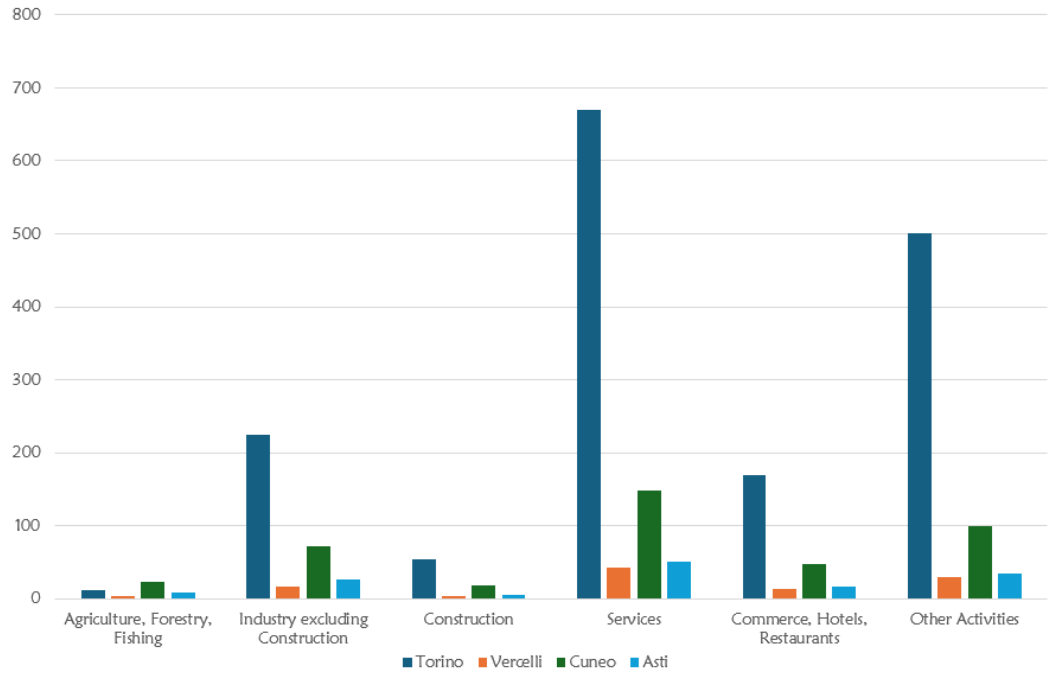


Figure 40: Employment in Provinces relevant to CollinaPo (thousands of workers) (2023)
Source: Author's elaboration based on data from ISTAT

The industrial sector, excluding construction, displays a similar spatial polarization. Turin leads with over 220,000 employed individuals, while Cuneo follows with a comparatively smaller but still significant industrial base exceeding 100,000 units. In contrast, the provinces of Vercelli and Asti maintain more marginal industrial sectors, reflecting their more peripheral economic positioning.

The primary sector, encompassing agriculture, forestry, and fishing, sustains low employment levels across all provinces, with no province surpassing 20,000 units. Nevertheless, Cuneo and Asti exhibit marginally higher proportions within this sector, attributable to the persistence of agrarian activities in the more rural areas of these provinces.

It is essential, however, to qualify these provincial-level data in light of the territorial configuration of the CollinaPo Biosphere Reserve itself. The reserve's boundaries do not align with provincial demarcations: within CollinaPo, the province of Turin is extensively represented through the inclusion of a large number of its municipalities. By contrast, the BR incorporates only one municipality from Cuneo, eleven from Asti, and three from Vercelli. This uneven territorial representation introduces a bias in the comparative interpretation of the data, as the provincial data reflects employment volumes across the entirety of each province rather than the specific portions contained within the reserve.

Despite this intrinsic limitation, data remains a critical reference point for situating CollinaPo within the broader regional economic context. Turin emerges as highly dominant in shaping employment patterns and sectoral specialization, dynamics that inevitably permeate the socio-economic trajectories of the BR. Even if the aggregates over-represent territories marginally encompassed by CollinaPo, they provide essential insights into the gravitational calling exerted by the urban core, the functional dependence of the surrounding areas, and the spatial inequalities embedded within the BR's fragmented geography.

If also considering the spatial distribution of income within CollinaPo, as depicted in Figure 41, a structured yet internally differentiated socio-economic framework is revealed. Analyzing the data of *Ministero dell'Economia e delle Finanze*, which present population's fiscal declarations of 2023, the average declared income per municipality is displayed, visually represented using a red color gradient to highlight income differences. Additionally, the number of taxpayers per municipality was compared against the local population, allowing for a percentage-based pie chart visualization of income across the territory.

Apparently, the average income per capita across municipalities ranges from €16,473 to €28,606, while the internal distribution of income classes, described by pie charts, exposes the socio-economic stratification within each locality. The highest income levels are concentrated in the first metropolitan belt of Turin, yielding per capita incomes above €27,000. In these areas, income distributions reveal a substantial presence of upper-middle and high-income groups.

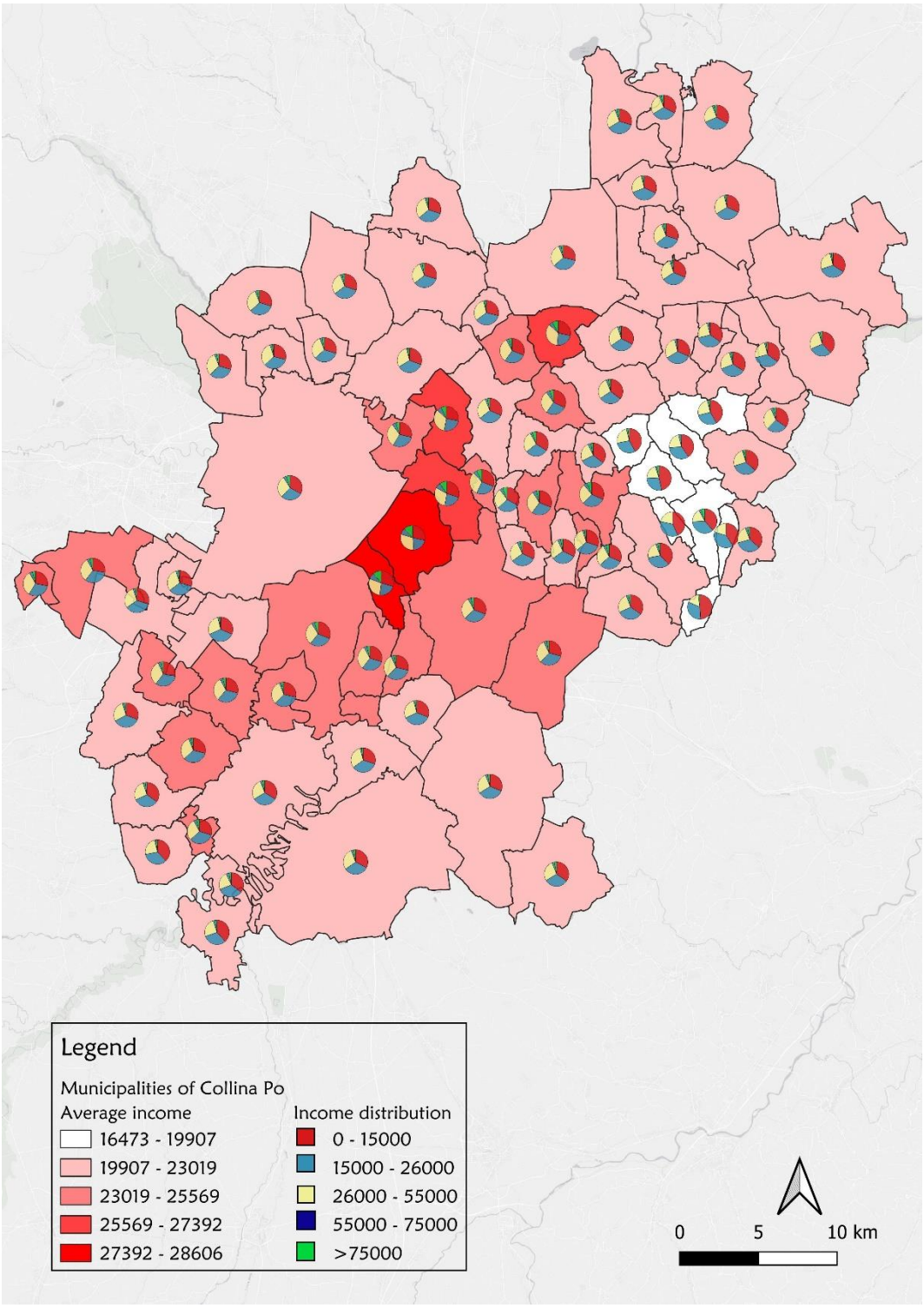


Figure 41: Average income and income distribution in CollinaPo's municipalities (2022)

Source: Author's elaboration based on data from MEF

Moving outward into peri-urban and semi-rural municipalities, average incomes decline steadily to ranges between €23,000 and €25,500, accompanied by a shift in the income structure towards lower-middle income brackets.

The hilly sectors, particularly within the *Collina Torinese*, exhibit a more complex pattern: here, average incomes remain moderately high relative to other peripheral areas, but this is less the result of local economic vitality than of selective residential settlement by affluent individuals, retirees, professionals, and entrepreneurs, whose income is largely generated outside the local context, predominantly from Turin.

This dynamic, associated with the environmental quality and desirability of the hills, has produced a socio-demographic profile that elevates average income indicators while masking significant internal disparities. Indeed, despite elevated averages, the income distributions in these municipalities reveal a substantial share of residents within the lowest income brackets, indicative of persistent local socio-economic vulnerabilities, often tied to residual agricultural economies or low-value service employment. In contrast, the eastern and southeastern rural plains of the reserve exhibit both lower average incomes and a more uniformly low-income structure.

The resulting income geography of CollinaPo thus reflects not only a metropolitan gradient but also the differentiated socio-economic trajectories of the hills versus the plains: the former characterized by income polarization and selective affluence, the latter by more homogenous, structurally low incomes.

4. Synthesis

This Chapter has situated the CollinaPo Biosphere Reserve within the broader institutional landscape of UNESCO, outlining what distinguishes the Man and the Biosphere Programme from other UNESCO initiatives. Unlike frameworks that are oriented toward preservation, the MAB Programme is defined by its experimental nature towards sustainable development and by its capacity to accommodate heterogeneous territories within a coherent perspective over environmental protection.

Understanding how CollinaPo performs the three core MAB functions, conservation, development, and logistic support, requires close attention to its governance structure and territorial organisation.

The Chapter sought to classify the territory of CollinaPo; this presents a highly stratified morphology. The geomorphological gradient is matched by a dense fluvial system which constitutes the ecological backbone of the Reserve but also exposes

it to considerable environmental risks. Land cover reflects a complex mosaic of artificial surfaces, productive landscapes, forests, and residual ecosystems.

Demographically, the area shows advanced ageing, shrinking youth cohorts, and a population structure increasingly marked by selective residential patterns.

The socio-economic structure of the Reserve is closely tied to the metropolitan gravity of Turin, which shapes labour markets, mobility patterns, and functional asymmetries across the territory. The institutional architecture, while articulated and proactive, remains exposed to discontinuity due to political turnover and the absence of binding planning instruments.

VI. A territorial food systems approach

1. Introduction

Building on the spatial and demographic classification of Turin's CRFS developed in Chapter V, with particular attention to the Biosphere Reserve designation of CollinaPo, this Chapter now turns to the study of the food system itself.

This corresponds to the second pillar of the FAO's City-Region Food System (CRFS) framework, which calls for a systematic assessment of the food system of the selected city-region. The Chapter opens the way to investigate how the food system in CollinaPo is structured and operates, and what specific challenges and opportunities it presents.

At the theoretical level, this reflection raises a broader question concerning the true goal of a food system study. Indeed, moving beyond quantitative understandings only, there emerge the need of connecting interdependences, vulnerabilities, and potential levers of intervention.

Within this framing, the notion of resilience emerges as a key concept to be explored. Resilience, understood as the capacity of food systems to absorb shocks, adapt to new conditions, and maintain essential functions while undergoing transformation if required, offers a promising lens to connect empirical description with normative reflections.

It opens the possibility of examining how CollinaPo's food system can be interpreted as both a socioecological structure and a governable system, and what role resilience may play in shaping policies that address uncertainty and changes.

2. Understanding the food systems approach

The extent and boundaries of the City-Region Food System (CRFS) have been widely debated, particularly concerning the possible delimitation of the Turin city-region and its focal area, CollinaPo. Having addressed these spatial considerations, it is now crucial to delve into the theoretical and empirical understanding of the food system itself.

Also relying on what has been presented in Chapter III, I now deepen the reflection concerning the CRFS Program in relation to its rooting in a "Food Systems Approach", which provides a holistic perspective on food production, distribution, and consumption within a city-region. As outlined in the FAO document *Building Resilient and Sustainable City Region Food Systems – Assessment and planning handbook*,

"the food system encompasses the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption, and disposal of food products that originate from agriculture, forestry, or fisheries, and parts of the broader economic, societal, and natural environments in which they are embedded" (FAO, 2023, p. 7).

The food system thus integrates multiple subsystems, such as farming, waste management, and input supply, and is intrinsically connected to broader infrastructures, including energy, public transportation, communication networks, road systems, and healthcare services. Particularly, this systemic perspective recognizes that multiple connections exist at once, and that disruptions or changes in one component of the food system have ripple effects on other interconnected domains (Béné, 2020).

Not only, while some still consider food systems and food supply chains synonymously, the food systems' connotation differs significantly from the linear nature of food chains. It emphasizes a nonlinear framework that captures the complex and dynamic interactions within the system (Béné & et al., 2019). Indeed, a system does not tend to fixity; rather, it emerges as a structured grouping of interacting or interrelated entities that form a unified whole, delineated by its spatial and temporal boundaries, surrounded and influenced by its environment (von Bertalanffy, 1968).

According to Goodman, the agri-food sector systemically operates within, and is influenced by, the social, political, economic, and environmental context (1997). Brock further elaborates on this, by counting the diverse set of institutions, technologies, and practices that govern how food is marketed, processed, transported, accessed, and consumed (2023). This comprehensive network of food-related processes addresses not only what is being consumed and how it is produced and acquired, but also who is able to eat and how nutritious their food is, thereby expanding the implications of food-related processes to a systemic conceptualization of those processes.

This understanding paves the way to the urgence of moving beyond merely acknowledging that food is composed of more than some streamlined parts, but also

beyond simply acquainting the interconnections between multiple elements. Rather, it is now crucial to recognize the ripple effects that one part may have on another.

In other words, the success of the food system approach regards providing a structured methodology to drive change adopting a multiple perspective. The fundamental advantage lies in its ability to identify entry points for change and opportunities for synergetic interventions toward more sustainable food systems (Dekeyser, Rampa, D'Alessandro, & Bizzotto Molina, 2020). Rather than applying isolated, sector-specific solutions, this approach enhances what has been called the "menu of opportunities" (Ruben, Verhagen, & Plaisier, 2018), toward an overall higher sustainability. By examining food systems holistically, policymakers and practitioners should uncover more effective leverage points where interventions yield the greatest impact, fostering systemic improvements of sustainability rather than localized fixes.

Nonetheless, although the efforts to understand and implement a more sustainable food system approach are surely noble, the goal is particularly problematic (von Braun, Afsana, Fresco, Hag Ali Hassan, & Torero, 2023). Several issues hinder the success, because not all goals are pursuable at once.

Among others, food systems must balance productivity with ecological integrity, ensuring economic viability while maintaining social equity. These dimensions often come into tension, making it difficult to implement policies that address sustainability as holistically as prospected.

For these reasons, the following discussion will critically engage with these complexities, exploring how different sustainability frameworks conceptualize and address these tensions.

2.1. Sustainable and resilient food systems

As displayed in Chapter III, FAO, in the framework of CRFS, conceptualizes sustainable food systems (SFS) as the successful intersection of economic, social, and environmental dimensions, emphasizing their interdependence in shaping food system outcomes (FAO, 2018). Moreover, it should guarantee stable access to nutritious food for all while safeguarding the ability of future generations to do the same. It should maintain economic viability, foster social well-being by ensuring fair distribution of benefits, and operate within ecological limits, minimizing environmental harm and promoting regeneration (FAO, 2023).

Nonetheless, aside FAO and other institutional bodies' efforts to clearly affirm what defines the sustainability in food systems, "there is no consensus on the definition" yet (Even, Thi Minh Thai, Thi Mai Pham, & Béné, 2024, p. 2); especially due to the "the inherent political nature of food system (un)sustainability,

with corporate power and institutional deficiencies creating foundational barriers" (Ivi, p. 12), sustainability remains a contested concept, interpreted differently across disciplines, each emphasizing distinct dimensions and intervention strategies (Béné, et al., 2019).

These variations do not depend on epistemological and methodological differences, or not only at least; rather, they are due to deeper differences in how food systems are understood and addressed according to disciplines. In carrying out this reflection, it is particularly helpful to rely once again on Béné et al.'s work (2019), because it set the moving principles of each discipline's interest in food systems sustainability successfully.

Agriculture, for example, tends to frame sustainability through an ecological lens, focusing on the depletion of natural resources and environmental degradation resulting from food production. This perspective has led to the promotion of "sustainable intensification", where productivity gains are sought following a useful guiding principle, therefore without exacerbating environmental damage (Pretty, 2008; Thompson & Scoones, 2009). This notion attempts to affirm that productivity in agriculture can be boosted at no expense of the system, finally reconciling competing objectives within this sector (Dubé, Webb, Arora, & & Pingali, 2014). However, the implicit assumption that intensification can coexist with sustainability is highly contestable, particularly when issues of biodiversity loss, soil depletion, and the ecological limits of intensified production systems are considered (Pretty & Bharucha, 2014)

In contrast, the field of nutrition has often left aside the systemic food system changes, operating within a narrower framework where sustainability is rarely problematized (Belarmino, et al., 2024). When considered, it is primarily from an environmental standpoint or as a factor influencing household-level resilience and capacity to sustain nutritional innovations (Ruel, Quisumbing, & Balagamwala, 2018). This sector's focus on health outcomes often isolates nutrition from broader systemic transformations, aiming to affirm that health issues do not engage with other food systems' conditions, despite mounting evidence that food system changes are among the primary drivers of malnutrition and diet-related diseases (Madzorera, et al., 2021).

Thirdly, the literature concerning the socio-ecological perspective seems to offer a more comprehensive lens, acknowledging the interplay between environmental sustainability, economic structures, and social inequalities (Duncan & Bailey, 2017). This perspective recognizes how global environmental change, intertwined with political and economic shifts, has placed unprecedented stress on food security and system resilience. Unlike sector-specific approaches, this perspective urges a

more holistic conceptualization of food systems that transcends activity-based definitions and instead incorporates structural factors, feedback loops, and system vulnerabilities (Shucksmith & Brown, 2016). It critiques the fragmentation of sustainability debates, challenging that true resilience requires addressing the underlying drivers of food insecurity, power asymmetries, economic inequalities, and unsustainable production models, rather than merely optimizing existing systems (Jessop, Brenner, & Jones, 2008). However, despite its systemic breadth, the socio-ecological perspective is often criticized for its conceptual vagueness and difficulty in translating theory into concrete policy interventions. Its emphasis on complexity and structural change, while valuable, can risk strategic paralysis or overlook the practical constraints of institutional decision-making (Lambert-Peck & et al., 2024).

In this framework, Béné et al. address the specific role of economic and market-based analysis, which, although embracing nutrition as a fundamental criterion aside from the value chain approach (Gelli, et al., 2015), lack in strongly addressing environmental goals; while efforts to increase the supply of accessible, nutritious foods for vulnerable populations are central to this approach, the ecological trade-offs of different supply chain models remain an understudied area (Hatjiathanassiadou, Moura Rolim, & Seabra, 2023).

It also emerges how agroecology, partially relying on the socio-ecological perspective, is an effective framework to provide sufficiently expanded conceptualizations of sustainability, explicitly integrating ecological, social, and political dimensions (Anderson, Bruil, Chappell, Kiss, & Pimbert, 2021). Yet, it does not capture the complexities at stake. Indeed, it advocates for an alternative paradigm centered on food sovereignty, local knowledge, and diversified farming systems, aligning sustainability with social justice and ecological resilience; nonetheless, its feasibility remains unclear for similar reasons to the socio-ecological perspective's ones (Guzmán, López, Román, & M. Alonso, 2013); the issue stands on the misalignment between targeted goals and ongoing realities.

A recurring feature regards the intention of sustainable food systems' studies to emphasize and constrain specific goals more than others. Sustainability is often presented as a measurable state, attainable through compliance with fixed components, although different according to the framework of selection. In this formulation, sustainability functions as the result of a programmable intervention that relies on institutions, businesses, and policymakers which set targets, monitor progress, and enforce corrective measures (Sala, Ciuffo, & Nijkamp, 2015).

However, the assumption according to which sustainability can be fully captured within a set of reachable thresholds fails to account for the systemic and processual

nature of the challenges it seeks to address, and the unique factors that characterize the context.

Food systems instead operate locally within highly variable socio-environmental conditions, influenced by a large spectrum of connected yet unstable features (Béné, 2020), but sustainability models, while conceived as general and ostensibly transferable across contexts, in practice reproduce an overly reductive reading of reality by aggregating heterogeneous conditions into standardized categories.

This tendency rests on two interrelated issues. First, it stems from the application of generalized and ostensibly context-neutral models that compress heterogeneous territorial conditions into aggregated categories, thereby obscuring the role of place-specific features. Second, by defining sustainability as a fixed endpoint, these approaches assume that once a system meets predefined benchmarks it can be considered as finite. This assumption, however, is at odds with the non-equilibrium dynamics of food systems, which are characterized by continuous change, adaptation, and mutation (Worstell & Green, 2017).

As a consequence, rigid definitions of sustainability often result in selective compliance, where actors optimize within existing regulatory parameters without addressing underlying structural inefficiencies (Wijen & Flowers, 2023). The ongoing widespread reliance on technical sustainability assessments exemplifies this issue: while these models provide quantifiable insights into the understanding of more sustainable parts, they inherently prioritize certain more achievable variables while overlooking others, leading to a biased representation of the system's sustainability (Ekvall, Assefa, Björklund, Eriksson, & Finnveden, 2007).

Conversely, it is necessary to outline that, in cases where sustainability is so crucial that ongoing realities cannot achieve it, it functions more as a discursive framework, allowing different stakeholders to interpret and apply it in ways that align with their operational goals (Kochkina, Macchia, & Floris, 2024). This flexibility surely allows wide application; however, the selection of preferred goals leads to inconsistent implementation, finally being deficient in ensuring overarching sustainable food systems.

In this formulation, sustainability does not operate as a clear standard but as a strategic concept that can be shaped according to institutional or market priorities. The prevalence of self-regulated sustainability initiatives illustrates this tendency: corporations and policymakers commit to sustainability goals while maintaining operational practices that remain fundamentally unchanged (Bîzoi & Bîzoi, 2025). Although not problematic per se, this situation makes it highly impossible to understand the overall path toward sustainability; indeed, if multiple, but

autonomous, strategies are developed, there is lack of consistency, with no overall picture that grasps the large-scale efforts' effectiveness.

This troubled duality, sustainability as a rigid compliance framework versus sustainability as an open-ended commitment, raises the question of whether sustainability should be treated as the objective or else.

If sustainability is defined as an end goal, it implies that systems can reach a condition of long-term finite success, provided that specific interventions and efficiency measures are adopted. However, empirical evidence from food systems and environmental governance suggest that this target is not achievable per se (Tendall, et al., 2015). The operational constraints behind food systems' functioning indicate that they cannot remain sustainable indefinitely without mechanisms for continuous recalibration. Sustainability, therefore, does not function as an outcome, but rather as a gathering of conditions that allows the system to resist and adapt to environmental, economic, and social mutations while maintaining critical functions (Rimhanen, Aakkula, Aro, & Rikkonen, 2023).

Understanding sustainability as a dynamic measure of overall performance, rather than a fixed end goal, enables a more accurate evaluation of how systems function under changing conditions and how they can be optimized for long-term viability (Zurek & et al., 2022).

Therefore, in the framework of food systems transformation, sustainability shall not regard the ability to meet present goals without compromising future capacities (Tendall, et al., 2015), or it can surely do it, but aside from celebratory disclaimers; rather, it should address the stable maintenance of the critical system functions, also in times of stresses. Hence, sustainable food systems are better understood in terms of resilience.

Defined as "the resistance or rapid recovery of system interrelationships and functions after perturbation" (Oliver & et al., 2018, p. 2), resilience represents the actionable expression of food systems: also described in the FAO works (FAO, 2023), it consists in the capacity to absorb shocks, adapt to change, and reorganize without compromising core functions. Unlike traditional sustainability models that seek to maintain an idealized environmental balance, resilience as a concept acknowledges the intrinsic dynamism of food systems, recognizing that disruptions, whether economic, ecological, or political, are not exceptions but inevitable realities (Doherty, Ensor, Heron, & Prado, 2019). A resilience-based approach, strongly built on a framework of sustainability, shifts the focus from protection to transformation, meaning to ensure that food systems can navigate crises (Allen & Prosperi, 2016).

The literature points to several foundational capacities that underpin resilience: the ability to resist disturbance, robustness, the availability of alternatives, defined redundancy, the speed and flexibility of response, reactivity, and the capacity to reorganize and recover, also called adaptability (Tendall, et al., 2015; Anderies, Folke, Walker, & Ostrom, 2013). Clearly, while these traits are valuable, framing resilience purely in technical or functional terms does not see the political dimensions involved (Soubry & Sherren, 2022).

What must be challenged is not only the tendency to naturalize crisis responses, but also the way resilience discourses obscure the political nature of systems' vulnerabilities. By framing disruptions as a matter of system performance or adaptation, there are risks of shifting attention away from the structural conditions that make shocks happening.

More detailly, the issue behind this lens is the responsibility's acknowledgment: food systems' crises are treated as external shocks to be managed, rather than symptoms of deeper systemic failures. Without a clear political commitment to justice and accountability, resilience becomes once again a convenient narrative that maintains the status quo while presenting itself as progressive (Soubry & Sherren, 2022). It is therefore vital to ask: whose resilience is being protected? Who decides what should be preserved, and who absorbs the cost when systems are pushed to their limits (Oliver & et al., 2018)?

These are not rhetorical questions; rather, they mean to address resilience as a political project: one that must be situated within broader struggles over power, access, and legitimacy. Considering that disruptions interact with, and amplify, each other, they contribute to revealing structural vulnerabilities that often remain hidden in times of stability. But this raises a pressing question: in case of stress, should the system's goal be to return to a prior state, or to use disruption as a catalyst for redesigning systems that are more just, inclusive, and responsive (Bullock & al., 2017)?

A critical issue lies in determining the unit of concern. Are the resolutive actions to shocks sought for the soil, the supply chain, the consumer, or the system as a whole? Considering that interventions are often geared toward preserving specific functions or protecting few actors, without considering broader societal outcomes, from a societal viewpoint, it is not the continuity of individual activities that matters most, but the preservation of core outcomes, such as equitable access to nutritious food and environmental integrity. However, different actors will inevitably value different outcomes, and these perspectives frequently conflict.

This makes it crucial to ask not only how resilience is built, but what it is being built around. Much of the literature treated the issue as if the foundations of the

food system were stable and changes occurred in the food supply chains stages (Kan & Amin, 2024), finally explaining why much food research is limited to picturing the current scenario. But increasingly, what is confronted are not one-off disruptions, but deeper transformations in how the system functions. The structures and relationships that once sustained food systems, local production cycles, predictable routes, consumer demands, are shifting. These are not surface-level pressures; they signal a change in the very "drivers" of the system.

2.2. The role of drivers

Clarified the overarching goal of the present work in food systems studies, an initial statement over the fundamental issue at systems' resilience basis is necessary: food systems' lack of stability is not dependent on emergency shocks only; rather, it is an ongoing condition depending on intersecting and situated drivers that concur in shaping the very functioning of the system itself (Hamilton, et al., 2020). Still, much of the dominant political discourse addresses these drivers as discrete, often technical variables: climate events, market shifts, demographic trends. The assumption underlying this framing is that food systems are more or less stable entities, occasionally disrupted by extreme events from the outside.

What is faced, instead, are not isolated shocks, but structural continuous re-adjustments: there are multiple and connected processes that put into discussion food systems' solidity and test their resilience. This is not an historical condition of food systems; rather, it emerged as a new, but paradigmatic feature, in the recent globalization of food, where the detachment of food from its original places (Wiskerke, 2009), made it subjected to external and unpredictable forces.

Therefore, to understand food systems today is not to deal with food chains capability to resist huge, unexpected stresses, not only at least, but to grapple with how continuous in-system recent forces are producing, mediating, and transforming the food system (Tendall, et al., 2015), and with how people are resisting with these rapid fragmented transformations.

Several frameworks categorize the drivers of change in food systems into two broad types: endogenous drivers, which originate within the system itself (such as shifts in production practices, consumer demand, or institutional reform), and exogenous drivers, which stem from outside forces acting upon the system (such as climate shocks, pandemics, or geopolitical crises) (van Berkum, Dengerink, & Ruben, 2018; HLPE, 2017). Among others, Béné et al. define drivers as the "endogenous or exogenous processes that deliberately or unintentionally affect or influence a food system" (Béné & et al., 2020, p. 4).

This binomial appears, at first glance, both intuitive and useful. It maps neatly onto systems theory and lends itself to planning models where internal mechanisms can be optimized while external pressures are buffered against. However, the reasoning's solidity stands on a problematic assumption.

Aiming at defining which drivers are conceived as endogenous and which are, instead, exogenous, does not regard the topic of interest only; rather, it implies understanding what role the observer is playing in the moment the issue is approached. If it regards developing policies for the improvement of the food system, the matter is mostly strategic; if, instead, it concerns the broader reflections that can be retrieved, it is a problem of ontology.

Therefore, at first, it must be remembered that the ongoing entanglement of agri-food regimes with extractive economic systems, led by capitalist accumulation, makes it increasingly difficult to draw any hard distinction between "inside" and "outside" the food system (Pereira, Drimie, Maciejewski, Tonissen,, & Biggs, 2020). In detail, although some literature presents in-food systems processes as clearly endogenous, and larger events as evidently exogenous (Fanzo & Miachon, 2023), the two are not simply the outcome of self-contained processes within the food system, or independent ones emerging from elsewhere. Rather, they are the product of broader political economies, ideological constructions, colonial legacies, and systemic priorities that stretch far beyond the agricultural or food policy domains (Anderson, 2024).

This problematic contrast is particularly evident if considering political ecological discourses: there is a tendency to emphasize that most systemic pressures, ecological degradation, land use shifts, even climate instability are human-induced, and therefore somehow internal to the system of production and consumption (Singer, 2021). Therefore, all food systems' drivers are, in essence, endogenous, produced by the system.

Climate crisis is a paradigmatic example. Framed by food planners as an exogenous threat to food security, to which systems must adapt with greater resilience, for other scholars, instead, it is not an outside force acting upon food systems; rather, it is the outcome of agro-industrial expansion, of deforestation driven by commodity crops, of supply chains powered by fossil energy, and of land-use regimes forged through colonial extraction and contemporary neoliberal enclosure (Anderson, Bruil, Chappell, Kiss, & Pimbert, 2021).

In this sense, the food system is not simply affected by climate crisis; it is a core engine of it and, therefore, should lead to endogenizing climate crisis (Fanzo & Miachon, 2023). Similarly, elsewhere, global financial instability is set as exogenous to a municipal food economy, but many scholars define it tightly

coupled with the speculative logics of agri-commodities, land grabbing, and corporate consolidation processes that affect urban areas where retailers acquire power (Voicu, 2022); in this sense, the economic context becomes fully part of the food system.

None of these views are incorrect; yet both discourses are often mobilized through partial vantage points. On one side, the political ecology tends to flatten the causal terrain: the food system appears self-contained, and its vulnerabilities are attributed to generalized human agency rather than to clearly identifiable political-economic structures. This produces a narrative that is ultimately misleading; it implicitly affirms that there are few or no actionable transformative choices capable of dismantling reality. On the other side, planners and practitioners often treat drivers as external constraints or as technical parameters to optimize around, as partially discussed above.

The first overemphasizes large-scale dynamics, effectively dismissing the capacity of local actors to shape transformative processes. The second, conversely, justifies local disengagement by portraying structural forces as fixed realities, elements that lie inherently outside the sphere of local agency. In the end, both frameworks risk considering local governance not as potentially disruptive, but as fundamentally adaptive, and, therefore, not capable of positive changes.

Treating a driver as exogenous or endogenous is not a neutral act, but a methodological and, consequently, political decision that shapes how responsibility is distributed, and which structures can be challenged. As also affirmed by Kretschmer and Kahl, drivers "are often portrayed as almighty and inevitable trends shaping food systems" (2021, p. 2). Nonetheless, they are not objective facts but products of interpretation; they emerge from the perspectives of the actors involved.

A way out might emerge if approaching the issue from a perspective that does not aim at reifying the endogenous/exogenous divide, but, rather, addresses drivers as relative to the viewer's positionality. Therefore, in this sense, the internal/external divide is less a reflection of the system's structure than a reflection of the framing choices. It depends on the scale of observation, the analytical boundaries that are drawn, and the institutional lens through which the system is viewed (Leeuwis, Boogaard, & Atta-Krah, 2021).

I do not intend to fully dismantle the distinction between endogenous and exogenous drivers; it surely retains relevance, but not per se. It emerges as significant if dealing with the food systems' comprehension at multiple possible scales. Local policymakers indeed cannot govern climate change, trade wars, or global capital flows; yet they can design strategies to mitigate their impact. From this perspective, it is both methodologically and politically meaningful to treat some

drivers as effectively exogenous to the system under observation. Nonetheless, this shall occur not because they are ontologically "outside", but because they exceed the governance scope of the selected system of intervention.

This relative exogeneity is not a fixed property but a contextual condition, dependent on the selected scale at consideration. The territorial dimension discussed so far becomes decisive, as drivers gain relevance not because of their presumed validity, but because of their capacity to provide the most accurate and situated representation of the conditions shaping the specific context of interest.

What is endogenous to a national food policy system might be exogenous to a UFP; what is endogenous to a global supply chain's logistics might be exogenous to a CRFS' framework of intervention. It emerges how this division between endogenous and exogenous drivers is not just a descriptive tool; it actively shapes how resilience is defined and pursued. When disruptions are framed as external shocks acting upon an otherwise functional system, resilience tends to be cast in technical terms: focused on restoring stability. This framing moves aside the political and structural roots of vulnerability.

Conversely, when drivers are understood as relational and embedded in an actionable scale, resilience can no longer be seen as a neutral property. It becomes a political choice and, if not aiming at transformation, it bears responsibility.

By structuring drivers into broader categories, the framework prevents the analytical scope from becoming too narrow or overly specialized, which is essential for capturing the interdependencies inherent in food systems (David-Benz, Sirdey, Deshons, Orbell, & Herlant, 2022). This is of high importance because drivers cannot be assumed to be uniform across contexts (Dengerink, Dirks, Likoko, & Guijt, 2021). Their structure regards processes that, as discussed above, are dependent on contextual territorial factors.

Ultimately, it is possible to affirm that categories, over larger frameworks, exist, but the choice of the relevant drivers to consider depends on the context to investigate.

3. Some key issues in standard food systems' mapping

Having clarified the interpretation of drivers that is relevant for the present study, it becomes necessary to specify the components of the food system that are going to be investigated in this work.

Drivers, as previously discussed, provide the structural horizon that conditions the system over time, but obviously they do not describe how food effectively exists within the CRFS.

This work adopts inductive methodology to structure an indicator-based framework of the food processes that remain grounded in the CRFS reference models while also responding to the contextual specificities of the case (FAO, 2023). Nevertheless, while the CRFS methodology proposes the definition of expected outcomes and related issues to be measured for each priority area (FAO, 2023; FAO, 2018), this study departs from that pathway. As previously discussed, identifying a predefined set of desired outcomes or "most significant" frameworks to address proves problematic. Consequently, stages to study acquire relevance insofar as they address concrete aspects of the system that are significant throughout the investigation.

In methodological terms, this orientation translates into a research design articulated into three interconnected parts which are not assumed to be relevant in themselves, but which acquire meaning because of their significance in CollinaPo. It is precisely at this point that the present analysis departs from much of the existing literature: the food system of CollinaPo is not examined according to a predefined template of what a food system study should include, nor through a prescriptive set of categories that claim universal validity. Rather, the approach adopted here is explicitly contextual and pragmatic, recognizing that the complexity of food systems makes it impossible to define once and for all the domains that deserve attention. The choice of what to investigate is therefore inevitably dependent on the availability and reliability of data, as well as on the capacity of those data to illuminate the case under study.

In this sense, the inquiry acknowledges the major categories that the literature considers pivotal for understanding food systems, hereby gathered within the drivers, the supply chain and the political stances, but it does not assert which indicators are the most relevant *per se*. Rather, it builds significance inductively, working with the elements that can be empirically traced in CollinaPo and that enable a meaningful understanding of CRFS dynamics in the context of study.

Therefore, the first part is dedicated to the analysis of the food system drivers, considered as structuring forces that condition processes over time and space. The second part turns to the food system itself, in which the conceptual apparatus is likewise paired with direct empirical observation of CollinaPo's dynamics, structures, and interactions. The third part addresses the political stances currently in place, offering a picture of the issues and attempts of change that are relevant to shape CollinaPo food system's possible governance.

All three parts are conceived not as sequential or isolated exercises but as complementary dimensions of a single process of inquiry, where theoretical reflection and empirical grounding constantly inform and reshape one another. This

avoids both abstract determinism and mere descriptivism, privileging a flexible, context-responsive methodology capable of capturing the specific reality of the system.

What is taken as significant in this study may not coincide with what others prioritize, but this is precisely the point: by grounding the analysis in CollinaPo's specific reality, the work remains situated while still advancing the broader objective of clarifying what sustains the resilience of food systems. To deepen this contextual grounding, the investigation also intersects quantitative data with insights from non-structured interviews conducted with actors and experts who hold direct knowledge of the components under scrutiny, thereby enriching the study with perspectives that capture dimensions often invisible in official statistics[60].

Annex E displays the scheme of the CollinaPo food system.

3.1. The drivers of CollinaPo's food system

It is now clear that analyzing drivers is necessary to understand what contributes to food system resilience, but this alone is not sufficient. These forces, however systemic, do not act in isolation or from a distance; they acquire significance only

[60] In addition to secondary data collection and desk research, applied primarily to the analysis of drivers and political dimensions, the methodology for the food system component integrates primary data collection and a purely descriptive analysis.

On the primary side, official cartographic layers were acquired from Geoportale Piemonte, while agri-food data were Last access: from the Chamber of Commerce using Codici ATECO that were initially selected in a first screening from the 2023 working database and then organized into supply-chain segments; records underwent data cleaning, geocoding was performed via the Geoportale Piemonte geocoder and BatchGeo, and all layers were harmonized in a projected metric CRS with consistent field naming and spatial joins to municipal and CollinaPo zonal polygons.

The cartographic analysis is entirely descriptive and limited to spatial representation. The interpretation of business structure relies on the following premise: this data is derived from the classification of agricultural enterprises according to the Codice ATECO, which is a national economic activity code system used for statistical and administrative purposes in Italy. Each agricultural holding self-declares its primary field of activity by indicating the most representative ATECO code, which in turn determines the crop or livestock category under which it is registered.

The proportions shown here therefore reflect the main activity as reported by the enterprise, not necessarily the complete range of its production mix. It is important to note that this representation is based on self-reported classifications and does not capture secondary or complementary production activities that may be relevant at farm level. Furthermore, this breakdown is provided solely to illustrate the structural composition of the sector and to understand the relationship between land use and productive output. In practice, possible errors and biases include misreporting or outdated self-declared ATECO codes (especially for multi-activity farms), loss of information on secondary activities, temporal mismatches between register vintages and cartographic dates, geocoding uncertainties (address normalization, centroid placement, private-road offsets), and scale/boundary effects that can shift local patterns; for these reasons, maps are treated as structured approximations designed to interrogate urban–rural interdependencies and governance levers rather than definitive territorial delineations.

Finally, the qualitative component follows the maps and consists of extracts from unstructured interviews conducted with food-system actors; interviews were coded along descriptive themes (production, logistics, environmental constraints) and positioned as interpretive commentary that explains or nuances the spatial patterns observed, without any claim to statistical inference.

in relation to the rest of the food system. For this reason, the present research does not treat drivers as standalone entities but instead examines them in close connection with the processes they shape.

In this spirit, there are several approaches aimed at categorizing drivers that are relevant to consider (Béné & et al., 2019; van Berkum, Dengerink, & Ruben, 2018). For the interest of this work, it is preferred to rely on the model developed by HLPE that identified six larger drivers' categories particularly relevant for food systems' transformation. They include: 1) biophysical and environmental, 2) demographic, 3) socio-cultural, 4) political and institutional, 5) economic and market, 6) technology innovation and infrastructure drivers (HLPE, 2020).

Accordingly, the analytical entry point into the food system lies in the exploration of its underlying drivers, here conceived as regional-scale forces that shape food system's long-term transformations. The emphasis, therefore, is placed on interrogating how such drivers have intervened in Piedmont Region, which hosts CollinPo, over a ten year long temporal horizon[61].

The selection of relevant drivers follows two guiding principles: first, the systematic availability and reliability of data that can be mobilized to empirically ground the analysis; and second, the substantive significance of each driver for the specific case at stake. In practice, this means privileging those forces that shape food system's phases in measurable ways, while remaining attentive to drivers that may not be easily quantifiable but still exert structural influence, and are therefore described qualitatively.

In operational terms, the drivers are sketched and mapped against the components of the food system to which they appear most directly relevant. For instance, certain economic drivers such as inflation or input cost volatility may primarily affect retail and catering, while environmental drivers like climate variability and water are more directly meaningful for production. Yet, their implications overlap. Therefore, this schematic representation does not aspire to affirm a unique drivers' framework of validity, but rather functions as an orienting device, clarifying where attention is most needed and highlighting the interdependencies between different structural forces. Within this structure, Tab. 18 presents the drivers considered most relevant for the case under study.

Category of driver	Selected driver

[61] For some drivers, data allows to investigate a longer temporal horizon. For others, the time span is shorter than ten years.

1.	Biophysical and environmental	1. 2. 3. 4.	Rain precipitations Surface air temperature Land degradation Land consumption
2.	Demographic	1. 2.	Population variation Age of farmers
3.	Socio-cultural	1. 2. 3.	Vegetarianism and veganism “Free from” diets Illness-related diets
4.	Political and institutional	1. 2. 3.	Agricultural and rural development policies Cohesion and structural development funds Extraordinary and competitive measures
5.	Economic and market	1. 2. 3. 4. 5. 6.	Number of active farms and economic sizes Size of Utilized Agricultural Area Import-export dimension Net population’s purchasing power Number of tourists Accommodation infrastructure
6.	Technological, innovation and infrastructure	1. 2.	Stages’ automatization Distribution of logistics

Table 18: Relevant drivers in CollinaPo’s food system
Source: Author’s elaboration

3.1.1 Biophysical and environmental drivers

This study investigates the impact of changes in rainfall patterns, rising surface air temperatures, accelerating land degradation, and growing land consumption. These factors influence agricultural productivity and ecosystem services, shaping vulnerabilities to climate change, pest and disease pressures, and resource scarcity (HLPE, 2020).

3.1.1.1. Rain precipitations

First, the analysis of annual precipitation in the Piedmont Region from 1950 to 2023 highlights a relatively stable long-term average in total rainfalls, although slightly decreasing in terms of overall volume. However, this apparent stability conceals a marked increase in interannual variability, with frequent oscillations between wet and dry years.

Rather than indicating a progressive decline in precipitation, the trend points to a more erratic distribution of rainfall events, with irregular peaks and droughts that challenge predictability. This mirrors broader national dynamics in Italy, where

total precipitation may remain stable, or decline slightly in some areas, but where the frequency and intensity of extreme events have intensified.

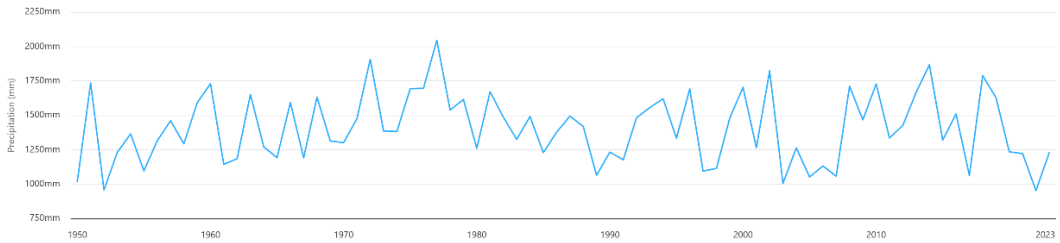


Figure 42: Overall annual precipitation of Piedmont (1950-2023)
Source: Climatology (ERA5), 2025, Climate Change Knowledge Portal for Development Practitioners and Policy Makers, World Bank, last accessed: August 07, 2025, from https://climateknowledgeportal.worldbank.org/country/italy/era5-historical.

3.1.1.2. Surface air temperature

Second, more urgent is the analysis of annual mean surface air temperature in the Piedmont Region from 1950 to 2023, which reveals a pronounced long-term warming trend. The earlier decades, particularly from the 1950s through the 1980s, are characterized by consistently cooler conditions, with a predominance of below-average years. From the 1990s onward, however, the pattern shifts sharply, with a steady succession of warmer years, culminating in the persistent prevalence of above-average temperatures observed in the last two decades.

This progression indicates not only a clear upward trajectory in average conditions but also a consolidation of heat anomalies as the new normal.

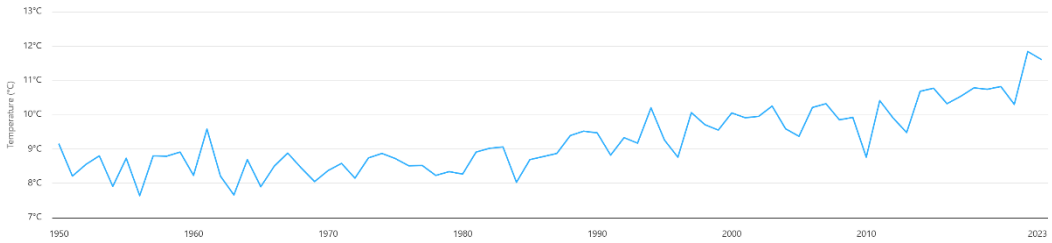


Figure 43: Overall annual mean surface air temperature of Piedmont (1950-2023)
Source: Climatology (ERA5), 2025, Climate Change Knowledge Portal for Development Practitioners and Policy Makers, World Bank, Retrieved August 07, 2025., from https://climateknowledgeportal.worldbank.org/country/italy/era5-historical.

Concerning the overall changes in climate conditions, a local producer affirms that,

Mio zio dice che i temporali forti ci sono sempre stati e non lo muovi di lì. Io però vedo che le stagioni si sono spostate: la pioggia che faceva in primavera ora arriva a maggio o giugno, gli inverni sono più caldi e con poca neve, e questo non fa bene alle piante perché non riposano e i parassiti non muoiono. Negli ultimi anni ci sono più bombe d'acqua e grandinate improvvise, anche a pochi metri di distanza. È difficile da accettare se vedi la terra tutti i giorni, ma è così[62] (Farmer, Interview, September 19, 2024).

3.1.1.3. Land degradation

ISPRA defines land degradation as the sum of changes in land use, loss of vegetative productivity, reductions in Soil Organic Carbon (SOC), over a baseline and reporting period. These indicators are aggregated into a single result that reflects the overall deterioration of land functions.

For the Piedmont Region, a 2019 ISPRA report estimates that 20.6% of the regional land, equivalent to 517,688 hectares, shows signs of degradation, closely mirroring the national average of 21.2%, while only 4.7% has improved (ISPRA, 2023).

Assuming a degradation increase consistent with national dynamics and based on the national increase of degraded land from approximately 7,196 km² in 2006 to over 56,000 km² in 2019. It is possible to estimate that the degraded area in Piemonte in 2006 was around 58,980 hectares, representing approximately 2.3% of the regional surface. This would imply a dramatic increase of more than 450,000 hectares over 13 years, with an estimated annual growth rate of around 1.4% of the regional territory. However, this reconstruction must be approached with caution: it is plausible that a significant share of the territory was already experiencing degradation before 2006, and thus the estimated rate may overstate the actual acceleration. Considering this, the average annual degradation growth rate may range between 0.9% and 1.4%, depending on the initial baseline conditions.

Projecting the trend forward, Piedmont could face an additional loss of approximately 225,000 to 350,000 hectares of land by 2029, finally affecting nearly 30–35% of the region's total surface[63].

[62] "My uncle says heavy storms have always been around and there is no way to convince him. But I can see the seasons have shifted: the spring rains now come in May or June, winters are warmer with little snow, and that's bad for the trees because they don't rest and the pests don't die. In recent years there've been more sudden downpours and hailstorms, sometimes just a few hundred meters apart. It's hard to read it, if you see the ground daily, but so it is".

[63] Trends are estimated according to figures displayed in the paragraph.

3.1.1.4. Land consumption

Following the reflection on land degradation, land consumption must be addressed as a distinct but interrelated structural process that affects the spatial availability and continuity of non-urbanized areas. While degradation compromises the ecological functions and productive potential of soil, land consumption irreversibly removes it from other natural functions, and it is mainly due to urban expansion and infrastructure development (Pileri, 2022).

In Piedmont, ISPRA's data indicates that between 2006 and 2023 approximately 28,533 hectares of land have been permanently consumed, representing a 1.12% increase from the 2006 total agricultural surface of approximately 2,538,865 hectares[64]. Assuming a constant annual growth rate based on this historical trend, projections suggest that land consumption could reach an additional 36,800 hectares by 2040. As visible in Figure 44, the spatial distribution of land consumption is significant everywhere, although the southern parts of Piedmont are more affected.

[64] Data are available at: https://groupware.sinanet.isprambiente.it/uso-copertura-e-consumo-di-suolo/library

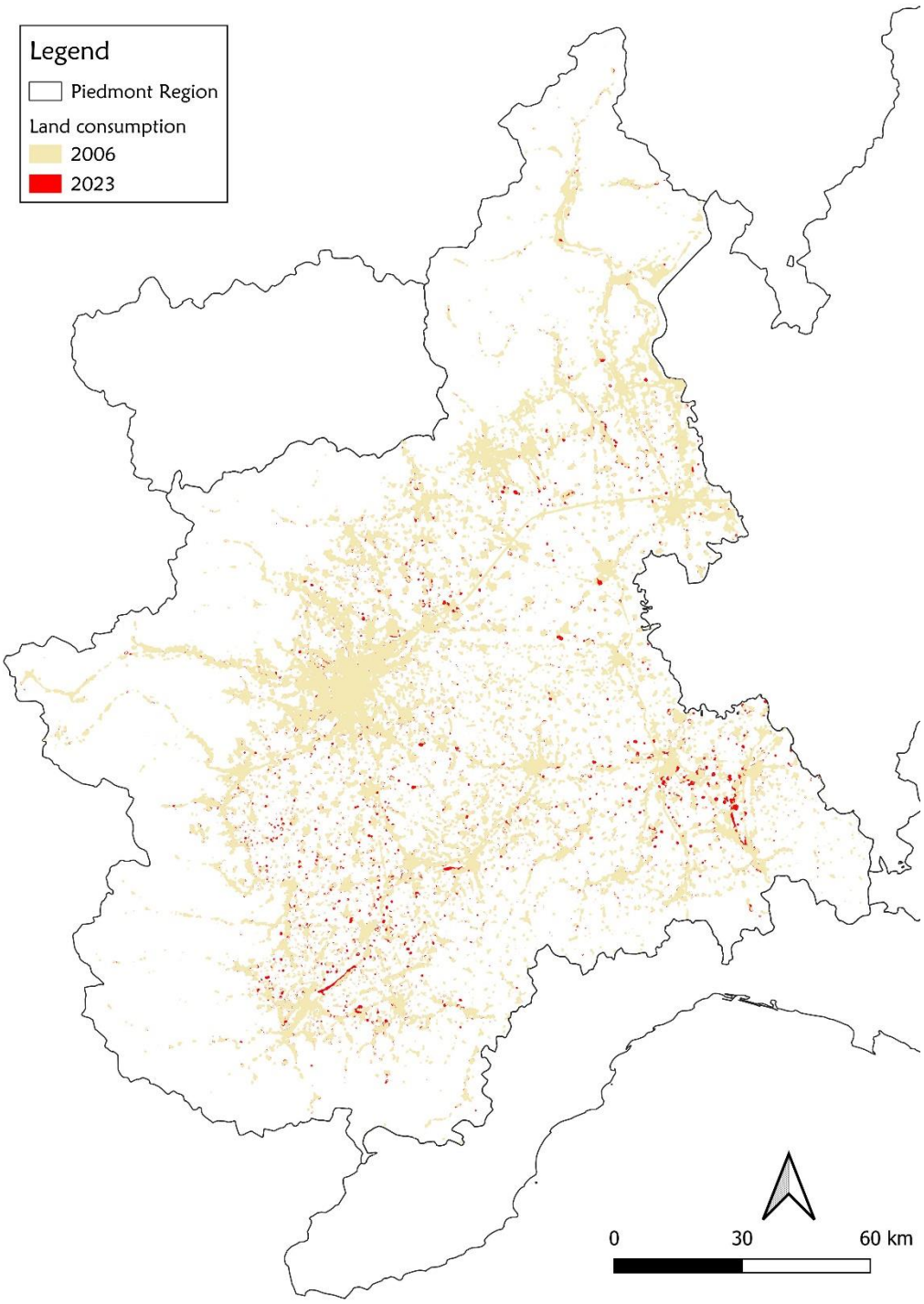


Figure 44: Land consumption in Piedmont Region (2006-2023)
Source: Author's elaboration based on data from ISPRA

3.1.2. Demographic drivers

This study considers the role of population variation and the age structure of farmers as key demographic drivers shaping food systems. Global population growth, projected to reach nearly 10 billion by 2050, alongside rapid urbanization, is reshaping food demand, diets, and labor distribution (HLPE, 2020).

3.1.2.1. Population variation

Population dynamics in Piedmont between 2015 and 2023 display a marked pattern of concentration in the provincial capitals. Turin shows the largest absolute increase, with nearly 40,000 additional residents (+4.6%) over the observed period, standing out as the main demographic pole in the region.

Growth is also registered in the medium-sized capitals: Alessandria gained around +2.3%, Asti +3.8%, Novara +2.1%, and Biella +4.4%. Smaller provincial centers also participated in this trend, with Verbania increasing by +3.1% and Vercelli by +2.4%. Overall, all provincial capitals, except for Cuneo, experienced population expansion, although with different intensities.

Beyond the main cities, much of the Piedmontese territory presents conditions of relative demographic stability. Most municipalities outside the provincial centers show values that range from limited decline to modest increase. In many areas, the variation is situated within narrow margins, typically between –50 and +50 residents, with several municipalities positioned in the range between 0 and +100. This indicates that a large portion of the regional territory, especially in the plains and hilly areas, has maintained a generally stable demographic profile during the period under consideration.

Alongside stability, localized areas of population decline are also visible. These are scattered across the region but tend to appear more frequently in mountainous or peripheral zones, where negative variations occasionally surpass –500 residents and, in some cases, even reach losses of more than –1,000 individuals. Nevertheless, these shrinking areas remain exceptions when compared to the broader picture: in fact, most municipalities in Piedmont have either gained residents or remained broadly stable, confirming that strong depopulation has not occurred in the last decade.

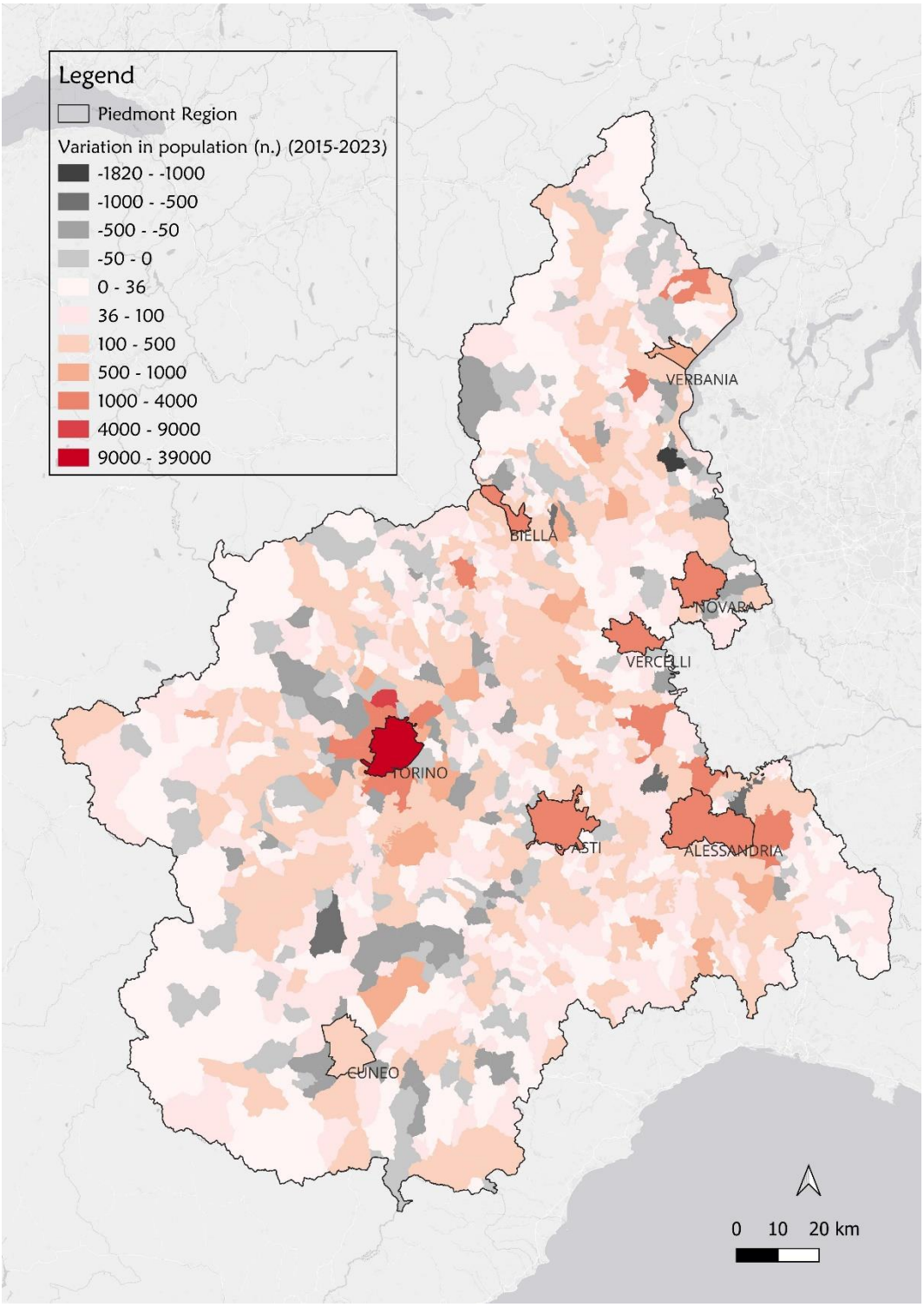


Figure 45: Variation of population in Piedmont Region (2015-2023)
Source: Author's elaboration based on data from ISTAT

3.1.2.2. Age of farmers

Farmers' demographic data in Piedmont between 2007 and 2024 reveals a reducing agricultural workforce, featured by prominent aging. As shown in Figure 46, the group of younger farmers under 25 has always represented a very small minority and shows no expansion over the years. More significantly, the cohort between 25 and 41 years old has undergone a sharp reduction, steadily contracting in absolute terms from 2007 to 2024. Together, these two age classes highlight a declining presence of young entrants in agriculture, indicating a weak generational turnover over the observed period.

The intermediate working-age groups also follow a downward trajectory. Farmers aged 41 to 55, who represented a substantial portion of the farming population in 2007, are visibly reduced by 2014 and continue to contract further by 2024. Similarly, the 55 to 65 age cohort decreases in size across the period, reflecting the overall shrinking of active middle-aged farmers. This contraction across the central age bands suggests that the demographic imbalance in the sector is not limited to the youngest groups but extends to a wider portion of the potential active workforce.

By contrast, the number of farmers aged 65 and above remains consistently dominant and stable across all three reference years. In 2007, this cohort already constituted the largest share, and by 2024 it consolidates its prevalence, standing out as the single most represented group within the farming population.

Figure 46 therefore illustrates a structural demographic shift: while younger and intermediate groups diminish, the older cohort maintains its central role, confirming the progressive aging of the sector and the persistence of an unbalanced age profile among Piedmont's farmers.

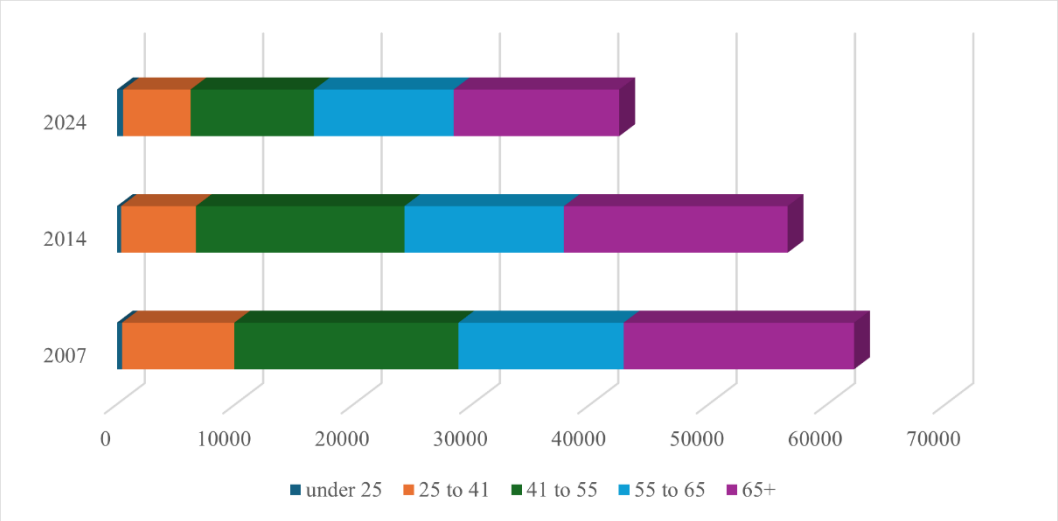


Figure 46: No. of food producers per age of farm owner (2022)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

3.1.3. Socio-cultural drivers

Among the socio-cultural drivers, particular attention is, here, given to dietary habits, as they directly influence both production choices and retail dynamics along the food supply chain.

Unfortunately, dietary data are rarely available at a regional scale; therefore, the analysis relies primarily on national-level evidence, which nonetheless provides a reliable framework to interpret ongoing transformations in Piedmont too.

3.1.3.1. Vegetarianism and veganism

The first notable long-term shift in Italy's dietary habits has been the steady rise of vegetarian and vegan diets. Around 2014–2015, approximately 7–8% of Italians identified as vegetarian or vegan (Eurispes, 2018). In recent years, however, this share has climbed markedly, as of 2024 about 9.5% of the population, or roughly 5.6 million people, report eating no meat (Eurispes, 2025).

Behind this choice, health and sustainability concerns are key motivations: many adopters cite perceived health benefits or ethical reasons such as animal welfare for choosing vegetarian or vegan diets.

Italian food culture is adapting accordingly, with a growing share of restaurants and food outlets offering vegetarian and vegan options. The Piedmont Region mirrors these national trends, with local consumers increasingly embracing plant-

forward foods. Overall, while Italy remains below some European countries in total vegetarians, the past decade has shown a tangible increase in meat-free eating habits (Eurispes, 2018).

3.1.3.2. "Free from" diets

Parallelly, Italians have become more health-conscious, fueling the popularity of "free-from" diets, such as sugar-free, lactose-free, and gluten-free options, even among those without medical needs. About 25% prefer sugar-free foods, nearly 30% buy lactose-free products, and 20% choose gluten-free items (Eurispes, 2024), often for perceived health benefits. The trend also includes increased consumption of wellness foods, supplements, and superfoods.

Spending on organic groceries has doubled in the last decade, with 90% of families buying at least one organic product by 2022, reflecting a cultural shift toward prioritizing food quality (Garancini, 2023).

A newer but relevant trend concerns the consumption of dealcoholized wines. The recent approval of legislation authorizing the production of dealcoholized and partially dealcoholized wines in Italy marks a turning point in the national wine sector (Liotta, 2025). These products are positioned within the broader No and Low Alcohol (NOLO) segment, which has expanded globally by 34% between 2020 and 2023 and is projected to grow by 7% annually until 2027.

Demand is largely driven by Millennials and Gen Z, who together account for around 40% of consumers, with motivations ranging from health and calorie concerns to curiosity and social occasions where alcohol consumption is less appropriate. In Italy, although the market is still at an early stage, around 15% of consumers have already tried low- or no-alcohol wines, with interest concentrated in northern regions and among younger population (essedielleenologia, 2025).

3.1.3.3. Illnesses-related diets

Changing dietary patterns are also partly driven by the rising prevalence of diet-related health conditions. In Italy and in Piedmont, celiac disease has become far more commonly diagnosed over the past decade. By 2020 Italy had over 230,000 confirmed celiac patients, up significantly from the mid-2010s. In Piedmont alone, more than 15,000 residents were diagnosed as celiacs by 2020 (Morichelli, 2022).

Similarly, diabetes has a significant and growing dietary impact. More than 3 million Italians are living with diabetes, the vast majority with type 2, and prevalence has been steadily increasing over the last twenty years (ISTAT, 2017).

Together, the higher incidence of conditions such as celiac disease and diabetes has reinforced trends toward specialized diets and product offerings, further reshaping Italian food consumption habits in the direction of new foods.

3.1.4. Political and institutional drivers

Within the political and institutional context, public policy instruments and funding programs represent the most prominent interventions shaping the food system. These initiatives constitute an integrated, multilayered framework operating across European, national, and regional levels, which allocate financial resources to enterprises, workers, and territories (Bader & al., 2025).

Some affirm that these measures are rarely activable; they are complex and time-consuming in terms of workforce necessary for the application, leading to dependance from sector experts.

"Il problema principale, come dicono anche altri, è la mancanza di competenze o di persone adeguate che sappiano intercettare i fondi disponibili. Le risorse ci sono, ma spesso restano ferme e non vengono utilizzate perché nessuno presenta i progetti o sa come gestirli" (Retailer, Interview, February 05, 2025)[65].

And

"L'unico modo appoggiarsi, come fanno tutti, alle associazioni di categoria, in questo caso la Coldiretti, che presentano le domande al posto tuo. Oggi però avere una piccola azienda agricola, non certo da centinaia di migliaia di ettari ma di quelle che ti permettono semplicemente di vivere, richiede un'enorme quantità di tempo ed è difficilissimo muoversi da soli. Se non ti rivolgi a un'associazione di categoria, infatti, è praticamente impossibile riuscire a sbrigare tutte le pratiche da te" (Farmer, Interview, September 20, 2025).[66]

From an analytical perspective, these measures can be considered collectively as a singular macro-driver; however, their internal diversity necessitates further clarification. Accordingly, this study identifies three distinct functional blocks to address their differentiated roles.

[65] The main problem, as others also say, is the lack of skills or appropriate people who can tap into the available funds. The resources are there, but they often remain unused because no one submits projects or knows how to manage them.

[66] The only way is to rely, as everyone does, on trade associations, in this case Coldiretti, which submit the applications for you. Today, however, having a small farm, not one with hundreds of thousands of hectares, but one that simply allows you to get through, requires a huge amount of time, and it's very difficult to manage alone. If you don't go to a trade association, it's practically impossible to deal with all the procedures by yourself.

3.1.4.1. Agricultural and rural development policies

First, there occur "Agricultural and rural development policies" that concern the Common Agricultural Policy (CAP) and Rural Development instruments, which remain the essential of agricultural and rural funding in Piedmont.

Within the CAP framework, the Region implements the *Complemento per lo Sviluppo Rurale* (CSR Piemonte 2023–2027), a regional document that specifies interventions financed by the European Agricultural Fund for Rural Development (EAFRD/FEASR) and national co-financing.

Instrument	Functioning	Target groups	Level of application	Regional funding	Reference site
1.1. Common Agricultural Policy (CAP) 2023–2027 – Piedmont CSR (*Complemento per lo Sviluppo Rurale*)	The CAP integrates direct payments to farmers, sectoral support schemes, and rural development measures. Piedmont implements the CSR, which specifies interventions on investment support, environmental schemes, cooperation, and LEADER.	Farmers, agri-food SMEs, cooperatives, young farmers, rural communities.	High – it funds production and transformation in the agri-food sector.	€756 million plus national co-financing.	www.regione.piemonte.it/web/temi/fondi-progetti-europei/sviluppo-rurale-2023-2027
1.2. LEADER (Intervento SRG06) – Local Action Groups (GAL)	LEADER works through Local Action Groups, which design and manage community-led local development strategies. Funds are distributed as small grants to rural actors for projects in diversification, short supply chains, processing, tourism, and cultural promotion.	Direct: Small farmers, micro-agri-food enterprises, rural municipalities, associations. Indirect: Rural communities.	Medium – it is especially relevant for small-scale or niche food projects in rural areas.	€83 million to 24 GALs.	www.regione.piemonte.it/web/temi/fondi-progetti-europei/leader-2023-2027
2.1. Regional ERDF Programme (PR FESR Piemonte 2021–2027)	The program co-finances projects for research and innovation, digitalization, energy efficiency, circular economy, and sustainable mobility.	Direct: SMEs, large enterprises, research centres, municipalities. Indirect: Workers, supply chains.	Medium/High – horizontal funds, widely accessible to food processing SMEs.	€1.5 billion.	www.regione.piemonte.it/web/temi/fondi-progetti-europei/fondo-europeo-sviluppo-regionale-fesr
2.2. Regional ESF+ Programme (PR FSE+ Piemonte 2021–2027)	The program funds education, training, employment measures, and social inclusion projects. Calls finance professional training courses, lifelong learning, and active labor market measures.	Direct: Workers, unemployed, young people, women, disadvantaged groups. Indirect: Enterprises.	Medium – it strengthens workforce skills relevant for agri-food plants and quality control.	€1.318 billion.	www.regione.piemonte.it/web/temi/fondi-progetti-europei/fondo-sociale-europeo-fse
2.3. Fondo Sviluppo e Coesione (FSC) – Piedmont Development and Cohesion Agreement 2021–2027	The FSC is Italy's national cohesion fund. In Piedmont it complements EU funds and finances territorial development projects in infrastructure, services, and co-financing of EU programs.	Direct: Regional government, municipalities. Indirect: Enterprises, communities.	Low/Medium – not sectoral but can improve logistics and infrastructure for agri-food.	€132 million.	www.regione.piemonte.it/web/temi/fondi-progetti-europei/fondo-sviluppo-coesione-fsc
3.1. PNRR – Mission 2, Component 1, Investment 2.3 "Innovation and mechanisation in the agri-food sector"	This investment line co-finances the purchase of innovative agricultural machinery, precision farming equipment, and digital tools that improve sustainability and efficiency. Applications are handled at regional level.	Direct: Farmers, agri-mechanical service companies, cooperatives. Indirect: Consumers.	High – it targets farms and agri-food producers.	€26.53 million (national).	https://bandi.regione.piemonte.it/contributi-finanziamenti/pnrr-m2c1-investimento-23-ammodernamento-macchine-agricole
3.2. "Transizione 5.0" Tax Credit	This tax incentive grants credits to enterprises investing in innovative, energy-efficient and digitalized machinery and software, conditional on proven energy savings. It replaces and extends Transizione 4.0.	Direct: SMEs, large enterprises (including agri-food). Indirect: Workers, consumers.	High – especially useful for food processors upgrading lines and refrigeration systems.	No dedicated regional funding.	https://www.mimit.gov.it/it/incentivi/piano-transizione-5-0
3.3. "Nuova Sabatini" – Beni strumentali	This provides subsidized loans and state contributions on interest to SMEs purchasing machinery, including digital and green technologies. Enterprises apply via banks and MIMIT subsidizes the loan interest.	Direct: SMEs, micro-enterprises, cooperatives. Indirect: Workers.	Medium/High – widely used by food SMEs for new machinery.	No dedicated regional funding.	https://www.mimit.gov.it/it/incentivi/agevolazioni-per-gli-investimenti-delle-pmi-in-beni-strumentali-nuova-sabatini

Table 19: Possible sources of funding for food-related activities in Piedmont
Source: Author's elaboration

The CSR serves as the principal mechanism for delivering direct support to farmers, agri-food SMEs, cooperatives, and rural communities. Through this channel, beneficiaries receive assistance for investments aimed at farm modernization, upgrading agri-food processing facilities, implementing environmental and other initiatives, and fostering generational renewal in the sector. For instance, specific measures target young farmers with dedicated start-up packages, while other calls focus on funding technological advancements and improving energy efficiency within processing operations. In addition to these, the CSR encompasses cooperation schemes and integrated projects, encouraging collective strategies and joint solutions across entire value chains.

Within this first block, the LEADER approach (SRG06) holds a special position. Though it is formally one of the CSR interventions, its functioning is distinct: resources are allocated to Local Action Groups (GALs), which design and implement local development strategies. Through their own calls, GALs finance small-scale projects such as short supply chains, rural diversification, agritourism, or community-led processing initiatives. In this sense, LEADER represents the most participatory and locally grounded dimension of the CAP, reinforcing the civic feature of rural food systems.

3.1.4.2. Cohesion and structural development funds

The second block, "cohesion and structural development funds", refers to Cohesion Policy funds, which, although not food-specific, play a decisive role in shaping the agri-food landscape. The European Regional Development Fund (ERDF, FESR) in Piedmont supports research, innovation, and digitalization, with explicit openings for food SMEs aiming to improve logistics, production efficiency, or sustainable packaging. Calls within the regional ERDF program also finance energy-saving technologies and circular economy models, which are increasingly relevant to agri-food processors under climate and competitiveness pressures.

The European Social Fund Plus (ESF+) contributes indirectly by strengthening the human capital of the sector. It finances training programs for young workers, including specific tracks dedicated to food technology, quality assurance, and food safety. It also enhances employment measures and social inclusion, which are significant for a sector relying on seasonal and sometimes vulnerable labor, as discussed below.

The Cohesion Fund (FSC), though primarily national in design, also co-finances regional infrastructure and complements ERDF and ESF+. In Piedmont, FSC allocations help sustain logistics, connectivity, and infrastructural development that, while not exclusive to agriculture, have significant spillover effects on food transport and distribution chains.

3.1.4.3. Extraordinary and competitive measures

The third block, hereby named "extraordinary and competitive measures" is formed by the National Recovery and Resilience Plan (PNRR) and complementary national incentives, which emerge from the extraordinary framework of NextGenerationEU and Italy's post-pandemic recovery strategy. The PNRR dedicates a significant portion of its Mission 2 to agricultural innovation and mechanization, making available dedicated funds to co-finance the purchase of precision farming equipment, advanced machinery, and digital monitoring systems.

Alongside the PNRR, broader national incentive schemes such as Transizione 5.0 and the "Nuova Sabatini" instrument are also open to agri-food enterprises in Piedmont. Transizione 5.0 provides tax credits for enterprises investing in energy-efficient machinery and digital tools, particularly relevant for food processors upgrading refrigeration systems, packaging lines, or automation processes. The "Nuova Sabatini" facilitates access to credit for SMEs through subsidised loans and grants for the purchase of new machinery, again widely used by small and medium-sized food businesses.

While not exclusively agricultural, these instruments complement CAP and Cohesion funds by offering a national-level innovation push in the food system.

3.1.5. Economic and market drivers

The analysis incorporates farm numbers and economic sizes, the extent of Utilized Agricultural Area (UAA), import-export dimensions, purchasing power of the population, as well as tourism flows and accommodation infrastructure. These economic and market drivers affect production scale, trade competitiveness, demand structures, and territorial attractiveness, thereby conditioning the stability and growth potential of agri-food systems in an increasingly globalized economy (HLPE, 2020).

3.1.5.1. Number of active farms and their economic sizes

The first data to consider concerns the total number of farms that are active in Piedmont. As visible in Figure 47, there has been a significant contraction, with the

number of food producers falling from 51,743 in 2015 (outer circle) to 40,483 in 2024 (inner circle), accompanied by a marked polarization of economic sizes.

The largest share in both years falls in the lowest economic class, holdings with an annual value of less than €15,000, which, despite declining from 46% to 33%, still represents one-third of all farms in 2024. Mid-sized classes (€15,000 to €85,000) show a slight relative increase, suggesting some consolidation, yet they remain modest in overall economic capacity. Higher-value categories above €150,000, although showing slight growth in percentage terms, still account for a small fraction of the total, with the largest class (€500,000 and more) representing just 3% in 2024.

This shift could signal improved stabilization and improvement for some actors, yet it also opens the possibility of a clear concentration of productive capacity in the hands of a small number of large-scale enterprises. Indeed, as a meat producer affirms:

> In agricoltura è difficile: se fosse solo questione di passione e si potesse tornare al baratto, dimenticando la parte economica, sarei felicissimo, perché le soddisfazioni che mi dà il lavoro non hanno prezzo. Ma purtroppo, come tutti, siamo dentro un sistema dove bisogna fare i conti con il denaro e affrontare tutti i problemi che ne derivano. E ce ne sono tantissimi: su tutto, mi scontro con un mercato dove lo spazio per quelli piccoli come me è nullo (Farmer, Interview, September 20, 2024)[67].

In quantitative terms, even under a conservative assumption where the largest economic class, over €500,000 annual turnover, is valued at its lower bound, the total market value generated by the regional agricultural sector increased from approximately €2.80 billion in 2015 to €2.97 billion in 2024, implying a growth of around 6%[68].

[67] "Farming is hard: if it were only about passion and we could go back to bartering, forgetting the economic side, I'd be truly happy, because the satisfaction this work gives me is priceless. But unfortunately, like everyone else, we are stuck in a system where you have to deal with money and all the problems that come with it. And there are many: above all, I face a market where there is no room at all for small farmers like me".

[68] Estimated market value calculated by multiplying the number of farms in each turnover class by the class midpoint (e.g., €7,500 for <€15,000; €30,000 for €15,000–€45,000; €65,000 for €45,000–€85,000; €117,500 for €85,000–€150,000; €200,000 for €150,000–€250,000; €375,000 for €250,000–€500,000; €500,000 for >€500,000).

2015: Σ = €2.80 B.

2024: Σ = €2.97 B.

Variation = $(2.97-2.8)/2.8 \times 100 = 6\%$ growth.

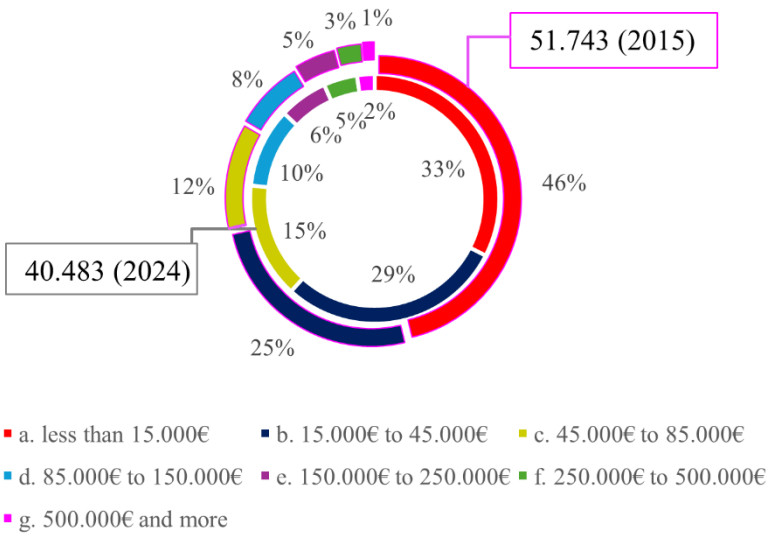


Figure 47: Percentage of food producers per market value (2022)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

3.1.5.2. Size of Utilized Agricultural Area

Concerning the contraction of food producers, while considering the timeframe between 2007 and 2024, a sharper decline emerges; as shown in Figure 48, producers declined from 62,059 to 41,053 units, a reduction of approximately 33.8% over the observed period. In contrast, the UAA exhibits relative stability, with values fluctuating within a narrow range, from 987,646.79 ha in 2007, to 934,688.40 ha in 2024. The juxtaposition of these trends confirms the process of structural concentration: while the total agricultural surface dedicated to production has not undergone major reductions, it is now managed by a considerably smaller number of operators.

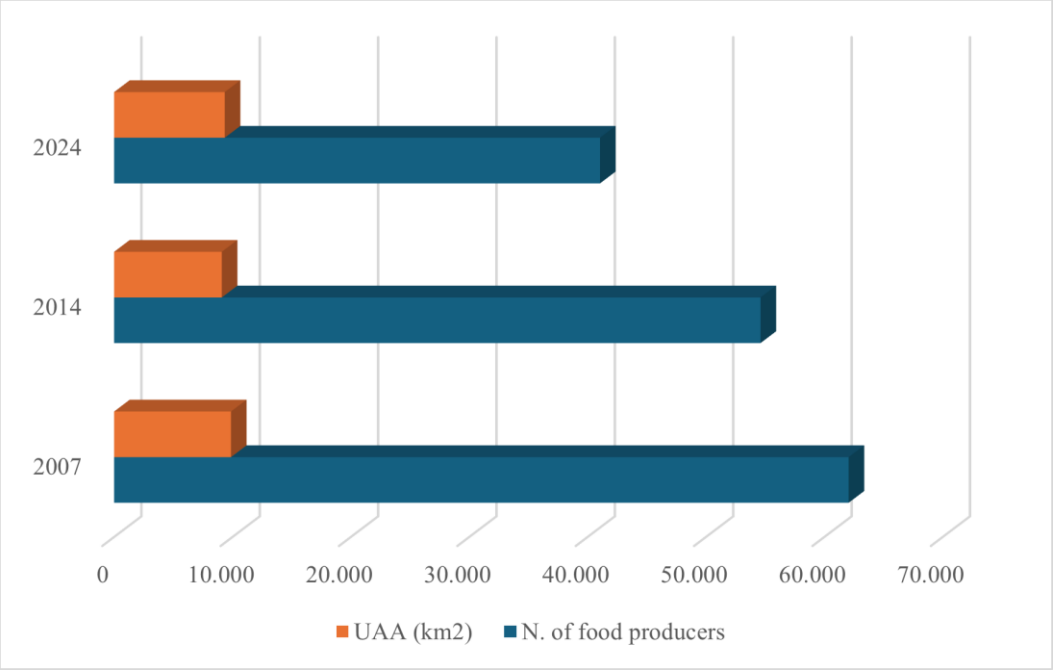


Figure 48: No. of food producers over the UAA (km2) (2022)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

3.1.5.3. Import-export dimension

A third important driver to address regards import-export. Piedmont's food sector has progressively strengthened its outward orientation. In 2023, the region generated an export value of approximately €6 billion, compared to €4.2 billion in imports. This resulted in a robust trade surplus, which was sustained even during the pandemic period (ISMEA, 2023).

The export portfolio is predominantly composed of processed goods, including wines, cheeses, coffee, confectionery, and cereal derivatives. In contrast, primary agricultural products are largely retained for the domestic market, with fresh fruit, particularly apples and kiwis, standing out as notable exceptions.

Building on this dynamic, it is important to acknowledge unequal positioning of territories within the regional agri-food trade. As shown in Figure 49, the distribution of export volumes, both in physical quantities and economic value, reveals a concentration of outward trade capacity in specific provinces, most notably Cuneo.

Over the observed period (2003–2023), Cuneo's export values have undergone an exceptional increase, surpassing €3.5 billion in 2023, while the physical quantities exported have grown only marginally. This divergence between value and volume is also visible, though to a lesser extent, in import trends, and across all

considered provinces, where monetary inflows have risen far more sharply than the tonnage of goods traded.

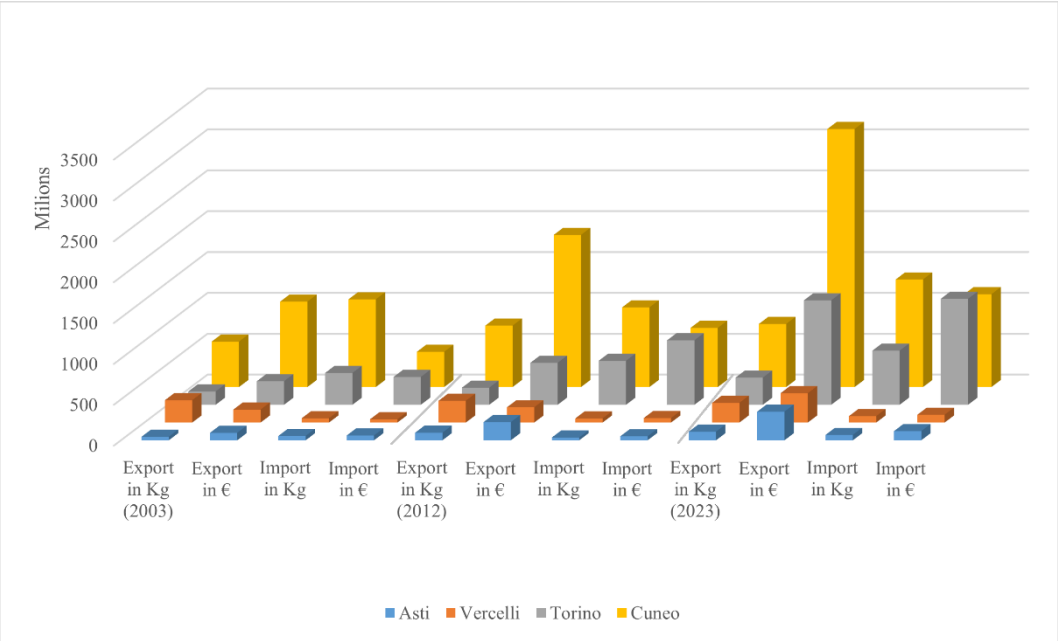


Figure 49:Value of import-export (in kg and euros) (2003-2023)
Source: Author's elaboration based on data from ISMEA

3.1.5.4. Population's net purchasing power

Next to the import-export value growth, another number deserves attention: the net purchasing power of the population. This has been calculated by deflating the nominal wage, €23,361, in 2022 (ISTAT, 2024), with the Piedmont NIC[69] index for food and non-alcoholic beverages, to obtain the real wage expressed at constant 2015 prices. The resulting trajectory highlights a progressive erosion of purchasing power: while the nominal wage is constant, the real wage declines from about €23,300 in 2016 to just over €18,000 in 2024, a loss of roughly –22% in eight years[70].

[69] The *Indice nazionale dei prezzi al consumo per l'intera collettività* (NIC) is an index referring to the entire population present in the country and to all goods and services purchased by households at an effective market price.

[70] The *real wage* was obtained by deflating the nominal wage (€23,361) with the NIC index (base 2015=100), i.e. Real rage = Nominal wage/NIC*100. For example: in 2016, with NIC=100.1, the real wage is €23,361 ÷ 1.001 ≈ €23,338; in 2024, with NIC=128.3, it becomes €23,361 ÷ 1.283 ≈ €18,212. The change amounts to (18,212 – 23,338)/23,338 ≈ –22%. This means that, despite unchanged nominal wages, purchasing power declined by about one fifth between 2016 and 2024.

In the chart, the blue bars show this real wage for each year, while the dotted lines indicate the trend: the orange line represents the longer-term downward trend driven by cumulative inflation, and the blue line the actual trajectory, which mirrors the more abrupt fall after 2021 as food prices accelerated. The divergence between the nominal wage (unchanged in this calculation) and the real wage underscores how inflation alone can shrink living standards even when incomes remain formally stable.

Looking ahead, if nominal wages do not increase at a pace equal to or faster than consumer prices, the downward trend in purchasing power is likely to persist.

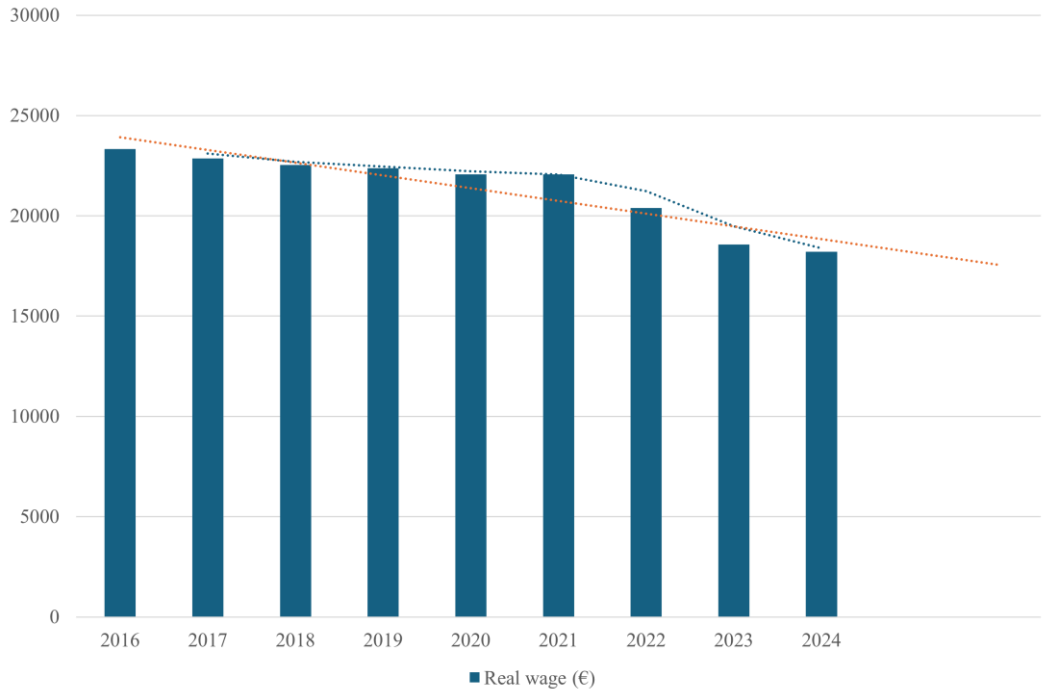


Figure 50: Real wage reduction in Piedmont (2016-2024)
Source: Author's elaboration based on data from ISTAT

3.1.5.5. Number of tourists

The final major economic driver centers on tourism. In Piedmont, except for the dramatic drop caused by the COVID-19 pandemic in 2020, when total tourist arrivals fell to 6,971,118, a decline of 53% compared to 2019, the overall trend shows steady growth in both domestic and international visitors (Piemonte, 2025).

Between 2015 and 2019, tourist presences increased by 11%, rising from 13,681,840 in 2015 to over 15 million in the years 2017–2019. The sector showed remarkable resilience and recovery in the aftermath of the pandemic: tourist arrivals

surged to 14,945,904 in 2022, a 51% rise from the previous year. This positive momentum further increased to 16,897,914, up 4.1% from 2023 (ibid.).

3.1.5.6. Accommodation infrastructure

Another key driver, positioned within the tourism sector, regards the evolution of accommodation infrastructure. The total number of beds has increased steadily, rising from 196,255 in 2015 to 304,433 in 2024 (+55%). However, the composition of this growth reveals important structural changes.

Traditional hotels (ALB) have maintained a stable capacity of around 80,000 beds, indicating a mature segment. Extra-hotel facilities (EXT), like Airbnbs, have grown moderately from just over 100,000 to about 125,000 beds.

The most significant change is in local accommodation (LOC), which has surged from nothing to nearly 100,000 beds by 2024, overtaking the traditional hotel sector.

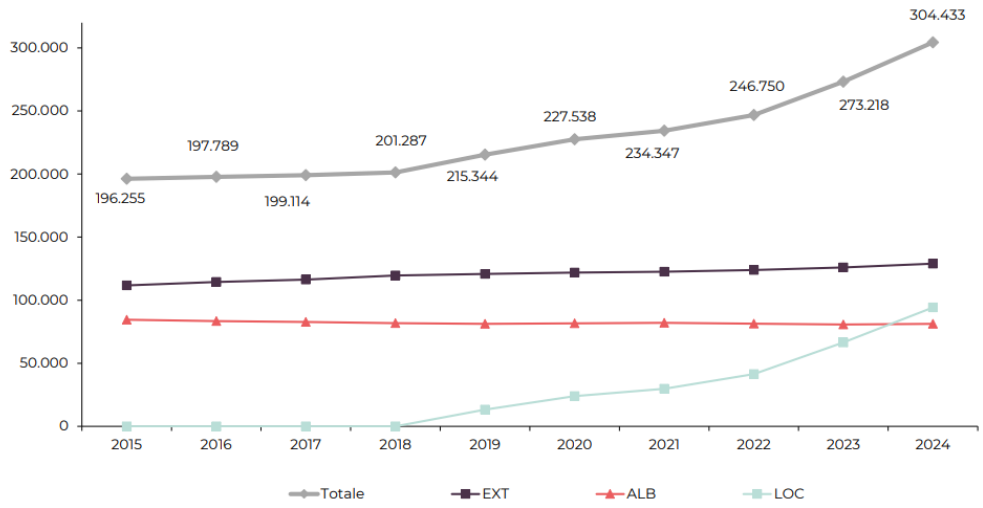


Figure 51: Evolution of accommodation infrastructure in Piedmont (2015-2024)
Source: Osservatorio Turistico della Regione Piemonte, *Rapporto Statistico del Turismo Anno 2024 Edizione 2024*, Regione Piemonte, 2024, p. 10.

3.1.6. Technological, innovation and infrastructure

In the rapidly evolving landscape of the food system, technological innovation and infrastructure development are also playing a role in the transformation of enterprises.

3.1.6.1. Stages' automatization

The first driver to consider regards the automatization of processes within the food system. Large-scale operators have systematically integrated advanced automation and industrial machinery, a process reinforced by the national "Industria 4.0" plan[71].

This has led to a professional structure in which operators of automated lines, fixed machinery, and packaging systems account for small portions of overall employment, specifically plant management and maintenance technicians are 6%, logistics and general services personnel 6%, and installation and repair specialists (3%). Considering the overall framework of short supply of high-learnt individuals, profiles with high technological capacities are in particularly short supply, with firms reporting chronic recruitment difficulties.

The adoption of advanced machinery often coincides with a redesign of operational workflows, expanding automation at human work expenses. In this framework, it is worth mentioning that the average number of employees of the food processing sector rose from 40,493 during the 2012–2014 period to 44,477 in 2014–2018 (IRES, 2021), marking a 9.8% increase. This period of expansion was followed by a sharp contraction, with the number of employees dropping to 32,013 by 2022 (ibid.).

While it is difficult to affirm that this reduction depends only on automatization processes, a correlation between the two frameworks is highly possible.

3.1.6.2. Distribution of logistics

The second factor is the concentration of logistical hubs in relation to their distribution. As visible in Figure 52, although logistics span the region, four specific areas are especially prominent. Turin, macro-hub by virtue, is a pivotal density of processing industries, and retail distribution nodes; Cuneo functions as a production-oriented logistics area linked to its high agricultural output, while Alessandria and Novara have acquired a distinctive specialization in large-scale logistics services. Alessandria's positioning along the Ligurian port–Po Valley corridor allows direct integration with maritime flows from the Genoa port system, supported by a high-capacity highway network. Novara's logistics profile is instead

[71] The term "Fourth Industrial Revolution" refers to industrial innovation processes based on new production technologies that connect physical and digital systems, perform complex analyses through Big Data, and enable real-time adjustments through the use of intelligent machines that are interconnected and linked to the Internet, with the aim of improving working conditions, creating new business models, and increasing the productivity, speed, flexibility, and production quality of plants. In this sense, these requirements have been incorporated by the Italian government through the National Industry 4.0 Plan, whose key guidelines concern innovative investments and skills (Micozzi, Micozzi, Dubbini, & Lepore, 2021).

reinforced by its adjacency to the Milan metropolitan area and its location on the Genoa–Rotterdam Trans-European Network (TEN-T) axis, a strategic framework of corridors that interests both domestic and trans-European connectivity (IRES, 2020).

As visible in Figure 52, the high density of mid- to large-scale hubs around Turin consolidates its role as the central logistics platform of the region, functioning both as a consumption-driven node, by serving a dense urban population, and as a redistribution hub toward external areas. Smaller facilities (green and purple), by contrast, tend to populate secondary railway lines and more peripheral zones. Their presence suggests a two-tiered system: a core network of high-capacity, rail-integrated hubs handling bulk flows, surrounded by a peripheral network of smaller-scale operations that manage more localized or specialized logistics functions, often dependent on road–rail interchanges at larger hubs.

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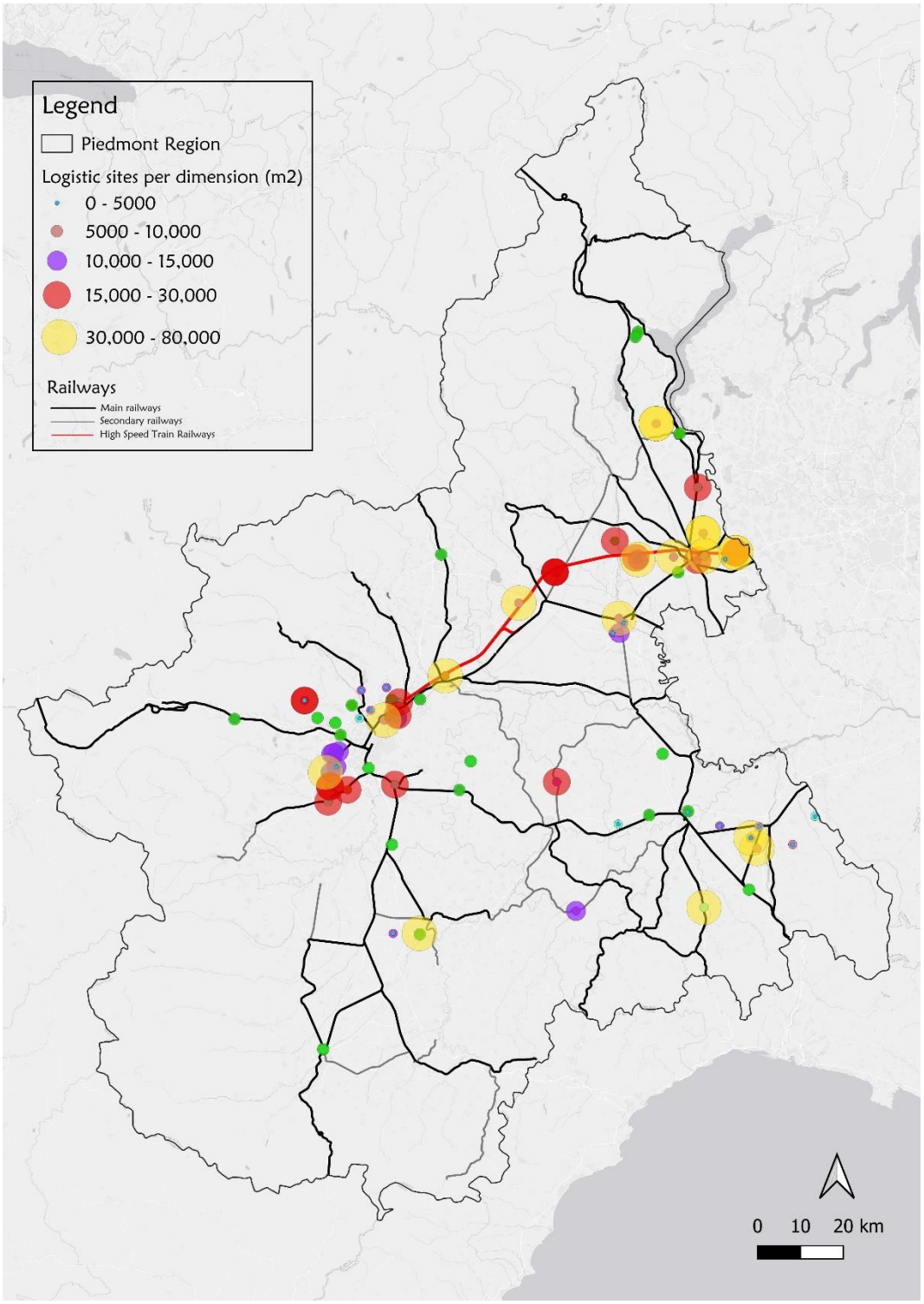

Figure 52: Distribution and size of logistic hubs in Piedmont (2023)[72]
Source: Author's elaboration based on data from Google Maps and Camera di Commercio

3.2. The current state of food in CollinaPo

In examining the specific food system of CollinaPo, this study adopts a supply chain analytical perspective. Such an approach does not dismiss the systemic perspective; rather, it is selected to better understand the processes to be observed and investigated (Su, Wu, & Hua Tan, 2023).

The inquiry is articulated across the principal stages through which food circulates, beginning with production, meant as both purely agricultural activities and livestock grazing too, turning to processing and transformation, in which raw materials are converted into intermediate or final products, often adding value and defining market niches. Attention is also given to logistics and transport, the connective tissue enabling flows between rural areas and the metropolitan core. The analysis continues with wholesale distribution, where aggregation and first market exchanges take place, followed by retail channels, through which food is made available to consumers in both traditional and modern formats. A further segment concerns catering establishments, restaurants, bars, and hotels, operating at the intersection of food, hospitality, and tourism. Finally, the framework addresses food waste aiming at understanding how the territory unfolds the management of this last part.

Each of these stages is treated as a distinct operational domain, also following a methodological framework adopted elsewhere by the research group that I am part of. Indeed, aiming at providing an analysis that is comparable to others undertaken before (Pettenati & Vittone, 2019; Krähmer & et al., 2025), this work emphasizes the spatial dimension of food and seeks to clarify the geographical bonds that link food to its social, and ecological components.

The supply chain framework thus serves as a precise analytical grid for critically assessing the material and territorial configuration of food within Turin's CRFS, CollinaPo.

In the table below, the specific indicators considered under each supply chain stage are clarified, providing an explicit mapping of the operational domains included in the analysis.

[72] The information displayed in the map was generated by searching online for logistic spaces and subsequently estimating their sizes using AI tools.

Supply chain stage	Selected indicator
1. Production	1. Utilized Agricultural Area (UAA) under production 2. Degree of specialization of CollinaPo by type of agricultural production 3. Number of farms cultivating crops for animal feeding 4. Livestock Unit (LSU) production 5. Livestock Unit specialization in CollinaPo 6. Number of livestock heads per livestock farm 7. Surface of organic farming 8. Surface of High Nature Value Farmland (HNVF) 9. Age profile of farmers 10. Distribution of farmers by declared gender
2. Processing	1. Distribution of agri-food enterprises 2. Processing enterprises represented by type of processed food 3. Number of processing enterprises by type of processed food
3. Logistics	1. Spatial distribution logistic hubs
4. Wholesale	1. Total number of wholesalers 2. Typology and distribution of wholesalers
5. Retail	1. Total number of specialized retailers 2. Typology of specialized retailers 3. Spatial distribution of specialized retailers 4. Total number of non-specialized retailers 5. Typology of non-specialized retailers 6. Spatial distribution of non-specialized retailers 7. Spatial distribution of retailers dedicated to specific diets (e.g. organic, vegan, ethnic) 8. Spatial distribution of farmers' markets 9. Overall distribution and density of food retailers 10. Buildings with population experiencing food desert conditions
6. Catering	1. Spatial distribution of bars 2. Spatial distribution of restaurants 3. Typology of restaurants
7. Waste	1. Kilograms of organic waste per municipality

Table 20: Investigated processes of the food supply chain of CollinaPo's food system
Source: Author's elaboration

3.2.1. Production

The analysis of food production within the CollinaPo Biosphere Reserve primarily addresses the territorial production capacity, focusing on the geographical distribution and characteristics of farms as a primary indicator of the organization of agricultural activity. This is because food production is approached not as a supply-side operation but as relevant process in the broader complexity of the food system. Particularly, producers are examined both in terms of their social diversity and their structural role as economic actors within the food system.

Figure 53 represents farms distribution. Density is expressed in a graduated color scale from low (light tones) to high (dark red), with the upper density limit recorded at 36 farms/km².

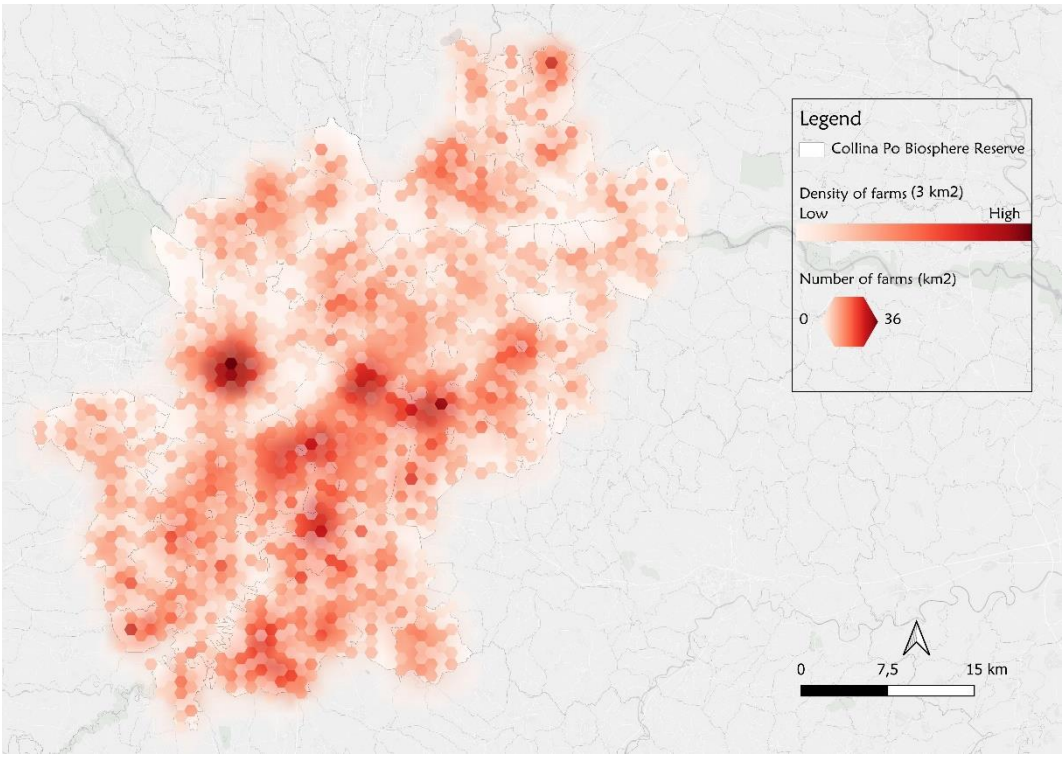

Figure 53: Distribution of farms in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

The distribution is heterogeneous and reflects both topographical constraints and land-use allocation patterns. High-density clusters (dark red hexagons) are

concentrated primarily along the central and southern belt of the BR, particularly in zones characterized by favorable morpho-climatic conditions. Lower-density areas (lighter tones) are generally located in the eastern parts, where hills determine higher elevation, and consequent dominance of non-agricultural land uses such as forests[73].

To look closely at farms' field of production, it is relevant to address the utilized agricultural area (UAA). The spatial distribution highlights a clear concentration of large-scale agricultural surfaces in the southern and northern parts, where a few municipalities account for a disproportionately high share of the total UAA, coherently with the plain's morphology.

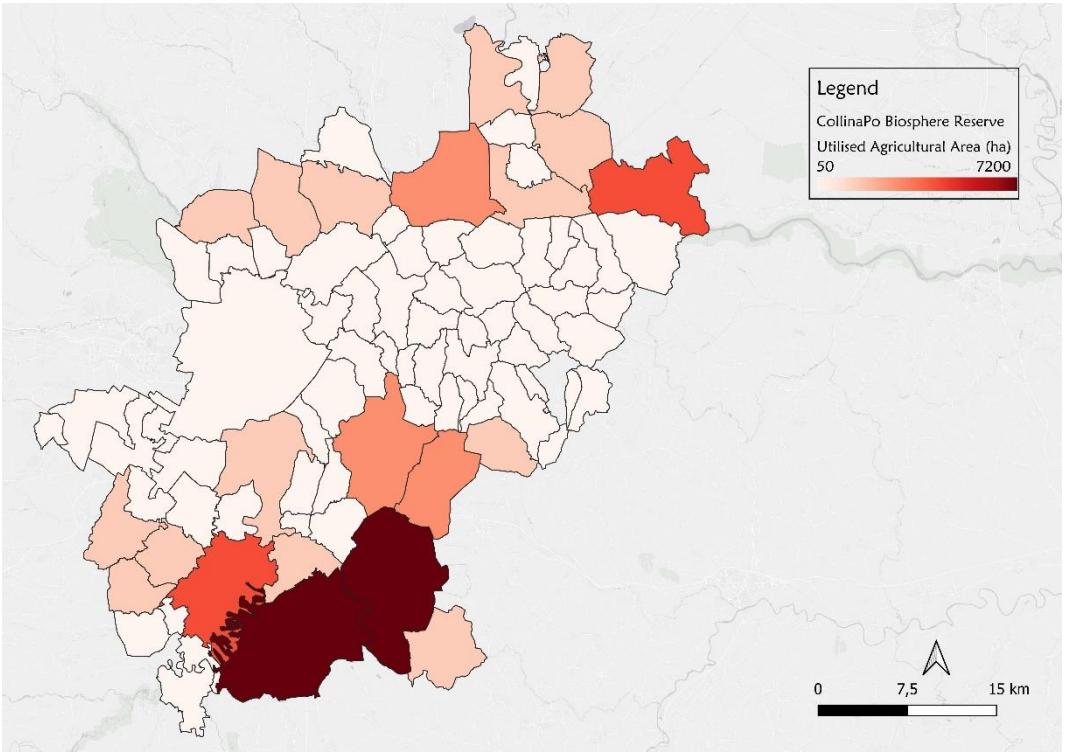

Figure 54: Utilized Agricultural Area (UAA) in CollinaPo (2023)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

In greater detail, the spatial distribution of agricultural land uses within the Biosphere Reserve reveals a differentiated agrarian structure (Figure 55).

[73] It is important to note that the apparent concentration of farms within the area of the City of Turin does not reflect the actual farms' space of activity; rather, it is largely the result of farms being administratively registered in the city while their production activities occur elsewhere. The dataset has not been adjusted to correct for this registration bias in order to preserve the integrity of the original source of data.

Arable land, depicted in light yellow, constitutes the dominant land-use category and occupies the majority of the southern, western, and northern sectors of the BR. This pattern indicates a strong prevalence of annual cropping systems, typically associated with mechanized production, crop rotation regimes, and market-oriented agriculture.

Arable meadows and pastures, shown in light green, are more fragmented in their spatial distribution, yet they exhibit higher concentrations in peri-urban areas and along intermediate hillslopes, where mixed farming systems and livestock-related practices remain viable due to topographic and accessibility conditions. Permanent crops, represented in pink, display a markedly clustered spatial configuration, concentrated in a limited number of municipalities.

This pattern reflects the localized establishment of vineyards, orchards, and olive groves, which are often tied to specific pedoclimatic conditions, historical land-use trajectories, and terroir-based or high-value agricultural specializations. Together, these spatial arrangements highlight the coexistence of extensive annual cropping systems with more localized, territorially embedded forms of cultivation within the BR.

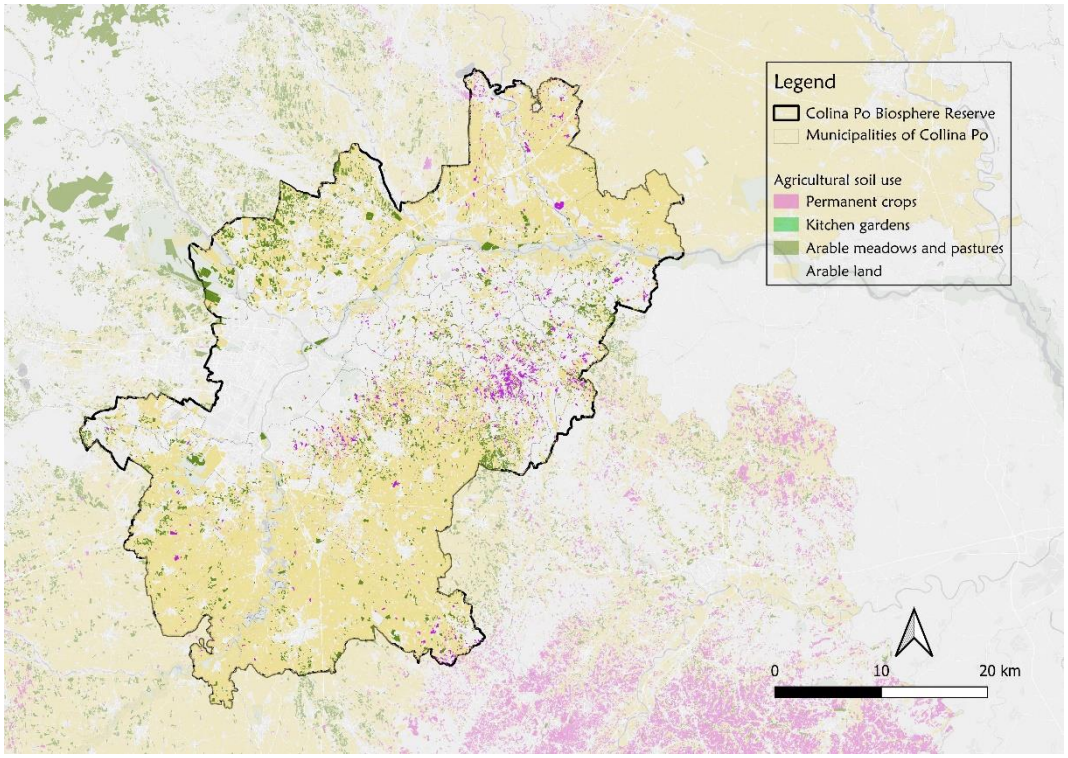

Figure 55: Agricultural soil uses in CollinaPo (2022)
Source: Author's elaboration based on data from Corine Land Cover

More detailly, Figure 56 clearly displays how the arable land is dominated by wheat (yellow) and corn (orange), with wheat showing widespread distribution across the southern and western sectors, while corn is concentrated in lowland.

Barley (brown) and oat (light green) are present in limited yet distinct patches, often in mixed-cropping contexts or marginal lands.

Rice (light blue) is highly localized in the northeastern municipalities, historically known for this production (Brusa & et al., 2004), while soy (dark blue) occurs in smaller, dispersed fields, describing a more specialized, rotation-based production pattern.

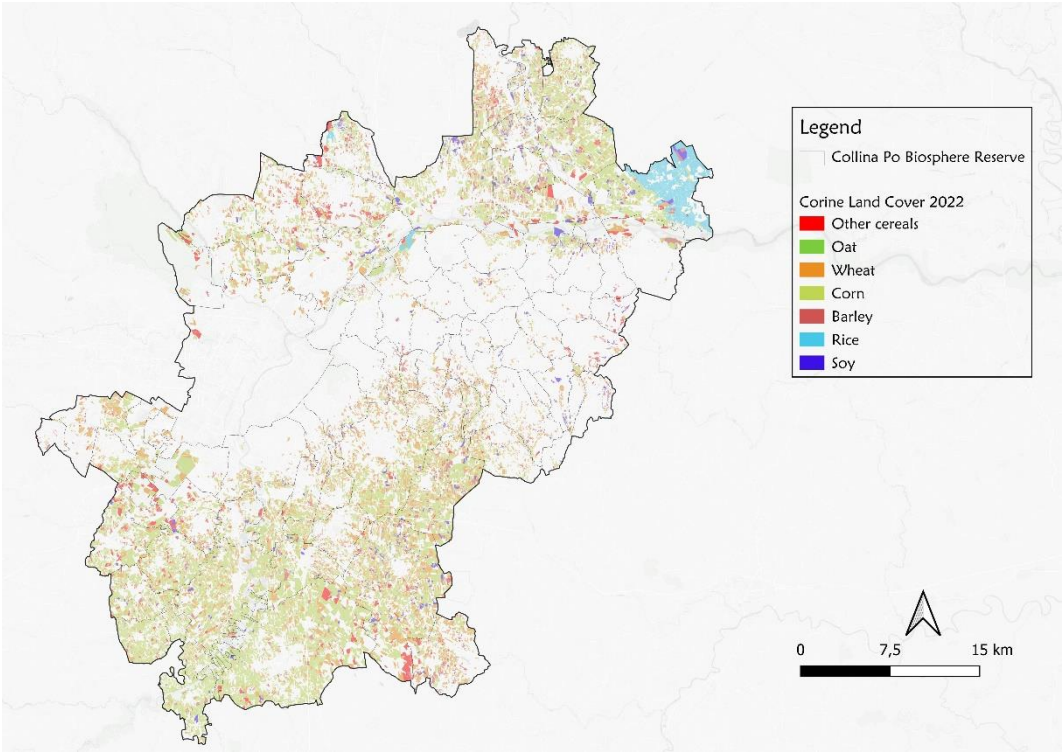

Figure 56: Production of cereals in CollinaPo (2022)
Source: Author's elaboration based on data from Geoportale Piemonte

It is possible to extract a synthesized understanding of the extension of cereal's production by analyzing the double horizontal bar chart visible in Figure 57. It compares the composition of Utilized Agricultural Area (UAA, in hectares) with

total production volumes (in quintals) across main crop macro-categories within CollinaPo.

Cereals account for the largest share of cultivated land, representing slightly more than 60% of the total UAA, yet their contribution to production volume is proportionally lower, suggesting harvest differentials compared to other categories.

Fodder crops occupy the second largest share of UAA, around 30%, and produce a similar proportion in terms of volume. Industrial croplands, although limited to a small fraction of UAA, contribute more significantly to production volume, indicating higher productivity per hectare. Vineyards, fruit trees, olive trees, vegetable crops, and other minor categories each occupy a minimal share of land use and show a proportionately small amount of production.

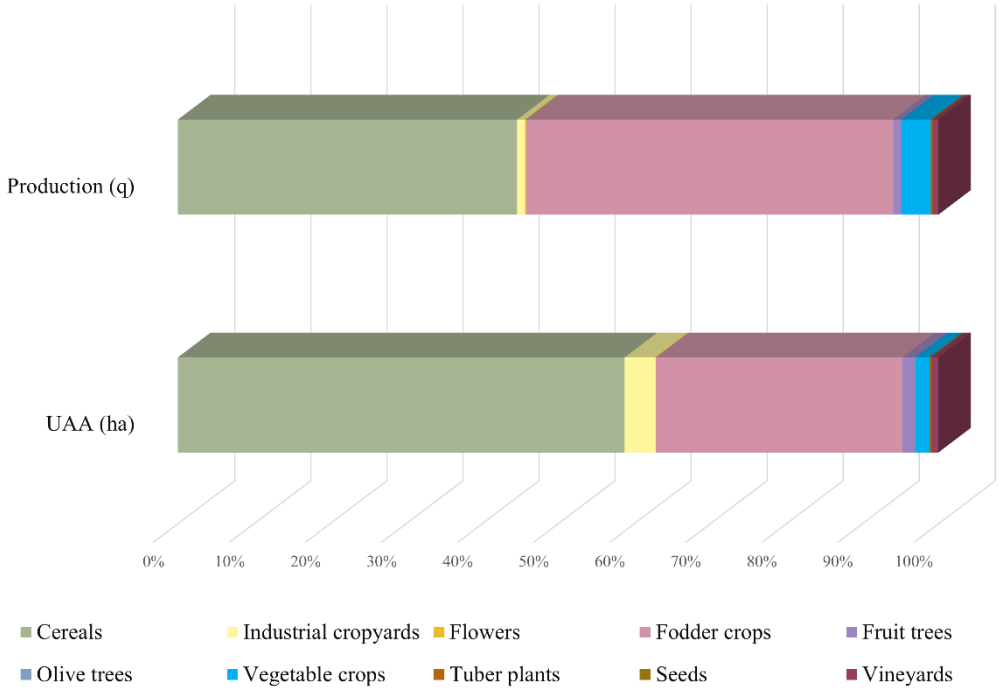

Figure 57: Productions over the UAA in CollinaPo (2022)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

The spatial distribution of production volumes for the main crop categories indicates a marked geographical specialization within the CollinaPo area (Figure 58), although the absolute quantities vary substantially between categories.

Cereals and vegetable crops show the highest concentrations in the southern municipalities, with particularly intense production in the south-western sector, around Carmagnola, which emerges as the major agricultural hub.

Fruit tree production is predominantly located in the northern and north-eastern parts of the area, while pulses, although quite contracted in terms of production, are localized in a very small group of northern municipalities, evidencing a curious extremely narrow geographical focus. Tuber plants are mainly concentrated in the south-east, with additional smaller nuclei in the south-west.

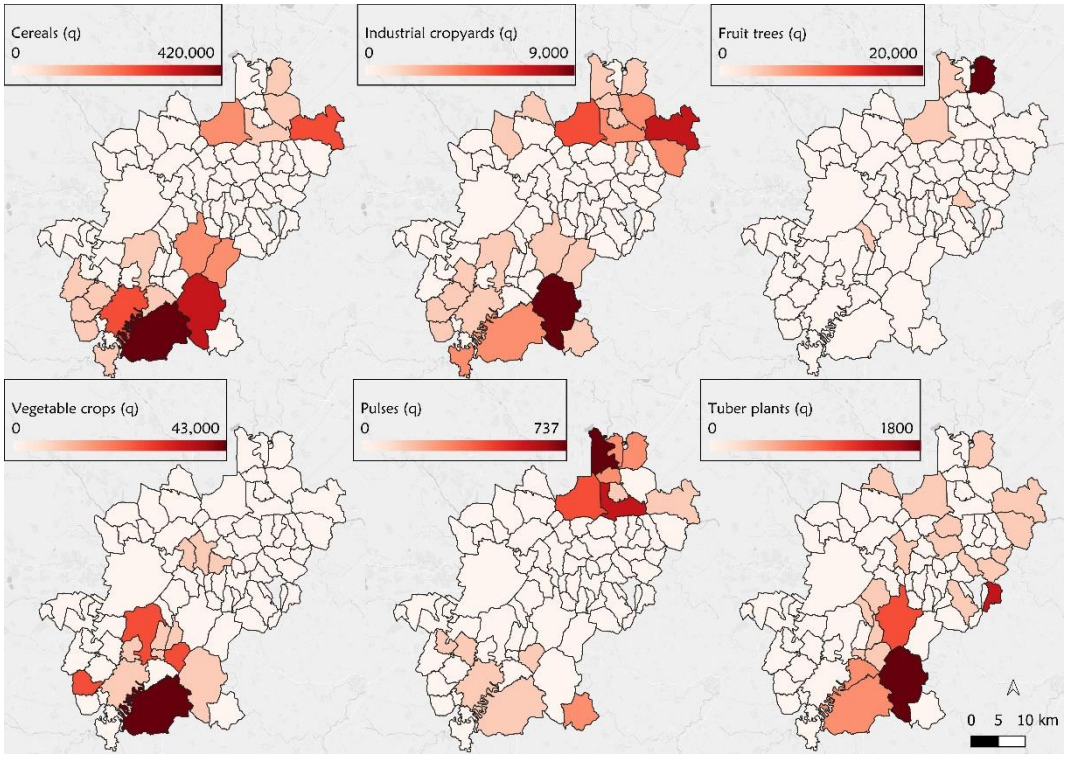

Figure 58: CollinaPo's territorial specializations of production (2022)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

The juxtaposition of area specialization and volume production, and the quantity over surface information addressed above, underline discrepancies between land allocation and output, evidencing how certain high-value or high-yield crops occupy disproportionate surface coverage.

Specifically concerning the cereals' production, it is worth noting that large amounts of this product are destined for livestock grazing, as confirmed by the number of farms active in this production at first (Figure 59).

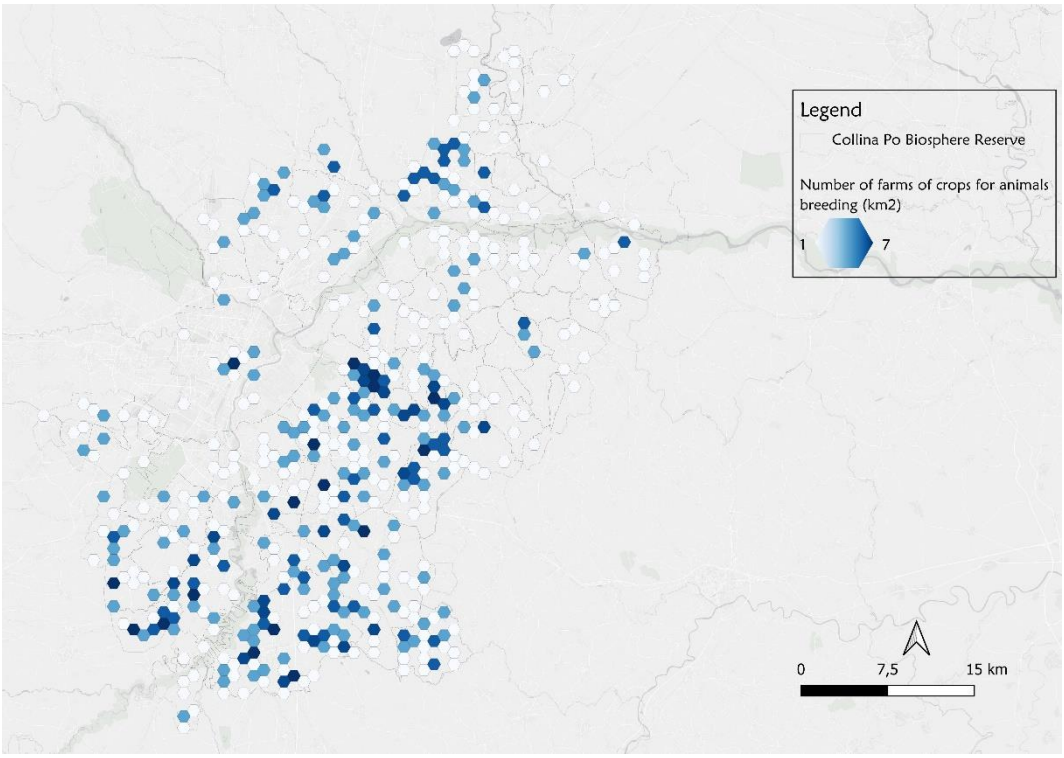

Figure 59: Distribution of farms of crops for livestock grazing in CollinaPo (2022)
Source: Author's elaboration based on data from Camera di Commercio

In this context, the spatial distribution of livestock production, expressed in Livestock Units (LSU), provides a direct measure of the intensity and concentration of animal farming activities across the CollinaPo territory. The map highlights a pronounced clustering in the southern municipalities, particularly in the south-west, where LSU values reach 15,000, indicating large-scale operations and a high density of rearing facilities. Adjacent southern and south-eastern areas also record significant livestock activity, forming a contiguous belt of elevated production intensity. In contrast, the northern and north-eastern municipalities show much lower LSU values, suggesting a prevalence of smaller-scale or less intensive operations.

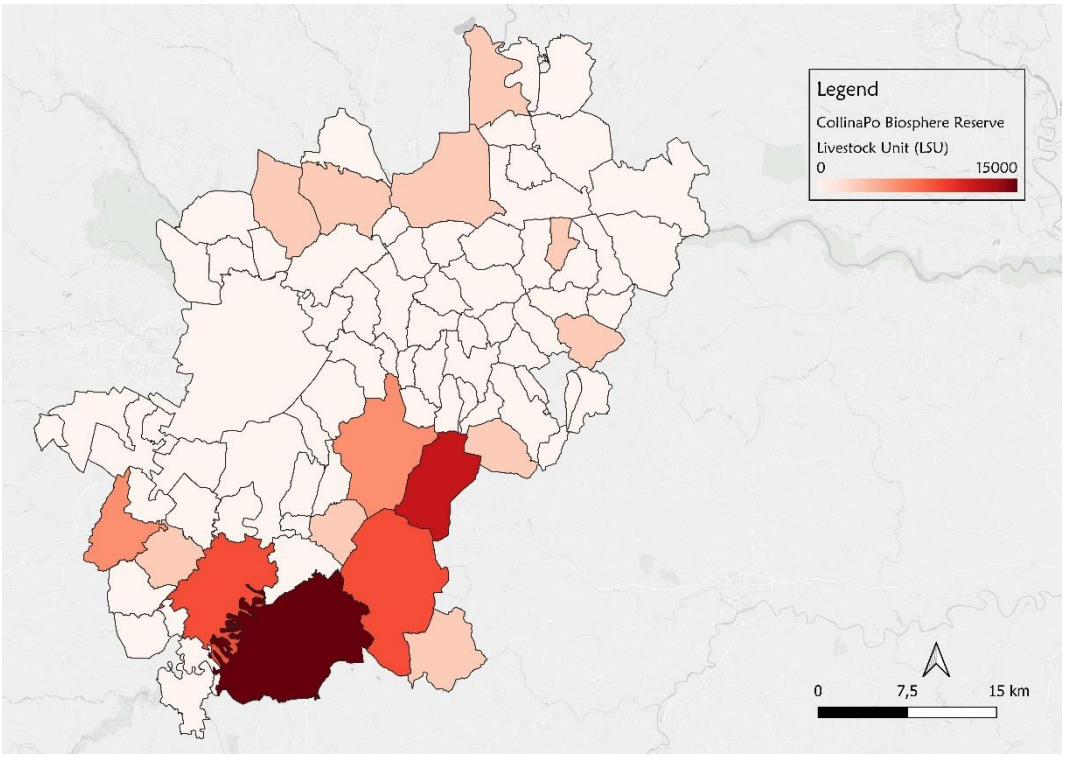

Figure 60: Livestock grazing in CollinaPo (2023)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

The spatial disaggregation of livestock production categories across the BR, displayed in Figure 61, not only confirms the presence of distinct production zones but also points toward structural characteristics of the local livestock economy.

Cattle and buffalo production is heavily concentrated in the southern municipalities, with herd sizes reaching 16,000 heads. This correlates directly with the high Livestock Unit (LSU) values already observed and suggests the existence of large-scale, capital-intensive operations capable of sustaining both breeding and fattening cycles. Pig farming displays a markedly different geography, with the highest concentration found in a central-eastern cluster. This centralization implies a high level of integration with feed supply chains, likely linked to the fodder production patterns previously mapped.

Poultry farming stands out as an anomaly in both scale and distribution. The extraordinarily high figure of 9 million birds registered in Cocconato is technically significant: such a volume can only be achieved by a small number of highly industrialized facilities, possibly even a single large-scale complex. This suggests that while the spatial footprint of poultry farming in the BR is small, its economic and environmental footprint may be disproportionately large, potentially

dominating local supply chains and consisting of harmful farms for poultry wellbeing.

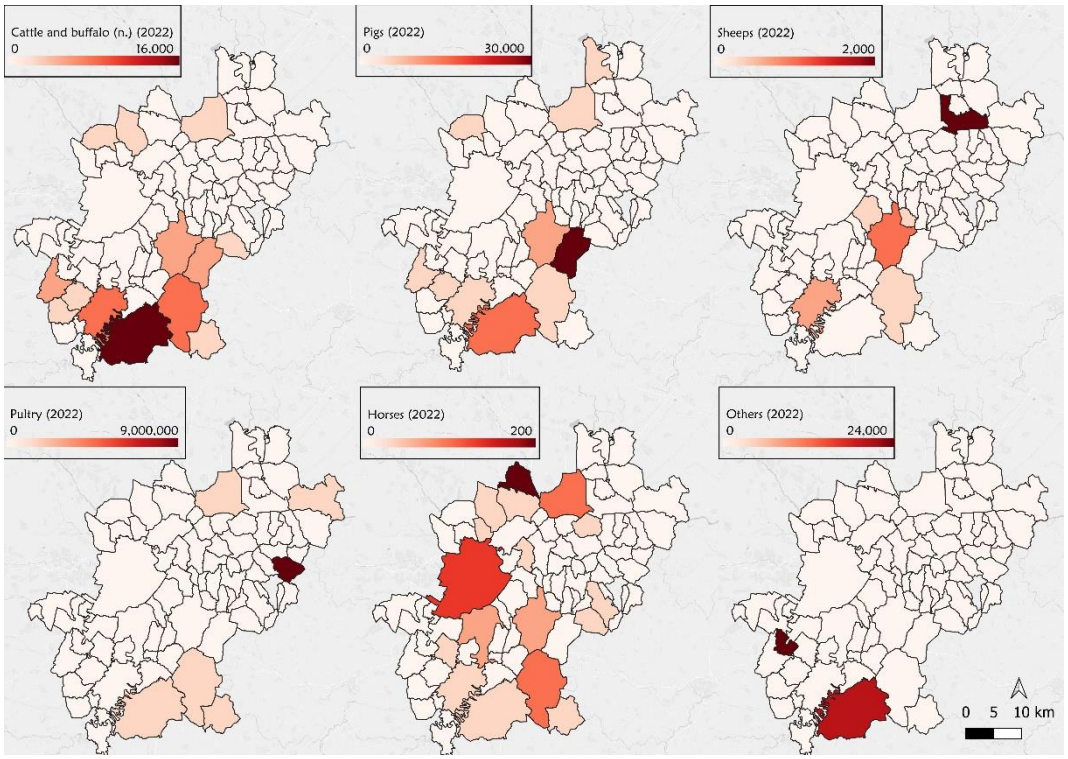

Figure 61: Livestock grazing specialization in CollinaPo (2022)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

Pig farming might experience a situation like the poultry's one. As visible on Figure 62, the juxtaposition of livestock heads and livestock farms by category provides clear evidence of structural concentration within pig farming. While pigs represent a very large share of total livestock heads, their share of total livestock farms is considerably smaller. This discrepancy confirms the presence of a highly concentrated production structure, where a relatively limited number of pig farms are responsible for disproportionately high output volumes. Such a pattern is consistent with intensive, industrial-scale farming systems, which operate with high stocking densities and advanced production infrastructure, allowing a few operators to dominate total output.

Clearly, differences in the final meat products are visible; as affirmed by a local producer,

"a differenza degli allevamenti che spingono molto sull'alimentazione e finiscono un capo in 14 mesi, a noi servono 22-23 mesi, diciamo dai 20 ai 24 mesi.

È un costo enorme, perché devi alimentare gli animali per molti mesi in più, e alla fine il peso guadagnato non è poi così tanto. Però l'alimentazione è più naturale e la carne rimane: quando la cucini non si riduce, perché si è formata lentamente. Chi spinge troppo sull'ingrasso ottiene una carne che non è la stessa cosa. Alcuni clienti mi hanno persino mandato dei video, dicendo: "Guarda, questa fettina presa altrove si è dimezzata in cottura, preferisco la tua carne!". È proprio una questione di cura"(Farmer, Interview, September 2, 2019)[74].

He also adds that,

"Detto questo, non me la prendo con chi alleva in modo diverso: purtroppo è la popolazione che lo richiede. Alla fine, chi vuole il prezzo basso e la comodità trova al supermercato carne ovunque, a un costo molto inferiore rispetto a una macelleria di qualità. E lo stesso vale per le macellerie: alcune lavorano molto bene, altre peggio persino di un supermercato" (Farmer, Interview, September 20, 2019)[75].

[74] "Unlike intensive farms that push heavily on feed and finish an animal in 14 months, for us it takes 22–23 months, let's say between 20 and 24 months. It's a huge cost, since you have to feed the animals for many more months, and in the end the extra weight gained isn't that much. But the feeding is more natural, and the meat holds: when you cook it, it doesn't shrink, because it developed slowly. Those who push too much on fattening get a meat that's not the same thing. Some customers have even sent me videos saying: 'Look, this steak I bought elsewhere shrank to half its size in cooking, give me your meat back instead!' It's really a matter of time and method".

[75] "That said, I don't blame those who farm differently: unfortunately, it's what people demand. In the end, those who want low prices and convenience find meat in the supermarket, at a much cheaper cost than in a quality butcher shop. And the same goes for butchers: some work very well, while others are worse than a supermarket".

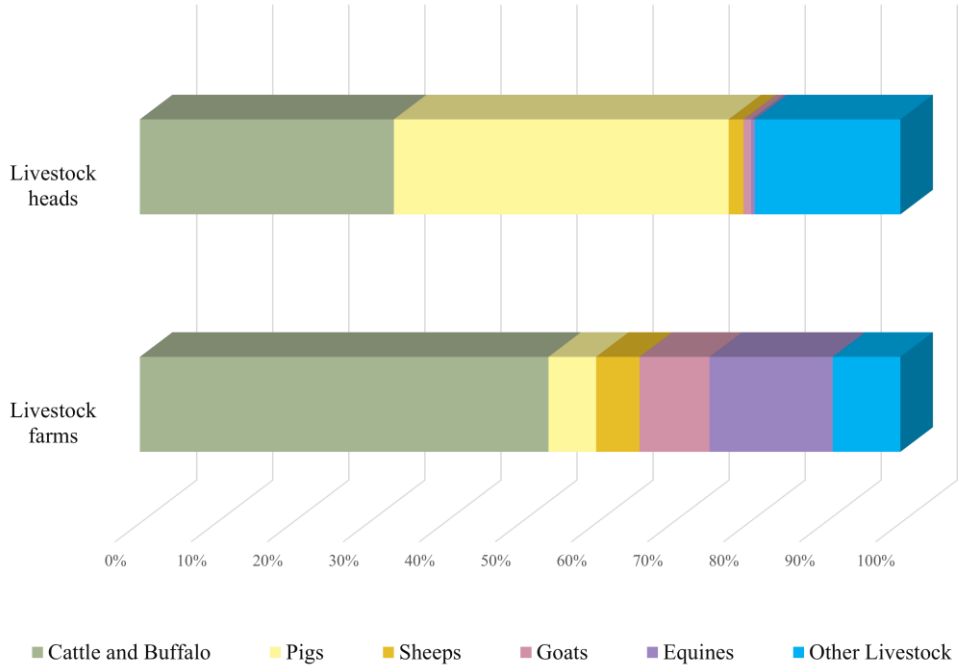

Figure 62: Livestock farms and heads by species distribution in CollinaPo (2022)[76]
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

Figure 63 depicts certified organic parcels (green) across CollinaPo's municipal frame and shows a highly fragmented, fine-grain distribution with a few clusters, most notably along the mid-Po and in the south, and large areas with little or no organic presence.

Against the reserve's 170,000 ha, a scale-based visual summation suggests organic land on the order of 6,000–9,000 ha (3.5–5.5%) of CollinaPo); even if one normalizes by Utilised Agricultural Area (UAA) rather than total territory, the organic share likely remains modest, roughly 7–14% of UAA under typical peri-urban ratios, underscoring under-representation relative to the agricultural base.

Patch geometry indicates high perimeter-to-area ratios and weak contiguity, implying sensitivity to spillovers from conventional neighbors, meaning that, if most of farmers keep working with traditional farming, those few organic areas might not be considered as respectful of the necessary prescriptions.

[76] Poultry was taken out of this graph due to the overrepresentation in percentage

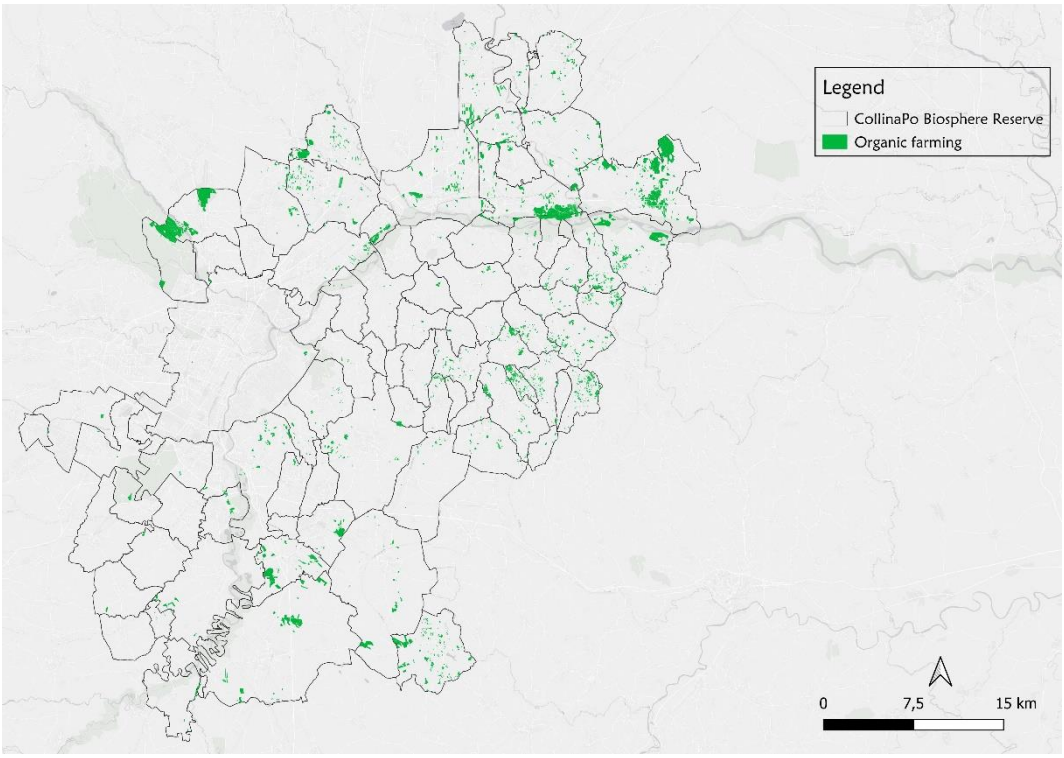

Figure 63: Surfaces cultivated with organic farming in CollinaPo (2023)
Source: Author's elaboration based on data from Geoportale Piemonte

Finally, the profile of farm owners in the CollinaPo Biosphere Reserve offers a complex, multi-layered picture of an agricultural system that does not differ from the regional one (Figure 64).

The age distribution is highly expectable: in CollinaPo, similarly to the above seen Piedmont region, producers over 55 years old constitute the clear majority, with the 65+ category alone occupying a significant portion of the total.

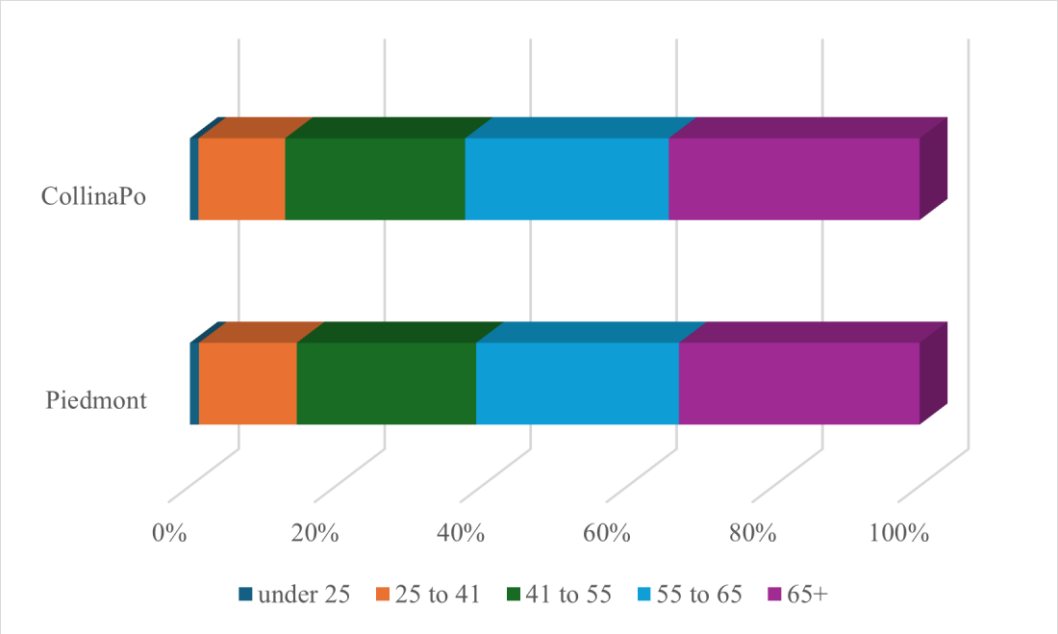

Figure 64: Farmers' age profile in CollinaPo and in the Piedmont Region (2024)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

Aside from farmers' age, the gender asymmetry within the farming population is a crucial dimension to investigate. As visible in Figure 65, the spatial gender maps reveal a marked male dominance in agricultural ownership across nearly the entire BR.

Female producers are not evenly distributed: they are concentrated in a small cluster of municipalities, mostly in the western and northwestern sectors of the area, where their share occasionally rises but remains firmly below 35% of total producers. By contrast, in most municipalities, especially in the southern and eastern portions of the territory, male ownership exceeds 70–80%, in many cases approaching full dominance.

This geographic polarization highlights how women's presence in farming is highly localized and marginal, suggesting that the gender imbalance is not only structural but also spatially uneven. The rarity of municipalities with higher female participation points to persistent barriers to women's access to land and farm ownership, with men overwhelmingly controlling agricultural enterprises across the region.

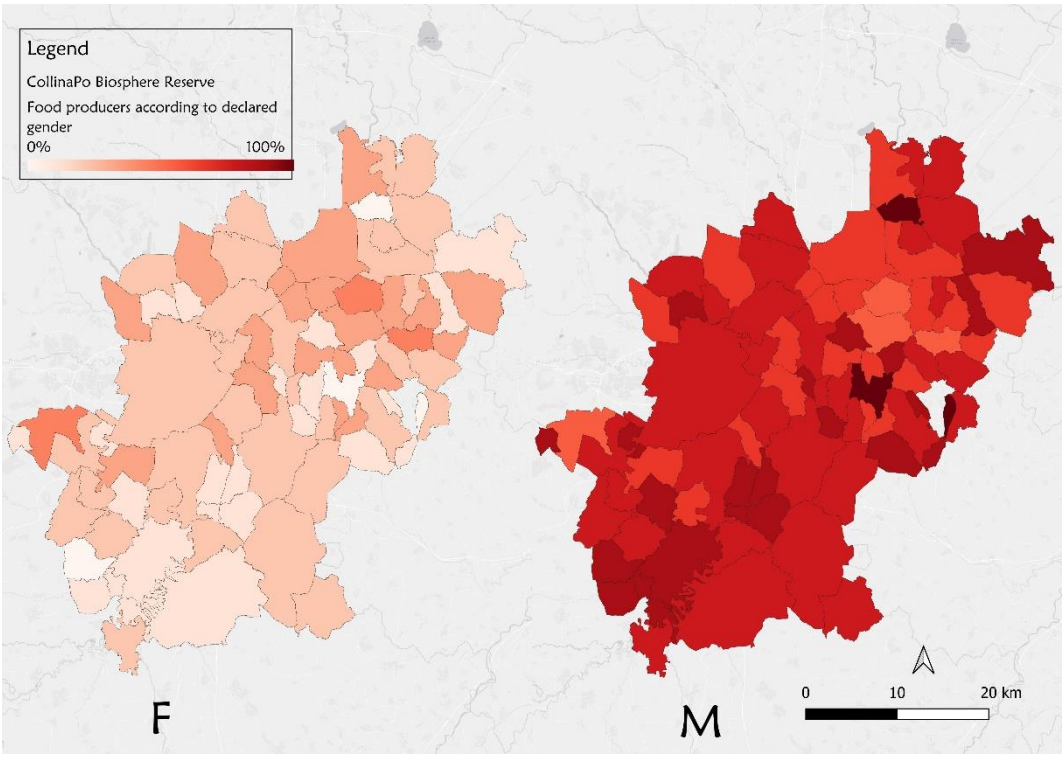

Figure 65: Farmers distribution according to declared gender (2024)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

Farms' legal form deserves attention too. As shown in Figure 66, the overwhelming dominance of individual enterprises, which constitute the majority of farms, highlights the persistence of family-based, unincorporated holdings as the prevailing organizational model in the CollinaPo area.

This prevalence reflects a deeply rooted tradition of small-scale farming, where ownership and management remain concentrated within households rather than being structured into more complex corporate or collective arrangements. Beyond individual enterprises, only a limited share of farms adopts alternative legal forms: simple partnerships represent the second most common structure, yet they remain marginal in comparison, while joint-stock companies, cooperatieve societies, and consortia account for a very small fraction of the total. Even rarer or absent, there are forms of cooperative and collective models suggesting that economies of scale, risk-sharing, and collaborative approaches to production and marketing are not yet widespread in this context.

Quite often, nonetheless, producers also join cooperatives to hold larger negotiation power when dealing with big retailers. Indeed, as affirmed by a local producer,

"La politica della nostra cooperativa è quella della qualità. Si è sempre scelto di non avere produttori con quantitativi enormi di merce, perché sarebbero molto più difficili da gestire anche in campo. È preferibile invece lavorare con piccoli produttori che hanno volumi più contenuti, ma che possono seguire direttamente e con cura tutto il processo produttivo della frutta: questo fa davvero la differenza" (Farmer, Interview, September 19, 2024)[77].

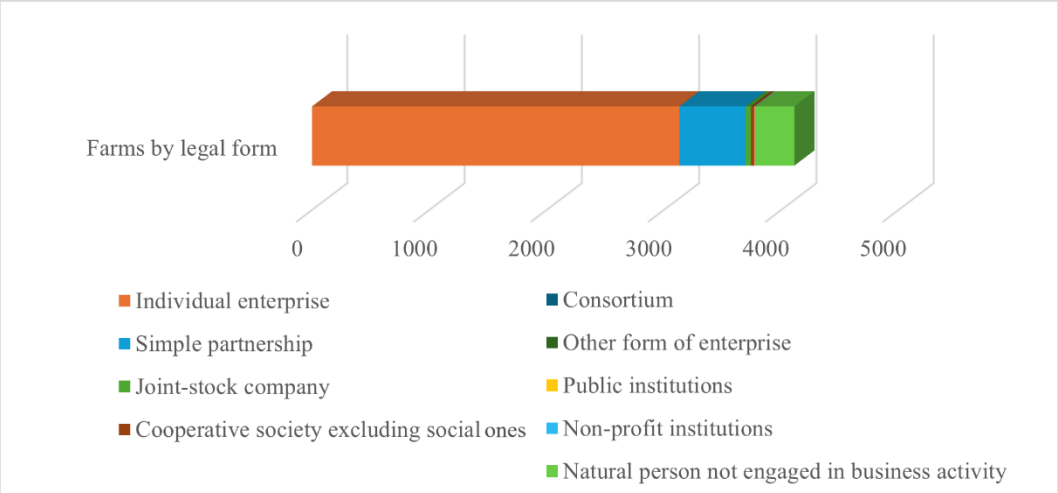

Figure 66: Farms according to their legal form (2024)
Source: Author's elaboration based on data from Anagrafe Agricola Piemonte

3.2.2. Processing

In Piedmont, the food processing sector represents the second foundational pillar of the regional food economy, alongside primary production. Structurally, it is a highly articulated system, encompassing multiple layers of specialization, firm typologies, and value-chain integration patterns. According to a report elaborated by IRES, the sector can be segmented into three principal categories (IRES, 2020): (1) vertically integrated operators within the main regional agri-food chains, viticulture, cereal and rice processing, fruit and vegetable transformation, dairy, and beef production, often combining primary production with processing capacities; (2) medium-sized enterprises, typically employing several hundred workers, in growth phases across bakery, preserved foods, and related sub-sectors; (3) a dense constellation of micro- and small-scale artisanal enterprises, driven by consumer

[77] "Our cooperative's policy is one of quality. They have always chosen not to work with producers handling very large volumes, as those are much harder to manage even in the field. Instead, it is preferable to have small producers with more limited quantities, who can directly and carefully follow the entire fruit production process: this is what really makes the difference.

demand of quality within local productions. In addition, a small but strategically significant group of national-scale operates with limited reliance on local raw materials but are strongly export-oriented.

Focusing on the processing sector distribution in CollinaPo, at first glance, it is markedly polarized, with a pronounced concentration in the urban area of Turin, where the map displays a compact industrial core. In contrast, within the rest of the CollinaPo Biosphere Reserve, the processing sector is far more dispersed, appearing as small, isolated clusters interspersed with extensive low-density or non-industrial cells.

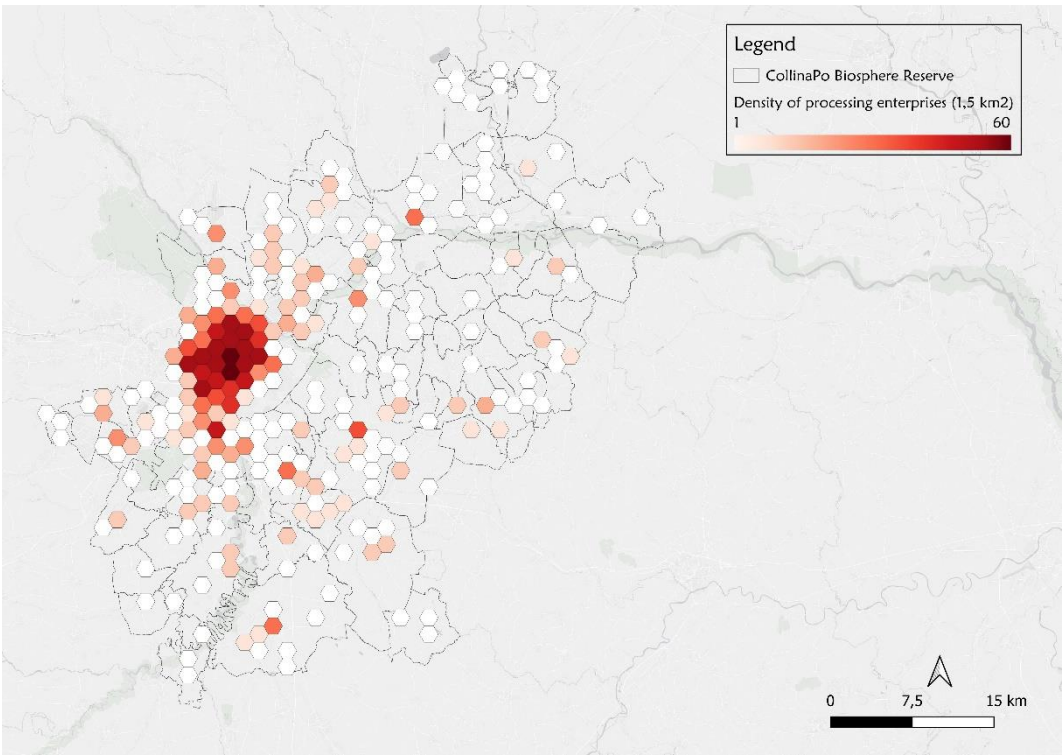

Figure 67: Distribution of processing enterprises in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

Yet, the high-density cluster observed in Turin corresponds, in the sectoral distribution, to an overwhelming predominance of bakery and farinaceous product enterprises, whose functioning is intrinsically tied to the daily provisioning of a large, concentrated consumer base. Complementary sectors, including dairy products and ice cream, meat-based processing, and miscellaneous food production, are present but spatially interwoven with bakery sites rather than forming independent concentrations, indicating a diversified yet bakery-led urban processing economy.

In contrast, the BR exhibits a markedly lower overall enterprise density in the previous map, but the point distribution reveals a wider functional spectrum, often aligned with primary production zones and territorial branding strategies. Alcohol production, encompassing spirits, wines, and beers, alongside cereal and starch-based manufacturing, shows localized clustering in rural municipalities, suggesting a strong integration with agricultural raw material supply chains and, in some cases, tourism-driven demand.

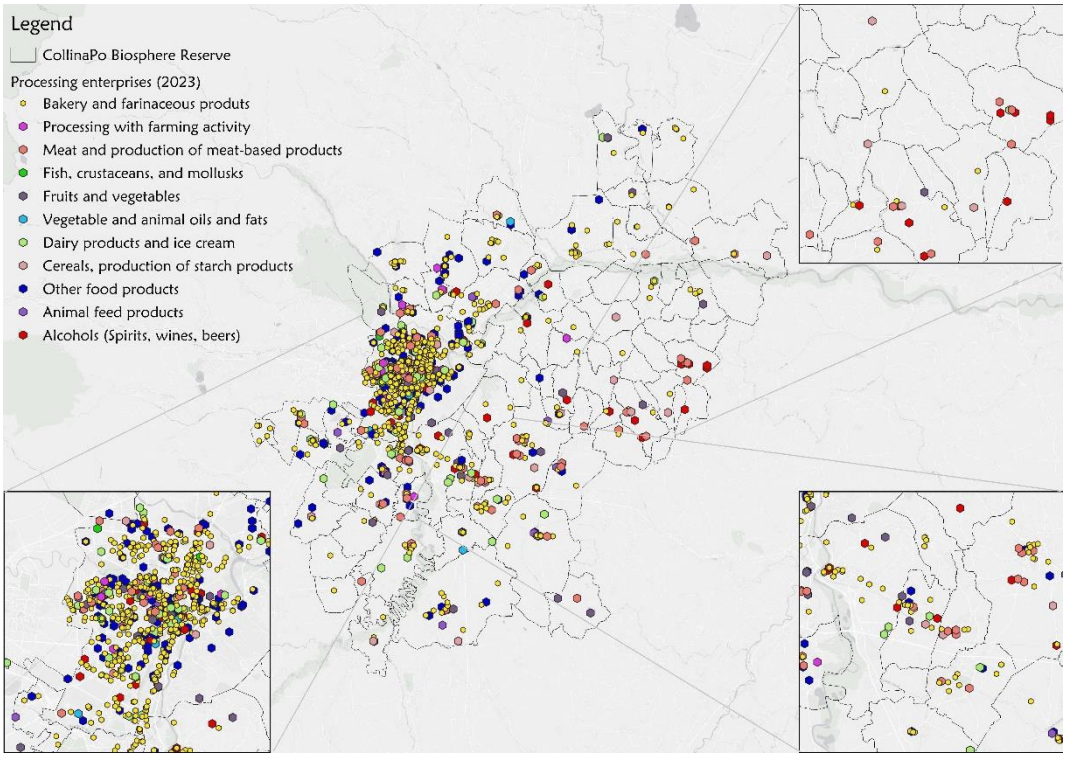

Figure 68: Processing enterprises distribution in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

Figure 69 presents the total number of processing enterprises in 2023, disaggregated by product category, and it confirms the predominance of bakery and farinaceous product manufacturing within the study area. With approximately 880 registered units, this category alone accounts for most processing sites. Meat and meat-based product manufacturing follows with around 90 units, representing a substantial though far smaller component of the sectoral structure, but probably larger in dimension of the infrastructure.

Dairy products and ice cream and beverage production stand out slightly among these minor groups. Cereals and starch product manufacturing, fruits and vegetables

processing, vegetable and animal oils and fats, and animal feed products each register minimal values, indicating niche or highly specialized activities.

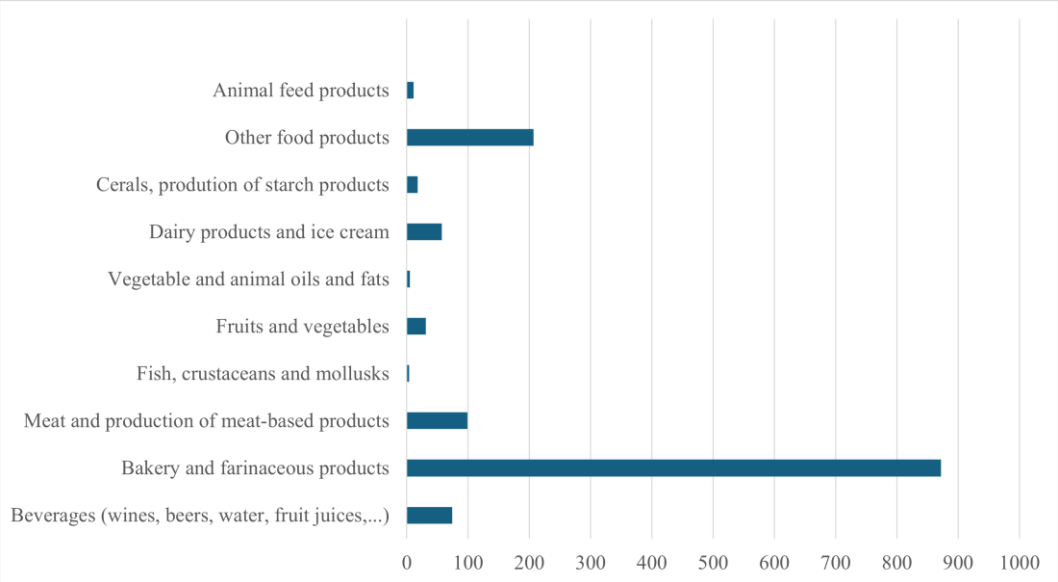

Figure 69: Processing enterprises per type of food in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

Alongside the food processing sector, which in most cases also performs packaging in-house, there is a much smaller segment of specialized firms offering contract packaging services. These third-party operators, far fewer in number, handle a wide variety of tasks for their clients: from primary and secondary packaging of food products to labelling, quality control, and portioning, as well as assembly, storage, and related logistics.

They may work with a broad range of products, from wine, coffee, and grains to meat, dairy, and prepared foods, and often provide flexible, on-demand capacity for seasonal peaks, promotional formats, or for producers lacking their own packaging lines. Though small in scale, this niche plays a strategic role in supporting diversity within the regional food system.

About their position in the food supply chain, a retailer affirms that

"Oggi c'è troppa scelta più o meno vera, soprattutto per i giovani: bustine, confezioni di cioccolato, creme… spesso ne basterebbe una, e invece se ne vendono, e quindi comprano, cinque. Così molta roba scade e finisce sprecata, mentre gli imballaggi, sempre più piccoli e numerosi, generano montagne di plastica e inquinamento. Il problema è che la prima scelta la fa la confezione: sette,

dieci colori che catturano l'occhio, specie dei bambini, e così non comprano il pacco bianco, che magari è uguale o migliore. Io anche, se voglio vendere, sono obbligato ad avere tutte le confezioni più estetiche e colorate, anche se sono tutte uguali" (Retailer, Interview, February 02, 2025)[78].

3.2.3. Logistics

The logistics sector, often underestimated in strategic agrifood analyses, probably due to the intrinsic difficulty of compiling comprehensive and comparable datasets, can be addressed as a "meta-sector" posing the fundamental basis for the entire agri-food system. In particular, as defined by IRES, "se la logistica non si limita alle sole attività di trasporto e di magazzinaggio e se i processi logistici si estendono in ogni ambito, allora non può essere considerata un settore a sé stante, ma piuttosto una componente presente in tutti i settori"[79] (IRES, 2021, p. 5). It structurally enables all other sectors to function.

Figure 70 distinguishes between the spatial patterns of farms (top left), processing enterprises (top right), and transport/logistics hubs (bottom center). Farms are widely dispersed across the territory, with moderate density peaks shaped by land availability and rural settlement structures. Processing enterprises are far more concentrated, clustering sharply in Turin's metropolitan area. Transport and logistics nodes surely align with the processing cluster.

Critically, what emerges is that the transport pattern is not an independent spatial system but a functional derivative of the processing geography, which itself is positioned to serve the diffuse agricultural hinterland. This creates a hierarchical land-use model: farms occupy an extensive, low-density rural matrix; processing operates as a selective urban-industrial core; the logistics forms an intensively centralized infrastructural overlay.

The strong spatial coupling of logistics, processing, and farming, visible in their near-perfect cluster overlap, may maximize economies of agglomeration. However, it also reveals structural vulnerabilities: the entire value chain's efficiency could depend on the capacity of a few concentrated hubs, making them potential bottlenecks.

[78] "Today there's too much choice, real or perceived, especially for young people: little packets, chocolate wrappers, creams… often one would be enough, but five must be ready, and so five get bought. A lot of this food expires and ends up wasted, while the ever smaller and more numerous packages generate mountains of plastic and pollution. The problem is that packaging makes the first choice: seven, ten colors that catch the eye, especially of children, so they don't pick the plain white pack, even if it's the same or even better. And I too, if I want to sell, am forced to sell products with more aesthetic and colorful packaging, even though the conent's all the same".

[79] If logistics is not limited to just transport and warehousing and if logistical processes extend to every sector, then it cannot be considered a standalone sector, but rather a component present in all sectors.

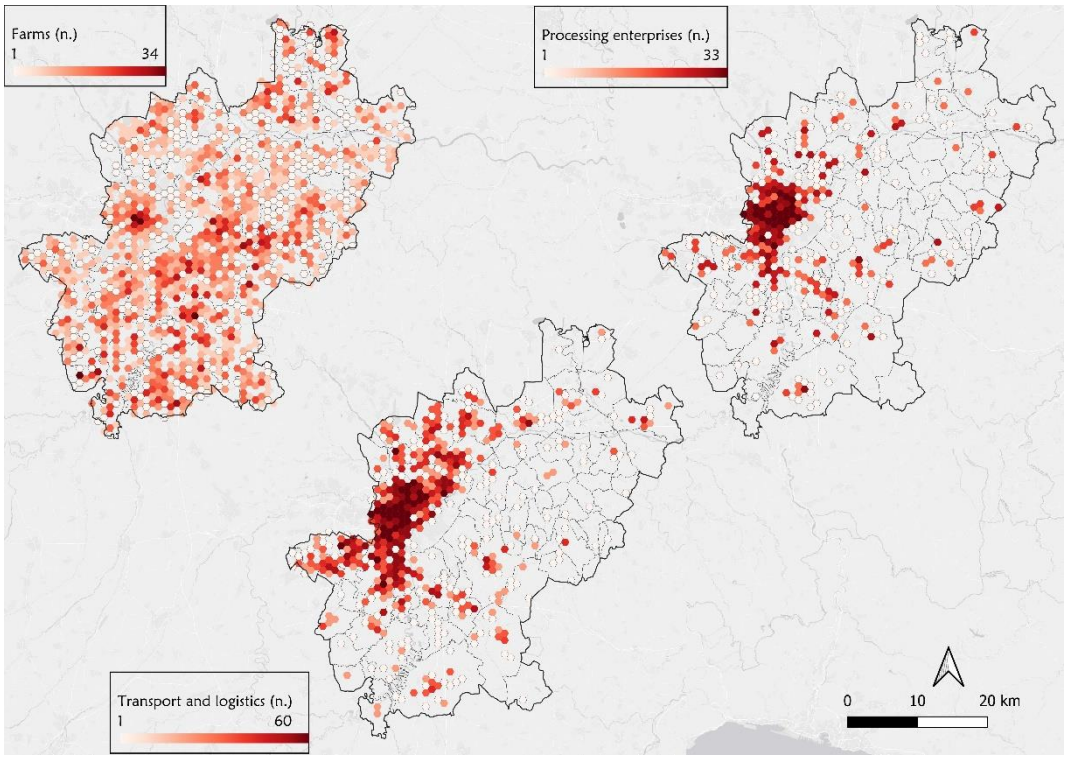

Figure 70: Distribution of farms, processing enterprises and transport and logistic hubs (2023)

Source: Author's elaboration based on data from Camera di Commercio

3.2.4. Wholesale

The wholesale food trade in Piedmont presents a markedly uneven structure, with a clear predominance of food wholesale intermediaries (agents), who count 3,929 actors and represent about 72% of the total.

This central role of intermediaries highlights the importance of brokerage in linking the production system to the retail network. The second largest group, wholesalers of food products and beverages (1,010 units, roughly 18.5%), constitutes the operational structure of distribution. By contrast, the non-specialized wholesale trade (356 units, 6.5%) plays a more complementary role, possibly offering broad-spectrum coverage in contexts where demand is varied but less intense.

At the lower end of the spectrum, the wholesale of agricultural raw materials and live animals (167 units, just over 3%) reflects the relatively minor need of intermediaries for the production section only, consistent with a food system where farms succeed in establishing own channels of sales.

Taken together, these figures depict a wholesale sector that is highly intermediary driven, with a strong reliance on agents and specialized distributors to sustain the scale of metropolitan demand, while still maintaining a degree of territorial coverage through non-specialized actors.

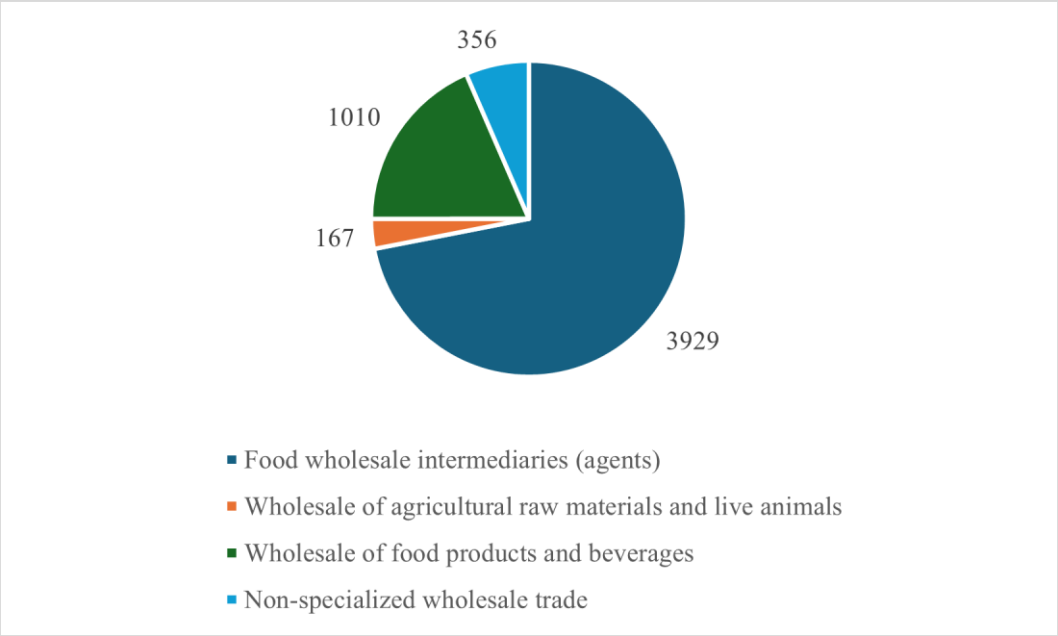

Figure 71: Share of intermediaries in CollinaPo's food supply chain (2023)
Source: Author's elaboration based on data from Camera di Commercio

Regarding this important number of intermediaries, often defined as brokers, a retailer affirms that

"Guarda, io direttamente dal produttore quasi mai riesco a comprare. Ci vuole sempre qualcuno in mezzo che faccia da tramite, e fin qui va anche bene, perché ti serve chi mette insieme i quantitativi e organizza i trasporti. Il problema è che in mezzo ci finiscono anche un sacco di broker strani: gente che non ha nemmeno un magazzino, non vede mai la merce, però fa fatture e gira soldi. Ufficialmente ti dicono che semplificano i passaggi, ma in realtà servono a far girare nero per le grandi aziende, che così si tengono liquidità fuori dai conti. E allora ti ritrovi con una catena piena di intermediari che non servono a niente sul prodotto, ma che sono utili a quel tipo di gioco lì. E ovviamente ti aumentano il prezzo finale, va così" (Retailer, Interview, August 24, 2025)[80].

[80] "Look, I almost never manage to buy straight from the producer. There's always someone in the middle, and that part is fine, you need people to pull quantities together and organize transport. The problem is that in between you also get all these shady brokers: people with no warehouse, who never even touch the goods, but issue invoices and move money around. Officially they say they make things easier, but in reality they mostly

More detailly, as visible in Figure 72, the spatial distribution of food wholesalers across the CollinaPo area presents a clear geography structured around metropolitan agglomeration, infrastructural corridors, and peripheral service points. At the metropolitan scale, Turin emerges, once again, as the undisputed core of wholesale activity, where all product categories converge in a dense cluster. The concentration of fruits and vegetables, meat and fish, dairy and fats, beverages, and confectionery indicates a strong reliance on metropolitan accessibility, where wholesalers can simultaneously respond to the demands of retail, catering, and hospitality sectors.

Moving outward from the urban core, the pattern shifts into a corridor-based structure. Wholesale establishments align along the main roads and logistics axes that connect Turin to the broader region.

Product-specific differences emerge within this system: perishable goods such as dairy, meat, and fresh produce show a stronger concentration within the inner belt of Turin, consistent with the need for cold-chain continuity and high-frequency deliveries, while beverages and confectionery exhibit a greater presence in peripheral locations, reflecting lower perishability and greater tolerance for longer supply cycles, other than proximity to grapes' production areas.

Peripheral areas situated away from major transport axes are only sparsely covered, although occasional clusters appear at secondary road intersections. These clusters are predominantly composed of non-specialized wholesalers or mixed-product depots that provide broad but less diversified services to scattered municipalities.

The resulting territorial organization can be interpreted as a hub-and-corridor system: a metropolitan nucleus where multi-category wholesale activity is intensely concentrated, coupled with distribution spines radiating along transport corridors that gradually thin out toward the periphery.

From the perspective of food-service establishments, this organization ensures breadth and responsiveness of supply for urban catering and hospitality actors, while operators in rural or peri-urban municipalities rely on corridor-based facilities with limited assortment depth.

serve to generate cash off the books for the big companies, who keep liquidity outside their accounts. So you end up with a chain full of middlemen who add nothing to the product, but are useful for that kind of game".

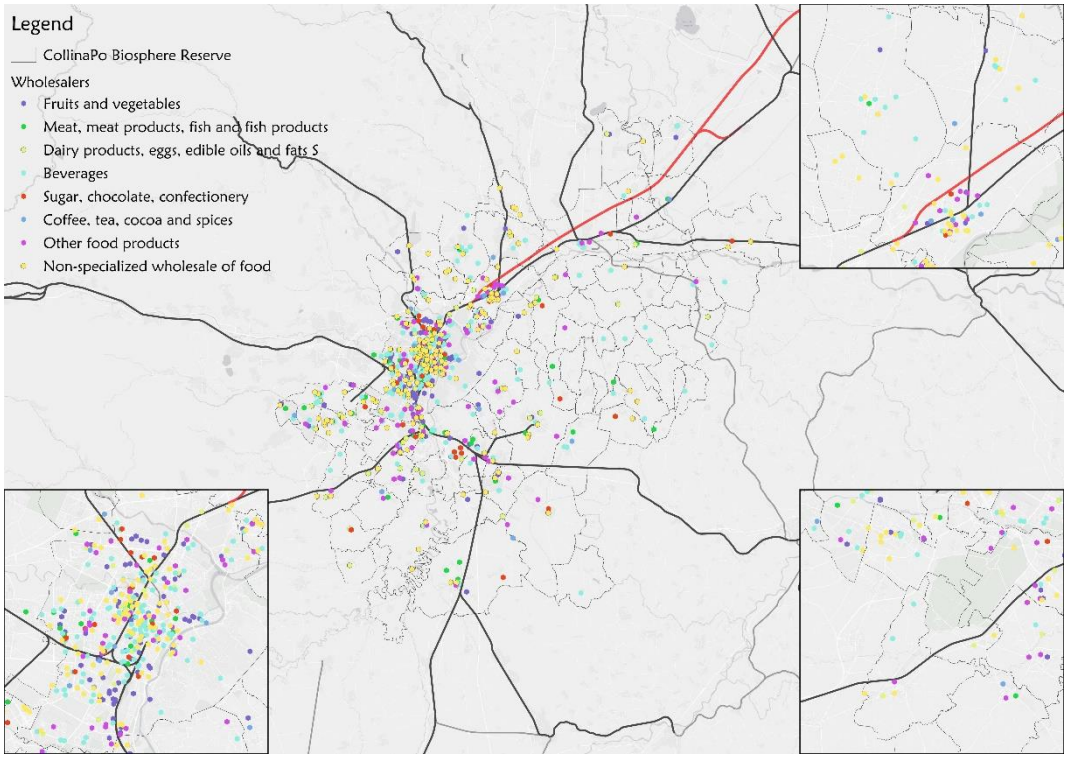

Figure 72: Distribution of wholesalers in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

3.2.5. Retail

The retail sector plays a pivotal role in shaping how food systems function, as it represents the primary interface between production and consumption. Beyond its economic weight, retail is crucial for determining which products reach consumers, under what conditions, and with what degree of accessibility. The graph below shows the structural composition of in-person food retail in CollinaPo, highlighting a clear diffusion of minimarkets, which account for 1,552 units and represent the largest segment by far. This is followed by other non-specialized food retail, and supermarkets, while hypermarkets, convenience stores, and frozen food retail outlets, occupy smaller segments, although they often consist of ultra large retailing facilities.

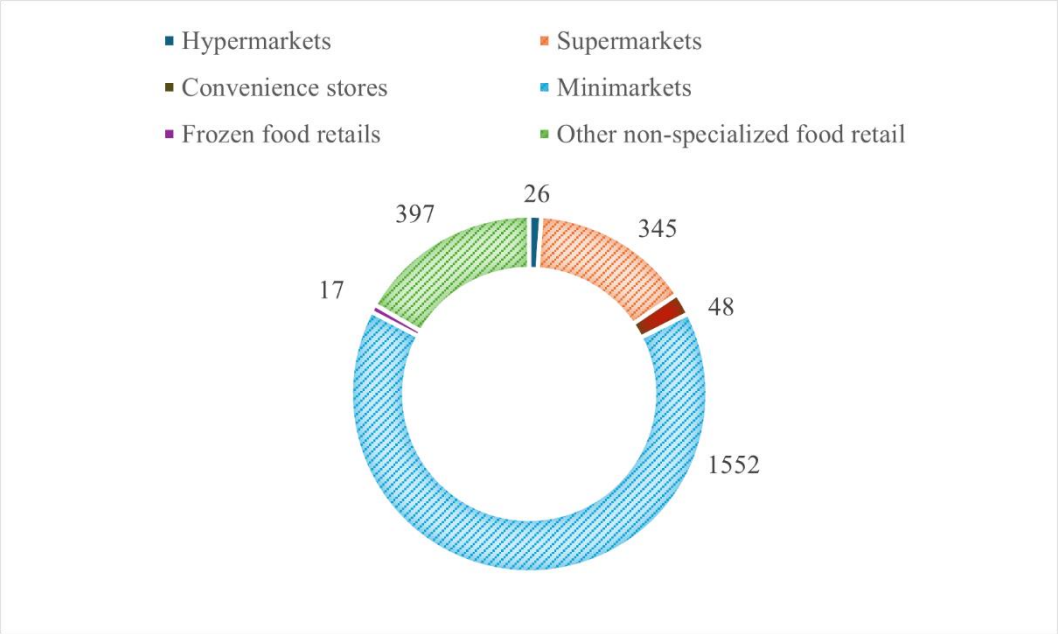

Figure 73: Share of types of non-specialized retailers in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

The spatial distribution maps make clear a structural imbalance in the geography of food retail in CollinaPo, shaped by the strategic choices of major market players. Large-scale formats, hypermarkets, supermarkets, and convenience stores are overwhelmingly concentrated in Turin and its peri-urban belt, where population density and purchasing power offer the highest short-term returns. This clustering reflects a profit-maximizing logic that privileges metropolitan consumer bases and the efficiencies of centralized logistics, while leaving less inhabited territories largely outside their operational horizon.

In contrast, smaller-scale minimarkets, often run by independent or community-based operators, are the only format that maintains a consistent presence across outer areas. These shops fulfil an essential service function in places where large corporate actors choose not to invest, ensuring basic food access but typically without the pricing power, product variety, or infrastructural support enjoyed by metropolitan stores. Therefore, although food availability exists, it is still convenient for consumers to move out of their zones only to do purchases, and, so, they tend to attend large players' shops.

The resulting pattern is not only a reflection of market demand but also a spatial expression of economic power asymmetries: large retailers consolidate in profitable urban clusters, while the responsibility for maintaining territorial food coverage is left to smaller, less capitalized actors who operate under tighter margins and with fewer resources.

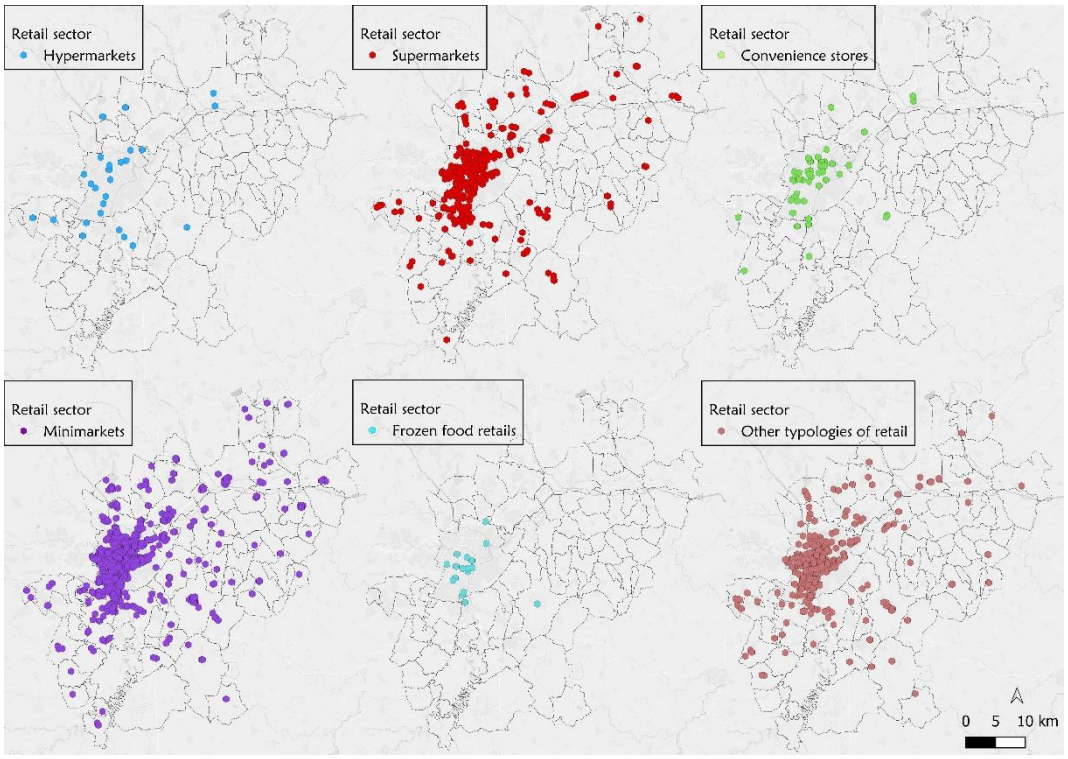

Figure 74: Distribution of non-specialized retailers in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

Then, if focusing exclusively on food-specialized retailers, typically smaller, often independent shops, the structural composition is more varied. The largest category is meat retail, which accounts for about 33.9% of all outlets, underscoring its central role in the local retail system.

This is followed by fruit and vegetables retail (19.5%) and other specialized food retail (18.7%), highlighting both the importance of fresh produce and the diversification of niche food businesses.

Bakery and pastry shops represent 17.6% of the total, confirming the strong demand for baked goods in the area. In contrast, beverage retail covers a smaller share (8.1%), while fish and crustaceous shops remain marginal, with only 2.2% of outlets.

Figure 75: Share of types of specialized retailers in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

The spatial patterns reveal both similarities and divergences from the non-specialized retail distribution. Some categories, bakeries and fish shops, display a pronounced concentration in Turin and its peri-urban zone, replicating the metropolitan bias already seen in larger-format outlets. This clustering points to the same gravitational pull of dense, affluent markets, where footfall and purchasing power sustain higher turnover even for small operators.

However, the degree of urban centralization varies by product type. Meat and fruit and vegetables retailers, and, at the municipal level bakeries too, exhibit a more scattered distribution, maintaining a presence in medium-sized towns and rural nodes, suggesting these formats operate at lower population densities, often because they serve recurrent, necessity-driven purchases.

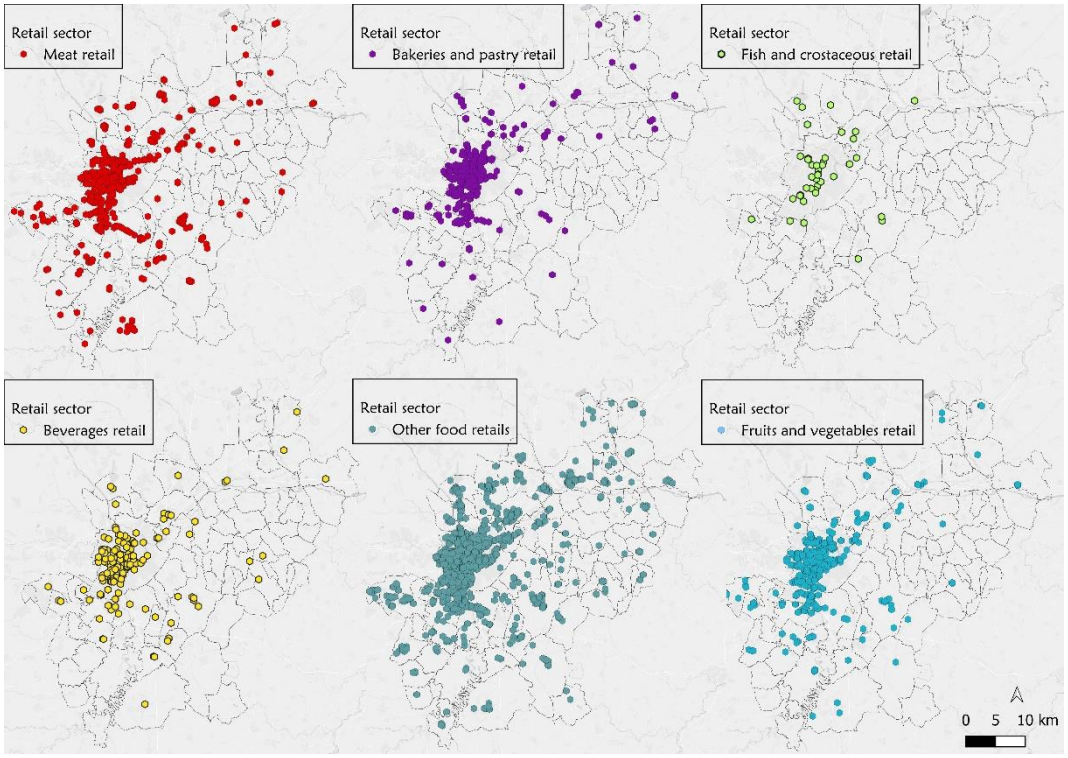

Figure 76: Distribution of specialized retailers in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

In this framework, it is worth mentioning that the spatial distribution of macrobiotic, dietary, and other special food retailers is heavily skewed toward Turin and its immediate surroundings, with only a sparse scattering of outlets in Turin's first belt. This concentration means that access to such niche, often higher-value food products is effectively urban-locked, compelling residents of rural and smaller urban areas to travel to the Turn if they wish to purchase them directly.

From a territorial equity perspective, this pattern reinforces existing disparities in food accessibility: while metropolitan consumers enjoy diversified options and proximity convenience, those in less populated areas face higher time and transport costs or must rely on limited online channels, which may not replicate the same product range or quality guarantees.

The fact that these retailers cluster so tightly in Turin also reflects broader market dynamics: specialized dietary products cater to consumer segments with lifestyle-oriented demand, concentrated in larger cities.

This creates a form of "nutritional centralization" where dietary diversity in food retail is tied to metropolitan consumption geographies, further widening the qualitative gap between urban and rural foodscapes, with reference to the definition of Vonthron et al. (2020).

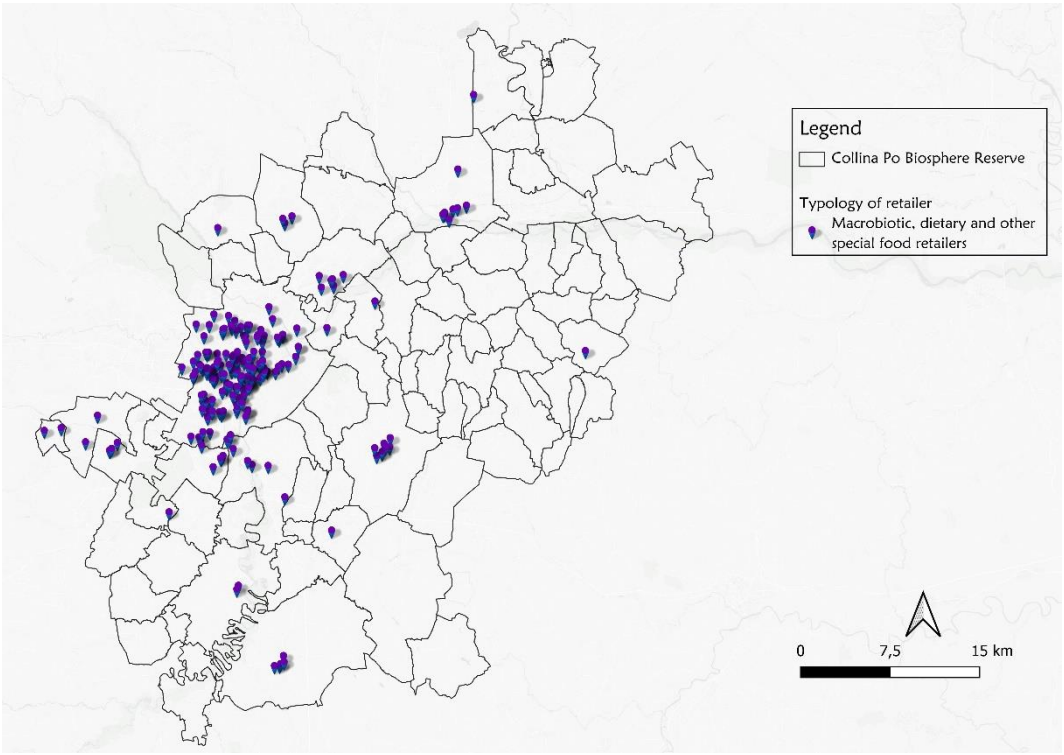

Figure 77: Distribution of diet-related retailers in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

Within CollinaPo, farmers' markets, which here include both direct sales and stalls operated by non-producer vendors, are primarily located in Turin, a phenomenon that mirrors the general metropolitan polarization of retail trade. This spatial concentration is the result of converging factors: the city's population density, purchasing power, and logistical infrastructure.

Nevertheless, despite this overall centralization, farmers' markets serve a specific and compensatory function compared to other retail models. They act as decentralized supply chain hubs that minimize intermediation, promoting transparency regarding the origin of products, their seasonality, and production methods.

Moreover, although the research regards CollinaPo, it is useful to situate market access using Turin's most recent municipal statistics. On an average weekday in 2023 roughly forty open-air markets operated across the city (with minor weekday variation), forming a dense but heterogeneous network that ranges from the very large Porta Palazzo to micro-markets in *Aree di Copertura Commerciale*. Citywide, open-air markets offered 22,948 weekly stalls across all sectors; within food, there were 5,198 fruit-and-vegetable stalls, 429 fish stalls, and 1,771 producer stalls

(weekly counts). Covered markets at Porta Palazzo added 236 daily stands focused on meat, cheese, cured meats and gastronomy (Assessorato Transizione Ecologica e Digitale Innovazione Mobilità e Trasporti & Dipartimento Cultura Politica Società (gruppo Atlante del Cibo di Torino Metropolitana), 2023).

Spatial equity indicators show meaningful differences across Turin's districts. In Circoscrizione 7, home to several busy markets, the ratio of residents per producer stall is the city's lowest at 681, signalling comparatively good access to direct sales. By contrast, Circoscrizione 4 exhibits the highest resident load per fruit-and-vegetable stall (1,970), pointing to potential access constraints in everyday fresh food supply (Città di Torino, 2023). More detailly, a local researcher points that:

"Sicuramente c'è una buona distribuzione di mercati lungo tutta la settimana, con picchi, appunto, di 40. C'è però un problema di accesso legato agli orari: si tratta, infatti, di mercati che si tengono tutti al mattino e sono quindi pensati per una fascia di popolazione ben specifica, principalmente anziani, probabilmente persone in pensione o lavoratori che in quella mattina non lavorano. Al contrario, la fascia del terziario e del secondario, che ha turni costanti al mattino, non può accedervi" (Researcher, Interview, September 06, 2025)[81].

The deep markets' integration into the local fabric ensures that a significant portion of consumers have consistent access to locally sourced, high-quality food outside of the dominant supermarket model, reinforcing local supply chains and supporting small-scale agricultural economies. Alongside municipal markets, indeed, 16 direct-sale farmers' markets run by private actors (notably Coldiretti and CIA) operate monthly or bi-weekly, mostly in central squares (Piazza Bodoni, Piazza Vittorio, Piazza Palazzo di Città) (Assessorato Transizione Ecologica e Digitale Innovazione Mobilità e Trasporti & Dipartimento Cultura Politica Società (gruppo Atlante del Cibo di Torino Metropolitana), 2023).

[81] There is certainly a good distribution of markets throughout the week, with peaks, in fact, of 40. However, there's an access issue related to the opening hours: these markets all take place in the morning and are therefore geared toward a very specific segment of the population—mainly older people, likely retirees, or workers who happen not to be working that morning. Conversely, people in the tertiary and secondary sectors, who have fixed morning shifts, cannot access them.

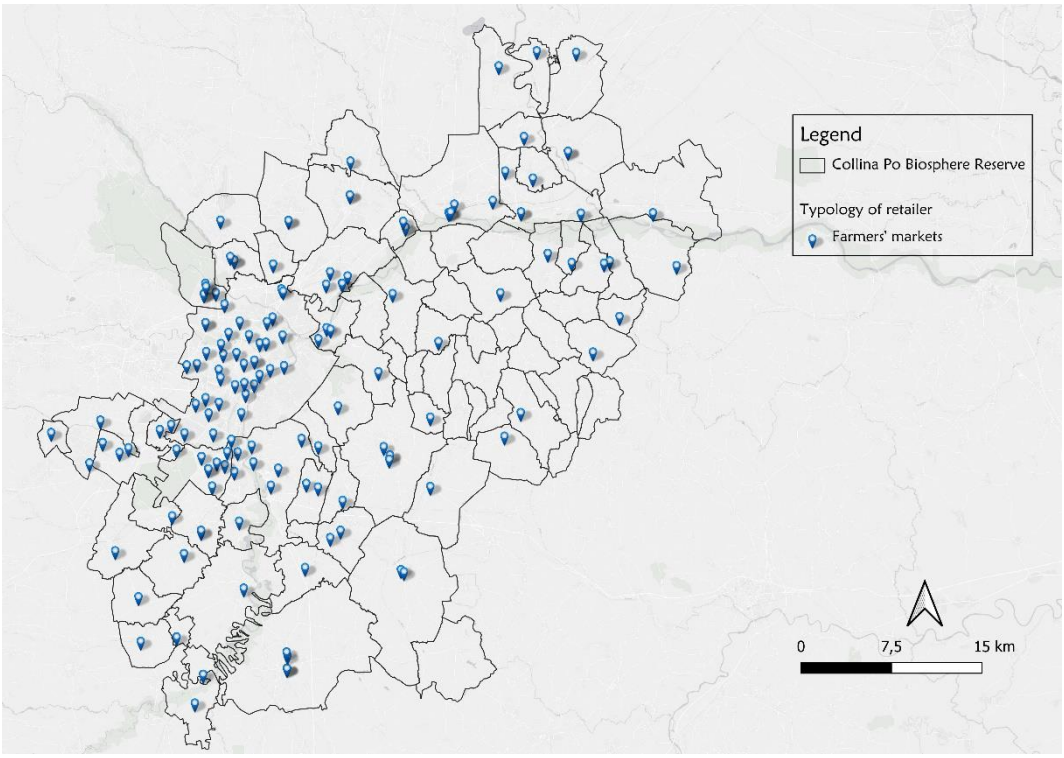

Figure 78: Distribution of farmers' markets in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

Having addressed the exact location of existing sources of food for CollinaPo's inhabitants, it is relevant to develop a broader reasoning concerning the overall distribution of retail services and what this implies for accessibility and equity within the CRFS. The spatial evidence provided by the density map clearly shows that food retail is far from evenly distributed: while the metropolitan core of Turin is saturated with outlets, progressively peripheral and rural municipalities reveal much lower densities, with some areas close to absence of structured retail options.

This spatial pattern has important consequences. In the city, the abundance of outlets translates into proximity and choice for most consumers. Residents can access different types of shops (supermarkets, minimarkets, specialized stores, discount chains) within short distances, often without the need for private transport. In contrast, in more remote municipalities of CollinaPo, particularly along its southern and eastern fringes, retail presence is minimal and fragmented.

What emerges is not a uniform condition of scarcity but rather the existence of incipient food deserts, understood as areas where inhabitants face difficulties in reaching adequate sources of healthy, affordable, and diversified food. These deserts are not absolute voids, food is always available somewhere, but they reflect relative deprivation, where the effort required to access food impose barriers that

disproportionately affect vulnerable groups. Elderly populations, households without private cars, and lower-income families are particularly exposed, as they are less able to bridge spatial gaps through mobility or by paying higher prices in local outlets.

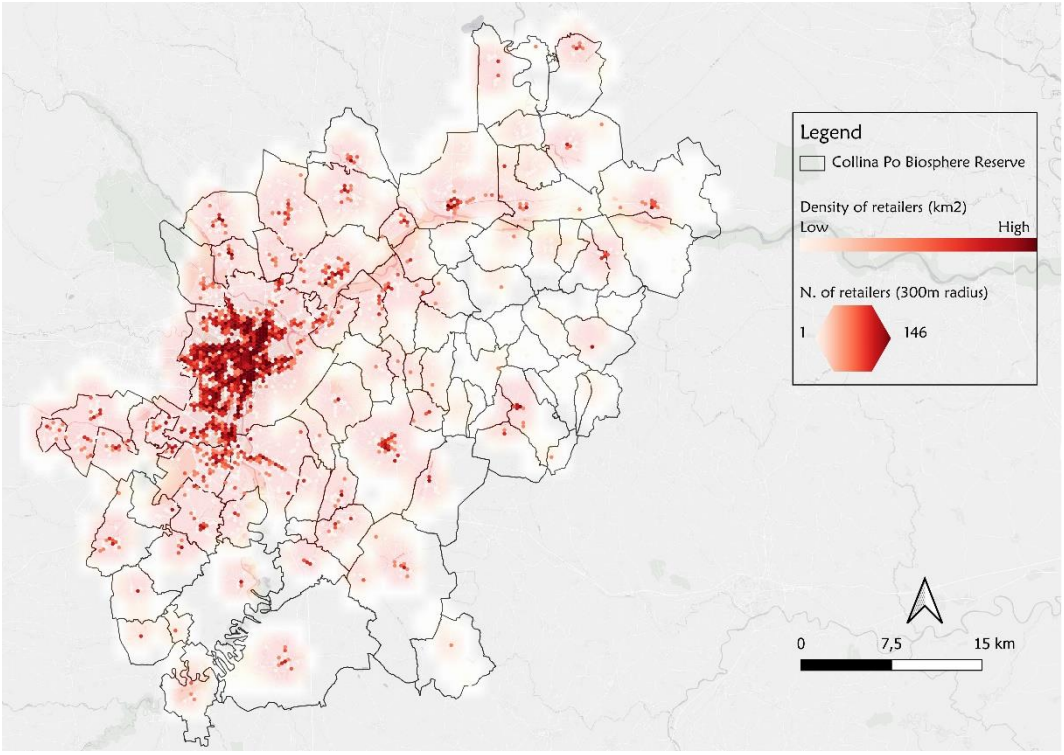

Figure 79: Density of retailers in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

This unevenness is not merely a matter of density: when analyzed through service radius, the accessibility gap becomes more visible and socially meaningful.

As addressed in Annex B, when applying a conservative threshold of 250 meters radius around each retail outlet, more than 270,000 residents in CollinaPo are found to live in conditions that correspond to full food deserts, areas with no proximate access to any formal food retailer. This is a significant portion of the total population, and it underscores that, despite the dense clustering visible in central Turin, peripheral and rural sections of the reserve remain structurally underserved.

Even if releasing the threshold to a 500-meter service buffer, the situation remains problematic. Over 100,000 people would still require an independent vehicle or other mobility arrangements to reach the nearest outlet, effectively translating into a structural dependence on private transport for basic food provisioning.

Moreover, as visible in Figure 80, certain areas of CollinaPo are not served at all by retail buffers. These municipalities are effectively excluded from the regional food retail network, relying instead on small itinerant markets, sporadic local outlets, or commuting to external centers. This exclusion is not marginal: it reveals how territorial inequalities are inscribed into the geography of retail distribution, with direct consequences for diet diversity, affordability, and the everyday right to nourish.

Taken together, the data demonstrates that CollinaPo's food system is characterized by a paradox of uneven abundance: hyper-saturation of outlets in Turin contrasts with structural scarcity in rural fringes.

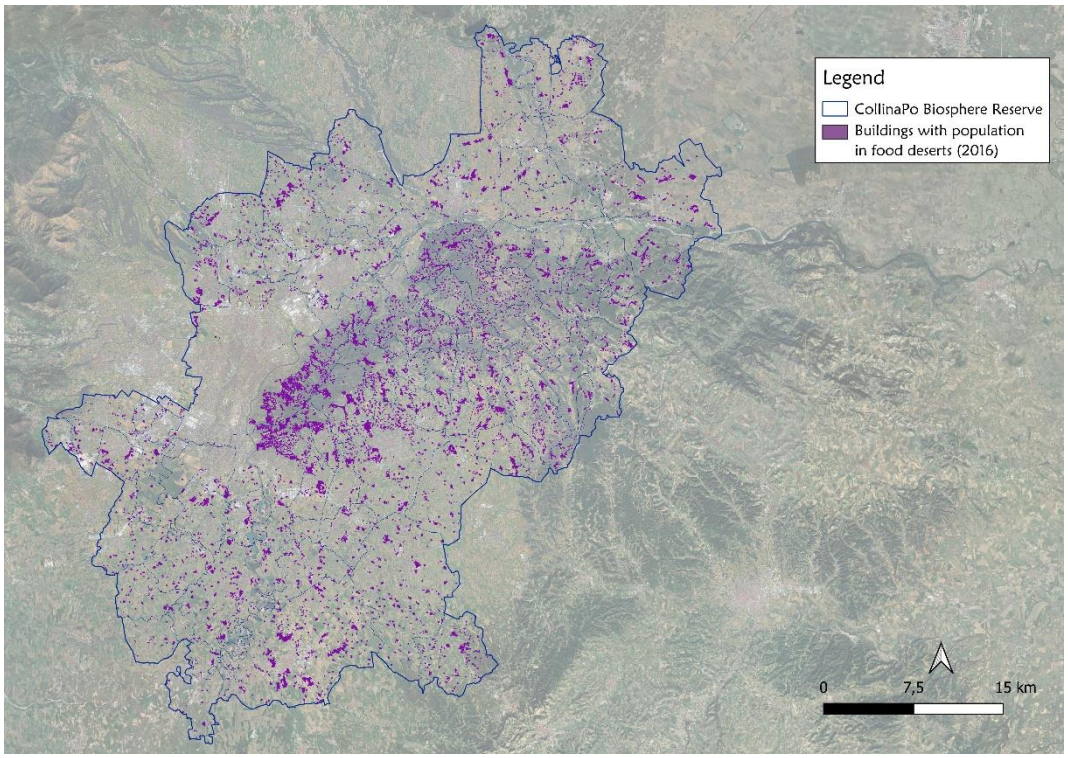

Figure 80: Buildings in food deserts in CollinaPo[82] (2023)
Source: Author's elaboration based on data from Camera di Commercio

[82] See Annex B for a more detailed cartographic representation of food deserts

3.2.6. Catering

Catering establishments represent a pivotal component of the regional food system, as they mediate between demographic dynamics, tourism flows, and local consumption practices.

Catering establishments can be broadly divided into three main categories: bars, restaurants, and hospitality structures. Bars represent the most capillary and socially embedded form, characterized by high territorial penetration and daily use, serving as both consumption points and social hubs. Restaurants, in contrast, are generally fewer in number but more strongly tied to the dynamics of urban concentration and tourism, where differentiation in cuisine, price, and service quality reflects competitive pressures and evolving consumer expectations, mentioned above. Hospitality structures, such as hotels and guesthouses, integrate food services into broader accommodation offers, though their relative weight has diminished as the market shifts toward more fragmented lodging solutions that externalize demand to independent restaurants and bars.

The map highlights a strong concentration in the metropolitan core of Turin, where densities peak at around 160 establishments per square kilometer, gradually decreasing toward suburban belts and rural municipalities.

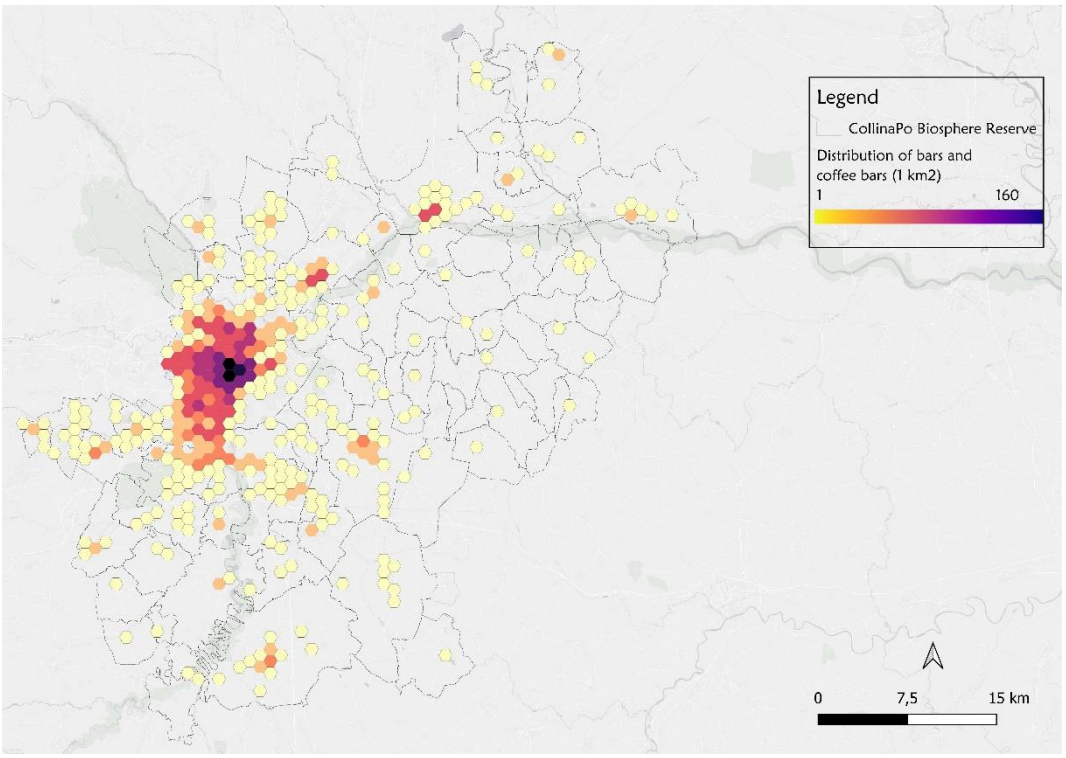

Figure 81: Distribution of bars in CollinaPo (2023)

Source: Author's elaboration based on data from Camera di Commercio

This distribution mirrors the urbanizing tendencies of resident populations, whose concentration in cities fuels demand for high-frequency, everyday catering options.

At the same time, the persistence of bars across peripheral and less densely inhabited contexts indicates that their function extends beyond mere demographic mass: they operate as nodes of social life too, holding relevance as places of daily interaction and routine consumption.

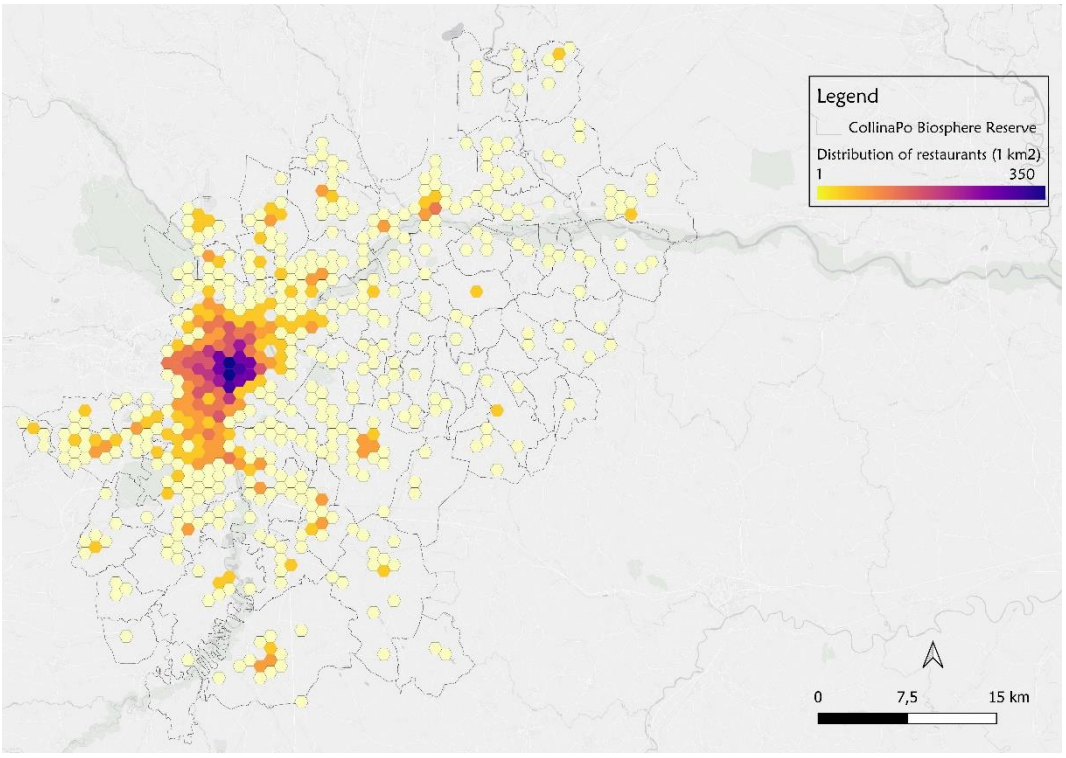

Figure 82: Distribution of restaurants in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

The spatial distribution of restaurants reveals a pattern that, while still concentrated in the metropolitan area of Turin, displays a more articulated presence across peripheral and inner territories compared to bars.

Densities peak at over 300 establishments per square kilometer in the urban core, but unlike bars, restaurants maintain major significant spread into smaller municipalities and rural areas. This reflects their role as locally embedded services that are not solely dependent on demographic concentration but also on the attractiveness of places for leisure, gastronomy, and quality consumption.

In this respect, restaurants act as strategic anchors in peripheral and inner areas, where they contribute to enhancing territorial appeal and counterbalancing processes of demographic decline. By combining everyday food provision with other experiences, restaurants position themselves as both economic actors and cultural markers, reinforcing the appeal of non-urban areas.

When disaggregating restaurants by type, the picture becomes more varied and confirms the overall greater territorial spread of this category compared to bars. Most subtypes demonstrate a distribution that extends well beyond the metropolitan core, although with different intensities and functions.

Ice cream shops and pastry shops are strongly clustered in the urban fabric of Turin, suggesting their dependence on high-density pedestrian flows and routine consumption patterns. Conversely, take-away restaurants display a broader coverage into suburban areas, reflecting their adaptability to new consumption models that privilege speed, convenience, and flexible locations. Catering services and canteens follow a pattern concentrated in urban and peri-urban settings, where they are tied to institutional demand from schools, workplaces, and collective structures.

Concerning the catering services, here meant as the contract to supply food and drink, involving both the preparation of meals and their delivery to the client, a person working in the sector affirms that these enterprises' headquarters never serve food to customers. Rather, each of the mapped activities is

"un posto gigantesco pieno di roba, letteralmente, dove da una parte sono tutti bicchieri di ogni tipo, dall'altra posate; sono veramente posti disorganizzati tra l'altro e alcuni hanno anche dei laboratori tipo la pasticceria, (…). Però non per forza hanno anche laboratori, principalmente è materiale d'allestimento. Talvolta, per farti capire la struttura di un catering, non hanno abbastanza materiale o il materiale che viene richiesto è particolare: per esempio ai matrimoni, dove [sono richieste] le tovaglie di un certo colore, o delle sedie che sono diverse da quelle del catering, lì si richiama poi un noleggiatore. Ci sono più noleggiatori nella zona che forniscono anche catering che non riescono a soddisfare le richieste del cliente" (Waitress, Interview, October 04, 2025)[83].

[83] "a gigantic place full of stuff, literally, where on one side there are all kinds of glasses, on the other cutlery; they are really disorganized places, by the way, and some also have laboratories like pastry, (…). However, they do not necessarily also have laboratories, mainly it is set-up material. Sometimes, to make you understand the structure of a catering, they do not have enough material or the material that is requested is particular: for example, at weddings, where [are requested] tablecloths of a certain color, or chairs that are different from those of the catering, there one then calls a rental company. There are several rental companies in the area that also supply caterings that are not able to satisfy the client's requests".

This interview was carried out with particular interest because research on catering services and their systemic impacts are surprisingly sparse, largely because caterers operate behind the scenes, in fragmented markets with opaque data, seasonal peaks, and outsourced logistics that make them less visible to scholars and policymakers. Particularly concerning the impacts of the food catering services, the waitress reports extremely severe information concerning the food waste.

"Si spreca tutto. Buttiamo tantissimo. È molto molto raro che ci dicano se vogliamo portare a casa qualcosa, succede solo con alcuni capi oppure solo con alcuni catering, ma è veramente raro, di solito buttiamo tutto, tutti gli avanzi, buttiamo tutto" (Waitress, Interview, October 04, 2025)[84].

And when questioned concerning the amount of food waste, the waitress replied

"Diciamo sacchi e sacchi di roba [per evento], ma non è neanche raccolta differenziata, c'è solo un catering che fa un'attenzione a questa cosa. Il punto è che [il cibo] non viene dato in beneficenza. Ieri hanno tenuto delle cose e hanno detto "le diamo alle suore", per dire, ma è tutto sottobanco, perché mi hanno spiegato una volta che non si può fare" (Waitress, Interview, October 04, 2025)[85].

Finally, the residual category of "all other restaurants" illustrates the backbone of the system, covering both the metropolitan area and secondary centers, thereby reinforcing their role in sustaining local economies and everyday food provision.

Altogether, this differentiation highlights how the restaurant sector functions as a multi-scalar network: some formats are highly urban-dependent, while others anchor themselves in rural or peri-urban areas, diversifying the foodscape and mitigating the spatial concentration of food systems.

[84] "Everything gets wasted. We throw away so much. It's very, very rare that they tell us that you want to take something home; it happens only with some supervisors or only with certain catering companies, but it's really rare—usually we throw everything away, all the leftovers, we throw everything away".

[85] "Let's say bags and bags of stuff [per event], and it's not even separate waste collection; there's only one catering company that pays attention to this. The point is that [the food] isn't given to charity. Yesterday they kept some things and said "we'll give them to the nuns", so to speak, but it's all under the table, because they once explained to me that it can't be done".

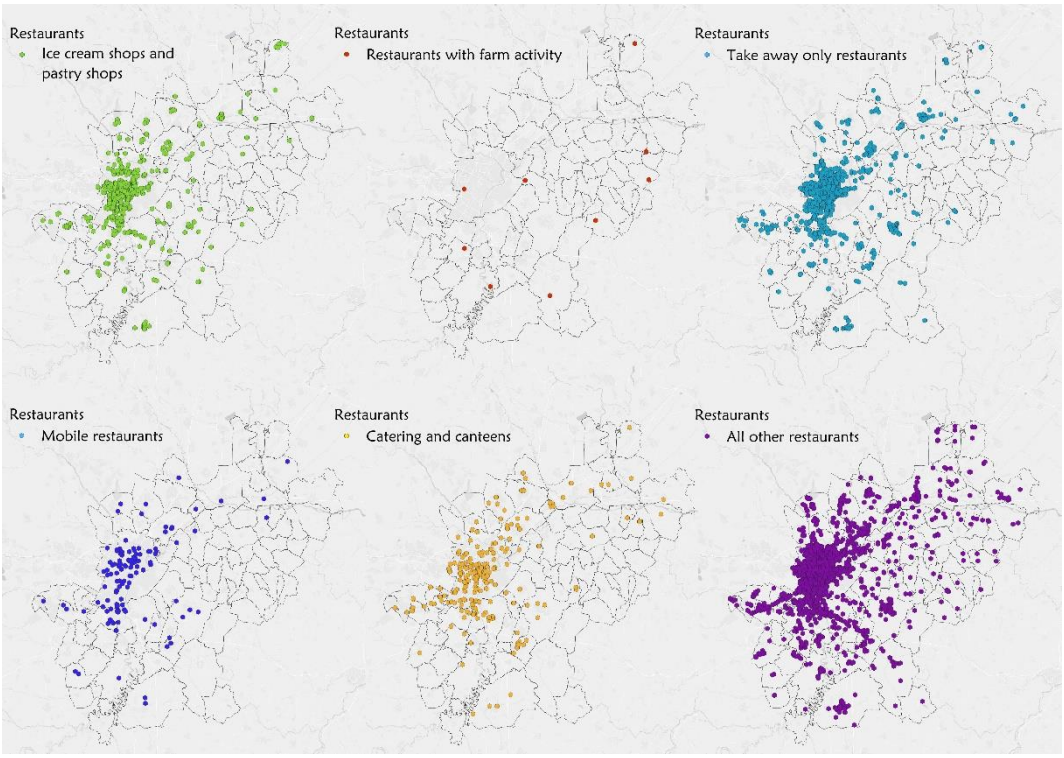

Figure 83: Distribution of restaurants per typology in CollinaPo (2023)
Source: Author's elaboration based on data from Camera di Commercio

3.2.7. Waste

Attention must be paid to the role of food waste which, like other food-related issues, often slips out of focus because data are hard to collect. In the case of the CollinaPo Biosphere Reserve, this challenge is compounded by the fact that the territory stretches across four provinces, creating a broad administrative mosaic for waste management and, consequently, uneven reporting frameworks[86].

Even with these caveats, the emerging picture is clear: Turin alone exceeds 52.8 thousand t in 2024, with 49,828 t of household waste plus 2,965 t from street markets, accounting for roughly four-fifths of the ~67 thousand t/year documented within the BR. Surrounding Turin, the hillside belt and the north-eastern quadrant

[86] Data discussed here do not fully cover CollinaPo. The research took into consideration data from COVAR14; Asti Servizi Pubblici; Consorzio Chierese per i Servizi; Consorzio di Area Vasta CB16.

The following data are available: Andezeno: 164,305 t; Arignano: 66,85 t; Baldissero Torinese: 231,01 t; Borgaro Torinese: 800 t; Brandizzo: 575 t; Cambiano: 526,37 t; Carmagnola: 2.583,39 t; Casalborgone: 103 t; Caselle Torinese: 904 t; Cavagnolo: 123 t; Chieri: 3.456,93 t; Gassino Torinese: 650 t; Mappano: 477 t; Marentino: 70,76 t; Mombello di Torino: 35,835 t; Moncucco Torinese: 15,84 t; Montaldo Torinese: 46,835 t; Moriondo Torinese: 46,84 t; Pavarolo: 73,92 t; Pecetto Torinese: 279,75 t; Pino Torinese: 571,27 t; Poirino: 801,86 t; Pralormo: 117,01 t; Riva presso Chieri: 254,66 t; Rondissone: 130 t; San Sebastiano da Po: 105 t; Santena: 1.016,36 t; Torino: 49.828 t (domestic) + 2.965 t (market stalls) = 52.793 t; Verolengo: 279 t.

form a more diffuse structure yet display remarkably stable per-capita yields of "pure" kitchen waste, typically in the 55–70 kg/person/year range, consistent with effective separate collection. On the south-eastern hills, a broader "Chieri corridor" adds over 10.3 thousand t in total, with a mix of larger and mid-sized contributors framing a coherent aggregate.

Read together, these figures sketch a two-speed system: a dense urban core concentrating volumes and exposure to impurities and market-driven peaks, and a constellation of peri-urban and rural municipalities where seasonality of green waste, and settlement dispersion insert statistical noise without overturning the underlying per-capita stability.

3.3. The political dimensions of CollinaPo's food system

The investigation of CollinaPo's food system requires the introduction of a third analytical register, complementing the study of structural drivers and the operations of the supply chain: the political dimensions of food. The decision to extract this dimension as a separate analytical layer reflects a deliberate attempt to strongly politicize food system analysis. Standard assessments often tend to reduce political dynamics to an invitation of upper governments to intervene in the food governance. Although in full agreement with that need, this work insists that food systems are inherently political formations and, therefore, they are constituted by asymmetries of power that directly shape their functioning and must be scrutinized.

Without attention to these dynamics, the resilience of the food system cannot be adequately grasped, since its very functioning is sustained through the recognition, and, at times, the reproduction, of problematic situations.

In operational terms, the political dimensions are examined at CollinaPo's scale as much as possible, although certain information is hard to grasp at single municipalities' level. Clearly, the analysis does not attempt to generalize CollinaPo's condition as identical at other scales; yet, it highlights how political processes materialize and interact in the specific territorial configuration under study, bearing in mind what occurs at different levels.

This analytical entry unfolds along three axes. The first concerns the question of rights, understood in relation to labor conditions within the agri-food sector, and regarding people's rights to have access to sufficient and nutritious food. The second concerns the question of participation, which emerges from civic and grassroots initiatives that challenge dominant models and experiment with different modes of organization. The third concerns the question of government, which refers to the planning tools, and institutional mechanisms deployed at local level, that are currently relevant in CollinaPo's food system governance.

3.3.1. The question of rights

3.3.1.1. The rights of workers

For what concerns labor in food, Italy is not as pure as it is often displayed. Several works already address this issue and, standing on these, and on more specific information available at municipal level, I wish to address CollinaPo's municipalities and nearby ones' situation.

This city-region is not immune to the labor rights challenges often associated with agriculture and food work; in recent years, especially after 2016 due to approval of the law against *caporalato*[87], evidence of workers exploitation emerged widespread across farms, processing plants, wholesale markets, and catering.

The range of violations is wide, spanning from the exploitation of migrants in farms, *caporalato*, and severely underpaid seasonal jobs to informal "off-the-books" arrangements, under-reported contracts, systematic health and safety violations, and the vulnerability of a largely migrant workforce (Fanizza & Omizzolo, 2019).

While such practices are stereotypically linked to Middle and Southern Italy only (Omizzolo, 2019; Mangano, 2022), they are a documented reality in Piedmont's countryside too, including the areas around Turin.

According to a very recent report of the Italian Ministry of Labour and Social Policies, the overall irregular employment rate in Piedmont stood at 13% in 2021. Estimates derived from field studies further reinforce this picture, suggesting the presence of between 8,000 and 10,000 irregular agricultural workers across the region (Giovannetti & Baldoni, 2025).

In vegetable-growing zones such as Carmagnola, workers have been hired through illicit intermediaries at hourly rates far below contractual standards (Caselli, 2023); in 2016, 150 cooperatives were discovered to pay less than 2 euros per hour to migrant workers (Giangrande, 2020).

While in Castelnuovo Scrivia, Alessandria, already in 2012, dozens of migrants were discovered to work 14 hours a day, seven days a week, for as little as one to four euros per hour, often receiving irregular partial payment and even being denied drinking water in the fields (Olivieri & Pesce, 2024).

[87] See the Law No. 199, 29th October 2016 at: https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:2016;199

A 2024 investigation in Calliano, Asti, revealed a poultry farm that had no contracts on paper, while in practice large migrant crews were paid €4–5 to load entire lorries of chickens, meaning a team of five could share €20 for hours of heavy, hazardous work (FLAICGIL, 2025).

In the wine and fruit harvest zones of Monferrato and Langhe, few municipalities after CollinaPo, unions have repeatedly documented the tactic of under-reporting days: workers labor for a full week but only two or three days are recorded on contracts, with the rest paid in cash (Simonetti, 2016).

Informality is pervasive: many enterprises in Piedmontese municipalities operate with no employees officially registered, relying instead on entire squads of undeclared workers. This strips them of rights, insurance, and pensions, and overtime work remains uncompensated.

Beyond the fields, exploitation penetrates the wholesale sector too. At the Torino wholesale producers' market (CAAT), more than 800 porters, mostly migrants, continue to work nights under subcontracting schemes that mask 12–16 hours shift behind nominal eight-hour contracts (INFOAUT, 2015). Such precariousness is compounded by safety deficits: agriculture and processing remain among the deadliest sectors in Piedmont, with 50 fatal accidents in 2022 alone (CRPiemonte, 2023). Injuries often go unreported because, on one side, the farms' owners and workers' recruiters, *caporali*, do not acknowledge their responsibilities; on the other side, workers, often irregular migrants, fear deportation if they seek medical help.

More detailly, these violations persist because many workers lack stable residency or income, making them fully dependent on farm owners or intermediaries. Poverty and debt reinforce this dependency.

In small towns, where alternative employment is scarce, workers accept exploitative conditions as the only available option, sometimes falling into debt bond to labor brokers for travel or lodging costs.

Behind this human precarity lie a few structural economic drivers: first, the explicit intention of farms' owners to profit over workers' lives. Second, and less expected, the stranglehold of the large-scale retail sector (Martino, 2018).

Farmers are forced to sell produce at prices below production costs, dictated by the retail, which leaves them with no margins, and pushes them to compress labor costs as the only adjustable variable. Even when farmers do not intentionally exploit migrant workers, this structural pressure leads them to use shady maneuvers to remain competitive (ibid.).

As affirmed by an apples' producer,

"Io devo sistemare i dipendenti, pagarli, ricavarmi lo stipendio… alla fine capisci che è difficile. Se prendessi un euro al posto di 40 centesimi [al chilo] sarei col sorriso fino alle orecchie. Ma non ti fanno un prezzo così. Al massimo, conferendo in cooperativa, sono sicuro di non avere invenduti solo"[88] (Farmer, Interview, September 19, 2024).

Thus, at the bottom of the chain, workers not only face the abuse of direct employers but also bear the burden of a market architecture that rewards the cheapest labor. The result is a food system in which illegality is normalized, rights are suspended, and resilience is maintained through systematic exploitation rather than legal and fair employment (Omizzolo, 2023).

3.3.1.2. The right of people who consume food

Aside from the critical situation of workers, people's rights in food consumption require careful attention too. I prefer to speak of people who consume food rather than simply "consumers", because, as Marcuse rightly pointed out, the latter makes humans direct extensions of the commodities they buy (Marcuse, 1964).

In CollinaPo, the right to food is not primarily hindered by physical availability. Food deserts emerge in areas historically shaped by Turin's gravitational consumption pull; therefore, although the hilly context displays a problematic condition of spatial access, yet the overall situation is troubled for something else. Following what has been said in the drivers' section, when we also consider the economic factors tied to purchasing power, a critical picture comes into focus: rising poverty rates and worsening food insecurity indicators reveal an increasingly critical reality.

In the 2010s, Italy was characterized by extremely low inflation, often close to 0%[89]. However, between 2021 and 2023 consumer prices in Italy surged cumulatively by more than 14%. The 2023 spikes alone cut real household incomes by nearly 4% in a single year (ISTAT, 2024).

Net purchasing power has declined steadily over the last 15 years. Although disposable income per capita has risen by roughly €3,000 since 2007, inflation has effectively neutralized these gains (Balduzzi, 2023). In other words, despite nominal growth, people can afford no more, and in many cases less, than they could

[88] "I have to manage my workers, pay them, and still make my own salary… in the end you understand how difficult it is. If I earned one euro instead of forty cents [per kilo], I'd be smiling from ear to ear. But you don't get that kind of price. At best, by delivering to the cooperative, I can at least be sure I won't be left with unsold produce".

[89] See https://it.tradingeconomics.com/italy/inflation-cpi#:~:text=Il%20tasso%20di%20inflazione%20in,percento%20nell'aprile%20del%201959.

15 years ago. The situation was exacerbated by the post-Covid surge in primary costs (energy, transport, raw materials), which translated into higher consumer prices but was not followed by any corresponding increase in wages or reversal of price levels once markets stabilized (Bendinelli, 2024).

This structural fragility is reflected in poverty and food insecurity figures. In Piedmont, 8.9% of individuals live in absolute poverty, meaning they cannot purchase the basket of goods and services deemed essential, including food (ISTAT, 2021). In Turin, while the incidence is somewhat lower than in other major Italian cities, the city exhibits deep structural deficits in food access. A local survey among food aid recipients illustrates this vividly. 60% of beneficiaries are women; the average household income is about €800 per month; one in four experiences homelessness; and one in three is employed yet still unable to afford essential needs, signaling the rise of the "working poor" (Allegretti & Toldo, 2023). The Food Insecurity Experience Scale (FIES) applied in Turin confirms that virtually all aid recipients live in conditions of moderate or severe food insecurity. These are not occasional difficulties but chronic patterns of deprivation: regularly skipping meals, reducing portion sizes, and living under the constant anxiety of running out of food. Beyond physical nutrition, food insecurity here also undermines dignity, social participation, and psychological well-being. Many report stress, sadness, and shame linked to their inability to feed themselves and their families adequately, leading to social isolation (ibid.).

The *Banco Alimentare* data reveal a critical geography of food insecurity across CollinaPo. Turin alone concentrates over 40,000 beneficiaries and nearly 30,000 quintals of distributed food annually, confirming the city as the epicenter of structural dependence on emergency aid. Yet the map also shows that food insecurity is not confined to the urban core: several municipalities in the BR, notably Moncalieri, Chieri, Carmagnola, Chivasso, and parts of the southern belt, register hundreds of recipients each and food distributions exceeding 1,000 quintals.

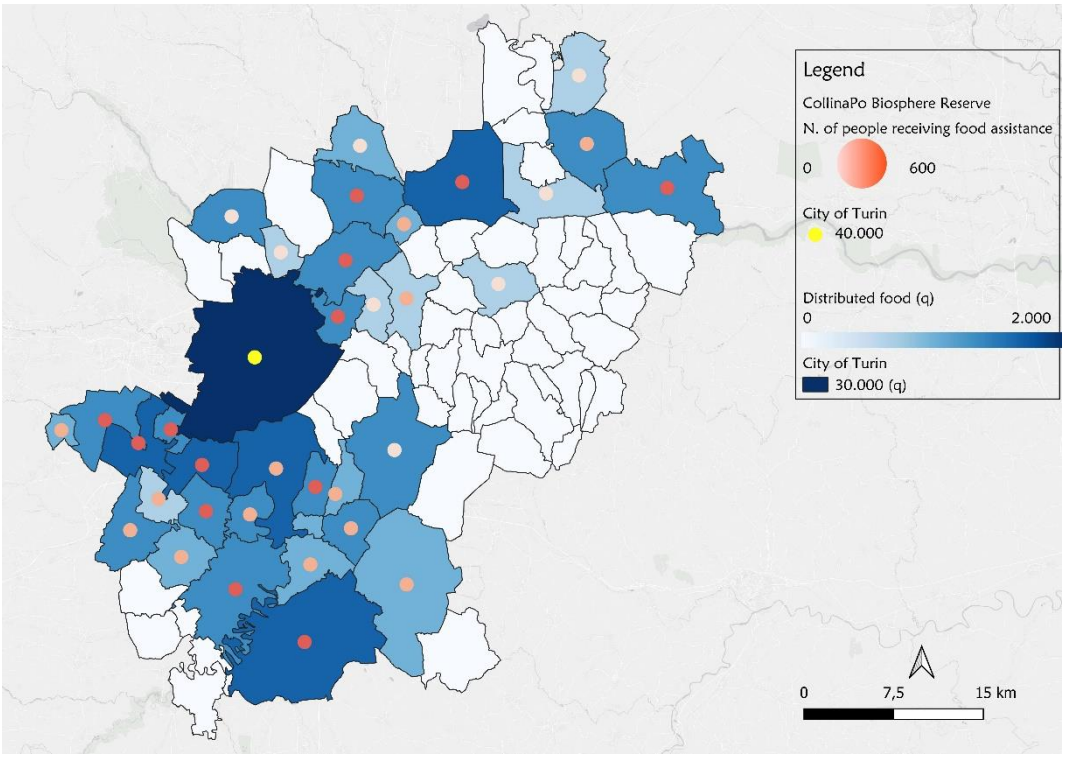

Figure 84: People receiving food aid and amount of distributed food in CollinaPo (2023)
Source: Author's elaboration based on data from BancoAlimentare

This dual pattern highlights two key dynamics. First, in absolute terms, Turin dominates clearly due to its role as the most inhabited municipality in CollinaPo. Second, in relative terms, smaller municipalities show a proportionally high reliance on aid, which displays the vulnerability of peri-urban areas. Indeed, food aid is provided almost entirely by NGOs and charities, whether linked to churches or sustained through public funds, and they are responsible for guaranteeing access in critical conditions.

While Turin already shows a significant dependence on the activity of these groups, in peri-urban municipalities the reliance becomes even more acute: with only a handful of organizations operating, any reduction or interruption of their work would leave the supported individuals and families without viable alternatives[90].

[90] The following section provides information on Food Sharing Initiatives and outlines the mapping methodology.

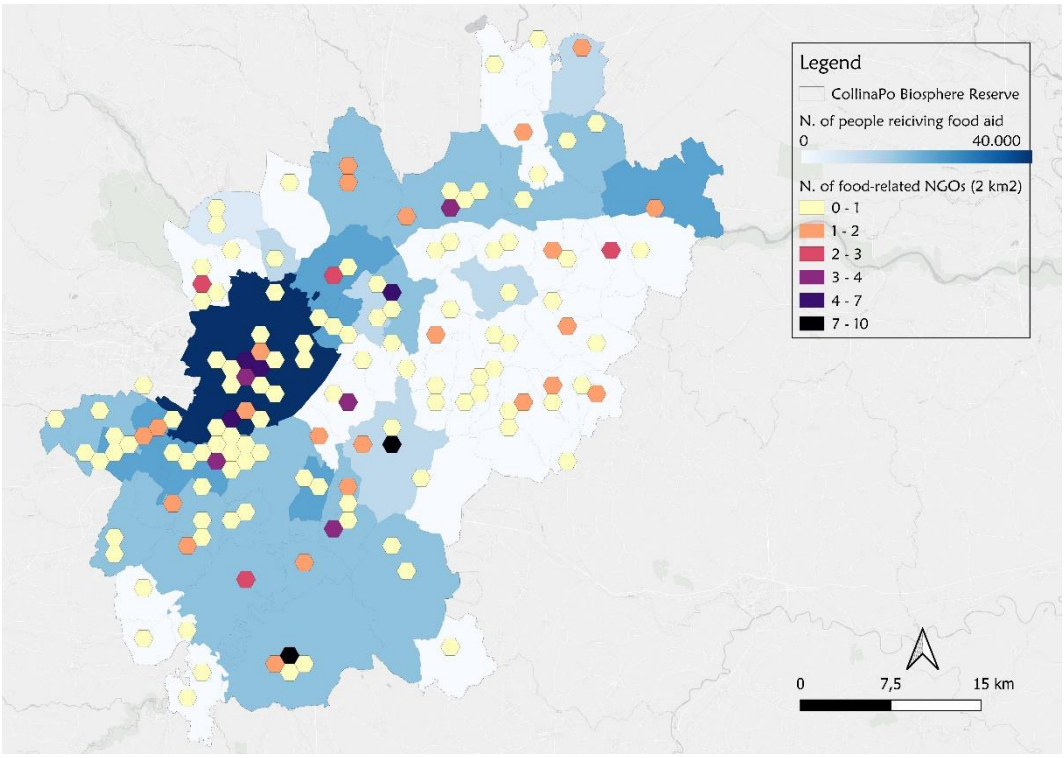

Figure 85: Distribution of Food Sharing Initiatives and number of food aid receivers in CollinaPo (2023)

Source: Author's elaboration

3.3.2. The question of participation

The second axis, that of democracy, directs attention to the ways in which food systems are shaped from below, through the practices and claims of communities, associations, and citizens.

Social actors, precisely because of their proximity to local realities and their capacity to represent diverse interests, possess an empirical understanding of the challenges that define contemporary urban and city-region food systems (Allegretti, Bruno, & Propato, 2023).

This axis therefore highlights the broader democratic dimension in which food becomes a medium for civic mobilization, experimentation, and collective agency (Manganelli, 2020).

3.3.2.1. The grassroot initiatives

In CollinaPo and Turin, this unfolds through initiatives that range from food-sharing networks redistributing surplus food, to short supply chains and farmers' markets reconnecting producers and consumers, to community-supported

agriculture and cooperative practices that embed solidarity within economic exchange. In other words, this framework identifies practices that are not merely functional responses to system's inefficiencies, but which consist of active laboratories where innovative dimensions of food systems are practiced.

The mapping of NGOs, associations, and grassroots groups relevant to this analysis has been carried out by explicitly adopting the methodological framework developed by Davies and Evans on Food Sharing Initiatives (2019)[91]. This perspective defines food sharing as

"eating a portion of food with others (shared consumption and commensality); giving a portion of food to others (redistribution); using, occupying or enjoying food and food-related activities, devices and sites jointly (shared use of spaces for growing, preparing and cooking; shared utensils and gardening tools; shared growing, cooking and eating experiences); possessing a common fascination with food (shared interest); telling someone about food (shared skills and knowledge)" (Davies & Evans, 2019, p. 155).

Aiming at categorizing the FSIs currently active in CollinaPo, most of the initiatives adopt a charity-based organizational form, accounting for 55.9% of the total. This prevalence reflects the deep-rooted presence of church-related actors in the territory, which historically play a central role in redistributing surplus food and in aiding vulnerable populations (CIT). Their weight underscores how much of the civic action around food remains anchored in logic of relief rather than structural transformation.

Yet, the second largest share, composed of associations at 30.9%, signals an important counterpoint. Associations operate on a more participatory basis, often grounded in local communities and capable of articulating collective visions that go beyond emergency responses. Their significant presence demonstrates that, alongside charitable redistribution, there is a parallel field where civic agency, alternative provisioning circuits, and democratic experimentation are actively pursued.

[91] The research over Food Sharing Initiatives in CollinaPo is developed by relying on the methodology of the CULTIVATE project. CULTIVATE, funded by Horizon Europe, supports sustainable urban and peri-urban food sharing through the co-design of the Food Sharing Compass, an online platform to map, monitor, and strengthen food sharing initiatives (FSIs) across Europe. The methodology was learnt during my visiting period at Trinity College Dublin, under the supervision of Prof. Anna Davies and Dr. Fean Phelan. Particularly, it consisted of a google search of key terms in a phrase that allowed to grasp all the Initiatives currently active in the selected area. Please, see https://cultivate-project.eu/project/ for further details.

During my time in Dublin, I carried out the mapping of FSIs in Turin, applying and testing the methodological framework developed within the project. I later reapplied and expanded this model to the FSIs of CollinaPo, refining the methodology and adapting it to local specificities.

The remaining organizational forms, non-profits, social enterprises, networks, public sector projects, and cooperatives, collectively represent less than 15% of the total, but their presence still points to diversification and to the gradual expansion of hybrid and participatory models.

Organisational structure	No. initiatives	% on total
Charity	237	55,94 %
Association	134	30,94 %
Non-Profit	21	3,71 %
Social Enterprise	18	3,22 %
Network	13	2,48 %
Public Sector	11	1,98 %
Cooperative	6	0,99 %
Other	5	0,74 %

Table 21: Number and structure of Food Sharing Initiatives in CollinaPo (2024)
Source: Author's elaboration

It is particularly interesting to see their distribution across the territory. As Figure 86 illustrates, NGOs and associations are present across almost all municipalities of CollinaPo, confirming that civic engagement in food is not limited to the metropolitan center but extends deeply into peri-urban and rural areas.

The densest clusters are located around the southern belt of Turin, where multiple initiatives coexist within the same municipality, with some areas reaching nineteen organizations per km^2. This concentration corresponds to the higher population density and the stronger presence of both surplus food sources and vulnerable groups in need of redistribution. However, what also emerges interestingly is the capillary spread of smaller nodes across the territory: many municipalities host at least one association or NGO, often with strong local roots and community-based operations.

The map therefore highlights a dual structure: on the one hand, urban and peri-urban clusters where initiatives are numerous and interlinked; on the other, a widespread but more fragmented presence in rural towns, where single organizations often represent the only civic actor intervening in the food system.

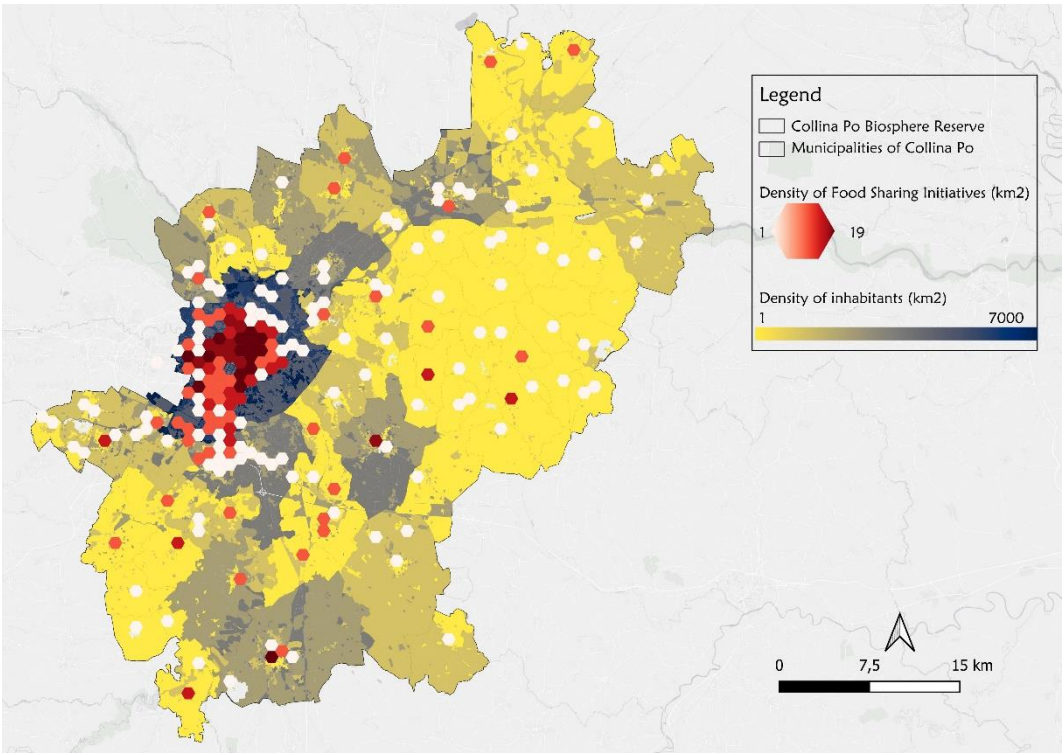

Figure 86: Distribution of Food Sharing Initiatives in CollinaPo (2024)
Source: Author's elaboration based on data from Camera di Commercio

Analyzing the primary activities undertaken by civic and grassroots food-sharing initiatives in CollinaPo further confirms the dual structure already identified between the urban and the peri-urban spheres.

In Turin and its immediate surroundings, initiatives tend to be scope-led, focusing on clearly defined functions such as the redistribution of food surpluses, specialized food banks, and targeted urban agriculture projects.

In contrast, in the outer municipalities, where initiatives are fewer and often represent the sole actor of civic engagement around food, activities appear more diversified. More detailly, they often consist in *pro loco* associations, which are community-based organizations formally established in many Italian towns to promote local culture, traditions, and collective life. Although not originally designed for food-related purposes, pro locos in CollinaPo often become the institutional vessel through which communities manage food-related initiatives, combining cultural programming with practical activities around provisioning and solidarity.

A single organization in a rural town may simultaneously combine food assistance with skill-sharing workshops, or the management of community spaces,

effectively broadening its scope to cover multiple functions beyond its original mandate.

This diversification reflects a pragmatic adaptation: with limited organizational density, initiatives cannot afford to be narrowly specialized and thus evolve into multi-purpose community anchors.

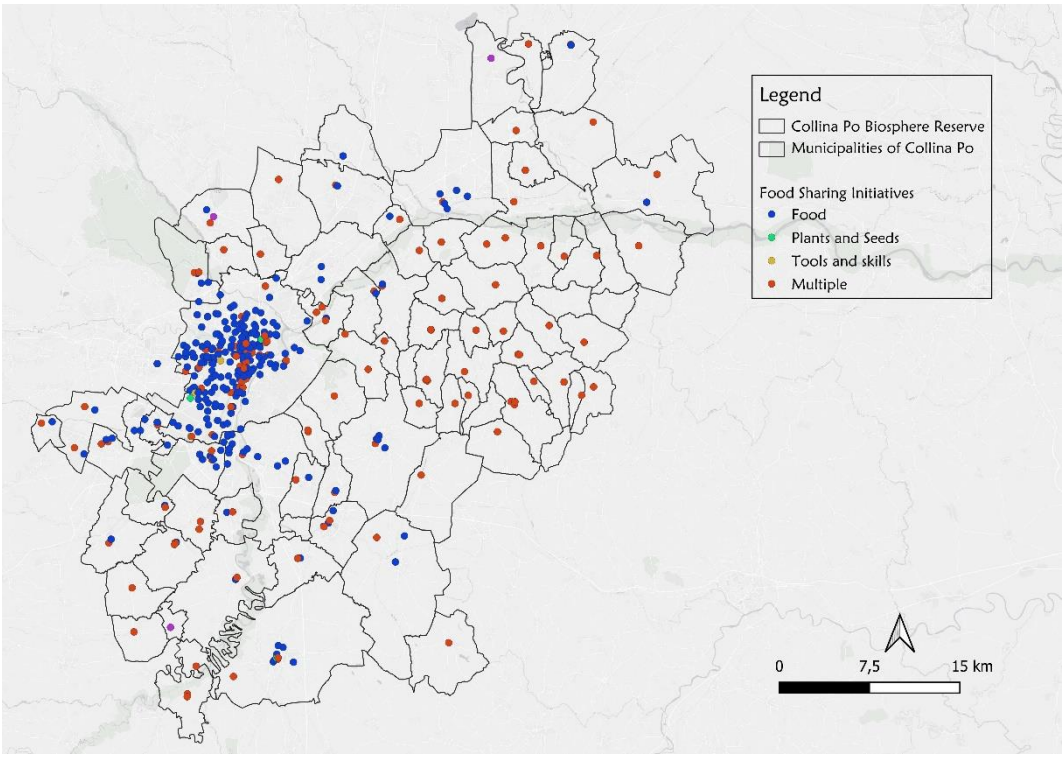

Figure 87: Distribution of Food Sharing Initiatives per main activity in CollinaPo (2024)
Source: Author's elaboration based on data from Camera di Commercio

3.3.2.2. A Network of food initiatives

A particularly relevant process within Turin's civic food landscape is the emergence of *Paesaggi e Comunità Urbane per Nutrire Torino* (*Punto al Cibo*)[92], a network that brings together NGOs, grassroots groups, and the University of Turin around shared concerns for food and the local food system.

This entity started in the summer of 2021, when several associations and networks active in the agri-food field initiated regular meetings aimed at fostering coordination, mutual support, and the creation of a structured dialogue. The University played a catalytic role by facilitating these encounters, leveraging its

[92]Urban Landscapes and Communities Nourishing Turin (Point of Food)

thematic expertise and sustained presence in the city's food-related events to stimulate bottom-up processes.

Through weekly meetings, the groups gradually consolidated a collective identity, identified common themes of interest, and outlined shared objectives. Aggregation was possible thanks to a profound knowledge of the local territory and to the complementarity of the scales of action represented by the diverse realities involved, each contributing specific capacities and experiences.

The collective reflections of Punto al Cibo show clear thematic priorities. First, the network identifies the need to tackle food waste and to strengthen consumer education as central axes of action. Second, it emphasizes the valorization of local producers and small-scale food economies as essential to sustaining territorial resilience. Third, it highlights the urgency of addressing food poverty through surplus recovery and redistribution, community solidarity initiatives, and urban gardening. Beyond these core concerns, the Punto al Cibo's groups also articulate broader objectives of environmental sustainability, social inclusion, and the promotion of food sovereignty. This convergence can be summarized in three overarching orientations: the valorization of local realities; the protection and support of vulnerable populations; and the creation of structured spaces of dialogue both among the civic actors themselves and between them and the institutions.

As discussed in specific research, the groups are acutely aware of the obstacles they face (Allegretti, Bruno, & Propato, 2023). They point to the fragmentation of initiatives and the lack of effective coordination as barriers to impact, and they denounce the absence of institutional recognition and dialogue from the municipal administration. Associations stress the need for a UFP capable of integrating actions across the food chain and amplifying the visibility of grassroots work, enabling stronger consumer–producer connections, critical consumption, and constructive engagement with for-profit actors. In their view, Punto al Cibo could play a mediating role with the public administration, serving as an interlocutor to structure this missing dialogue.

3.3.3. Food regimes

The intention, here, is to understand what designates the processes through which food is not only made available as a commodity but codified by institutional authority. Through legal categories, and symbolic devices, certain foods, and processes behind them, acquire visibility and legitimacy, while others remain invisible or marginal.

This is not a neutral act of classification: it establishes hierarchies of value, defines what counts as authentic, and embeds power relations into the very fabric of food economies.

In this sense, food becomes a political object twice: first in its material circulation across production and consumption, and again in the institutional mirrors that spread, or silence its multiple meanings.

3.3.3.1. Geographical Indications

Probably the most common way in which territories are institutionally represented through food is by means of Geographical Indications (GIs). This framework provides a legally codified link between specific places and the products that originate from them, translating local practices into official categories that carry both symbolic and economic weight. GIs make territories legible by designating them as the source of foods that are distinctive, authentic, and worthy of protection (Sciarra & Gellman, 2012).

In doing so, they do not only safeguard traditions and heritage but also shape markets, since recognition as a GI often reorients production toward consumers willing to pay premiums for quality and distinctiveness.

Piedmont stands out as one of Europe's powerhouses of geographical indications (GIs), with a particularly dense concentration of certified products in both food and wine. Established in the 1990s by initial attempts, two main GI categories now exist for food: DOP (Denominazione di Origine Protetta / PDO, Protected Designation of Origin) and IGP (Indicazione Geografica Protetta / PGI, Protected Geographical Indication). DOP certifies products whose production, processing, and preparation all take place in a specific area, ensuring a strong link to the territory. IGP, by contrast, requires that at least one stage of production occurs in the designated area, offering more flexibility while still protecting regional identity.

In the wine sector, these are complemented by DOC (Denominazione di Origine Controllata / Controlled Designation of Origin) and DOCG (Denominazione di Origine Controllata e Garantita / Controlled and Guaranteed Designation of Origin). DOC identifies wines made in specific areas following established rules of grape varieties and production methods. DOCG represents the highest classification, applied to wines of exceptional quality, and requires stricter controls, including official tasting panels before release.

For what concerns Piedmont, as visible in Figure 88, a few highly specific PGIs products (e.g., Cuneo's apple and bean areas; hazelnuts and chestnuts belts; "Vitelloni Piemontesi") sit alongside a broader PDO stratum dominated by cheeses (Bra, Castelmagno, Gorgonzola, Murazzano, Ossolano, Raschera, Robiola di Roccaverano, Taleggio, Toma Piemontese), cereals (Riso di Baraggia biellese e

vercellese), cured meats (e.g., Crudo di Cuneo, Salamini italiani alla cacciatora), and a few aquatic designations (the Tinca gobba dorata del Pianalto di Poirino). Over and above these layers, the wine system is crucial: the region hosts an extensive mosaic of DOC (42) and DOCG (22), which clearly regard the Langhe–Roero–Monferrato complex, and radiate toward the Turin hills, making wine the principal vehicle through which Piedmont translates territory into market visibility.

Within this regional picture, CollinaPo is not a GI "core" like Langhe–Monferrato, but it intersects several key designations. The Reserve contains the production area of the *Tinca gobba dorata del Pianalto di Poirino* (PDO) and overlaps with PDO cheeses. On the wine side, CollinaPo hosts DOCs rooted in the Turin hills (e.g., Freisa di Chieri DOC, Collina Torinese DOC) and touches DOC/DOCG fronts of Monferrato. PGIs are comparatively thinner inside the Reserve, but region-wide PGIs, like nuts, intersect CollinaPo too.

Read together, the maps show a clear hierarchy: wine GIs drive the widest and most continuous territorial coverage; PDO foods provide diversified but patchier recognition; PGIs crystallize a handful of iconic niches. CollinaPo sits at their intersection: it is strongly imprinted by wine designations along its hill margins, it hosts a distinctive aquatic PDO at Poirino, and it participates in wider cheese and cured-meat PDO networks via production and processing nodes on the plain.

In practice, this means the Reserve's institutional visibility depends less on a single flagship GI, but can rely on aa composite belonging, urban-adjacent DOCs, a unique local PDO, and inclusion in broader, multi-provincial PDO/PGI regimes that connect CollinaPo to the wider Piedmont food economy.

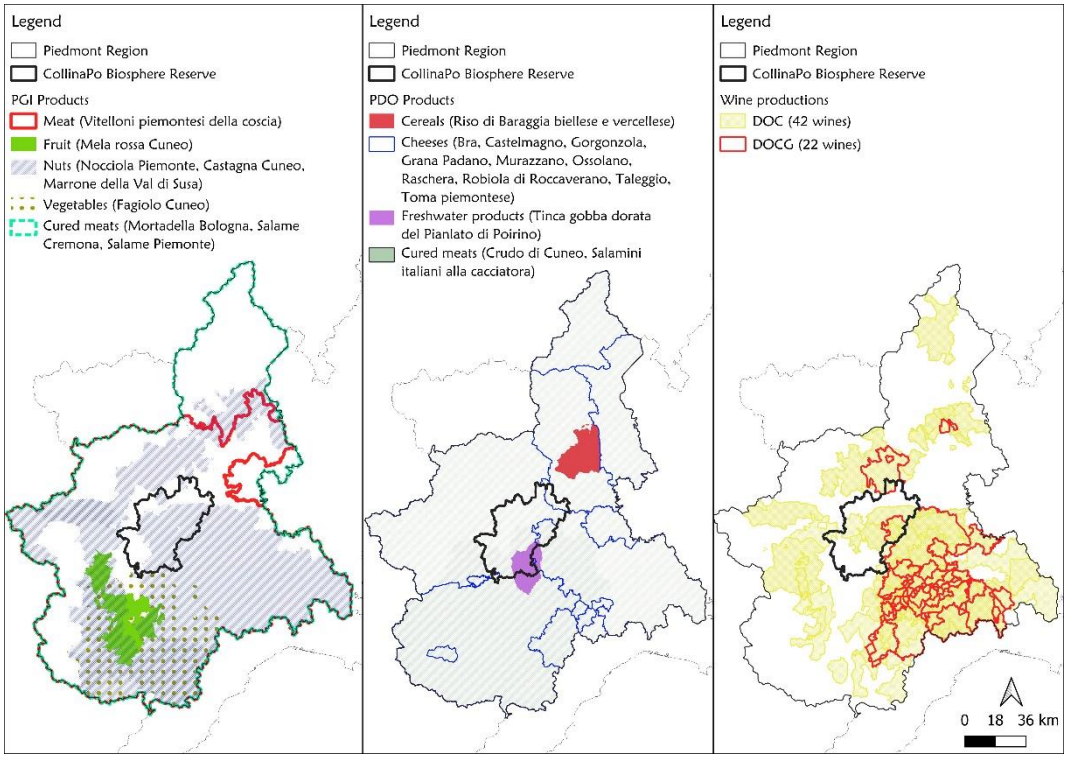

Figure 88: Geographical Indications of food in Piedmont and CollinaPo
Source: Author's elaboration based on data from Geoportale Piemonte

Italy, with more than a third of Europe's wine labels and a quarter of its PDO and PGI foods, is often portrayed as the emblem of territorial quality. Yet this abundance of certifications hides important distortions (Pettenati, Amo, & Woods, Assembling mountains through food. Typical cheese and politics of mountainness in the Italian Alps, 2024). The areas with the highest concentration of GIs are not the purest, rarest, place-bonded production zones but rather regions with strong agro-industrial structures, such as Lombardy, Emilia-Romagna, or the fertile Alpine foothills.

By contrast, in southern mountain regions like Calabria or Basilicata, where high-quality farming exists but enterprises are smaller and less capitalized, certifications remain scarce, revealing how access to GI markets depends more on economic capacity than on territorial distinctiveness (Varotto, 2020).

Behind this imbalance lies a structural paradox: many certified products retain the imagery of traditional landscapes but only partially correspond to those contexts in practice. Industrial demands have progressively reshaped production, moving it into valley floors or nearby plains where mechanization and plant expansion can meet market volumes. As affirmed by Lazzeroni et al.,

"da un lato potenziali elementi di una sostenibilità produttiva e di una rilocalizzazione delle filiere basata su saperi e pratiche sedimentate localmente e improntate a una gestione oculata delle risorse; dall'altro prodotti caratterizzati da una crescente richiesta di mercato, che può stimolare processi di espansione e/o intensivizzazione insostenibile delle filiere 'tipiche', che ne mettono in discussione il rapporto con il patrimonio culturale locale e la sostenibilità ambientale"[93] (Lazzeroni, Pettenati, Privitera, & Zilli, 2023).

As a result, "typical" products often emerge from highly uncarefully extractive and profits-led systems, like large-scale viticulture in Piedmont and Veneto (Pettenati, 2019). What is sold in supermarkets as authentic heritage is frequently a symbolic staging, a "showcase" of rural purity masking industrial logics. This dynamic has been described as a form of "food neocolonialism": first exploiting the image of ecological integrity and artisanal traditions to reassure consumers after decades of food scares, then anchoring production geographically while eroding its actual territorial substance (Varotto, 2020).

The central idea is that the landscape where the product is made is no longer merely a physical or natural setting; it has been transformed into an enriched cultural object that people consume alongside the product itself. This means that when people buy or experience food or wine, they are also "consuming" the cultural meanings attached to the place of production. Ultimately, the economic and identity value of the landscape is not simply given but is actively constructed through a storytelling process that highlights the unique conditions in the production's backstage (Privitera, Graziano, & Polizzi di Sorrentino, 2025).

3.3.3.2. Distretti del Cibo

A further element relevant to the institutionally symbolic dimension of food in Piedmont is represented by the *Distretti del Cibo* (Food Districts). Established under national law (Legge 205/2017) and implemented by the regions, food districts are territorial aggregations of municipalities, enterprises, associations, and institutions that cooperate around a shared agri-food identity, production system, or landscape, finally overcoming other pre-existing tools of municipal aggregation around food (Tecco, Bagliani, Dansero, & Peano, 2017).

Their formal recognition allows access to specific lines of funding, with the aim of promoting integration across supply chains, supporting local products, and

[93] "On the one hand, there are potential elements of productive sustainability and a relocation of supply chains based on locally embedded knowledge and practices, guided by careful resource management; on the other hand, there are products characterized by growing market demand, which can stimulate processes of unsustainable expansion and/or intensification of "typical" supply chains, calling into question their relationship with local cultural heritage and environmental sustainability"

linking food production to environmental and cultural heritage. In principle, they are conceived as laboratories of territorial food governance, to coordinate actors across sectors and scales (Giuca, 2019).

As shown in Figure 89, CollinaPo does not constitute a food district of its own, but it overlaps with several of them. It fully contains the *Distretto del Cibo Chierese–Carmagnolese*, a district strongly characterised by vegetable cultivation, notably Carmagnola's peppers, and other horticultural productions. It also crosses extensively with the *Distretto del Cibo e del Vino Langhe–Monferrato*, which represents one of the most internationally recognized agri-food areas in Italy. In addition, CollinaPo touches both the *Distretto del Cibo e del Vino Mombarone*, *Serra Morenica e Naviglio d'Ivrea* and the *Distretto del Cibo Terre da Tastè*, each linked to smaller but symbolically important local productions.

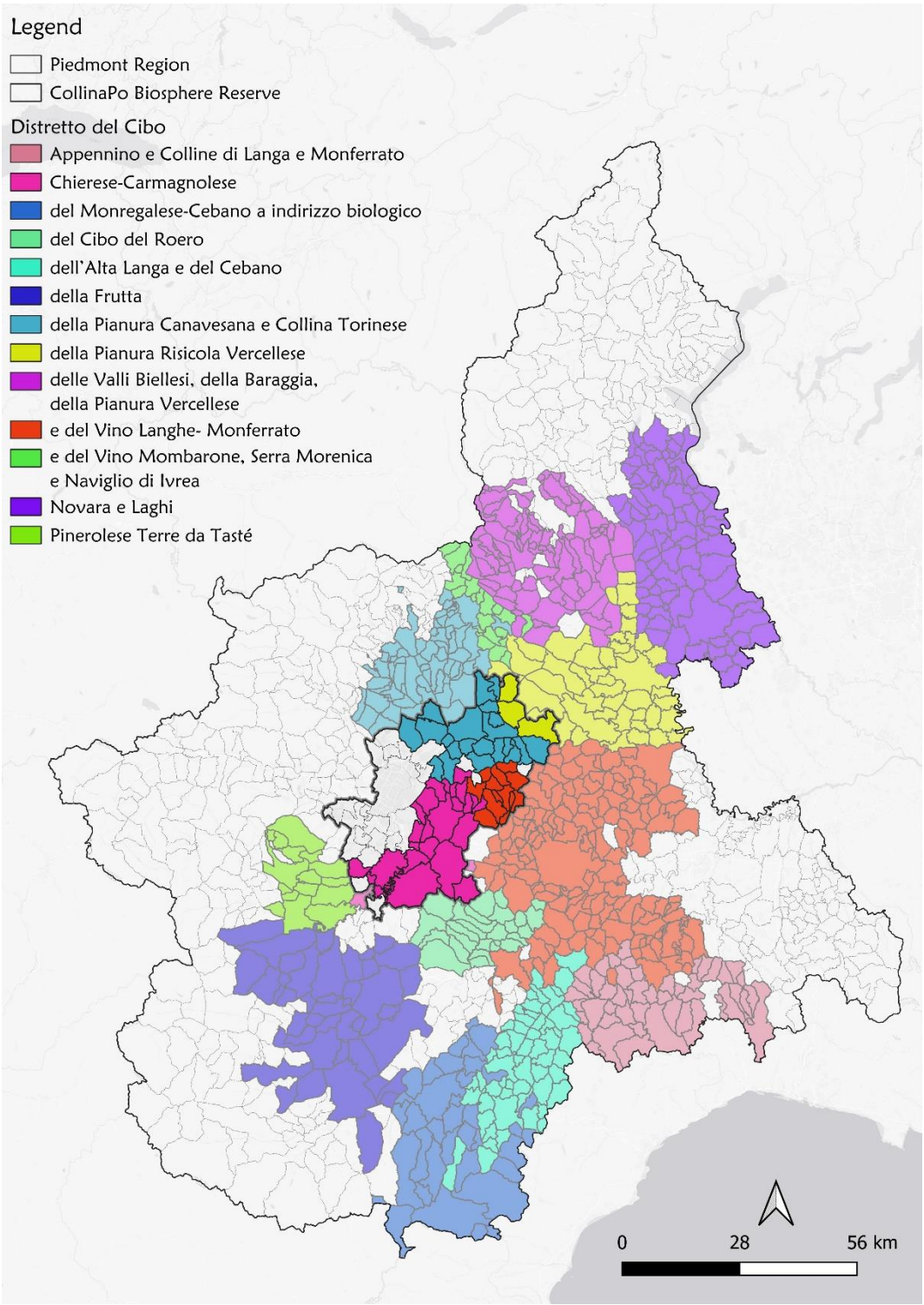

Figure 89: Food districts in Piedmont (2025)
Source: Author's elaboration based on data from Regione Piemonte

Despite their aspirational framing, food districts face substantial limitations that often undermine their transformative potential within regional food systems. Their formation is often grounded in administrative convenience or political considerations rather than in strategic food-system logic. This can lead to uneven territorial configurations and inconsistent engagement from essential local stakeholders, including producers, distributors, civil society, and consumers.

Many food districts remain production-oriented, emphasizing promotional campaigns for local commodities, such as agricultural products or wine, without embracing more comprehensive objectives like equitable food access, sustainability, or social justice; in other words, they lack clear connections to more sounding food-related policies and planning tools (Gottero, 2024). In this sense, districts may function more as branding initiatives than as integrated food-system governance tools.

A fundamental concern is that governance models within these districts tend to privilege institutional and economic stakeholders, like industry representatives, and other agri-business interests, while marginalizing civic actors. This imbalance strongly limits opportunities for bottom-up experimentation, community participation, and co-produced solutions, reinforcing existing power asymmetries rather than challenging them.

3.3.3.3. The phenomenon of foodification

Among the multiple political issues behind food and cities, the concept of *foodification*, a blend of "food" and "gentrification", captures a set of urban transformations in which food plays a pivotal role, reshaping spaces[94]. Beyond the mere multiplication of restaurants, foodification

allude al carattere massivo, dilagante ed espansivo del comparto gastronomico nei contesti urbani, apprezzabile – anche per banale esperienza diretta – sia nello spazio fisico, attraverso la continua apertura di nuovi ristoranti, caffè ed esercizi di somministrazione, sia nello spazio virtuale, tramite l'invasiva presenza del cibo nell'immaginario urbano messo in circolo dalle diverse piattaforme digitali istituzionali e non (Bourlessas, Loda, & Puttilli, 2022, p. 8)[95].

[94] Although no primary data collection was conducted as part of the foodification study, the topic remains pivotal and warrants attention because of the major changes it has been driving in Turin.

[95] "It regards the massive, rampant, and expansive character of the gastronomic sector in urban contexts, perceptible—also through simple direct experience—both in physical space, through the continual opening of new restaurants, cafés, and food-and-beverage service establishments, and in virtual space, through the invasive presence of food in the urban imaginary set into circulation by various institutional and non-institutional digital platforms".

Across Italy, cities such as Florence, Bologna, Naples, and Palermo have embraced food as a tool for tourism promotion. In Bologna, for example, scholars have described the emergence of a "city à la carte", where food-centered atmospheres and spectacularized consumption has become fundamental an experience to "live" the city (Frixa, 2022).

In this framework, Turin offers a particularly rich example of these dynamics. Already in 2009, within a research refleting over Turin's search for a post-industrial future, it was defined by Governa, Rossignolo and Saccomani, as "the city questing for a new identity and a new growth model, the 'minor global city'" (Governa, Rossignolo & Saccomani, 2009, p. 21). Innovative opportunities, both in research and corporates, and in tourism and major events, were looked for (Dansero & Puttilli, 2009).

Since the 1980s, when Slow Food emerged and local products such as wine and chocolate were reframed as crucial cultural assets, food has been strategically mobilized to reposition the city in a post-industrial context.

Over the decades, local authorities, entrepreneurs, and organizations have constructed discourses of quality and distinctiveness, giving a peculiar branding to the city as a major destination for food-related rich cultural experiences. The 2018 launch of the "Capital of Taste" brand enforced this trajectory, cementing food as a pillar of Turin's growth. Today, more than 8,500 food and beverage venues operate in the city, with dense concentrations in central districts and San Salvario, revealing the degree to which gastronomy has been woven into urban redevelopment (Assessorato Transizione Ecologica e Digitale Innovazione Mobilità e Trasporti & Dipartimento Cultura Politica Società (gruppo Atlante del Cibo di Torino Metropolitana), 2023).

However, what is important to underline hereby, more than elsewhere, is the role of foodification in Turin as much more than a troubled experiential consumption: within this city, foodification actively reorganizes socio-spatial relations and drives processes of gentrification and displacement.

As deeply addressed by Bourlessas, Cenere and Vanolo, Porta Palazzo, a historically working-class and multiethnic neighborhood located at the north of the city center, lies at the heart of this transformation (2022). Since 2019, it has become the testing ground for food-led "requalification" policies. The opening of Mercato Centrale inside the underused Palafuksas building, located at the centre of Porta Palazzo square, which holds the largest Italian open air market, was accompanied by institutional narratives depicting the neighborhood as "degraded" and "peripheral", and therefore in the need of major positive transformations. This process must also be situated within Turin's broader geography of urban

transformation. Porta Palazzo is strategically positioned between the fully gentrified Quadrilatero Romano to the west and the north-eastern districts, currently undergoing fragmented but significant redevelopment. While the neighborhood had long stood in contrast to the polished *Quadrilatero*, foodification has created a bridge through which gentrifying dynamics can extend (Semi, 2004).

Meanwhile, to the north-east, several major developments have emerged: the relocation of higher education institutions such as the University of Turin's *Campus Luigi Einaudi*, IAAD, and *Scuola Holden* has brought new populations and consumer practices; Combo, an international hostel and restaurant, opened in 2020 on *Piazza della Repubblica*; and across the Dora river, Lavazza's new headquarters, museum, and restaurant complex, as well as EDIT, a large multi-eatery concept, have reshaped the area's economic landscape (Bourlessas, Loda, & Puttilli, 2022). Foodification is therefore accelerating gentrification in Porta Palazzo, displacing residents and informal economies as small foodie ventures and corporate anchors rebrand the area.

Overall, this process unfolds through aestheticization and homogenization of the urban environment, that function as "material grips" for consumers to enact status distinction. This welcomes new eateries on one side, and, on the other side, gastronomic displays that are not neutral: they actively reshape everyday practices of consumption, embedding new cultural codes into the retail-scape and making food an opportunity for few. As consumption becomes more sedentary and staged within these aestheticized spaces, it produces what Bridge calls "the very stuff of the gentrification aesthetic" (Bridge, 2001, p. 211-212), materially generating a displacement atmosphere.

The consequences of these transformations are tangible. Rising property values, speculative real estate investments, and the arrival of wealthier consumers are reshaping the demographic and commercial fabric of Porta Palazzo. The dynamics unfolding in Turin reveal that foodification is not a neutral or organic evolution but a structured process that legitimizes and materializes urban restructuring, and inhabitants' exclusion, through food (Cenere & Bourlessas, 2022). And crucially, this situation has a clear political root: it stems from the absence of a regulatory and strategic framework capable of governing these transformations. The city lacks a coherent, equity-oriented food policy that could mediate between economic development and social justice. In this vacuum, market forces, branding strategies, and private entrepreneurial logics have filled the space, leading to the production of new urban value but also deepening spatial inequalities, accelerating displacement, and reconfiguring the social fabric of entire neighborhoods (Giannitrapani, 2021).

3.3.3.4. Attempts of Urban Food Policies

With the explicit goal of clarifying what is relevant in terms of key policy-making actors, due to the incoming Chapter VII, that will concern multistakeholder engagement and participatory governance, preliminary clarification is needed between the notions of governance and government, hereby adopted. The first refers to the plurality of actors, networks, and processes, public, private, and civic, that collectively shape decisions and practices in the food system, often through horizontal coordination and shared responsibilities (Hospes & Brons, 2016). Government, by contrast, indicates the formal, institutional, and hierarchical dimension of public authority: the capacity of municipal, regional, or national administrations to design policies, allocate resources, and regulate practices in a binding manner (Jessop B, 2011). While governance highlights participatory processes, government concerns the official exercise of political power through structured institutions.

In the case of CollinaPo, the analysis focuses on the governance rather than government. This choice stems from the fact that the Biosphere Reserve does not possess a dedicated architecture for food: there is no integrated UFP, and no institutional participatory body explicitly charged with coordinating food-related issues at this scale. The absence of such structures makes it impossible to speak of a government framework in a strict sense. Instead, what can be observed are the lower arrangements that deal with the matter of food.

Within this discourse, as the regional capital and the city that presides over the BR, Turin holds a central institutional position. Moreover, it is in Turin that the most advanced experiments in UFP and institutional coordination have been developed within the metropolitan area. For these reasons, the focus must shift from the CollinaPo's municipalities to Turin's initiatives, which represent the most concrete expression of how the governance dimension of food is being articulated in the city-region.

The trajectory of Turin over the last decade illustrates a gradual transition from fragmented initiatives to more systemic approaches. The first significant step came in 2013 with Torino SMILE ("Smart Mobility, Inclusion, Life & Health, Energy") (Allegretti, et al., 2022), a participatory planning initiative for Turin's smart city strategy. Although not initially focused on food, it provided a platform where multiple actors began to frame food as a strategic issue. Within SMILE, ad-hoc working groups addressed the environmental and social equity impacts of food supply chains, identifying priorities such as shortening supply chains, reducing waste, and improving access. From this platform, the idea of creating permanent instruments emerged: a knowledge hub to map and connect actors and initiatives

and a service platform for small producers (Dansero, Pettenati, Toldo, & Bonavero, 2019). These concrete proposals were not implemented, but SMILE served to catalyze dialogue and prepared the ground for subsequent initiatives.

The second stage of the local food governance process was launched a few months before the 2014 "Salone del Gusto – Terra Madre", as part of the work on the Third Strategic Plan "Torino Metropoli 2025". The initiative, originally called "Turin Capital of Food", was later renamed "Turin City of Food". This participatory process led to the development of two major proposals: (i) the establishment of a Food Commission, conceived as a non-institutional governance platform for guiding and coordinating Turin's food policy; and (ii) the creation of the Food Atlas of Metropolitan Turin, a research-action project designed to support public decision-makers by mapping, analyzing, and representing the discourses, policies, and practices related to food in the city (Allegretti, et al., 2022; Dansero, Pettenati, & Toldo, 2015; Dansero & Gilli, 2019).

While the first proposal remained largely aspirational, the second materialized with the creation of the Atlante del Cibo (Turin Food Atlas) in 2015, a collaborative platform initially participated by the University of Turin, Politecnico di Torino, the University of Gastronomic Sciences, and the Chamber of Commerce[96].

The third stage of Turin's path toward the governance of food consisted in Nutrire Torino Metropolitana (NTM), coordinated at the Metropolitan City scale in 2015 with the engagement of more than 240 actors, that coincided with the Milan EXPO 2015. Through three workshops, NTM mapped the local food system and identified eight priorities, including education, information, logistics, public procurement, quality incentives, territorial planning, and new governance forms. It also proposed initiatives such as nutrition education in schools, logistics hubs to connect producers and consumers, a collaborative governance body, and revised procurement rules favoring local sustainable supply chains (Allegretti, et al., 2022). Although many remained at the formulation stage, NTM's key achievement was mobilizing a broad and diverse set of actors around a shared food agenda, later incorporated into the Metropolitan Strategic Plan.

In 2016, the City of Turin formally incorporated the Right to Food into its Statute. The approved text affirms the commitment to

[96] Since then, the Atlas has become a key infrastructure of Turin's food governance: it monitors the metropolitan food system, fosters interaction between research, public authorities, and civil society, and produces the Turin Food Metrics reports, which provide quantitative tools to guide attempts of governance by substantial data. Its membership has expanded to include the City of Turin, the Metropolitan City of Turin, IRES Piemonte, Urban Lab, and since 2023 the Piedmont Region.

promuovere l'attuazione del diritto a un cibo adeguato, inteso come diritto ad avere, permanente e libero accesso a un cibo di qualità, sufficiente, nutriente, sano e accettabile da un punto di vista culturale e religioso, che garantisca il soddisfacimento mentale e fisico, individuale e collettivo, necessario a condurre una vita degna[97].

Nevertheless, despite these advancements, political will and coordination remained weak. Alongside governance bottlenecks, Turin's food policy process was also hindered by a territorial issue: the lack of a metropolitan perspective. Although initiatives like NTM engaged actors beyond the city, they never produced genuine trans-scalar policies linking urban, peri-urban, and rural areas. Three dynamics explain this failure. First, small provincial producers identified strongly with rural traditions and, feeling excluded from past initiatives such as school catering or regional food districts, remained distant from city-led processes. Second, the Metropolitan City, which should have coordinated across scales, was weakened by cuts in resources, staff, and competencies, limiting its capacity to act[98]. Third, both the Municipality and the Metropolitan City struggled to involve the Piedmont Region, missing opportunities to use new tools such as *Distretti del Cibo* or *Comunità del Cibo* to connect city and countryside (ibid.).

From 2019 onwards, two major events reshaped the food policy landscape in Turin: the COVID-19 pandemic and, more recently, the launch of the FUSILLI project. Concerning the first, the pandemic marked a turning point. Emergency initiatives such as Torino Solidale, which coordinated parishes, neighborhood houses, supermarkets, Banco Alimentare, and the Municipality in the distribution of food aid, revealed both the strength of civic infrastructures and the pressing need for stronger institutional steering.

Regarding the second, a significant step forward came in January 2021 with the launch of the EU-funded Horizon 2020 FUSILLI project[99]. Involving more than 30 partners, it was locally led by the City of Turin and the Mirafiori Community Foundation and supported by the Turin Food Atlas, the University of Turin, the University of Gastronomic Sciences, as well as the associations Està and Orti Generali.

The project directly enabled the creation of the *Gruppo Interdipartimentale e Interassessorile per le Politiche Alimentari* GIPA (Inter-departmental Food

[97] "Promote the implementation of the right to adequate food, understood as the right to have permanent and free access to quality food that is sufficient, nutritious, healthy, and acceptable from cultural and religious perspectives, ensuring both mental and physical well-being, individually and collectively, as necessary to lead a dignified life".

[98] See the issue of Provinces' downsizing in size and competencies mentioned before.

[99] https://fusilli-project.eu/

Policies Working Group). GIPA, formally established in 2022, represented the first institutional mechanism, not a food policy council, to overcome the fragmentation of food competences across municipal offices, coordinating all initiatives under a single steering committee (Krähmer & et al., 2025).

Within this framework, the City adopted the Food Policy Guidelines in 2023, that sets a vision for 2030: sustainability, equity, waste reduction, circularity, support for vulnerable groups, and integration of urban and peri-urban agriculture. With GIPA and these guidelines, Turin has effectively begun to institutionalize its food governance. At the core, therefore, there emerge the following structure: the City and GIPA provide an institutional anchor and a potential decision-making space. The Turin Food Atlas contributes research capacity, system mapping, and policy dialogue arena, offering evidence and knowledge that can inform GIPA's coordination. Meanwhile, Punto al Cibo ensures the involvement of NGOs, networks, and grassroots associations, bringing civic participation and social needs into the debate.

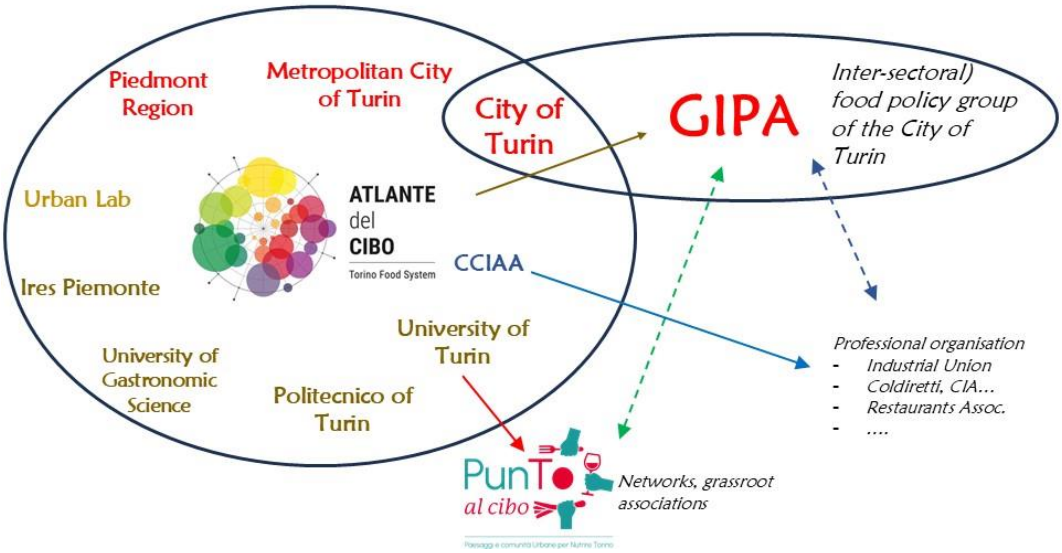

Figure 90: Turin's food governance possible infrastructure
Source: Author's elaboration based on data from *Atlante del Cibo di Torino Metropolitana*

What emerges, however, is a problematic framework. On the one hand, although GIPA has continued to meet even after the conclusion of the FUSILLI project, its meetings have reduced in number and depth. Moreover, when considered together with *Punto al Cibo* and other initiatives discussed above, there has been a unique

encounter within the whole of 2024. Therefore, the picture is less one of a coherent governance system and more of a constellation of numerous actors and projects. These actors coexist in the same field but rarely interact in sustained or coordinated ways.

This fragmentation has two sides. Positively, it demonstrates the vitality and interest around food policy issues in Turin, with many organizations, institutions, and networks investing energy in the field. Negatively, however, it highlights a lack of integrative capacity: without final engagement and clear mechanisms for coordination, the system struggles to converge on a decisive policy-making architecture. In other words, food governance in Turin remains dispersed, rich in actors and initiatives, but limited in its ability to consolidate them into a unified, long-term framework.

4. A SWOT analysis

To provide an integrated reading of CollinaPo' CRFS, the analysis is structured through a SWOT framework, that juxtaposes internal strengths and weaknesses with external opportunities and threats. This framework consolidates the empirical evidence presented in the previous section into a synthetic assessment of the system's resilience capacity.

For both the internal and external dimensions, a summary is developed hereby.

4.1. Internal strenghts

The CollinaPo food system is distinguished by a high density and diversification of enterprises across the entire supply chain, helping to improve structural solidity. More than 4,600 farms constitute the productive foundation, while 1,365 processing enterprises and 132 packaging and labelling firms sustain downstream value-adding functions and secure differentiated market niches.

The presence of 2,349 logistics operators consolidates the connective tissue between rural areas and the metropolitan core, facilitating continuity of flows and mitigating the risks of systemic bottlenecks. The distribution infrastructure is particularly extensive: 7,610 retailers, supported by more than 800 neighborhood bakeries, above all, and a dense network of farmers' markets, form a fine-grained provisioning landscape. This structure reduces dependence on the limited number of extremely large outlets, safeguards access in less populated municipalities and enhances the capacity of the system to maintain continuity under stress.

The catering and hospitality sector further strengthens this density, with 4,430 bars and over 7,200 restaurants, in addition to 746 food-serving accommodation

facilities. The guaranteed presence of restaurants in every municipality underlines the ubiquity of food services across the territory, ensuring everyday access, although granting diverse options if compared to retailers.

At the territorial level, CollinaPo displays marked productive specialization: cereals, vegetables, fruit, and vines cluster in defined sub-areas, creating localized comparative advantages.

The system retains a substantial agricultural base, with more than 92,800 hectares of UAA, ensuring the persistence of farming functions.

Resilience is also reinforced by a dense layer of civic and associative infrastructures. Over 400 NGOs and associations engage in food-related initiatives, from sustainability practices to civic mobilization and education. This social capital sustains collective action, facilitates coordination across actors, and provides important support to local populations.

4.2. Internal weaknesses

Despite its density and diversification, the CollinaPo food system also reveals a set of structural weaknesses that limit its capacity to sustain resilience. The agricultural base is still largely dominated by extensive cereal and fodder cultivation, with 45,529 hectares of cereals (3.9 million q) and 18,394 hectares of forage (639,762 q). Much of this production is directly or indirectly destined to animal breeding, as confirmed by the 122,203 Livestock Units (UBA Eurostat) and the large number of active farms (over 1,000 cattle farms, plus swine, ovine, caprine, poultry, and equine units). This renders the system heavily livestock-dependent, a model that is less accessible, less healthy from a dietary perspective, and highly resource-consuming, thus constraining sustainability and adaptability in the long term.

Demographic indicators reinforce these vulnerabilities. The age structure of farmers is skewed towards older cohorts, with a high share of producers over 55, while generational turnover remains weak. Gender balance is also severely lacking: the sector is overwhelmingly male dominated, limiting inclusivity and potentially narrowing innovation pathways that rely on diverse participation.

On the economic side, the structure of intermediation in distribution creates inefficiencies and opacity. A considerable share of intermediaries operates without warehouses or physical handling of goods, issuing invoices and circulating liquidity in ways that sustain shadow practices. While presented as simplification of trade flows, such dynamics in fact consolidate asymmetries, increase final prices, weaken producer margins, and reduce transparency, ultimately eroding the robustness of the supply chain.

Retail distribution is spatially unbalanced: while dense in urbanized areas, it leaves peripheral zones underserved, forcing residents to rely on hypermarkets or travel outside their municipality. This contributes to the persistence of food deserts, particularly in less accessible zones. Although these are partially mitigated by higher-income populations, their presence reflects territorial inequities in food access and heightens vulnerability in times of crisis.

Labor practices further weaken resilience. Agricultural production is sustained by precarious employment frameworks, with widespread reports of exploitation and *caporalato*, estimated to involve at least 13% of the workforce in Piedmont. This undermines social sustainability and erodes the legitimacy of the food system.

Finally, raising levels of food poverty underscore systemic fragility: approximately 8% of Piedmont's population is poor, and the number of people relying on food aid is increasing, with Turin alone accounting for tens of thousands of assisted individuals.

4.3. External opportunities

The CollinaPo food system operates in a regional environment marked by demographic dynamism, considering the period 2015-2024. Turin alone has grown by nearly 40,000 residents (+4.6%), consolidating its role as the primary demographic pole of Piedmont. Also, much of the surrounding territory shows demographic stability, and the expansion of different demands represents a stable outlet for food provisioning and a driver of market continuity for producers in CollinaPo.

Socio-cultural trends reinforce this potential. The share of Italians identifying as vegetarian or vegan has increased from 7–8% in 2014–2015 to nearly 9.5% in 2024–2025, equivalent to 5.6 million people. This reflects a growing consumer demand for plant-based, health-oriented, and sustainable diets, opening new market segments that producers in CollinaPo could capture, particularly given the area's specialization in cereals, vegetables, and fruit.

At the policy level, a wide range of public instruments and funding programs shape the enabling environment. The CAP 2023–2027 CSR and LEADER programs provide targeted support for rural innovation and diversification. Structural funds—ERDF, ESF+, and the FSC Development and Cohesion Agreement—open further channels for investment in agri-food innovation, skills development, and territorial cohesion. Together, these instruments constitute a multi-level policy architecture that, if effectively accessed, can provide resources to strengthen resilience and innovation in CollinaPo.

Economic opportunities are also visible in trade and tourism. The growth of food exports in Piedmont signals external demand for regional agro-food products, though the challenge remains ensuring that benefits accrue to local systems rather than being captured by large-scale intermediaries. Meanwhile, the rapid expansion of accommodation capacity and tourist beds creates synergies between food, hospitality, and place-based branding, integrating CollinaPo into a broader territorial narrative of gastronomy and tourism.

Infrastructurally, the system benefits from a stable and well-distributed logistics network anchored in rail transport nodes. This ensures integration into regional and national supply chains while reducing vulnerability to road-based disruptions.

Institutionally, opportunities arise from emerging governance structures. The role of the City of Turin and GIPA as institutional anchors, the Turin Food Atlas as a platform for research and evidence-based policymaking, and Punto al Cibo as a bridge to NGOs and grassroots actors collectively point towards a hybrid governance arena. This offers the potential to align public, academic, and civic resources around shared objectives, increasing strategic capacity.

Additional opportunities lie in the variety of Geographical Indications (GIs) linked to CollinaPo, which support differentiation and reputation, provided that territorial wellbeing remains prioritized over purely commercial exploitation. Furthermore, CollinaPo's location within established food districts reinforces its potential integration into regional production clusters, providing economies of scale and visibility.

4.4. External threats

The CollinaPo food system is increasingly exposed to climatic pressures. Although long-term average rainfall appears relatively stable, there is a marked increase in interannual variability, with frequent oscillations between wet and dry years. This greater irregularity reduces predictability for farmers and intensifies risks of both droughts and floods. At the same time, mean annual temperatures have risen consistently, with the last two decades characterized by persistent above-average values up to +2°C compared to the previous decade. Together, these dynamics intensify evapotranspiration, stress water resources, and exacerbate production risks.

Environmental degradation compounds these pressures. 20.6% of Piedmont's land (517,688 ha) shows signs of degradation, while ISPRA data indicates that between 2006 and 2023 approximately 28,533 hectares of land have been permanently consumed. These processes erode the ecological base of food production and constrain the long-term availability of agricultural soil.

Demographic and structural dynamics further weaken resilience. The agricultural workforce is shrinking and aging: farmers under 25 remain a negligible minority, while the 25–41 age cohort has contracted sharply between 2007 and 2024. More broadly, the total number of food producers declined from over 51,700 in 2015 to just 40,483 in 2024, reflecting a structural contraction. Despite a modest growth in aggregate market value (+6% between 2015 and 2024), this is largely due to concentration in larger farms, underlining polarization of economic sizes rather than broad-based vitality. The Utilized Agricultural Area (UAA) remains stable, which, combined with fewer producers, indicates ongoing concentration and reduced diversity of actors.

Socio-economic fragilities intersect with these structural issues. Real wages and purchasing power have steadily declined since 2016, eroding household capacity to access quality food and reinforcing inequalities. This fuels the expansion of food poverty and dependency on food aid, already highlighted internally.

Finally, institutional factors also act as threats. Despite the presence of raising food governance infrastructures, the inability to consolidate a definitive and effective food policy reflects persistent political fragmentation and lack of will. This hampers the capacity to translate opportunities into systemic resilience strategies, leaving the system fully incapable of responding to changes and shocks.

5. Synthesis

This Chapter dealt with resilience as a contingent condition rather than a stable attribute of food systems and emphasized its relational and context-dependent character.

The empirical analysis developed along three interconnected directions. First, the examination of drivers situates long-term structural pressures within the specific territorial configuration of CollinaPo, showing how dynamics commonly framed as external are in fact filtered and reshaped by the scale at which the food system operates. Second, the analysis of the food supply chain traces connections and discontinuities across production, processing, distribution, and consumption, revealing both critical vulnerabilities and the persistence of territorially embedded alternatives. Third, attention to the political dimensions of food highlights the role of rights, collective action, and institutional arrangements in shaping the social conditions under which resilience can emerge.

The Chapter therefore closes with two recognitions: on the one hand, CollinaPo’s food system is marked by structural fragilities that limit its resilience; on the other, resilience is not absent but uneven, expressed in partial, situated practices that remain vulnerable to wider asymmetries.

Understanding resilience in this way, neither as a property to be measured once and for all, nor as an ideal to be normatively prescribed, allows us to approach CollinaPo as a laboratory for studying how multistakeholder engagement could lead to innovative participatory governance toward the establishment of an effective UFP.

VII. Multistakeholder engagement and participatory governance

1. Introduction

Building on the previous Chapter, which carried out a thorough diagnosis of CollinaPo's food system through a general SWOT analysis, the most significant challenges of the area were identified.

This Chapter shifts from analysis to design. It aims to respond to sub-research question three: in what ways does the City-Region Food System approach enhance the production of Urban Food Policies?

The point of departure is an analysis of power asymmetries in food systems' governance. Too often, it is insulated in bounded models of intervention where narrow coalitions of actors and interests are unable to mobilize the broader territorial dynamics that structure food systems. Against this, the Chapter investigates the range and scope of engagement necessary for participation to be effective, other than the institutional arrangements needed to convert that participation into legitimate decision-making. Underpinning such questions is the lens of food democracy, which explicitly articulates how governance structures can benefit powerful groups at the expense of others and, therefore, why inclusivity, transparency, and countervailing safeguards are not options but constitutive requirements.

Empirically, the Chapter undertakes a multi-scalar stakeholder analysis, aimed at surfacing both evident and hidden actors in CollinaPo, identifying points of leverage for the installation of a UFP. This iterative methodology is intended to be exploratory, so as not to rule out any relevant actor *a priori*, and empirically grounded systematically, in order that the pursued UFP in the CRFS context is not only normatively sounding, but distributive of voice and authority in practice.

2. The participatory governance in the CRFS conceptualization

In the *Building Sustainable and Resilient City Region Food Systems: Assessment and Planning Handbook*, FAO advances multistakeholder engagement and participatory governance as the third essential pillar of City-Region Food System.

The handbook emphasizes that CRFS cannot be adequately governed without the systematic involvement of a vast constellation of actors across sectors and competencies (FAO, 2023). These include producers in rural, peri-urban, and urban spaces; actors throughout the value chain; policy-making and regulatory institutions; civil society organizations; academic and research bodies; and representatives of vulnerable or marginalized groups.

It is noteworthy that, within FAO's handbook, this pillar does not affirm the design of UFP, or food strategies as ends in themselves. Rather, it concentrates, quite interestingly, I would say, on the notion of engagement. This orientation is a significant change: the framework reframes the need to govern food not simply as the production of formal laws, but as the construction of relational and procedural capacities through which such outcomes become possible. In other words, the "value" lies less in the policy text than in the negotiated process that produces it. From this perspective, decision-making is conceived as an emergent property of inclusive interaction, where legitimacy derives from the breadth of participation and the quality of the decision-making process (Roosendaal, et al., 2020).

Yet, the involvement of this plurality of actors is anything but easy. Although all voices contribute to understanding food systems, their engagement in governance is difficult to ensure and not always meaningful. For this reason, several CRFS scholars attempted to establish methods and strategies for decision-making democratization that regard, among others, stakeholder mapping, advisory group formation, iterative visioning, and collective validation of findings (Santini, Dubbeling, & Blay-Palmer, 2020). On the one hand, these approaches aim to better and more comprehensively assess potential ways of involvement. On the other hand, participatory models also create the conditions for collective ownership of the process, strengthening legitimacy, and providing a basis for governance structures capable of functioning beyond the temporal boundaries of funded projects.

The emphasis on multistakeholder processes in the FAO framework is not isolated; instead, it connects to other ongoing debates on territorial approaches to food security. As discussed by Blay-Pamer et al. (2018), drawing on a joint OECD/FAO/UNCDF report, territorial approaches should place local participation

and representation at the center of policy development initiatives, both in formal and informal cases (OECD/FAO/UNCDF, 2016). Particularly, they highlight the need for cross-sectoral, multidimensional policy responses that build on inclusive participation across governance levels, recognizing that social participation is indispensable for effective implementation and the legitimacy of outcomes.

The latter is extremely important in light of risks of opacity in the policy-making processes. Many participatory spaces are indeed only superficially democratic, with the real decision-making power concentrated among a few actors (Anderson, 2023). In the context of UFP, these dynamics mean that participatory arrangements formally embedded within policy frameworks, function primarily as instruments of procedural legitimation, while substantial agenda-setting and decision-making powers remain concentrated within established spaces. As a result, food policies consist of agendas that remain compliant to existing regulatory frameworks.

In cases where the delivery of UFP is deputed to participatory bodies, governments may even use such inclusive decision-making groups as instruments of co-optation, filling them with two typologies of actors: first, those who wish making the difference, but possess no effective power; second, those who, although not necessarily opposed to innovative bottom-up decisions, implicitly represent the interests of the most institutionalized players.

As a result, participation is dominated by organized interests and professionals, while marginalized groups, such as those with lower socioeconomic status or minority backgrounds, remain largely excluded (Candel, 2022). Also, major urban frameworks are often privileged because food systems' rural processes are difficult to grasp considering that they extend across multiple municipalities (Slade, Baldwin, & Budget, 2016).

The consequence is an overall food governance process shaped by a set of actors and interests that, even if expanded, maintains the broader territorial dynamics underexplored. In the end, such initiatives risk, at worst, reproducing the very divides they claim to bridge; at best, being meaningless.

Before advancing, a clarification is needed. This work is deliberately positioned at the interface between UFP and food governance, as it is precisely at this interface that the conditions of "policy producibility" can be examined. UFP are addressed as formal policy instruments that selectively structure and orient food system interventions yet remain partial and contingent outcomes of broader governance processes (Cretella, 2025).

Food governance is, in turn, conceptualized as the relational field within which the necessary set of conditions for policy production are formed. It is within this zone of articulation that the Chapter assesses whether, and under which conditions,

CRFS' multistakeholder engagement and participatory governance generate the institutional, relational, and procedural prerequisites for the effective production of territorially grounded UFP, rather than remaining confined to symbolic or consultative arrangements.

2.1. Power asymmetries and the right to food

To understand how participation can affect the production of meaningful and impactful UFP, it is necessary to pause and reflect on the role of structural power asymmetries within contemporary food systems. This reflection draws on the earlier discussions in Chapter II, where the globalized food system era was described as marked by unprecedented concentration of economic and political power in the hands of a few multinational corporations.

A global market dominated by a handful of multi-billion-dollar agribusiness corporations raises multiple issues at once. First, firms exercise structural power across inputs, processing, distribution, and retail, controlling the full food supply chain (Clapp, 2023). Decades of mergers and acquisitions have concentrated decision-making power in very few hands, with just four corporations now controlling most of the global seed and agrochemical market, while similar oligopolies prevail in grain trading and fertilizer production (Deconinck, 2020). This concentration confers boundless influence over fundamental decisions: what is produced, how it is produced, who gains market access, and ultimately what ends up on people's plates (Mooney & Van Wagoner, 2021).

What makes these oligopolies fundamentally troubling is their corrosive impact on the right to food, briefly mentioned before in the context of the *Statuto di Città di Torino*, which is rather "realized when every man, woman and child, alone or in community with others, have physical and economic access at all times to adequate food or means for its procurement" (The right to adequate food (art. 11), 1999, p. 3). This sentence, although important per se, acquires relevance if considering its formal significance. The right to food is not a vague aspiration but a binding entitlement: as clarified in *General Comment No. 12 of the Committee on Economic, Social and Cultural Rights*[100], which contains the right to food statement, States are required to respect, protect, and fulfil this right. On one side, they are prohibited from adopting measures that would impede access to adequate food. On the other hand, private actors must be regulated to ensure that no one is deprived of the access. In practice, the obligation to fulfil has two dimensions: to

[100] See https://www.ohchr.org/en/documents/general-comments-and-recommendations/ec1219995-general-comment-no-12-right-adequate-food

facilitate, by taking proactive steps to strengthen people's access to resources and means of securing their livelihoods; and to provide, by directly supplying food when individuals are unable, for reasons beyond their control, to enjoy this right (United Nations, 1999). To strengthen the sphere of intervention, the definition comprises a plurality of dimensions related to the right to food: at first, much attention is put over the concept of "adequacy"; yet, this is shaped by several social, economic, cultural, climatic, and ecological conditions, which accompany a "sustainability" feature that incorporates the temporal dimension of long-term availability and, finally, accessibility of food for both present and future generations.

Nevertheless, the current paradigm of corporate power undermines each of these pillars. Availability is distorted when food production systems are reoriented away from diversified local food provision toward the cultivation of export-oriented monocultures, thereby reducing the supply of fresh and culturally appropriate foods for domestic consumption. At the same time, the local food environment becomes increasingly dominated by transnational retail chains and standardized distribution networks, where availability is largely defined by the commercial strategies of a few corporations (Popkin, 2020). Accessibility is compromised when oligopolistic food corporations exert disproportionate market power to influence prices along supply chains, fueling inflationary dynamics and price volatility that place basic, nutritious diets increasingly beyond the economic reach of large segments of the population. Moreover, the spatial distribution of food retailers is rarely the result of democratic planning or public health objectives; rather, it reflects corporate market strategies, leading to concentrated retail infrastructures in profitable urban zones and chronic under-servicing of low-income or peripheral areas, thereby structurally constraining people's physical access to adequate food (Eisenhauer, 2001).

These issues are not new. It has already been widely debated that, in essence, food has undergone a profound shift from being recognized as a human right to being treated as a tradable commodity (Arvanitakis, 2006). What I wish to stress here is that, while such a consolidation is often politically justified in terms of efficiency for the global food security, in practice it skews food systems toward corporate control, narrowing farmers' modes and choices of production, other than consumers' options (Clapp & Scrinis, 2017). Corporate power translates into market dominance: agrifood giants can inflate input prices, extract monopoly rents, and dictate procurement terms to suppliers and workers, exacerbating inequalities along value chains (Hendrickson, James, & Heffernan, 2013). Even worse, the consolidation implicitly stimulates the construction of the need for this epistemic dominance: corporate narratives present industrial agriculture, monopolies, and

technological intensification as needed and inevitable, crowding out alternative innovative bottom-up paradigms (Holt-Giménez, 2017). Political power completes the picture: large agribusiness corporations use their lobbying political influence to shape public policy in ways that reinforce their market dominance. They actively address the design of agricultural subsidies, trade agreements, and regulatory standards to favor industrial, large-scale production models. In doing so, these companies not only protect their current market position but also help create a legal and economic environment that makes it difficult for alternative food practices to emerge (Clapp & Fuchs, 2009).

What ultimately results is a governance architecture ordered by a managerial rationality that maintains control over the possibility of change, not through explicit prohibitions but through the way in which power is distributed, and decision-making spaces are rendered participatory (Clapp & et al., 2025). In sum, food systems' dominant players are not just part of the governance processes, but consist of their backstage architects, embedding their priorities in global frameworks through initiatives that insidiously equate corporate voices with those of people (McKeon, 2021).

The strength of this architecture lies in its capacity to shape the production of food rules by primarily rendering specific policy-making options to appear natural and self-evident, while marginalizing others. Parallelly, and more problematic, it affirms that innovative food policies such as UFP should be developed within policy spaces compatible with dominant supply chains, thereby pre-structuring the range of admissible interventions (Sonnino, Mardsen & Moragues-Faus, 2016). As a result, alternative policy trajectories are not formally excluded but are effectively rendered impractical, as actors seeking to influence policy production are required to align with existing frameworks in order to gain the possibility to speak.

It is precisely here that Foucault's notion of governmentality provides an analytical lens: power operates as the conduct of conduct, producing subjectivities, discourses, and regimes of truth that shape behaviors and expectations from within, rather than transparently manifesting commands from above (Foucault, 1991). Within this framework, the everyday regulation of food, neither food governance nor UFP following Chapter II concepts' separation, composed of nutritional guidelines, safety standards, sustainability metrics, emerge as technologies of government that structure the field of possible actions, subtly aligning subjects with institutional rationalities rather than manifesting overt commands (Rose, 1999). As a result, alternatives do not emerge, not because of unsuccessful proposals, but because these exist within a pre-defined behavioral code that implicitly states what

is thinkable and actionable, and what is not, thereby constraining genuine autonomy to operate changes.

Looking at the possibility of producing UFP, this code of conducts does not manifest through a single, uniform logic but rather through a constellation of mechanisms that structure epistemic hierarchies. Building on Foucault's conceptual apparatus, three problematic, interrelated mechanisms can be identified: "responsibilization", which affirms the atomization of commitment, calling for individual active roles; "regimes of truth", which establish and stabilize epistemic authority; and "technologies of government", which materialize governance through concrete instruments and techniques. Clearly, these are not discrete categories but overlapping manifestations that, taken together, help explain the realm of possibilities.

In detail, the first key mechanism considers citizens as self-governing agents by mobilizing moral imperatives of individual responsibility. Policy discourses and initiatives call upon individuals to "do their part" by reducing household food waste and choosing the "right" or "healthy" food (Guthman, 2007). Through these injunctions, the place of both solution and failure is relocated onto the individual, thereby producing subjectivities that are simultaneously enabled, through the promise of agency, and starkly disciplined, through the on-person assignment of governance rationalities and the moral burden of systemic problems. This approach shrinks the people's possibilities of change by atomizing the responsibility of the transformation; it affirms the role of individuals to be far more important than communities' one.

A second mechanism is the entrenchment of regimes of truth, which constitute the epistemic architecture of food governance. Dominant frameworks of food-related knowledge, such as nutrition and sustainability, as also expressed in Chapter VI, primarily conceive food systems through quantitative indicators, delineating which forms of knowledge are legitimate and which objectives are prioritized. By valorizing technical expertise as the sole arbiter of rational policy, these regimes relegate independent knowledge to subordinate positions, either marginalizing them altogether or integrating them only in ways that do not disrupt prevailing epistemic hierarchies (Lang, 1999). These regimes of truth shape the parameters of what can be acted upon, finally stabilizing selected power–knowledge formations within governance arenas.

A third mechanism concerns the deployment of technologies of government, through which complex realities are rendered legible, and thus governable. Instruments such as spatial food mapping, monitoring dashboards, and participatory toolkits translate heterogeneous food practices into standardized categories. This

process highly privileges what can be measured and monitored, orienting actors toward improving selected indicators while obscuring non-quantifiable but politically significant dimensions (Moragues-Faus & Sonnino, 2012). The lack of neutrality of these devices not only privileges certain types of information at the expense of others but also disciplines both the objects of governance and the subjects involved, leading them to adjust their behaviors to better fit the compliant categories. Even participatory UFP arenas, often celebrated as spaces of co-decision-making, are implicated in these dynamics. By incorporating citizens into the institutional grammar, composed of institutionally set timelines and agendas, they normalize dissent and translate political claims into administrative problems, thereby circumscribing the space of contestation within boundaries compatible with the existing order (Li, 2007).

Taken together, these mechanisms reveal how power control in UFP is present less through direct coercion within their production than through the production of tools that shape the very conditions under which action is possible. This explains why, despite the proliferation of "inclusive" participatory processes toward UFP, meaningful shifts in prospected transformations often remain elusive: it is the underlying rationality of governance itself that prefigures what counts as valid and how claims must be articulated, channeling innovative practices into established corridors that, in the end, reproduce the previous structural asymmetries (Lemke, 2002). This transformation manifests deep democratic deficit within the contemporary society. If food is a right, people must be able to shape the rules that determine access to it (Knuth, 2015). In reality, the architecture of governance itself works in the opposite direction.

The consequences therefore extend well beyond food insecurity. With private actors dominating food without a democratic mandate, food becomes a domain where citizens are fully reduced to consumers rather than protagonists, where the right to food is subordinated to the needs of capital accumulation. For this reason, scholars and social movements increasingly frame the struggle for the right to food as inseparable from the struggle to democratize food systems. Without reclaiming decision-making power from corporate hands, the legal promise of adequate food for all will remain systematically unfulfilled (Holt-Giménez, 2017).

2.2. Food democracy and the hybrid food governance: voice and legitimacy

At its core, food democracy refers to the claim that decisions over food should not be left to pre-established hierarchical authorities but should instead become a matter of collective deliberation and civic responsibility. The intellectual origins of

the term further underline this critical force. Tim Lang introduced the concept in the late 1990s to describe the pressure emerging from below to challenge the consolidation of industrialized food systems and their erosion of public authority (Lang, 1999). For Lang, food democracy is the political stance that wants people to eat adequately, affordably, safely, humanely, and in ways that align with their cultural values, these conditions should not be dictated by distant markets but secured through democratic means (ibid.).

It stands in explicit opposition to the treatment of food as a mere commodity and reasserts the idea that it must be governed as a public good. Hassanein has described this shift as a democratic reawakening from below, in which people cease to be passive consumers and assume the role of food citizens who actively shape the norms of the food system (2003). To clarify this periphrasis, Welsh and MacRae put the accent over the transformative potential of the food citizenship (1998): the cruciality of this new democracy lies precisely in the fact that power over food should no longer reside in capital, but in civic participation, which constitutes a direct challenge to capitalist hegemony by relocating the power to shape food systems within collective agency.

What immediately emerges from these clashes is the peculiar and crucial recognition that capitalist power within food systems does not operate as an all-encompassing "totality" (Goonewardena, 2018). Rather, this problematic framework reveals itself as a battlefield, where domination is constantly negotiated. The control of food systems is not a definitive achievement, but a process marked by fractures. The real question is therefore not whether this system can be resisted, it already is, but whether there exists the possibility to amplify the resistant tensions to accelerate the transformation.

In line with Gramsci's anticapitalistic theories, these forces, both residuals, stemming from previous attempts of transformation, and emergent, arising from current conditions, are the protagonists of the framework (Jameson, 1991). Indeed, these flows highlight how the ruling capitalist system must constantly negotiate and incorporate these diverse forces to maintain its dominance. If these lacked their effectiveness or agency, there would be no need for such a hegemonic project as the capitalist one (Gramsci, 2022).

David Harvey uses Lefebvre's concept of "heterotopia" to highlight spaces of potential resistance against capitalist hegemony (Harvey, 2012). These heterotopias are social spaces that offer the possibility of a divergence from the dominant capitalist logic, to emerge. This might not stem from a deliberate plan but from everyday actions and practices as people seek meaning in their lives. Harvey argues that these spaces are not isolated, nor do they require a grand revolutionary

movement to come into existence. Instead, they are already present wherever people create alternative ways of living and interacting, which ultimately embody subtle yet powerful acts of resistance (Harvey, 2012).

Thus, understanding food systems by relying on this lens brings to see how dominant power is exercised not just through overt control, but through the continuous management of these various forces (Motta, 2016), making it clear that food systems are not static; rather, they are arenas of ongoing struggle and negotiation, where totally unchallenged structures do not exist (Attuyer, 2015). Therefore, the democratic acting is conceived not as the pursuit of consensus into institutionalized systems, but as a continuous fight against entrenched power, as contestation. The struggle for food democracy thus consists in the terrain where there is confrontation between forces seeking to maintain control over the food system and those striving to build more democratic alternatives.

The strength of addressing food democracy as a lens to comprehending resistance to capitalism lies in the fact that it is not confined to speculative academic debates but is visible in practice through the work of on-ground actors. Across cities and regions, associations, solidarity purchasing groups, farms, and cooperatives embody the aspiration to reclaim food systems for citizens rather than corporations. Such initiatives make food democracy tangible by embedding participation in daily practices and organizational structures, translating ideals into collective agency (Claeys, 2021). They are not merely illustrative examples; they constitute the first material and social infrastructure through which democratic aspirations in food systems can be articulated. It is precisely here that the radical potential of food democracy becomes visible: in its ability to unsettle established modes of power. This perspective is analytically relevant insofar as it provides a criterion for evaluating the contribution of co-produced UFP within food governance. Instead of assessing policies according to their formal existence, the focus shifts to their emergence as participatory processes that, in turn, facilitate the structuring of democratic governance. From this viewpoint, the decisive factor lies in the extent to which such initiatives actively sustain and institutionalize horizontal, and often conflictual, dynamics of food democratization, independently of their formal location within policy architectures.

Clearly, given that democracy foregrounds collective agency toward system transformation, it must confront the mentioned risk of administrative standardization, but democracy cannot be realized through normative declarations alone. Thus, its materialization requires organizational forms capable of sustaining autonomous aspirations and transforming them into durable political action. In this sense, the democratic reconfiguration of food systems presupposes the presence of

collective subjects, situated within concrete legitimate socio-political deliberative arenas (Andreola, Forno, & Giovannini, 2025), able to interact with the reality.

Recent scholarship has highlighted the centrality of food movements as collective actors who possibly materialize food democracy (Manganelli, 2022). Food movements can be understood as fluid and heterogeneous assemblages of actors, practices, and organizational designs that mobilize around shared transformative principles, including food democracy, food sovereignty, and food justice[101], with the aim of challenging current food regimes and redefining the political, social, and ecological relations that structure food systems (ibid).

Nevertheless, rather than forming a single coordinated corpus, food movements tend to emerge as polycentric and networked formations, sustained through multi-scalar and cross-sectoral linkages that connect diverse actors across spatial, institutional, and social boundaries (Levkoe, 2014; Allegretti, Bruno, & Propato, 2023). Some have described this distinctive structure as a "network of networks", whose power derives from its capacity to generate collective and multiplier force through relationality: they mutually reinforce by exchanging knowledge, sharing material and organizational resources (Andrée, Clark, Levkow, & Lowitt, 2019).

Latham identifies several constitutive elements through which food movements can be acknowledged: they are typically horizontally structured and self-organized, driven primarily by civil society actors; they operate across multiple scales, often connecting local action to transnational networks; they embody a plurality of value systems and thematic concerns; and they rely on limited material resources, which encourages adaptive and flexible modes of mobilization, although implying limitations (Latham, 2016). This combination of horizontal governance, inter-scalar connectivity, and value-based mobilization defines food movements as political projects rooted in collective practices, rather than as fixed entities (Manganelli, 2022). This perspective is particularly significant because it allows us to overcome contrasts between "grassroots", bottom-up, and "institutional", top-down, forms of mobilization in the realm of food governance. What ultimately determines whether an initiative falls into the scope of a democratic food movement is not its legal status or its point of origin, but the extent to which it actively participates and reinforces these horizontal, yet highly contrasting, attempts of democratization of food.

[101] Alessandra Manganelli (2022) identifies food sovereignty, food justice, and food democracy as key principles underpinning the emergence and evolution of food movements. However, the first two will not be addressed in detail here, as the focus of this Chapter is on food democracy. The reason for this choice lies in the analytical scope of the Chapter: food democracy offers a particularly useful entry point for examining questions of governance, participation, and power redistribution, which are central to the discussion on City-Region Food Systems' multistakeholder engagement and participatory governance developed here. Food sovereignty and food justice remain fundamental, complementary frameworks, but their broader socio-political dimensions exceed the specific focus of this work, that regards the application of the CRFS' third pillar.

For example, Food Policy Councils (FPC) or other semi-institutional spaces can act as strategic nodes within food movements when they function as arenas for political negotiation, alliance-building, and transformative agenda-setting that link actors across different social and territorial scales, with the foreseen possibility for thinner actors to emerge and self-affirm. Conversely, grassroots initiatives, featured by a strongly radical feeling, that remain fragmented, parochial, or poorly interested in fostering cross-levels dialogues do not embody the organizational density and strategic reach necessary to be considered part of a movement, despite their bottom-up character. As Manganelli points out, the strength of food movements lies precisely in their ability to assemble heterogeneous actors and practices into flexible but durable configurations, rather than in their adherence to a specific institutional form or values manifesto (2022).

This organizational arrangement leads us directly to a deeper engagement in the issue of UFP production. Indeed, understanding the reality of food movements requires engaging less with the production of UFP per se, and more with the framework of governance not as a fixed institutional design but as a dynamic field of interactions between actors, value systems, organizational cultures, and territorial scales (Moragues-Faus & Battersby, 2021; Ansell & Gash, 2008). While food movements represent the collective actors that mobilize to democratize food systems, the so-called hybrid food governance refers to the new shifting configurations of negotiation and power where state, market, and civil society actors interact (Manganelli, 2022). It is a contested terrain where fixed structures are not immediate, because

> "governance involves interactions among (coalitions of) actors aligned towards common identities and interests, but also (conflictual) relations among agents belonging to different organisational spheres and embodying diverse values, habits, and cultural frames" (ibid., 2022, p. 58).

This is the reason why, rather than a simple partnership model, it is an evolving space: it confronts interwoven movements and institutions, revealing that grassroots initiatives operate inside dense webs of laws, routines and markets that both constrain and empower them. What emerges is a "bottom-linked" form of governance, in which the insurgent energy and moral authority of civil society intersect with the regulatory-fixed formality of institutions, giving rise to novel modes of decision-making that depart from previous structures (Moulaert & MacCallum, 2019).

The density of these interactions breeds friction, exposing responsibilities of existing power relations. Here, Manganelli distinguishes three main clashes within

a structured synthesis. Resource-related tensions arise around struggles for access to and control of land, infrastructures, logistics, finance, and food itself. These are shaped by competing claims between bottom-up networks and top-down state or corporate systems, and by regulatory frameworks that either enable or constrain access. Organizational tensions emerge as food movements mobilize and expand, navigating frictions between hierarchical and participatory governance modes, efficiency and inclusiveness, and coordination across fragmented sectors and jurisdictions. Finally, institutional tensions occur at the interface between grassroots actors and state or corporate institutions, where divergent values and regulatory structures create both obstacles and opportunities for transformation (Manganelli, 2022, p. 65-66).

Taken together, these tensions reveal hybrid food governance as a dynamic and negotiated political space. It is at once critical and constructive: critical in challenging the concentration of power in corporate and technocratic hands, and constructive in developing tangible forms of governance that embody democratic values. While they expose power struggles, they also generate opportunities for new governance arrangements that can really advance food democracy.

3. Hardware, software and multi-level alliances

The challenge of democratizing food systems does not hinge on creating new forums or expanding the number of participants; it requires a profound rethinking of the power relations that feature the food-related decision-making context. Hybrid governance, as previously discussed, is not a template to be imposed from above, but a space in which a plurality of subjects may constantly negotiate responsibilities. It can become a vehicle of transformation only when it enables truly bottom-up demands for democratization to surface and consolidates them, by enabling effective institutional communication channels. This means recognizing and valuing the diversity of food movements, which are often spontaneous and different among each other, to contest the commodification of food and experiment with alternative practices (Battisti, Cuomo, & Manganelli, 2024).

For this reason, public policies should not attempt to "construct" these movements; rather, they should create conditions for them to take root, and, only then, set up proper tools of engagement that ensure equal footing (Wekerle, 2004). Particularly, this involves creating institutional spaces that guarantee equitable interaction, in which all participating actors are formally acknowledged as legitimate stakeholders and are granted equal and transparent access to information (Giesbers, Mattijssen, & Leeuwis, 2025).

3.1. Multi-Level Governance in the hybrid food governance

From a conceptual standpoint, this primarily means conceiving governance as based on heterarchies that distribute power across levels and sectors (Homsy, Liu, & Warner, 2019). The resulting paradigm of multi-actor, multilevel governance (MLG) emphasizes interdependent relationships among local, regional and national scales, acknowledging the contributions of the plurality of actors' engagement in setting goals and delivering outcomes (Ostrom & Janssen, 2004).

The central orthodox tenet affirms that decision-making is best channeled through a linear, streamlined framework of discussion, which allows information and decisions to flow more quickly and accurately across actors and levels.

Nevertheless, the scholarship on MLG converges on a core institutional problem: how to allocate authority in ways that ensure successful mutually reinforcing and not exclusive processes? This question is crucial: if final authority is too rigid, decision-making structures may become overly centralized and blind to emerging issues. Conversely, if authority is unnecessary long and distributed, governance arrangements risk losing coherence. Overall, the issue concerns both legitimacy and effectiveness. The latter entails the demonstrable capacity to coordinate interdependence across jurisdictions and sectors, and to deliver outcomes at the scale of the problem. Legitimacy overcomes formal consultation: it requires that multiple relevant subjects exert meaningful influence over priorities; also, it favors the better distribution of costs and benefits, so that choices reflect real needs and publicly manifest trade-offs (Oosterveer, 2015).

The previous discussion correctly identifies legitimacy and effectiveness as foundational principles of governance. Yet, emphasizing these principles inevitably exposes a structural tension at the heart of institutional design. When governance must simultaneously uphold democratic legitimacy and guarantee effective performance, questions emerge concerning the institutional capacity of current structures to deal with competing demands, on one side; on the other side, it regards the span of actors' involvement, particularly for-profit ones.

More detailly, the MLG configuration brings tensions if the local choices generate spillovers that exceed the jurisdictions involved in the governance process, due to overlapping municipal and extra-municipal authorities for example. The most immediate solution would regard escalating authorities' participation upward: this might produce higher-level institutional policies that could ensure larger application, yet risks eroding local knowledge and the voice of minorities, if it looks for success missing the process democracy (Polman & Bazzan, 2023).

The second issue concerns the participation of for-profit subjects: their activities have already shaped the food system's agenda, more or less explicitly, due to the power asymmetries discussed above; therefore, should they be formally incorporated into the governance?

The question is less about inclusion per se than about the tensions it exposes. Private participation can amplify effectiveness by mobilizing capabilities that states and communities lack, other than becoming first-hand actors of transformation; yet the situation may simultaneously unsettle legitimacy, considering that agenda-setting power would reflect financial weight rather than affectedness, fundamentally confirming a structurally asymmetric representation (Clapp & et al., 2025). Institutional design therefore turns on a problematic question of structure. Although positive interactions across levels occur, they also entail higher transaction costs due to the coordination demands needed among multiple actors (Termeer, Dewulf, & van Lieshout, 2010).

On this, MLG's theory separates two ideal types of design logics. Type I, "normally focused on policy outcomes" (Jani & et al., 2022, p. 5), works through a clear vertical chain: responsibilities are assigned to distinct levels of government, and coordination follows those tiers. The benefits are predictability and coherence: actors know who is in charge, which budget applies, and where to seek authorization. The cost is rigidity. Rules set at the center can be slow to notice local variation or to adjust when conditions change on the ground, falling into the blindness issue mentioned above.

Type II starts from the problem rather than the structure: it gathers public authorities, civic groups, and firms into flexible coalitions, "where organizational boundaries are blurred, or even disappear" (ivi), around a specific food-related issue so that capabilities fit the task at hand. This approach rewards experimentation and allows different kinds of knowledge to matter. Yet precisely because authority is polycentric, it can be highly inconclusive: discussion does not always end in a decision, responsibilities differ substantially, and powerful actors may choose not to participate, rendering the decisions fully ineffective.

This either–or "Type I" and "Type II" categorization, although theoretically sounding to explain some current governance structures' issues, presents limits in foreseeing new models of governance. What I hereby suggest is that organizational forms should not be seen as rigid structures, but rather as context-dependent components assembled according to local desires, to key issues' management. Crucially, democratic quality does not (only) reside in "Type II" arrangements because they are broader or more inclusive in appearance; as Manganelli argues, it depends on the complexity and depth of the work. Therefore, if the aim is to identify

paradigms capable of orienting a renewed governance, the unit of analysis should shift from discrete organizational types to macro-systems that contain a plurality of choices of action.

In this perspective, the results of Oñederra-Aramendi et al.,'s literature review, visible in Figure 91, are especially valuable, because they synthesize macro-systemic combinations of governance in relation to the issue of effectiveness and legitimacy (2023). The work discusses a triadic arrangement for food governance that integrates structural, relational, and institutional dimensions into a single design device. The "hardware" dimension provides the institutional skeleton (Gallar, Calle, & Candòn, 2014): participatory arrangements, rules for power distribution, that define "the spaces that are structured for decision-making" (Oñederra-Aramendi, Begiristain-Zubillaga, & Cuellar-Padilla, 2023, p. 12). The "software" dimension supplies the social capacity that animates the skeleton: trust-building among heterogeneous actors, plus reflexivity to "develop an awareness of their way of acting and, in this way, they are able to create new frames of reference" (Kirwan, Maye, & Brunori, 2017; Oñederra-Aramendi, Begiristain-Zubillaga, & Cuellar-Padilla, 2023, p. 13). Multi-level alliances translate cooperation into institutional interventions. They concern how responsibilities, resources, power relations and rights, among others, are allocated to each actor, and how those allocations are made operative through multi-level alliances that connect sectors horizontally and scales vertically (Sonnino, 2019).

The scholars' synthesis is not considered the preferrable finite taxonomy; it is best understood as a comprehensive analytical lens for locating and comparing the many ways multilevel, multistakeholder, and multi-actor engagements are assembled in food governance. Read this way, it functions as a speculative, but applicable, structure to accommodate considerable variation in possible food systems' governance, while still providing a common language to describe who holds which powers, on what terms, with what accountability, and through which connective tissue across levels. The value is therefore diagnostic and comparative: it helps situate a prospective arrangement on multiple axes at once, rather than finally suggesting a unique shape.

The triad does not "solve" Manganelli's identification of the three recurring issues, discussed before; yet, it provides a reflective overview to approach them by translating those concerns into practical points of attention and management: where to anchor co-decision and with which safeguards; how to maintain trust and reflexivity under asymmetries of resources and voice; when to trigger escalation corridors across community, municipal and regional levels.

Only under these conditions the prospected food governance architectures, such as those proposed within the CRFS framework, function as instruments of emancipation rather than devices for adaptation an deliver UFP that ultimately transform food systems.

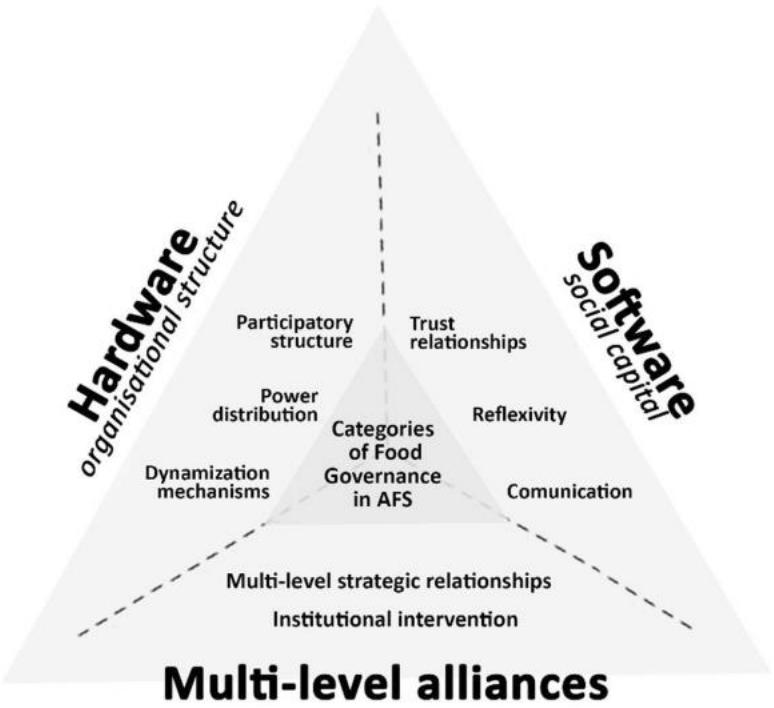

Figure 91: The food governance categories of analysis
Source: Oñederra Aramendi, A., Begiristain Zubillaga, M., & Cuellar Padilla, M. (2023). Characterisation of food governance for alternative and sustainable food systems: a systematic review. Agricultural and Food Economics, 11(18).

3.2 Exemplary scenarios of food governance

Following the discussion on the need to focus over democratic participatory processes to implement the forms of multi-stakeholder engagement and participatory governance suggested by the CRFS approach, the following section examines a selection of relevant cases. The aim is to investigate how different contexts have institutionalized food governance arrangements, and more precisely how the interplay between organizational “hardware”, “software” and “multi-level alliances” has been put in action, with particular focus on the participatory processes that underlie these innovations.

In varied geographic and institutional settings, Global North and South cities have developed different structures of food governance, translating similar participatory ideals into a varied set of transformative terms.

Toronto[102], Ghent[103], Montréal[104], and Glasgow[105] embody a model best described as institutionally anchored to participatory governance. These cities have created permanent advisory forums or partnership agreements, frequently grounded in legal mandates, and placed within municipal or metropolitan administrative structures. *Toronto's Food Policy Council*, based within the public health bureaucracy since the early 1990s, is among the oldest and most sustained examples of a continuing forum for dialogue between civic actors, municipal officials, and local food producers (Blay-Palmer, 2009). *Ghent en Garde Food Policy Council* is quite similar although not formalized in local legislation, with sectoral representation and thematically organized working groups reporting directly into executive decision-making (Hovhannisyan, 2022). The *Conseil du système alimentaire montréalais* coordinates multiple partners via a council and working committees (Doyon, 2020). *Glasgow Food Policy Partnership* was co-designed underpins a ten-year city food plan. The prime merit of this configuration is its degree of institutionalization: such bodies provide permanent forums for debate and policy-making (Brown, et al., 2023). However, although these bodies can play a valuable role, they often remain advisory rather than genuinely decision-makers.

Seoul[106] and Los Angeles[107] embody a very different logic, incorporating participation directly into regulatory institutions. Seoul combines participatory budgeting laws and the legally mandated *Seoul Food Citizens' Committee* to provide citizens and civil society organizations with a say in budget priorities and food policy (Jin-Sook, 2021). In Los Angeles, civic values have been embedded in the *Los Angeles Food Policy Council*, which, through the innovative "Good Food Purchasing Policy", regulates purchasing across city departments and the school district. The program is buttressed by verification systems and monitoring coalitions of unions, suppliers, and advocacy organizations (Day Farnsworth, Delwiche, & McKinney, 2019). In both cases, engagement is channeled through legal and fiscal mechanisms rather than advisory councils, thereby locating decision-making powers in forums linked to real resource commitments. This approach provides great implementation capacity by linking engagement to

[102] https://foodpolicy.to/
[103] https://foodactioncities.org/case-studies/ghent-en-garde-food-policy-council/
[104] https://www.montrealmetropoleensante.ca/a-propos/sam/
[105] https://www.sustainablefoodplaces.org/members/glasgow/
[106] https://fsi.seoul.go.kr/front/M0000027/content/view.do
[107] https://www.goodfoodla.org/

financial leverages, producing tangible policy outcomes. Yet the technocratic demands of such processes can advantage actors with administrative or financial weight, perhaps excluding less institutionalized groups unless there are supportive mechanisms in place.

Nairobi[108] and Cape Town[109] represent a third box, aimed at scalar coordination forums. Here, hybrid governance serves less as a deliberative forum and more as a mechanism to align actors across administrative levels. Nairobi's Food Liaison Advisory Group connects municipal authorities, county governments, and international partners to address governance fragmentation (Ikua & Carey, 2024). The Cape Town Food Systems Working Group operates in conjunction with the Western Cape Food Forum convened by EDP, bridging the provincial and city governments with private and civil society actors (Adelle & Haywood, 2021). These platforms enable territorial integration and bring dispersed responsibilities together, but their sustainability often depends on external facilitation, such as FAO, RUAF, or donor agencies, and on political coalitions that may be volatile. Without strong institutional anchoring, such platforms can remain project- or leadership-reliant and lack resilience in the face of political transition.

Ede, smaller Dutch city,[110] accepts what can be termed experimental or programmatic participation infrastructures. Instead of regulatory entrenchment or permanent councils, innovation platforms, pilot projects, and interdepartmental working groups are utilized to engage stakeholders. *EetbaarEde* institutionalized a city "Food Team" to carry on a participatory visioning process initiated in the early 2010s (van den Oever, 2024). Both models emphasize co-design and iterative learning, fostering agility and experimentation. Its issue lies on dependence on external funding cycles and political momentum; lacking institutional consolidation mechanisms, participatory involvement can collapse when project funding ends.

Berlin[111] and Detroit[112] illustrate movement-led trajectories. In these two cities, civil society networks established food policy councils independently and only later negotiated formal linkages with municipal governments. *Ernährungsrat Berlin* was established in 2016 as a solely civil society platform for advocating a systemic food transition, which later engaged with the Berlin Senate in the development of the 2021 Food Strategy while deliberately maintaining autonomy (Zentgraf, 2025). *Detroit Food Policy Council*, which emerged from food justice movements, was institutionalized within municipal government through bylaws in 2009. These

[108] https://www.kisumu.go.ke/lessons-from-kisumus-flack/
[109] https://www.capetown.gov.za/Family%20and%20home/Greener-living/Green-gardening-and-eating
[110] https://eetbaarede.nl/
[111] https://ernaehrungsrat-berlin.de/the-berlin-food-policy-council/
[112] https://dfpc.jdcreative.org/

experiences place civic mobilization at the center, with institutionalization following civic agenda-setting rather than preceding it (Morrell, 2016). They represent strong democratic dynamism and normative orientation, often promoting more transformational policies than those launched by public authorities. However, they must continuously balance tensions between maintaining autonomy and participating in official governance arrangements.

Comparing these clusters reveals a few cross-cutting dimensions[113]. Institutional embeddedness refers to the degree to which participatory arrangements are integrated into formal decision-making institutions: Toronto, Ghent, and Barcelona councils are highly embedded but possibly structurally conservative, whereas Berlin and Detroit began outside institutional frameworks and negotiated their position subsequently.

Instrumentalization is the extent to which participation is implemented through regulatory, fiscal, or programmatic tools, most clearly in Seoul and Los Angeles. Scalar articulation specifies the coordination across administrative levels of actors, which is particularly evident in Nairobi and Cape Town. Temporality and flexibility distinguish permanent institutions from time-limited experimental designs such as Ede's one.

The lens exposes a series of tensions. Institutional embedding provides stability but at the risk of bureaucratizing participation, narrowing democratic space. Regulatory embedding yields effective tools but favors technically advanced actors. Scalar platforms facilitate coordination but are prone to brittleness. Experimental frameworks drive innovation but suffer from continuity problems. Movement-led experiments offer democratic impulse but must repeatedly renegotiate their position within institutional arrangements. Multistakeholder involvement, therefore, does not look like a single model, but rather a contingent assemblage of arenas, tools, and alliances. Depending on the setting, it may take the form of structured discussion, regulatory agencies, territorial coordination, experimental spaces, or movement mobilization.

Seen as a whole, the picture is one of interlocking tensions rather than discrete problems, each arising from, and acting back upon, the others. When participation takes an institutional shape, it gains continuity and procedural stability, yet the very routines that guarantee endurance can bureaucratize involvement and narrow the field for contestation; this, in turn, drives governance toward regulatory solutions

[113] Many other cases could have been taken into consideration, and Guelph–Wellington and Milan were particularly interesting examples. However, the former is no longer active, while the latter does not involve any participatory process. Rather, it represents a fully institutions-lez, top-down decision-making process, which makes it irrelevant for the purposes of this work.

that grant actors effective tools but systematically reward those already parts of the governing regimes. To counterbalance these skews, multi-scalar platforms are often set up to stitch jurisdictions and sectors together, but their coordinating promise is tenuous whenever political coalitions shift or administrative incentives clash, prompting falling back on experimental arrangements that energize learning while still being subjected to short funding cycles and the absence of hard mandates.

Movement-based initiatives can re-inject democratic energies into this environment, opening agendas and bringing to the fore hidden demands, yet they must continually renegotiate their place within institutional grammar not designed to incorporate them, which too frequently returns the process to the old bargains of bureaucratization and technocracy. In these dynamics, "multistakeholder engagement" is less a model with predetermined characteristics than a contextualized combination of organizational choices. Critically, none of the arrangements implicitly gives inclusion: representation always tends to favor well-organized, well-resourced actors at the expense of marginal groups who remain on the outside, and even robust participatory arenas typically operate in the shadow of proximate decision centers, where agenda closure and ultimate decision-making authority are exercised.

Empirically, this means that "installing" hybrid governance is a mistake: it cannot be rolled out like a toolkit, but it must be allowed to emerge through context-specific strategies that rewire where authority sits, how it is exercised, and who can effectively contest it. In practice, this entails dealing with participatory frameworks where the outcome is not the finite result: rather, the process of policy-making is pivotal. This demands a redesign of institutional passages and temporalities, from multi-year mandates to binding follow-up and sunset clauses, so that experimental participation can survive electoral cycles and administrative choices.

In short, hybrid governance only becomes real when participatory processes are structurally engaged to the instruments that move policy, while equity is operationalized not as aspiration but as the key infrastructure.

4. Evidence from CollinaPo

Having clarified the premises that should underpin the food governance setting within CRFS, this research suggests a structured methodological framework to assess the multistakeholder architecture and participatory dynamics operating within the CollinaPo context, with the goal of suggesting a potential UFP.

The BR's governance architecture is anchored in a multi-actor system comprising a General Assembly of signatories, an executive committee, a technical secretariat and formal registers for third-sector organizations, schools and private

enterprises (Bruno, Baima, Dansero, Fogliato, & Tresso, forthcoming). This structure provides a platform for vertical coordination across institutional and non-institutional actors. This is relevant because the social landscape of CollinaPo is characterized by diverse grass-roots associations and cooperatives whose activities are particularly relevant in the context of UFP. These actors operate as *de facto* welfare providers and local knowledge enhancers, but their formal decision-making contribution is unclear.

This highlights the need for a food governance arrangement that integrates information flows and agency across scales. A conceptual model is therefore envisaged in a way that civil-society actors constitute the foundational layer, in-CollinaPo municipal governments and the technical secretariat form the intermediary level, and external cross-cutting authorities occupy the apex. Such a configuration would enable bidirectional flows of information, resources and policy influence, allowing CollinaPo's governance to grasp the on-ground needs and, simultaneously, to develop an effective democratic participatory policy-making process.

To account for this complexity, the methodology deployed in this research rests on a multi-level stakeholder study framework, articulated in four interdependent analytical phases (Figure 92). Rather than being guided by pre-defined assumptions or hierarchical readings of the possible UFP's actors, the framework foresees research that does not exclude any possible stakeholder and contribution toward CollinaPo's food system governance, finally ensuring a transparent identification of all potentially relevant actors.

The research is conceived with an open structure to both capture what subjects, and respective mandates, competences, or activities, intersect with food governance, and engage with those actors whose strategic role becomes empirically evident. This approach aims not only to analyze the architecture of participation, but to understand the possibility of developing UFP according to what was stated before.

The first phase[114] involves a comprehensive stakeholder mapping (yellow in Figure 92), which seeks to identify all actors whose mandates, activities, or strategic orientation intersect with food-related governance functions within the BR. Here, stakeholders are identified through the triangulation of multiple sources: the Food Sharing Initiatives mapped before are addressed in detail, taking into consideration those that acknowledge the existence of MAB UNESCO designation; other

[114] The stakeholder mapping consisted of a primary data collection through desk research, combining Food Sharing Initiatives mapping, Banco Alimentare's data, institutional sources from Municipalities' websites. Other stakeholders were identified through snowballing, as suggested by others.

institutional datasets are addressed to investigate potential institutions that could intervene; finally, some informal sources, likewise local third-sector registers, are taken into consideration too. Actors are grouped according to the belonging to the following four possible categories: Public Administration (PA), Civil Society (CS), Private Entity (PE), Alternative Food Network (AFN).

The second phase[115] (green in Figure 92) applies a power–interest matrix to classify stakeholders according to their degree of power exercitation over decision-making processes and their possible interest in CollinaPo's possible food-related agenda (Eden and Ackermann, 1998). The power–interest matrix is designed to capture the complexity of the governance landscape by assessing each stakeholder independently, without presuming relational dependencies or hierarchical linkages at this stage. Both power and interest are evaluated from 0 to 8 according to the present guidelines: Interest (0-1 Uninterested; 2-3 Partially significant; 4-5 Regularly updated; 6-7 Involved in activities; 8 Direct costs or benefits); Power (0-1 Irrelevant; 2-3 Significant; 4-5 Influential; 6-7 Responsible; 8 Decision Maker). To ensure a more accurate and differentiated understanding, a third analytical dimension is introduced: stakeholder size. This additional variable serves to contextualize power and interest levels without allowing scale to obscure or artificially inflate an actor's strategic positioning. Instead, it enables stakeholders to be represented in their full capacity, allowing power and interest to be understood, apart from their operational magnitude. The size dimension is evaluated from 0 to 3: Stakeholder's Scale (0 - Agreements, Unions, Formal not municipal acts; 1 - In Municipality activities; 2 – Municipal activities; 3 - Extra Municipal binding acts)[116].

The third phase[117] undertakes a network analysis to examine the structure and quality of interactions among the previously selected stakeholders (blue in Figure 92). The analysis stands on the power-interest analysis' results to explore the actual

[115] The stakeholder analysis consisted of a secondary data collection based on the results of the stakeholders mapping. Each stakeholder was positioned within a power–interest matrix according to predefined criteria of influence, engagement, and dimension.

[116] In constructing the Stakeholder Power–Interest Grid, the measurement scales were defined in relation to the data available, with a 0–8 range adopted to provide sufficient precision while maintaining readability (Freeman, 1984). The assignment of values for "Power" and "Interest" was not arbitrary but grounded in multiple sources, including interviews, documentary analysis, and perceptions emerging from the research context. Stakeholders were comparatively assessed to ensure internal consistency and proportionality in the scoring process (Bryson, 2004). To minimize subjective bias, the evaluation was, where possible, discussed and validated, thereby enhancing transparency and reliability. This approach aligns with Mitchell, Agle, and Wood's (1997) salience model, which emphasizes the importance of applying shared and multidimensional criteria to stakeholder assessment.

[117] The network analysis relied on the power–interest analysis' secondary data collection. Each relation between actors was individually scored and weighted according to the intensity and frequency of interaction. The resulting matrix was then processed and visualized using Gephi.

connective architecture that sustains or fragments governance processes[118]. Relationships are coded according to the presence of two distinct types of functional bonds: information and coordination. The first one regards relationships of purely informative connections, where no binding relation emerges, for the present purposes. The coordination bond regards relationships where actors relate to each other according to long-term mutually conditioning connections, also relevant for the present purposes.

In the network specification, two edge classes are operationalized: information ties (directional flows of data, advisories, or signals) and coordination ties (joint planning, resource pooling, task interdependence, or co-decision); and both are modeled as weighted rather than binary relations. Each tie is assigned an integer weight from 1 to 3 under standardized coding rules. Information (1 – Occasional communication; 2 – Recurrent exchange; 3 – Institutionalized sharing). Coordination (1 – Ad-hoc collaboration; 2 – Programmatic cooperation; 3 – Formal co-governance). This scoring enables the reconstruction of a network topology that reveals key patterns of centrality, brokerage, and exclusion. To complement this, the graphical representation of stakeholders is refined by scaling node size not by organizational scale, but by relative power, as previously assessed. This representational logic is intended to foreground not the magnitude of the institution, but its actual capacity to shape CollinaPo's food system governance dynamics[119].

The fourth and final phase[120] involves a series of qualitative semi-structured interviews with a targeted subset of stakeholders previously identified through the

[118] As evidenced in similar works, a meaningful network analysis can be built upon the systematic examination of stakeholder interactions derived from qualitative and participatory data (Leimkühler et al., 2024). Previous research has demonstrated that mapping ties of information exchange and coordination, based on interview evidence and contextual knowledge, provides a robust framework for assessing structures within food systems (den Boer et al., 2023). This approach allows to translate the relational dynamics into weighted networks, bringing to identify the central, bridging, and peripheral actors that sustain or hinder the system.

[119] The typological distinction between information and coordination bonds, as well as their associated intensity values, is directly rooted in qualitative evidence emerging from the semi-structured interviews. Stakeholders frequently referred to other actors in terms that implicitly or explicitly revealed the nature and quality of their interrelations. References to occasional updates, project dissemination, or indirect awareness were coded as indicative of information bonds, whereas mentions of co-design processes, shared decision-making, or institutionalized collaboration were classified as coordination ties. The strength of each tie (1 to 3) was assigned through a systematic interpretive reading of the interview transcripts, gauging the relational intensity from the vocabulary, frequency, and strategic relevance of the connections described. In cases where one of the two stakeholders involved in a dyad was not interviewed or where direct relational data were lacking, the attribution of both tie type and weight was carried out by the researcher based on prior in-depth knowledge of the governance ecosystem, including long-standing research engagement, policy document analysis, and participation in inter-institutional working groups.

[120] The fourth phase consisted in a series of semi-structured interviews with 29 stakeholders. Interviews were conducted between September and October 2024 and were lately analyzed through thematic coding.

combined mapping and relational analysis[121] [122]. The primary aim of this phase is to assess the extent to which the selected actors recognize the existence and institutional significance of the CollinaPo Biosphere Reserve, their perception of its territorial and governance impacts, and their views on its potential contribution to the formulation of a coherent UFP within the broader CRFS. The interviews are structured to elicit informed positions on the Reserve's strategic value, institutional visibility, and operational relevance in shaping food-related agendas at both local and metropolitan scales.

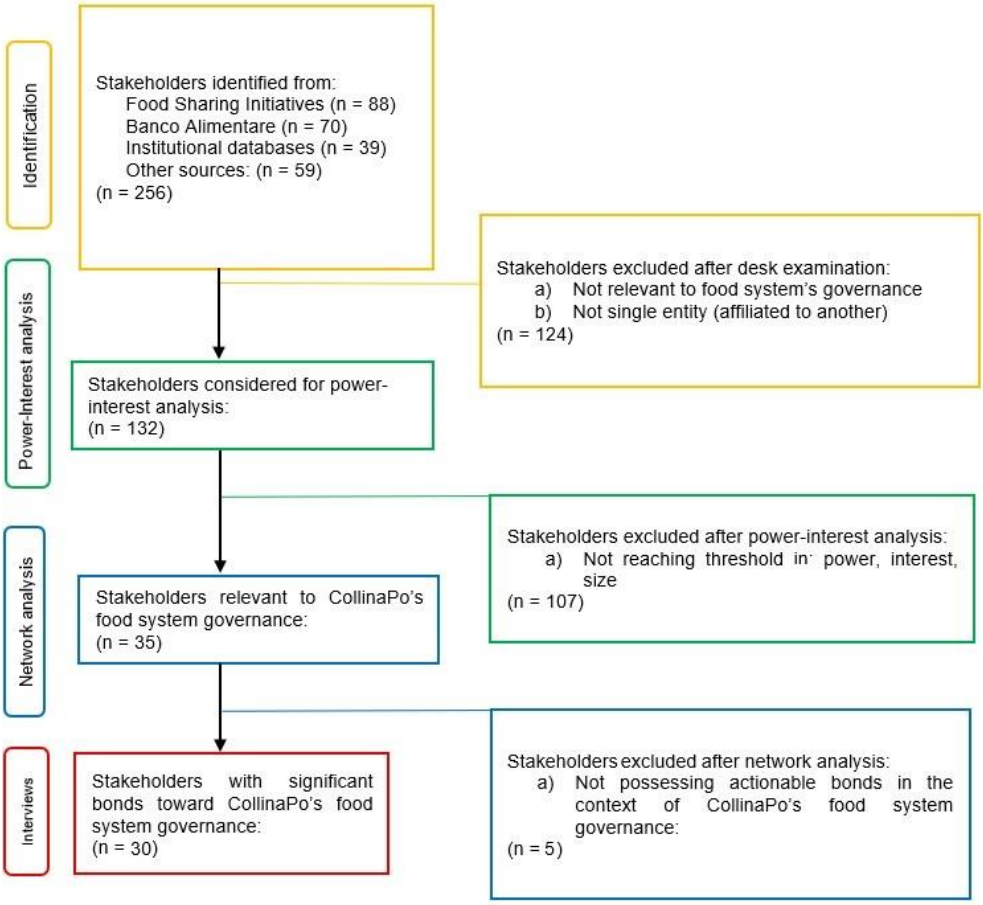

Figure 92: The process of analysis of CollinaPo' CRFS stakeholders

[121] Due to unforeseen unavailability of 7 stakeholders among the 29 identified, the sample was partially reconfigured. To preserve typological representativeness and ensure consistency with the original analytical structure, 6 additional stakeholders were identified and interviewed. These replacements were selected based on two criteria: demonstrable familiarity with the CollinaPo MAB Reserve and affiliation with the same stakeholder categories as those no longer available, specifically CS, PA, AFN and PE. This corrective measure allowed for the restoration of balance across stakeholder types and ensured that the empirical basis for interpretation remained reflective of the intended diversity

[122] For general information concerning the interviews, refer to Chapter I. The list of questions is available in Annex 1.

Source: Author's elaboration

4.1. Results

The following section presents the outcomes of the stakeholder study conducted within the CollinaPo BR. To ensure analytical clarity and methodological coherence, each component of the process is addressed independently. The results are structured to reflect the logic of the methodological framework, beginning with the initial stakeholder mapping and continuing through the power–interest–size classification, the network-based relational analysis, and the interview-based assessment of institutional recognition and perceived relevance of the BR. Each stage is examined in detail, with a focus on its specific analytical contribution to the overall understanding of multistakeholder engagement and participatory governance within CollinaPo's CRFS.

4.2. Stakeholders mapping

The stakeholder mapping constitutes the first stage of the analytical process, aimed at reconstructing the governance architecture of the CollinaPo Biosphere Reserve regarding the food system engagement. A total of 256 stakeholders were identified and classified. Each actor was assigned to one of four macro-categories based on institutional nature and functional orientation: Public Administrations (PA), Civil Society organisations (CS), Alternative Food Networks (AFN), and Private Enterprises (PE). This typological framework was chosen to capture the heterogeneity of institutional actors operating in the BR, and to ensure that both formal and informal, top-down and bottom-up, state and non-state forms of agency could be analyzed within a unified interpretive structure.

The resulting stakeholder configuration is markedly unbalanced across categories, reflecting the unique nature of CollinaPo. The CS sector accounts for 183 stakeholders, by far the most numerous groups. This includes a wide array of associations, volunteer organizations, foundations, cooperatives, grassroots initiatives, and third sector initiatives. Their predominance signals a high degree of civic engagement and associational density across the BR, as well as some opportunity of engagement with the MAB designation.

Public Administrations represent 41 actors, ranging from individual municipal governments and inter-municipal consortia to regional institutions and technical agencies. This fragmentation reflects the complex jurisdictional layering that characterizes the Biosphere Reserve. Despite their more limited numbers, public

institutions retain very strong significance due to regulatory and planning powers and are therefore key governance actors.

The category of Private Enterprises consists of 25 stakeholders and includes both conventional food system actors (e.g. producers, distributors, logistics operators) and more hybrid or socially oriented entities involved in surplus management, corporate social responsibility programs, or ethical trade networks. Their inclusion is critical if considering their resource mobilization capacity, infrastructural relevance, and increasingly frequent participation in public–private partnerships.

Lastly, Alternative Food Networks (AFNs) are represented in 7 cases. Though numerically limited, these actors often play strategic roles in piloting food systems' transformation, because they localize supply chains, and mobilize citizens in the exploration of innovative food-related practices. Their operational scale is frequently small, but their political and symbolic capital within the food discourses tends to be high, especially considering that they engage multiple citizens.

Figure 93 displays the spatial representation of the territorial distribution of stakeholders that can be involved in food governance across the CollinaPo BR. As seen before, the mapping reveals a markedly capillary distribution of food-related stakeholders, with dense clusters observable in Turin and its immediate surrounding, especially along the southern and southeastern metropolitan periphery of Turin. These clusters correspond to the most urbanized and demographically active portions of the BR, where CSOs, AFNs, and hybrid public-private initiatives tend to concentrate. In contrast, the more peripheral and topographically complex sectors of the BR display lower densities, often characterized by isolated stakeholders dispersed across the landscape. Especially they consist of *Pro Loco* activities.

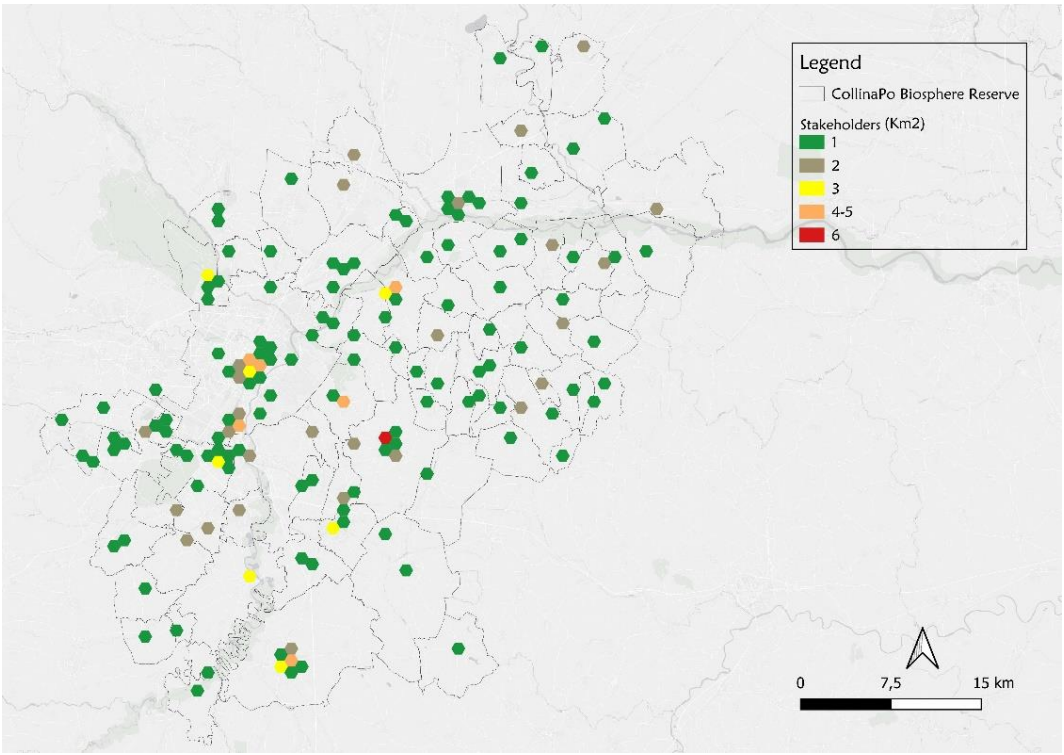

Figure 93: The stakeholders mapping in CollinaPo' CRFS (2023)
Source: Author's elaboration

4.3. Power-interest analysis

From a structural standpoint, the power-interest analysis, displayed in Figure 94, exhibits a highly diversified context. First, it is of particular interest to assess the concentration of Public Administrations (blue nodes) and Private Enterprises (orange nodes) in the top-right quadrant. These stakeholders combine high power and high interest, and many of them are characterized by medium to large systemic dimensions.

Within this strategic quadrant, *Città di Torino* (ID 93, Power 8, Interest 8) is pivotal. It holds more power than MAB UNESCO CollinaPo (ID 1, 8/7) itself due to its possession of MAB's Presidency and its evident possibility of imprinting a clear direction to the BR's activities. *Comune di Moncalieri* (ID 95, 7/7) stands out for its exceptional positioning too because it hosts the Technical Secretariat of the BR.

These institutions not only display maximum power-interest convergence but are also characterized by large systemic dimensions in the graph, indicating their administrative capacity, and centrality within the territorial coordination. *Comune di Carmagnola* (ID 99) and *Comune di Chieri* (ID 95) further reinforce this

coalition of powerful institutional actors, whose mandates are crucial in shaping the BR's possibilities.

Among private actors, IREN and SMAT (IDs 122 and 123, both 2/8) exemplify a critical configuration: they hold maximum power scores due to their influential contribution in terms of funding yet display only marginal thematic engagement. Their physical size on the matrix underlines systemic importance, but their governance role is not relevant. Nonetheless, any strategy for territorial food resilience that neglects the influence of these utilities would be structurally incomplete.

The *Centro Agroalimentare Torino – CAAT* (ID 30, 5/3), though slightly below the top quadrant, also deserves attention: as a regional food logistics hub, it concentrates substantial operational power in supply chain management, particularly for perishables, and is thus a potential facilitator of more efficient and equitable distribution models.

The second area of significance is the central-right region, where stakeholders express high interest but only moderate or limited power. This space hosts a dense and diverse constellation of actors with a strong commitment to food sustainability but limited institutional leverage. Among these, *Atlante del Cibo di Torino Metropolitana* (ID 7, 7/3) plays a notable role as a knowledge integrator of urban food initiatives. Its analytical orientation and institutional networks make it a bridge between academia and policy. Slow Food (ID 15, 6/3), *Fondazione Campagna Amica* (ID 11, 7/4) and *IlTuoParco* (ID 54, 6/4) also figure prominently in this zone, where their advocacy capacities allow them to shape norms, promote innovative food models, and, more detailly, foster short food supply chains. However, these capacities are not formalized into governance mandates or explicit duties of coordination within the BR, therefore explaining their mid-level power values.

Similarly positioned is the public organization *ARPA Piemonte* (ID 21, 5/3), which provides crucial environmental data, but often remain peripheral to core decision-making processes. Educational and research institutions such as the *Università di Torino*, *Politecnico di Torino*, and the *Università di Scienze Gastronomiche* (IDs 22, 23, 24) are also hereby concentrated, reflecting their foundational role in generating scientific knowledge. Their relatively modest power scores do not reflect weakness, but rather an institutional sorting where their influence is mediated by partnerships rather than formal mandates.

Another important presence in this area is the *Distretto del Cibo del Chierese e Carmagnolese* (ID 6, 6/4), which, as discussed in Chapter VI, functions as a territorial network aiming to coordinate municipalities above issues of agricultural value chains and local development food-related strategies. Its mid-range

positioning on both axes signals latent potential for cross-sectoral coordination. Likewise, civil society actors such as *Reciprocamensa* (ID 38, 5/1) and *Orme ETS – Orti Metropolitani* (ID 17, 4/1) combine small to mid-scale operations with high contextual intelligence, yet their influence is not institutionally embedded, calling for facilitative governance structures that could translate operational knowledge into strategic impact.

In the lower-left quadrant, stakeholders exhibit low interest and low power, often reflecting functional peripherality or thematic misalignment. Actors such as *Consorzio delle Residenze Reali Sabaude* (ID 4, 2/0) and *Provincia di Cuneo* (ID 114, 1/0) exemplify this group. Despite their administrative relevance in other domains, their marginal presence in food governance processes suggests limited significance for the present scopes; concerning the first actor, it is a matter of theme; concerning the second, it is a question of territorial relevance, if remembering that, out of all Cuneo Province's municipalities, only Casalgrasso one is involved in the BR.

Numerous local projects and associations such as *Corona Verde* (ID 9, 4/0) and *Cascina Caccia* (ID 74, 3/0) also appear here, because, even if different in terms of structure, they often possess mono-sectoral orientation or occasional, rather than systematic, involvement in food-related projects. Also, they are not systemically involved within the BR.

Yet, while these actors may appear tangential, their mapping serves a key function: delineating the limits of the current governance field and identifying possible entry points for future engagement, especially when tackling cross-sectoral challenges like the one of food.

The lower-right quadrant, where interest is high but power remains low, deserves particular attention for its density and diversity. It includes many Alternative Food Networks and grassroots CSOs. For example, *GASTorino* (ID 18, 5/2), *L'Alveare che dice Sì* (ID 19, 5/2), and *GAS Verrua Savoia* (ID 75, 5/2) demonstrate consistent thematic alignment and operational relevance but lack access to policymaking spaces. Their presence in this area is highly informative: they represent the operational infrastructure of alternative food but suffer from fragmentation and lack of institutional recognition. Empowering this quadrant, without co-opting or diluting their specificity, is a priority for democratic food governance.

Within the top-left quadrant, significant insights emerge regarding two stakeholders that, while lacking a direct or privileged interest in the Biosphere Reserve, wield substantial strategic influence. These are *Fondazione Compagnia di San Paolo* (ID 122, 2/8) and *Fondazione CRT* (ID 123, 2/8). Both are major philanthropic institutions, non-commercial entities rooted in the banking legacies

of Intesa SanPaolo and Unicredit, that channel extensive resources toward initiatives addressing climate crisis mitigation, sustainable resource management, arts and culture, and social inclusion. Their potential engagement within the CollinaPo framework could therefore exert a considerable transformative impact, especially if aligned with the Reserve's strategic objectives.

The asymmetrical distribution of actors across the matrix reveals significant imbalances. Public Administrations and some major enterprises dominate the strategic zones, while Civil Society and AFNs occupy intermediary or marginal positions. This pattern confirms the broader tensions in MLG systems, where formal authority, operational capacity, and thematic commitment are rarely aligned. It also points to different governance opportunities among actor types: while municipalities such as *Città di Torino* or *Comune di Carmagnola* have both the mandate and the resources to intervene in the food systems' management, many third-sector stakeholders remain structurally excluded despite their embeddedness and innovation potential.

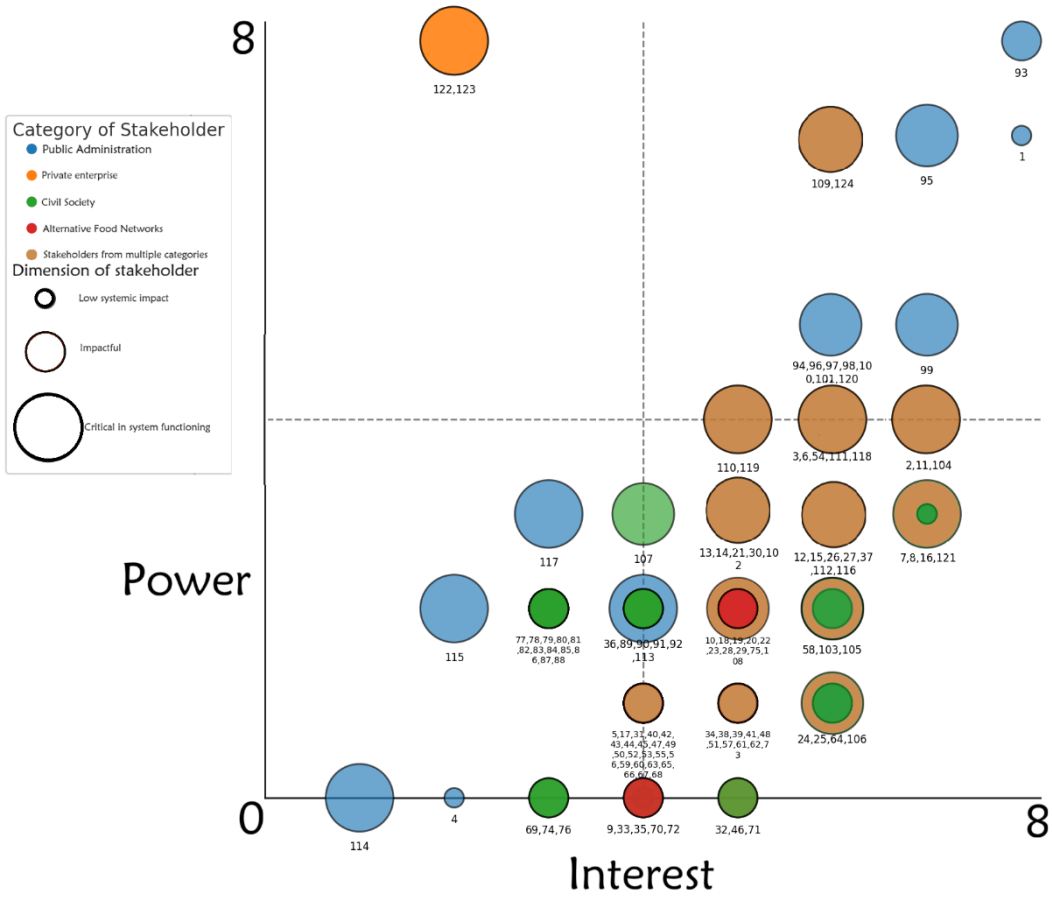

Figure 94: The power-interest-size analysis of stakeholders in CollinaPo' CRFS[123] (Annex D)

Source: Author's elaboration

4.4. Network analysis

The network analysis of stakeholder interactions within the CollinaPo Biosphere Reserve reveals a structurally articulated yet asymmetrical relational architecture. Each connection displayed in Figure 95 distinguishes between two types of relational bonds: coordination, represented by orange arrows, and information sharing, represented in green. This distinction is methodologically significant, as it reveals not only whether stakeholders are connected, but also the intensity of their collaboration.

A clear pattern emerges when observing the typology of ties among Public Administration (PA) stakeholders. Coordination bonds are highly concentrated within this group, suggesting a governance core in which formal mandates and institutional legitimacy underpin tight operative synergies. For instance, the CollinaPo BR (1) exhibits coordination relations with several institutional actors such as the *Città di Torino* (20), *Comune di Moncalieri* (22), *Regione Piemonte* (29), and the Po Protected Areas Authority (28). These ties are often high in strength, situated at level 3, and indicate an established platform of inter-institutional collaboration, supported by formal agreements and shared projects.

This pattern is further reinforced by the configuration of *Città di Torino* itself, which shows coordination links of high intensity with both local and regional institutions, including multiple municipalities (22, 23, 24, 25), academic institutions (10, 11), and infrastructure actors such as SMAT (33) and IREN (32). These connections form a tight-knit cluster that exhibits features of a governance "core", where institutional coordination is the primary mode of interaction. Such clustering reflects the capacity of public institutions to set strategic planning and policy implementation through formalized mechanisms that often avoid involving other actors of the system.

In contrast, Civil Society (CS) and Alternative Food Networks (AFN) tend to be engaged primarily through information-sharing relationships. Stakeholders such as

[123] The representation was produced by an automatized displayer integrated in Chatgpt. Data were provided in an Excel file and subsequently analyzed and visualized through specific prompts of work. Some colors may not fully match the intended stakeholder categories due to limitations in the automated classification process, where certain items were interpreted ambiguously. In those cases, if there is a clear majority of categories, their color is selected. Otherwise, brown color is displayed. Despite this, the overall structure of the analysis remains accurate and coherent.

Punto al Cibo (6), *Reciprocamensa* (16), and *Centro Studi CollinaPo* (17) are largely recipients or sources of information for the main institutional actors, but only rarely participate in coordination ties. For example, *Punto al Cibo* shares coordination links with a limited set of actors, such as *Reciprocamensa* and the *Università di Torino*, but remains structurally peripheral to the main coordination flows among municipalities and regional authorities. This limited inclusion reflects a gap in the operational integration of this network of food initiatives into strategic decision-making spaces.

Moreover, the CS and AFN groups tend to form loosely connected sub-clusters. While they may be thematically aligned and locally embedded, the lack of coordination ties suggests that their contribution remains largely consultative or single project-based rather than structurally institutionalized. This asymmetry is particularly evident in the case of stakeholders *Pro Natura Torino*, *Reciprocamensa*, and *CiòCheVale*, which display only weak or medium-strength information ties to public or academic institutions, without access to coordination mechanisms that could translate their engagement into governance agency.

Private Enterprises (PE) show a dual pattern. Strategic philanthropic actors such as *Compagnia di San Paolo* (30) and *Fondazione CRT* (31) are relatively well integrated through coordination ties with universities and *Città di Torino*, indicating their role in resourcing or co-developing policy initiatives. Conversely, infrastructure providers such as IREN (32) and SMAT (33), while connected to governance enhancers, exhibit a lower density of ties and primarily function within the coordination sphere only when directly involved in technical implementation.

The mapping also highlights several structurally relevant intermediary nodes. For instance, the *Università di Torino* (10) and the *Politecnico di Torino* (11) maintain both information and coordination bonds with a diverse array of actors across categories. Their roles are not confined to academic consultation but extend into system integration, translating knowledge into policy-relevant frameworks or projects development. The coordination ties connecting them to the *Città di Torino*, *Compagnia di San Paolo*, and the BR itself, reinforce their centrality as epistemic and operational nodes.

From a governance perspective, the typology of ties provides actionable insights. Coordination ties signal longstanding relations with high-trust, high-capacity relationships in which actors already actively co-produce interventions. Information-sharing ties, in contrast, indicate the flow of knowledge without direct influence on decision-making. Therefore, actors positioned in the network but confined to information bonds, particularly within the CS and AFN categories, are structurally limited in their ability to shape institutional agendas. This governance

gap may hinder the emergence of inclusive UFP if not proactively addressed through mechanisms of empowerment, representation, or co-design.

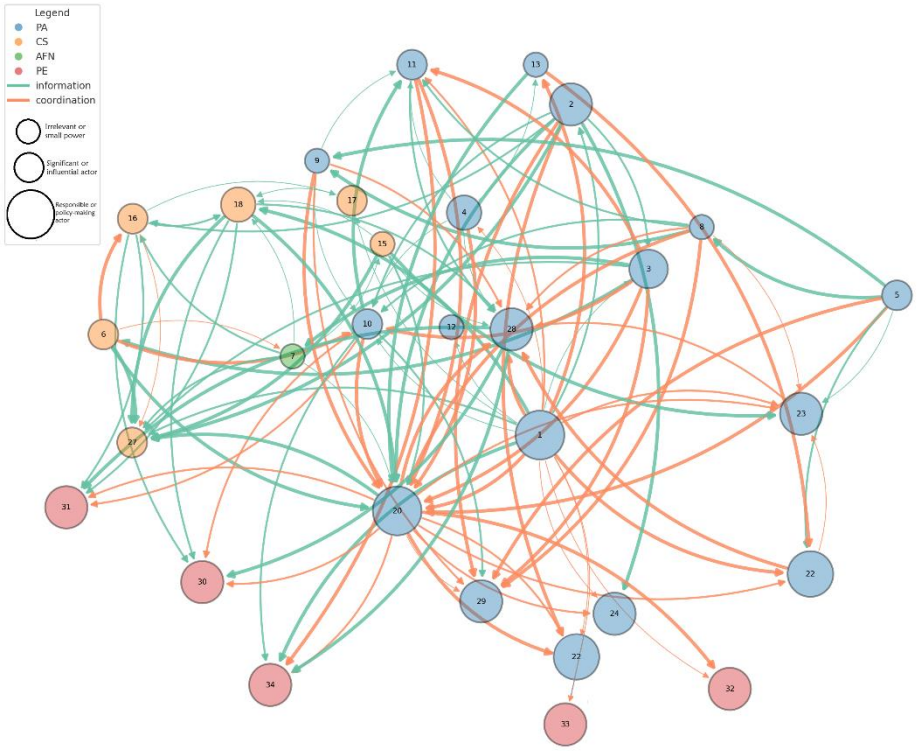

Figure 95: The network analysis of stakeholders in CollinaPo' CRFS (Annex D)[124]
Source: Author's elaboration

4.5. Interviews

The semi-structured interviews, conducted with 29 selected stakeholders, among Public Administrations (PA), Civil Society (CS)[125], and Private Enterprises (PE), aware of the processes happening in CollinaPo, regard four interconnected topics: the function of the MAB designation, the impact of the designation, the general recognition of CollinaPo as a BR, and the perceived relation between food and MAB[126].

[124] The representation was produced by an automatized displayer integrated in Chatgpt. Data were provided to Chatpgt in the form of an Excel file and subsequently analyzed and visualized through specific prompts of work within Chatgpt.

[125] Alternative Food Networks are removed because no individual from this group was sufficiently aware of the CollinaPo Biosphere Reserve current functioning and future trajectories.

[126] The lists of questions is displayed in Annex C.

The answers' analysis is carried out through a dual interpretive approach, presented in the following two sub-sections, combining both theory-driven and data-driven approaches. In the first section, a category-based analysis is presented, structured around the stakeholder typologies previously adopted. This phase of the analysis aims to identify recurrent thematic patterns within each category of stakeholders and is supported by selected direct quotations extracted from the interview corpus. This structured reading reveals a relative thematic homogeneity within some categories, notably among Civil Society actors and Public Administrations' ones; Private Enterprises exhibit more fragmented positions.

From this, a second layer of analysis was carried out, independent from the pre-assigned categories, and based on the inductive aggregation of cross-cutting thematic clusters derived from the empirical material. The cluster analysis presented here compares the responses grouped within Cluster 1 and Cluster 3, which were identified through hierarchical clustering applied to the full set of stakeholder interviews. Cluster 2 is excluded from the analysis due to an insufficient number of cases, which would compromise the interpretive consistency of its inclusion.

The clustering procedure was performed by cutting the dendrogram at a dissimilarity threshold of 1.2, thereby isolating the main branching structures and generating clearly distinguishable clusters (Figure 96). The classification process is based on a typology that I constructed manually, following a structured, theory-informed interpretation of the interviews. This methodological choice lends strength to the approach, as the clustering does not rely on arbitrary categories but rather on consistent patterns of meaning and positioning expressed by the interviewees themselves. This transformation reduces subjectivity in the interpretation phase and anchors the analysis in a clearly traceable logic, increasing both transparency and reliability.

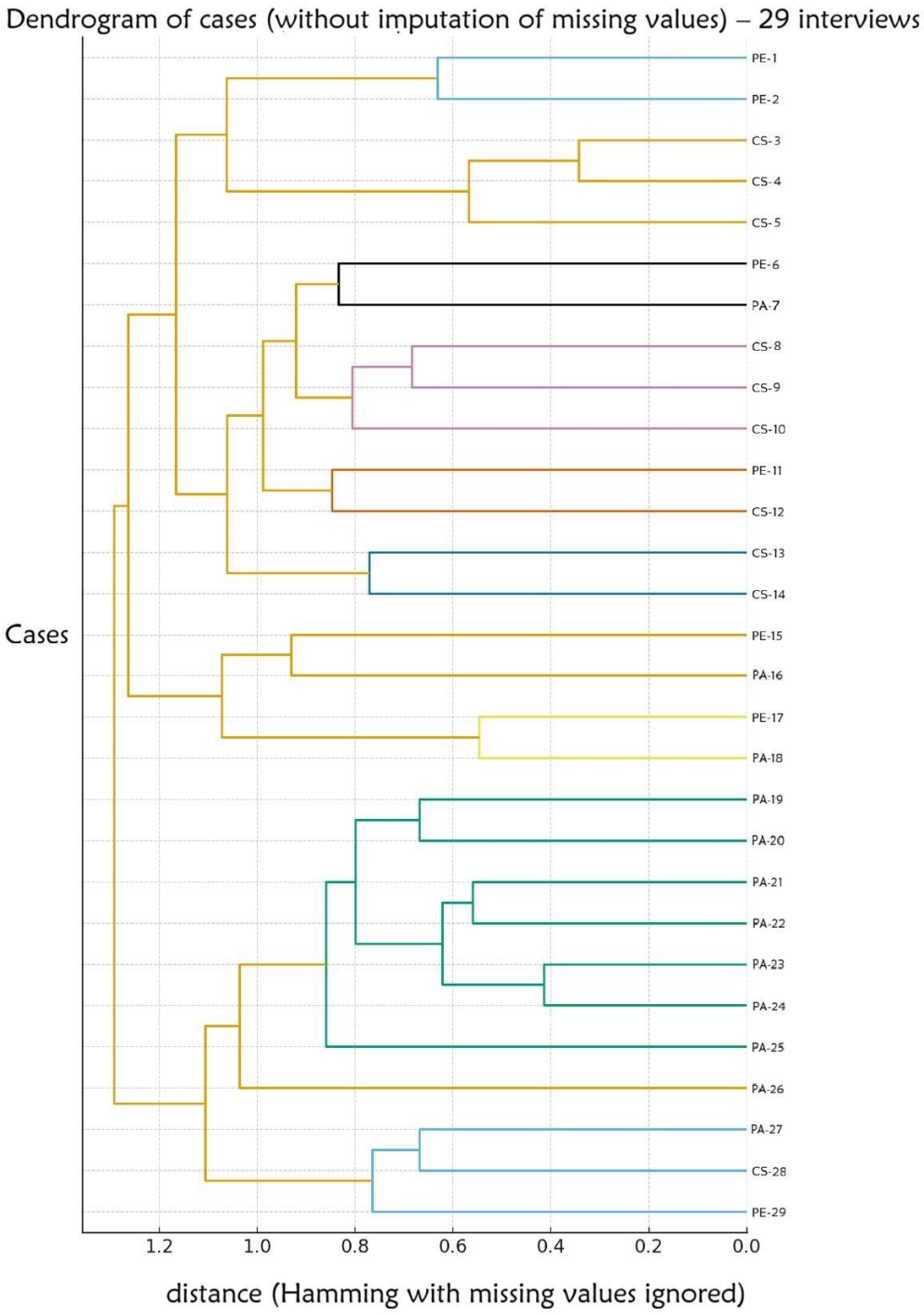

Figure 96: Dendrogram of cases (interviews analysis)

Source: Author's elaboration

4.5.1. A theory-driven analysis

For the interviewees in the "PA" category, the distinctive feature of the MAB CollinaPo lies in its cultural and social dimension. Unlike the "PE", who mainly see it as an institutional device, and the "CS", who underline its limits, the "PA" speak of the MAB as an educational project capable of spreading knowledge, stimulating environmental awareness, and building collective belonging.

"Questo riconoscimento, essendo un sito UNESCO immateriale, non si concentra su elementi tangibili come il patrimonio architettonico o culturale, ma sul patrimonio immateriale, ovvero il territorio, l'ambiente, la natura e la biosfera in generale. (…). Questo approccio mira non solo alla conservazione ma anche al coinvolgimento delle comunità locali e dei protagonisti del territorio, per promuovere una consapevolezza collettiva sul valore e sulle potenzialità di questo riconoscimento" (PA13, Interview, September 24, 2024)[127].

Already in the definition of objectives, they place themselves on a different ground: not so much governance or technical management of the territory, but the possibility of mobilizing people, creating collaborative networks, and strengthening the sense of identity.

"Questo riconoscimento ha l'obiettivo di promuovere politiche sostenibili coinvolgendo tutta la comunità, con un ruolo fondamentale per le associazioni del territorio. Tra gli obiettivi specifici c'è la creazione di "antenne MAB" sul territorio, un'iniziativa volta a rafforzare il legame con le realtà locali" (PA22, Interview, September 29, 2024)[128].

This orientation clearly emerges in the assessments of the local community involvement. The "PA" insist on the need to open the project to associations, schools, and citizens, underlining the importance of bottom-up participation. Whereas the "PE" speak of institutional actors and the "CS" denounce their weakness, the "PA" see social involvement as the beating heart of the MAB. The same happens when collaborations are discussed: for the "PA", these are

[127] "This recognition, being an intangible UNESCO site, does not focus on tangible elements such as architectural or cultural heritage, but on intangible heritage, namely the territory, the environment, nature, and the biosphere in general. (…). This approach aims not only at conservation but also at the involvement of local communities and key actors in the territory, in order to promote a collective awareness of the value and potential of this recognition".

[128] "This recognition has the objective of promoting sustainable policies by involving the entire community, with a fundamental role for local associations. Among the specific objectives is the creation of "MAB antennas" in the territory, an initiative aimed at strengthening the connection with local realities".

experiences that strengthen the social and cultural fabric, a horizon quite different from the instrumental view of the "PE" or the marginality described by the "CS".

"A nostro giudizio, il Mab non sembra avere un ruolo concreto sul territorio. Se il suo compito è dialogare con la politica e collaborare con associazioni, pro loco e amministrazioni locali, non abbiamo mai percepito la sua presenza. Non possiamo escludere che qualcosa sia stato fatto, ma dal nostro punto di vista non è stato efficace né evidente, il che ci porta a considerarlo poco attivo" (CS6, Interview, September 18, 2024)[129].

The difference is also noticeable in the perception of changes over time and of positive effects. The "PA" see an increase in environmental sensitivity among citizens and speak of cultural growth, whereas the "PE" underline institutional stability and the "CS" do not perceive significant transformations.

"Secondo me è un coinvolgimento più spontaneo, non strettamente legato alla consapevolezza di abitare in un MAB UNESCO. Le persone hanno un legame individuale con l'ambiente e un desiderio di tutelarlo che nasce dalla crescente sensibilità verso temi come la sostenibilità e la tutela ambientale. Tuttavia, molti di loro probabilmente non sanno nemmeno di abitare in un'area che fa parte del MAB UNESCO" (PE30, Interview, September 21, 2024)[130].

Even in the assessments of negative effects, "PA" stand out: although recognizing difficulties, they interpret them as obstacles to be faced and overcome, without the minimizing attitude of the "PE" or the pessimism of the CS.

Another field in which the "PA" emerge clearly is that of visibility and notoriety. They do not share the optimism of the "PE" nor the pessimism of the CS: they assess notoriety as partial but growing and attribute a crucial role to cultural and public events as vehicles of social legitimization. Consistently, their proposals to improve recognizability focus on educational, school-based activities and collective awareness-raising initiatives.

Finally, even on the subject of food, the "PA" stand out, attributing to it a role of cultural and social leverage. They do not see it as marginal or accessory, but as a

[129] "In our view, the MAB does not seem to have a concrete role in the area. If its task is to engage with politics and collaborate with associations, pro loco groups, and local administrations, we have never perceived its presence. We cannot rule out that something has been done, but from our perspective it has neither been effective nor evident, which leads us to consider it scarcely active".

[130] In my opinion it is a more spontaneous involvement, not strictly tied to the awareness of living in a UNESCO MAB. People have an individual bond with the environment and a desire to protect it that arises from the growing sensitivity to issues such as sustainability and environmental protection. However, many of them probably do not even know that they live in an area that is part of the UNESCO MAB.

tool to reinforce awareness and the rooting of the MAB in everyday practices. In this sense, food-related activities represent opportunities for meeting and participation, more than institutional collaborations or sporadic initiatives. Taken as a whole, the positions of the "PA" outline a profile oriented towards the construction of meaning, the creation of networks, and the social legitimization of the initiative.

"Il tema del cibo, pur essendo centrale nel contesto del MAB CollinaPo per il suo legame con la natura e la sostenibilità, solleva interrogativi sulla gestione e il coordinamento delle iniziative già esistenti. In particolare, il distretto del cibo rappresenta una realtà consolidata che opera nella promozione e nella valorizzazione delle produzioni agroalimentari locali. La creazione di ulteriori enti o sovrastrutture, come un nuovo organismo legato al MAB UNESCO, rischierebbe di generare sovrapposizioni e ridondanze" (PA15, Interview, September 24, 2024)[131].

The interviewees in the "CS" category stand out for a more critical and disenchanted attitude towards the MAB CollinaPo. Their peculiarity emerges above all in the judgement of the objectives and of the concrete effects: unlike the "PE", who see the MAB as a governance tool, and the "PA", who speak of education, the "CS" denounce a lack of clarity and concreteness. In their discourse, the idea often recurs that the UNESCO recognition is not sufficient to transform practices and that the gap between the international title and the daily life of the territory remains significant.

"Sul territorio, parlando di cambiamenti tangibili e fisici legati direttamente al riconoscimento MAB, faccio davvero fatica a individuarne uno in particolare. Onestamente, a parte alcune iniziative già citate, come le antenne che rappresentano forse l'unico elemento che si collega esplicitamente al MAB, non noto altre trasformazioni o interventi che possano essere chiaramente attribuiti a questo riconoscimento" (CS11, Interview, September 20, 2024)[132].

This critical attitude is reflected in the evaluations of the commitment to environmental conservation and of the changes over time. The "CS" speak of a

[131] "The subject of food, while central in the context of the MAB CollinaPo due to its link with nature and sustainability, raises questions about the management and coordination of initiatives that already exist. In particular, the food district represents a consolidated reality that operates in the promotion and enhancement of local agri-food production. The creation of further bodies or superstructures, such as a new organism linked to UNESCO MAB, would risk generating overlaps and redundancies".

[132] "On the ground, speaking of tangible and physical changes directly linked to the MAB recognition, I really struggle to identify a particular one. Honestly, apart from some initiatives already mentioned, such as the antennas which perhaps represent the only element that explicitly connects to the MAB, I do not notice other transformations or interventions that can be clearly attributed to this recognition".

partial and not very incisive commitment, and declare that they have not perceived tangible transformations over the years, distinguishing themselves both from the institutional optimism of the "PE" and the educational confidence of the PA. Even in responses about positive effects, the "CS" differentiate themselves: while the other two groups point out benefits in terms of visibility or awareness, they highlight above all the limits and shortcomings. Not by chance, when it comes to negative or unexpected effects, the "CS" are the readiest to recognize them and underline their impact.

"Sì, sicuramente l'aspetto più negativo è legato alla gestione politica dell'UNESCO MAB e alla difficoltà di creare tavoli di lavoro realmente paritetici. Per "paritetici" non intendo che tutti debbano avere le stesse responsabilità – è giusto che la parte politica mantenga il proprio ruolo decisionale – ma che ci sia un vero coinvolgimento delle realtà locali. Invece, per buona parte del periodo, con l'eccezione della fase iniziale, il coinvolgimento delle associazioni è stato pressoché assente" (CS12, personal cmmunication, September 20, 2024)[133].

The divergences with the other groups are also evident in visibility and notoriety. For the "CS", the MAB is little known, both by administrators and especially by citizens. In contrast to the PE, who tend to overestimate its notoriety, and the PA, who assess it as growing, the "CS" insist on the limited diffusion of knowledge and the weak effectiveness of the events organized so far. For this reason, when it comes to proposing solutions, they strongly call for greater direct involvement of local communities, from which they feel excluded.

The same critical stance is found in the evaluations of collaborations: the experiences among producers, associations, or municipalities are perceived as episodic, fragmented, and poorly structured, in stark contrast to the valorization offered by the "PS" or the instrumental reading of the "PE".

"Alcune collaborazioni tra produttori stanno emergendo, anche se spesso in maniera indiretta. Per esempio, in dialogo con Coldiretti, alcune realtà agricole si sono affacciate al MAB, mostrando interesse per i temi di sostenibilità e valorizzazione del territorio. Tuttavia, queste collaborazioni non si concretizzano

[133] Yes, the most negative aspect is certainly linked to the political management of the UNESCO MAB and the difficulty of creating genuinely equal working tables. By "equal" I do not mean that everyone must have the same responsibilities— it is right that the political side maintains its decision-making role— but that there is real involvement of local actors. Instead, for most of the period, with the exception of the initial phase, the involvement of associations was almost absent.

sempre in nuove progettualità e soprattutto non accadono dentro al contesto MAB" (PE16, Interview, September 25, 2024)[134].

A very relevant reflection in this context regards a critical opportunity.

"Le collaborazioni tra produttori si sono sviluppate in un contesto complesso, poiché il marchio MAB UNESCO non può essere utilizzato a fini commerciali. Tuttavia, molti produttori agricoli, soprattutto quelli che trasformano i loro prodotti nel settore agroalimentare, riconoscono il valore aggiunto che il marchio MAB può rappresentare" (PA14, Interview, September 23, 2024)[135].

Finally, on the theme of food, the "CS" maintain a deflationary position:

"Il cibo è un tema centrale per il MAB CollinaPo, soprattutto per quanto riguarda la sostenibilità e la valorizzazione della produzione locale. La collina offre una rete diffusa di contadini e produttori che permettono di accedere a prodotti freschi e a chilometro zero, favorendo una connessione tra consumatori e territorio" (CS6, Interview, September 18, 2024)[136].

"CS" recognize food's marginality and underline the sporadic nature of the activities carried out, distinguishing themselves from the "PA" who see it as a cultural lever and from the "PE" who interpret it as an accessory aspect of policy.

"Il tema del cibo, sebbene ancora poco sviluppato nel contesto del MAB CollinaPo, è una dimensione con grandi potenzialità. Si tratta di un aspetto che potrebbe fungere da "gancio" per coinvolgere la cittadinanza e promuovere la sostenibilità" (PA17, Interview, September 23, 2024)[137].

[134] Some collaborations between producers are beginning to emerge, although often in an indirect way. For example, through dialogue with Coldiretti, several agricultural actors have started to engage with the MAB framework, showing interest in issues of sustainability and territorial valorization. However, these collaborations do not always translate into new projects, and above all, they rarely take place within the MAB context itself.

[135] Collaborations among producers have developed within a complex context, since the UNESCO MAB label cannot be used for commercial purposes. Nevertheless, many agricultural producers, especially those involved in processing their products within the agri-food sector, recognize the added value that the MAB label can represent.

[136] Food is a central theme for the CollinaPo MAB, particularly in relation to sustainability and the valorization of local production. The hills host a widespread network of farmers and producers that provide access to fresh, locally sourced products, fostering a strong connection between consumers and the territory.

[137] The food theme, although still underdeveloped within the CollinaPo MAB context, holds great potential. It represents an entry point to engage citizens and promote sustainability.

Overall, the profile of the "CS" is that of critical and disillusioned observers, who highlight the limits of visibility and rooting of the MAB and call for a stronger connection with the daily life of local communities.

For the interviewees in the "PE" category, the MAB CollinaPo primarily assumes the meaning of an instrument of governance and institutional coordination. This approach strongly distinguishes them from the other two groups: whereas the "PE" emphasize the cultural aspect and the "CS" question its effectiveness, the "PA" underline the role of the UNESCO recognition to strengthen the legitimacy of local administrations and to give continuity to environmental conservation policies.

"L'impegno del MAB CollinaPo nella promozione della conservazione ambientale è importante, ma lo considero comunque secondario rispetto ad altre competenze perché spetta principalmente alle aree protette e agli enti parco, che svolgono un ruolo fondamentale in questo ambito. La protezione ambientale è spesso regolata su scala comunale attraverso strumenti come le norme di pianificazione, che identificano e tutelano specifiche aree, o attraverso i piani regolatori che ogni comune definisce secondo le proprie esigenze" (PA14, Interview, September 23, 2024)[138].

4.5.2. A data-driven analysis

Taking into consideration the three clusters mentioned before, the first one is distinguished by a reading of the MAB CollinaPo that strongly ties it to the social and cultural dimension. The interviewees in this Group 1, mostly belonging to the "PA" category but also including one "PE" and one "CS", underline how the main goal of the initiative is not just environmental protection, but also awareness-raising, education, and the creation of community networks.

In their discourse, the idea recurs that the MAB has fostered the emergence of connections between associations, schools, and citizens, helping to strengthen a sense of shared identity and to disseminate environmental awareness. This approach is also reflected in how they evaluate the changes brought about by the MAB: whereas others remain more cautious, in Group 1 there is a perception of increased ecological awareness among the population and of new collaborations among social and cultural actors. What distinguishes them is their belief that the MAB can be a

[138] L'impegno del MAB CollinaPo nella promozione della conservazione ambientale è importante, ma lo considero comunque secondario rispetto ad altre competenze perché spetta principalmente alle aree protette e agli enti parco, che svolgono un ruolo fondamentale in questo ambito. La protezione ambientale è spesso regolata su scala comunale attraverso strumenti come le norme di pianificazione, che identificano e tutelano specifiche aree, o attraverso i piani regolatori che ogni comune definisce secondo le proprie esigenze

community process capable of producing everyday transformations in behaviors and values, rather than simply representing an international label.

The divergences with Group 3, mostly inhabited by "CS" become very clear when it comes to visibility and notoriety: for Group 1, awareness of the MAB is still partial but growing, especially thanks to public events and cultural initiatives.

The most common proposal to strengthen its impact is to invest in educational and bottom-up communication pathways, involving schools and associations.

On this front, the contrast with Group 3 is evident: where the latter insists on poor notoriety and fragmented initiatives, Group 1 interprets the same processes as seeds of a transformation in progress.

The topic of food also proves to be a defining feature: for Group 1, it is an important cultural and social level, capable of embedding the MAB's principles into daily life and of building new forms of participation. They do not see it as a marginal aspect, but rather as an opportunity for collective awareness-raising, in sharp contrast with Group 3.

Overall, Group 1 outlines a profile oriented toward trust in the social dimension of the MAB, with a strong emphasis on education, associative networks, citizen participation, and the use of food as a cultural tool. The other cluster is characterized by a more institutional and critical vision of the CollinaPo MAB. Composed mostly of "CS" interviewees, along with several "PE" and one I, this group tends to question the effectiveness of the UNESCO recognition and to downplay its concrete effects on the territory.

Also in the definition of objectives, Group 2 differs from Group 1: emphasis is placed on environmental conservation and institutional coordination, while the educational and cultural dimensions appear less central.

In evaluations of the MAB's commitment to conservation, Group 3 appears skeptical: the project is judged as partial and not very incisive, lacking significant impacts over its ten years of existence.

On the topic of participation as well, the difference with Group 1 is marked.

Where the first cluster speaks of social and community networks, Group 3 insists on the weakness of local embeddedness, pointing out that collaborations are limited, episodic, and focused on a few institutional actors.

Another distinguishing feature emerges in the perception of visibility and notoriety.

For Group 3, knowledge of the MAB remains very low, both among administrators and especially among citizens. The events that have been organized are not considered capable of making a deep impact, and for this reason, proposals

for improvement point toward more direct involvement of local communities, but always within a framework of initiatives coordinated by institutions.

The theme of food also sets Group 3 apart from Group 1: it is considered a marginal aspect, poorly developed and scarcely integrated into MAB practices.

The activities that have taken place appear sporadic and lack real social impact, in stark contrast with the vision of food as a cultural lever that characterizes the other cluster.

Group 3 presents the image of a more skeptical and critical set of actors, who view the MAB as an important international recognition but one that is weak in producing concrete effects and in embedding itself in the daily life of the territory.

Shortly, Group 1 is characterized by a community-oriented perspective on the MAB CollinaPo initiative. Its members emphasize the program's ability to foster awareness, education, and participation, and identify associations, schools, and citizens as the primary subjects that can drive the Programme's development. According to this view, MAB has already enabled the emergence of some social collaborations, increased environmental awareness, and supported the growth of CollinaPo's public recognition, primarily through public events and cultural initiatives.

Group 3, by contrast, presents a more structured, yet critical interpretation. The focus is strongly placed on the pillars of environmental conservation and administrative coordination, with overall scepticalness regarding the effectiveness of MAB. In this group, public awareness is perceived as very low, collaborations are described as sporadic and weak, and the positive effects are considered marginal. Food is also viewed as a non-central and underdeveloped component of the initiative.

In summary, the two clusters represent contrasting characteristics: Group 1 sees MAB as a growing social and cultural process that can engage citizens and associations, while Group 3 interprets it as an institutional mechanism with limited outcomes, still distant from the everyday life of local communities.

While the clusters are methodologically coherent among them, and reveal meaningful distinctions, it is necessary to acknowledge the limits and boundaries of the present analysis. The findings are drawn from a relatively small and qualitative sample[139], which, although rich in depth, cannot be taken as statistically representative. The typologies developed are the result of a solid, researcher-led clustering process, based on a comparative analysis of the interviews, but they should still be considered as hypotheses in need of further verification. A more

[139] Sample includes 29 individuals.

robust understanding of these patterns would require a broader empirical base, potentially integrating quantitative tools, larger stakeholder samples, and mixed-method triangulation over time.

4.6. Intersecting the need for democracy in food systems with the on-ground reality

The integrated findings from the network analysis, the power-interest-impact mapping, and the cluster-based interpretation of stakeholder interviews offer a composite understanding of the governance landscape in which the MAB CollinaPo Biosphere Reserve fits. Rather than isolated data, these analytical perspectives converge to expose a system that is structurally mature but politically asymmetrical, administratively coherent but socially fragmented, and technically articulated yet normatively unfinished.

The network analysis confirms that in CollinaPo there exists a coordination nucleus involving the Public Administrations (PA), but that this nucleus remains only partially connected to the wider ecosystem of actors that a CRFS requires. The PA and selected Private Enterprises (PE) compose a truly effective but detached architecture. These actors are embedded in high-intensity coordination ties, typically characterized by formalized mandates or structured project frameworks. Stakeholders such as *Città di Torino*, *Comune di Moncalieri*, and *Regione Piemonte* form an institutional cluster where strategic decision-making occurs. Their ties strength points to a consolidated governance body, which, although solid, is primarily self-referential, and the coordination is achieved at expenses of inclusion.

By contrast, Civil Society Organizations (CSOs) and Alternative Food Networks (AFNs) are present in the wider territory but are formally excluded from a point of view of relations. These actors' networks are represented mainly through information-sharing ties, with few or no coordination bonds. While they can bear important contributions concerning sustainability and food systems, their influence remains consultative rather than co-decisional. Nodes such as *Reciprocamensa*, *Punto al Cibo*, or *Pro Natura Torino* function as knowledge or practice hubs, but they lack institutional involvement and therefore all their intelligence remains external to governance. This relational asymmetry is not a partial mistake: it is a systemic blind spot that restricts the ability to democratize territorial food governance.

The power-interest matrix confirms this imbalance. The top-right quadrant of Figure 93, where high power and high interest converge, is populated by municipalities and strategic enterprises, including Città di Torino (ID 93). These stakeholders not only hold formal authority but also manage key infrastructures,

budgets, and networks. In contrast, the lower-right quadrant, where interest is high but power remains low, is crowded with CSOs, AFNs, and thematic initiatives such as *GASTorino* or Slow Food, whose systemic contributions remain under-recognized. The asymmetry is further reinforced by a condition of apparent power without engagement, and partial engagement without any power (as seen in many CS initiatives). The result is a fragmented governance in which participation, expertise, and legitimacy are misaligned.

The analysis of the clustered stakeholders' interviews adds another interpretive layer. The first cluster (Group 1) is dominated by actors who frame the MAB as a social and cultural infrastructure, a platform for collective learning, civic mobilization, and local identity-building. These stakeholders, mostly from the "PA" category, describe the MAB not as a static designation, but as a transformative process. They highlight its potential to catalyze everyday behavioral change through education, networks, and food-related practices. The second cluster (Group 3), formed primarily by CSOs and some PE actors, articulates a more institutionally critical and operationally skeptical perspective. Here, the MAB is seen as a technocratic initiative, valuable in principle, but detached from territorial realities and insufficient in generating substantive change.

What is relevant to underline is the internal coherence of these stakeholder categories, which varies significantly. Actors from the "PA" and "CS" groups display high consistency in their views, clustering tightly around shared narratives. Private Enterprises (PE), on the other hand, show a more heterogeneous distribution, indicating that organizational position, mandate scope, and administrative scale exert more influence than categorical belonging; it is probably subjected to the perceived margin of profit. A regional planner and a local technician may both fall under the PE category but engage with the MAB from vastly different institutional logics and with diverging expectations. The cluster patterns also clarify why stakeholder categories behave differently. PE and CS produce internally coherent narratives because their roles are comparatively homogeneous in the present system. PA are fragmented because scale, legal competences and political incentives diverge across administrations. This heterogeneity is not a weakness if explicitly harnessed.

Across all these analytical layers, a clear paradox becomes visible: the MAB CollinaPo is recognized as a formal governance device, supported by solid institutional linkages and symbolically reinforced through international UNESCO status. Yet its actual capacity to enact cross-sectoral, participatory, and transformative governance remains partial. Many of the most committed actors, those operating grassroots initiatives or piloting innovative food models, are fully

excluded from coordination processes, even when their contributions are recognized in discourse. Conversely, actors with the strongest mandates are often disconnected from the community-based dimensions of sustainability, acting within technocratic rationalities that privilege efficiency over inclusiveness.

The concentration of authority in a small set of public actors, the latent yet decisive influence of utilities with high power and low thematic engagement, and the persistent confinement of CS to information ties together, reproduce the pattern where inclusiveness is asserted discursively but is not actually developed. The theoretical warnings about performative participation and co-optation find empirical confirmation in the current architecture: advisory contact points exist, but the conversion of civic knowledge and AFN capacities into possible policy-making participation is missing. From a conceptual perspective, this gap confirms how power is poorly distributed in CollinaPo. Even further, the overall co-produced governance of CollinaPo fails, as no attempt of involvement of bottom-up initiatives and association is made.

These empirical results are interpreted here within the analytical distinction between food governance and UFP that structures this thesis. The situation mapped in CollinaPo describes a governance framework that opens to dealing with food, yet it is much far from the delivery of a final UFP. In this sense, the diagnosis does not evaluate a policy output, but the conditions of policy producibility.

Read through the CRFS requirement of multistakeholder engagement, the empirical evidence therefore functions as a readiness assessment of CollinaPo's territorial governance for a democratically grounded UFP, highlighting that the core deficit is not the absence of actors or initiatives, but the absence of institutional interfaces that can stabilize their participation into policy production.

This diagnosis has direct implications for the UFP design choices. First, on the hardware of governance, the current structure would benefit from the formalization of co-decision spaces that are procedurally binding for specific domains of the food agenda. A CollinaPo-centred forum with delegated authority over selected food system functions would rebalance the present asymmetry by guaranteeing that AFNs, CS, producer groups and research bodies do not merely inform plans but co-determine priorities, instruments and evaluation criteria.

Second, on the software of governance, the network shows where trust and reflexivity must be built. The dense cluster of high-interest, low-power actors already operates as a repository of knowledge and community trust. Yet, their patience and interest in the process is not limitless. They wish being involved, but their transition from information suppliers to governance partners requires structured cycles of dialogue.

Third, on multi-level alliances, the network analysis already clarifies the corridors that currently matter. The next step concerns the explicit construction of a collaboration between the municipal coalition that anchors the top-right quadrant and the peri-urban and rural producers, logistics intermediaries and welfare actors through stable coordination routines, not ad-hoc projects.

At the same time, it would be methodologically irresponsible not to recognize the limitations of the empirical basis. The analysis, particularly the cluster-based interpretations, are grounded in a relatively narrow sample of interviews. While the triangulation of method, enriched by the high number of MAB-learnt individuals interviewed, the extrapolation of results beyond the observed sample must be approached with caution. These findings should be seen not as definitive conclusions, but as strong suggestions, demanding further testing with expanded datasets and comparative territorial cases.

Nevertheless, the empirical evidence gathered here yields compelling orientations for action, particularly when considering the emergent need for an UFP in the metropolitan context. The MAB CollinaPo, as a trans-scalar platform with ecological legitimacy, cultural symbolism, and territorial reach, is uniquely positioned to act as a governance facilitator. Following the theoretical discussion developed above, if the body of governance of CollinaPo was equipped with appropriate institutional mechanisms, such as a multi-stakeholder forum, the BR could move beyond symbolic functions to become an engine for larger governance, particularly in terms of democratic UFP production, while respecting the three-fold structure mentioned above.

In doing so, it could bridge the very gaps identified in the current system: reconnecting institutional power with community innovation, aligning the need for technical functions with ecological values, and embedding food governance in both policy and practice. This does not imply expanding the bureaucracy of the MAB but rather recalibrating its operational architecture to become a true interface between actors, sectors, and scales.

Ultimately, the MAB CollinaPo represents a strategic opportunity for redefining territorial governance through the lens of food, in the direction of a true hybrid governance. Not merely as a thematic focus, but as a relational and political entry point for addressing sustainability, justice, and democratic renewal. To realize this potential, however, the system must confront its asymmetries, recognize its internal pluralism, and a new model of governance. Only then can the BR move from being an institutional landscape to becoming a living infrastructure for governing food, in the realm of ecology.

5. Synthesis

Based on a Foucauldian conception of governmentality, regarding how power passes through rationalities, practices, and subjectivities rather than by direct command, the Chapter examined how an open, yet articulated architecture of governance can redistribute voice and democracy in food systems. Organized by the three pillars of hardware (rules, mandates, decision rights), software (deliberative processes, knowledge ecologies, openness), and alliances (cross-scale coalitions that resist capture), the study of hybrid food governance confirms that plural decision-making is feasible when these pillars are co-designed and not treated as add-ons.

On this theoretical framework, CollinaPo case was challenged using stakeholder mapping, power–interest analysis, network analysis, and semi-structured interviews in the context of understanding possible multistakeholder engagement and participatory governance processes. The results define both constraint and possibility.

In order to move from participation-as-access to participation-as-power, CollinaPo's CRFS will require inscribing co-decision and mark out mandates at various levels; give transparency, countervailing know-how, and agenda-setting for participation; and meet vertical and horizontal frames, especially bridging over public actors with civic and peri-urban producers networks.

VIII. The *pusa caffé*

1. Answering the research questions

In Piedmontese tradition, the *pusa caffé* is the final bite of a meal, taken to counterbalance the coffee and bring closure. It is not an addiction to the meal, but a form of synthesis of it. The same role is held by Chapter: it synthesis the most significant theoretical, methodological, and practical developments explored in the thesis and puts them into a concluding framework.

This research engaged Urban Food Policies (UFP) as a means towards understanding how different theoretical frames and operational paradigms concerning local-*ized* food systems can contribute towards participatory and effective food governance, particularly under conditions of institutional complexity such as UNESCO Man and the Biosphere Reserves.

Bounded by geographical reflections, this research meant to make available a systematic and critical framework whose basis has not yet been articulated in a clear manner. Indeed, multiple studies, and planning exercises have, over the years, addressed the issues of food governance, and territorial approaches to food systems, but they lacked a single solid conceptual frame through which their applicability may be understood and interpreted at once.

This work, therefore, combined a critical theoretical analysis with an in-depth, multi-scalar empirical investigation carried out in the CollinaPo MAB Reserve territory. At the core of this inquiry stood a set of guiding research questions that have framed the structure and scope of the thesis. Briefly, they consisted of the following ones:

- RQ 1: How do different theoretical frameworks and operational paradigms concerning localized food systems contribute to develop effective Urban Food Policies, particularly within unique contexts like Man and Biosphere UNESCO Reserves?
- Sub-RQ 1: To what extent do Urban Food Policies engage with food relocalization approaches?
- Sub-RQ 2: How does the City-Regin Food System approach acknowledge the territorial component of food systems?

- Sub-RQ 3: In what ways does the City-Region Food System approach enhance the production of Urban Food Policies?
- RQ 2: How can Urban Food Policies contribute to CollinaPo's achievement of MAB UNESCO Reserves' goals?

Although these questions were clearly situated within the specific issue of urban food planning, they were deliberately broad in scope. Above all, the first research question is particularly large. At its heart, indeed, lies the notion of "local-*ized*" food systems, which is intentionally emphasized to signal my specific research interest in those processes, research, policies which attempt to bring food back to its territorial foundations.

This focus is not a speculative choice; rather, it emerged as a paradigmatic feature from the earliest stages of the research. There exists a formal and explicit necessity to bring food systems back to the local scale, with the goal of countering dominant neoliberal, globalized, market-led logics that have progressively commodified food and disconnected it from its spaces of production. Furthermore, as cities face mounting pressures due to rising populations, environmental degradation, and deepening social inequalities, local governments are increasingly called upon not only to govern food systems, but also to actively engage in their functioning, and, therefore, relocalization.

The literature concerning this growing demand of institutional responsibility has led me to the need of affirming an explicit relation between the initial focus of this work, UFP, and the broader framework of food system relocalization. In this sense, from the very beginning, the research embraced the deliberate attempt to reconnect food systems to the contexts that shape them, both materially and institutionally.

Chapter II has therefore sought to respond to the second research question by intersecting the debate on UFP with the diverse frameworks emerging from food relocalization literature, in order to assess the extent to which these approaches address the issue of food systems' governance.

It emerged a persistent structural dilemma. Despite the proliferation of innovative practices and conceptual frameworks, there remains a fundamental lack of clarity regarding how these approaches should engage with governance architectures. In general terms, contemporary attempts to counteract the globalization of food systems and to localize them in a sustainable manner often avoid explicitly addressing UFP, or food-related policy more broadly; probably, this occurs less because of a lack of interest, and more because they have inherent intention to operate in grassroot frameworks. Yet their underdeveloped governance's engagement limits their impact.

An overview of the main food relocalization approaches helped clarify this landscape. The literature on these approaches is extensive and heterogeneous, reflecting significant differences in their primary goals and in actors involved actors. The main frameworks considered in this research included Urban and Peri-Urban Agriculture, Alternative Food Networks, Short Food Supply Chains, Local Food Systems, Localized Agri-Food Systems, Systèmes Agroalimentaires Localisés, City-Region Food System, and Agroecology-based Local Agri-Food Systems.

Upon an extensive survey of the literature, it emerged that each of these approaches, with the lone exception of ALAS, which is in an earlier, more speculative stage of development, offers at least a minimal interaction with governance, which renders them sufficient for the purposes of this analysis. Each of them, however, shares weaknesses in their interaction with governance, despite their conceptual utility and practical relevance.

Urban and Peri-Urban Agriculture is a field of high potential but continued institutional neglect, where governance is invoked as a support, not a priority. Alternative Food Networks, alternatively, present themselves as insurgent challengers to dominant agri-food orders, but struggle to find a secure position between autonomy and institutionalization. Short Food Supply Chains, though effective in narrowing the production-consumption distance gap, are constrained by regulatory and jurisdictional barriers. Its governance perspective, in this regard, is like UPA's one: reactive, rather than engaging.

Local Food Systems face another kind of problem: conceptual ambiguity: "local" wavers between a descriptive condition, and a normative aspiration attempting to transform food systems. This variation creates fragmented and often inconsistent interventions among the plurality of actors that relies on this definition.

Taken together, they show a stimulating wealth of possible approaches to relocalization; nevertheless. the degree of fragmentation of governance that they display limits their potential to influence policymaking in any integrated way and explains why, while they have been applied widely in a variety of contexts, their transformative impact is still heavily context-dependent and overall speaking, unsuccessful.

In fact, it is important to clarify that this observation does not imply that these approaches did not bring transformations at all, nor are they irrelevant to the UFP arena. On the contrary, most of them are considered, and activated in one way or another in food agendas. However, the issue is with the typology of engagement: it does not emerge from within the approaches themselves. That means, they do not suggest any specific articulation of interaction with the governance. As a result,

their transformative potentiality depends very much on policymakers' discretion to activate them. This external and arbitrary mode of interaction has the inclination to reproduce fragmented interventions, which limits their potential to induce coordinated and sustainable systemic transformation.

Nevertheless, amidst all this landscape, one more paradigmatic approach emerges: City-Region Food System (CRFS). Unlike the others, it offers a coherent framework with the potential to hold together a structured and concerted engagement on multiple scales of reflection, from the territorial reading of food systems to suggested participatory governance. This is a strength that clearly owes to the explicit effort made by FAO and RUAF in creating a framework that is clearly transformative.

Yet, its effectiveness should not be taken for granted. The other approaches had some institutional foundation too.

What sounds stimulant hereby, are the variances in the way that the academic literature employs CRFS to engage actively with governance processes rather than merely being acted upon by them. This is a significant shift: it means that CRFS can support the development of UFP, based on a more territorial, integrated approach to food systems.

It is precisely for this reason that the CRFS framework was identified as the most suitable conceptual and operational reference for this research. Particularly, its three core pillars, territoriality and city-regions, the food systems approach, and multi-stakeholder engagement and participatory governance, function as interdependent analytical dimensions that characterize the approach through fully streamlined logics, establishing a coherent and multi-scalar framework to integrate spatial analysis, systemic understanding of food dynamics, and governance design.

From this starting point, Chapter III meant to address the third research question. Initially, the intention was to investigate the foundational geographical dimension of the model: namely, how the spatial perimeter of the city-region is defined, which connections within the food system are considered, and which human processes are understood as leading to governance dynamics.

However, an initial examination of the "city-region" component in the CRFS framework revealed a critical gap. The territorial extension of the city-region is not underpinned by the extensive body of reflection developed within critical political urban geography, which has long interrogated the power relations within city-regions. As a result, while the CRFS perspective tends to present "city" and "regions" as positively interconnected, in practice significant tensions emerge in relation to governance arrangements, resource distribution, and power asymmetries within and across city-regions.

Therefore, although the research aimed to directly investigate the territorial understanding of food systems, with an immediate application of CRFS to the CollinaPo case, as the work progressed, it became evident that both the model, now ten years old, and my own research perspective led to the need of installing a more substantial understanding of the model's pillars and, consequently, of the applicable methodologies. In other words, what began as an effort to use the CRFS approach as a lens through which to interpret certain phenomena, gradually evolved into a needed process of full reinterpretation of the approach itself, to give these phenomena a more coherent and contextually meaningful framework. This shift proved crucial, as it enabled the research to fully explore the CRFS approach, its constraints, but also its possibilities.

2. Key reflections over the City-Region Food System approach

The following section is divided into two parts. The first one, having a theoretical and methodological nature, focuses on the restructuring of the CRFS framework and, therefore, addresses research questions 3 and 4, examining the three theoretical pillars that underpin the CRFS approach.

The second part responds to research question 5, discussing the findings that emerged from the CollinaPo CRFS' study; it finally explores the potential UFP for this context. This structure reflects the dual ambition which, in the end, features this work: on the one hand, to contribute to the theoretical refinement of the CRFS framework itself; on the other, to explore its potential when implemented within a complex territorial setting such as CollinaPo.

2.1. Theory

2.1.1. Advancing the geographical basis of the approach

Drawing on the mentioned limitations of applying the city-region concept, the CRFS framework additionally engages the territorial dimension in a way that is both foundational and inadequate. It formally utilizes territoriality as one of its essential pillars; however, its treatment of this concept remains largely functional and administrative, plotting out a spatial perimeter made up of existing structures. This instrumental reading overlooks the deeper ontological nature of territory as understood within geography, which strongly overcomes the understanding of space as a passive container, but rather focuses over its relational and generative

connotation, formed through the layering of material configurations, symbolic processes and negotiated power relations, that ultimately manifest in the concept of territoriality. (Raffestin, 1984).

Redefining city-regions, by primarily addressing the notion of territoriality can amplify the spatial understanding of CRFS: it is no longer a given definition, but an expression of relation between living beings and territory, whereby the latter is not merely where policies occur; it becomes a participant in itself. Engaging the territory shapes the manner collective endeavors, like food governance, are realized (Salone & Segre, 2012). By embedding food systems in such a relational conception of space, territoriality becomes a driver of transformation, not an administrative delimitation variable.

At the same time, a second problematic definition was addressed: the scalar definition of CRFS. City-regions as defined now depend on scales that mostly depend on very assertive administrative areas. However, scale is not ontologically given, nor is it politically innocent. Therefore, it is not possible to presume that city-regions are relevant at a given metropolitan scale, as often occurs.

Scale is a contested social construct, which constrains and opens spatial rebuilding. (Sisson, 2021). This is especially relevant for CRFS, where scalar delineation determines the geographical unit of governance.

The discussion between Brenner and MacKinnon captures this duality quite effectively. Brenner thinks about scale mostly as a structural device used to deploy an exercise of systemic power: scalar hierarchies are stabilizing forms of political-economic configurations. MacKinnon agrees, but proposes a more agency-focused interpretation, and believes that scales are also produced, negotiated, and reworked by a range of actors.

In sum, scale is not only imposed from above but is a relational and strategic resource generated from the bottom to pursue a range of alternative projects (Brenner, 2001; MacKinnon, 2010). For this reason, an arbitrary understanding of scale, depending on the most efficient context-specific definition of “city-region” is not possible.

Within this context, the urban bioregion paradigm emerges as a productive adjunct. Rather than rejecting the scalar dimension, which I strongly wish to maintain, it rearticulates it within a broader territorial ontology, that also pertains to territoriality. It conceives territory as a living, co-evolving structure rather than a bounded administrative unit (Magnaghi, 2019). This is significant because CRFS’ city-regions usually rationalize food systems according to logics imposed from outside the territory, whereas bioregions want to express an internally generated sense of spatial belonging and, especially, ecological coherence. It is then possible

to respond to the third research question: the integration of the proposed perspectives enables re-framing the territorial dimension of CRFS as complex and dynamic, where the spatial order is implicated in the ecological and sociocultural significance of the territory.

In this respect, the research identified CRFS' scale to be better understood in terms of three innovative declinations: first, scale can be interpreted as a manifestation of territorial functionality, insofar as urban–rural relations are structured by functional interactions such as food flows, economic exchanges, resource allocation, and population dynamics that transcend municipal boundaries and shape the effective organization of food systems. Second, scale reflects environmental and socio-spatial interdependencies, rooted in shared ecological processes, hydro-geomorphological systems, and settlement patterns that link urban and rural areas within broader bioregional configurations, requiring a systemic perspective attentive to co-evolution and territorial commons. Third, scale constitutes a governance condition, as the mismatch between functional food system dynamics and fragmented administrative competences calls for intermediate and coordinated governance levels capable of enabling inter-municipal cooperation and policy integration.

From this triple definition, a set of territorial criteria was developed to assess whether the designation of city-region perimeters in CRFS application truly reflects the designed area of intervention. Indeed, I do not reject the favorable implications of dealing with pre-existent governance scales, but I suggest opening to a wider constellation of possibilities.

These criteria facilitate a bridge between theoretical reflection and policy practice by systematically appraising the spatial configurations of CRFS' as strategic territorial projects rather than logistical spaces.

Importantly, this work does not propose abandoning the CRFS terminology in favor of alternatives such as "Urban-Bioregion Food System". While the latter may capture certain ecological and cultural traits more fully, replacing the term would risk displacing the debate rather than transforming it. The CRFS framework has acquired important recognition through the work of organizations such as FAO and RUAF, making it a successful platform from which critical refinements can be advanced. And, here, the aim here was not to overcome the framework but to expand and deepen its territorial dimension, enriching it with further geographical understandings.

2.1.2. Advancing a resilient understanding of the food system

In its original formulation, CRFS followed the FAO's tripartite understanding of sustainability, grounded in the convergence of economic, social, and environmental dimensions (FAO, 2018; 2023). This framing offered institutional coherence and policy leverage, clarifying a common lexicon to be used among governments and international organizations. However, its underlying orientation was relatively narrow: sustainability came across as a goal, or balanced state, to which food systems could aspire. Resilience was mentioned, but more as a supporting idea than the engine of conceptual development.

This orientation quickly became evident in its limitations. Sustainability is a fractured category, articulated against the interests of different disciplines and policy intentions. Agricultural, nutritional, socio-ecological, and market-based framing emphasize different ends with distinctly different operating logics (Béné et al., 2019; Even et al., 2024). In reality, sustainability policies tend to be structured around sectoral improvements only, leading to selective unreal compliance. These types of approaches do not see food systems as evolving, politically negotiated, and structurally unstable. Treating sustainability as a final state obscures the reality of how food systems are constantly composed of environmental crisis, economic restructuring, and social negotiation.

Resilience provides a much sharper lens. Resilience is defined as the ability to absorb disturbance, adapt, and reorganize while retaining essentially the same functions. This allows for a dynamic reading of food systems' performance (FAO, 2023). Rather than envisioning stability as the achievable result, resilience takes turbulence, uncertainty, and non-equilibrium as the terrain on which systems persist and evolve.

Put differently, disruption is not seen as problematic deviation, but a constitutive condition. The emphasis moves from meeting prescribed benchmarks to activating an organization of co-negotiated processes clarifying what functions are maintained, which are changed, and how those made choices are processed under stress (Tendall, et al., 2015). This perspective brings the political dimension of governance to the foreground: resilience highlights questions of whose stability counts, which territorial relations are reinforced or dismantled, and who bears the costs of adaptation (Soubry & Sherren, 2022).

This understanding brings to downgrade the relevance of food systems' study that picture the today-reality only. In this frame, what acquires relevance is the existence of turbulent forces whose role must be acknowledged across a large span of time, the drivers.

Traditional frameworks have identified endogenous and exogenous drivers, suggesting that food systems have stable structures, with internal governable changes, that are just disturbed by rare shocks of some external force. That dual structure does not resist further study. Many processes classified or labelled "external" are actually co-produced within the food systems' realities, and many "internal" drivers are defined like part of the today-reality picture, mentioned before.

Instead, a more productive approach treats drivers as positionality-dependent and scale-dependent rather than fixed. Whether a force appears internal or external depends on what scale is relevant to the observer's eye, and, therefore, which relations are investigated. This reframing turns resilience into a strategic field: actors decide which pressures to confront, how to redefine their spatial position, and where to locate transformative capacity. This insight exposes the UFP development room for maneuver embedded in territorial relations, challenging the idea that shocks simply arrive from outside and must endure.

The combination of these alternative models reconfigures the conceptual frame of CRFS. Rather than sustaining an imagined future horizon, I consider resilience as the practice of living the today-reality of supply chains, and the structural forces bringing constant changes. Drivers no longer serve as stable categories, but as relational coordinates within political and scalar shifts. This reallocation gives CRFS a more valuable analytical capability to address food systems as politically negotiated, placed and scale situated, to structure modifying formations.

This understanding situates governance within the realities of systemic change, rather than within a conceptual equilibrium.

2.1.3. Advancing a hybrid food governance understanding of the food system

The inversion described in the previous two sections has implications in the domain of the third pillar too. In the opening Chapter, the debate centered on which approaches to relocalization most effectively dialogued with UFP; at that stage, the emphasis laid on choosing the appropriate spatial and conceptual lens for intervention. By the end of this inquiry, the focus has shifted: it is no longer a matter of identifying the right path toward UFP development, but of recognizing the urgency of constructing participatory governance architectures adequate to a new democratic food policy development. Without such a structure, even the most sophisticated territorial or systemic frameworks risk remaining abstract blueprints, unable to mobilize the right resources.

The conventional policy-development sequence assumes a linear and hierarchical model: policy frameworks are designed in institutional spaces,

abstracted from territorial dynamics, and later applied to real contexts as if these were passive containers. Territory, in this model, is where implementation occurs, not where policy is conceived. If, however, territory is understood as relational, dynamic, and politically produced, the linear sequence changes. Policy cannot emerge in isolation from the socio-spatial processes it seeks to regulate; it must grow from within. Territorial and systemic comprehension constitute the fundamental ground above which policy becomes legitimate.

Hierarchical systems offer institutional stability but often struggle to accommodate the plurality and fluidity of territorial dynamics. Reframing CRFS as operating at the interface between how territories are understood and how inclusive processes of UFP development are constructed highlights the need for a hybrid configuration. It should combine the formal capacities of institutions with the adaptive, reflexive, and relational capacities of networks and civic actors. (Manganelli, 2022).

This hybrid governance shall operate through three interdependent dimensions. First, the structural dimension, or governance "hardware," provides the institutional skeleton: legally defined decision-making spaces, power distributions, and mechanisms for participation and accountability. Second, the relational dimension, or "software," encompasses the social capacities that animate governance: trust-building among heterogeneous actors, shared reflexivity, and the ability to generate new interpretive frames through deliberation. Third, multi-level alliances form the connective tissue, linking different administrative scales vertically and diverse sectors horizontally, ensuring that power, resources, and responsibilities circulate across levels and domains (Sonnino, 2019).

When these dimensions are read together, hybrid governance emerges not as a simple blend of organizational forms but as a strategic assemblage designed to hold territorial complexity and systemic dynamism in productive tension. It reframes the governance unit away from fixed institutional types toward macro-systems of governance capable of accommodating a plurality of voices.

Within the CRFS framework, this understanding transforms UFP from a discrete governmental instrument into an explicit arena of democratic participation. Policy can no longer consist of pure regulations development, but rather becomes a negotiated practice through which state, market, and civil society actors collectively articulate territorial visions, and define shared transformative horizons for the government of food systems.

I will be clear: this vision is not about adding participatory mechanisms after policies are drafted; it is about placing participatory frameworks at the origin of

policy-making, so that policies are generated through, not imposed upon, territorial processes.

In this light, hybrid governance represents the institutional manifestation of the epistemic reversal achieved through the reconceptualization of territoriality and resilience. It translates spatial and systemic complexity into governance forms capable of strategic action. Rather than prescribing a universal model, CRFS can therefore provide the conditions through which hybrid governance emerges contextually, responding to specific territorial conditions while remaining coherent at a systemic level.

This theoretical repositioning addresses the fourth research question directly. The CRFS approach enhances the production of UFP not by delivering pre-formed governance templates, but by clarifying how the space of governance should be composed.

CRFS's Theoretical domains addressed	**Identified gaps**	**Advancements**
Territoriality and city-regions	1. City-region area was treated as an administrative device (fixed spatial perimeter of existing structures). 2. Scale was assumed as fixed and tied to administrative boundaries.	1. Territoriality is reframed as an active relational component of space comprehension. 2. Scale is rearticulated through the urban-bioregion paradigm (the concept is kept, but within a broader territorial ontology). 3. Criteria are proposed to define CRFS perimeters as context dependent.
Food systems approach	3. Sustainability was framed as a static achievable end-state, leading to sectoral compliance approaches. 4. Drivers were split into fixed endogenous/exogenous categories.	4. Resilience is reframed as necessary to understand food-system dynamic performance. 5. Drivers are recast as relational and position-dependent, opening room for maneuver for UFP.
Multistakeholder engagement and	5. Limited theorization of governance as	6. Democratic participatory governance is posited as the core base via a

participatory governance	constitutive, power-aware architecture. 6. Participation was framed primarily as procedural engagement across modules.	hardware/software/alliances understanding of the hybrid governance that binds co-production of UFP into the CRFS design.

Table 22: A summary of the thesis' advancements

Source: Author's elaboration

2.2. Practice

This section responds to the fifth question but also translates the results into policy-relevant suggestions. It is structured in two distinct parts. The first consolidates findings concerning the CollinaPo Biosphere Reserve as an institutional device operating at the interface between special planning and ordinary planning.

The second part derives implications for food governance, specifying how the BR framework might deal with UFP grounded in CRFS knowledge.

2.2.1. Emerging possibilities

The fifth research question has turned out to be particularly demanding, not because of theoretical incompatibility between the two frameworks involved, CRFS and MAB Reserves, but because it required assigning meaning and operational depth to a domain of public action, Urban Food Policies, that is still under construction within institutional practice. In many national contexts, and most notably in Italy, UFP have not yet crystallized as a stable field of policy intervention. Rather, they are acknowledged as crucial in the contemporary troubled times, but their institutional embedding remains partial and fragmented, reflecting a broader reluctance of public administrations to assume responsibility for governing food systems as an explicit policy domain.

As a result, UFP frequently still operates at the margins of formal governance structures, and food policy suggestions are driven by networks of civic actors, research initiatives, or short-term project funding, rather than by sustained political commitment. Crucially, this difficulty in eliciting political engagement around emergent policy domains does not regard food only: analogous patterns surface in other agendas, where pilot projects multiply but rarely translate into durable mandates, or newly affirmed competencies (Pizzimenti & Di Giulio, 2023). In the Italian context, more broadly, this points to a broader, path-dependent inability to rework settled institutional orders and to transcend compartmentalized

administrative routines, with fragmentation and short-termism becoming the default.

To unpack this disconnection, it is useful to recall that the Italian planning landscape is characterized by a historical divide between special and ordinary planning, which has produced parallel, weakly communicating regimes (Martinelli, 2005). Special planning encompasses instruments whose mandate is exploratory and visionary: they articulate programs of ecological conservation and experimentation, which aim at overcoming traditional approaches of planning. By contrast, ordinary planning operates through a rigid hierarchical model. Pre-existing and institutionalized frameworks dictate rules, leaving little room for adaptive governance or place-based experimentation.

UNESCO's Man and the Biosphere (MAB) Reserves emerged as pivotal in this discourse: although BRs offer a potentially powerful spatial and institutional scaffold for integrating ecological conservation with sustainable development, in Italy the link between MAB Reserves and ordinary planning structures remains largely underexplored and politically weak (Ramella, et al., forthcoming). Italy has not a dedicated "MAB law", and the program's implementation is coordinated by the National MAB Technical Committee, established by Ministerial Decree in 2009.

MAB frameworks can therefore function as special planning devices only. Their organizing structures of protection and experimentation, through the three-folded core, buffer, and transition zonation, provide a layered framework through which human activities and ecological spheres coordination can be only suggested, not enforced.

The possibilities of the BRs fully depend on the institutional structure upon which they exist and on the ten-year Action Plan that each BR shall develop. This tool guides and coordinates sustainable development projects across the territory, in line with global objectives, like the Agenda 2030, and the three MAB functions. Yet, these plans do not have binding regulatory force over land-use, like municipal General Regulatory Plans (PRG); rather, they provide a shared, voluntary strategic framework agreed among local stakeholders.

Moving toward the context of interest, it is relevant to underline what emerged in the CollinaPo Biosphere Reserve: at the time of writing, the BR has not yet articulated and implemented its ten-year Action Plan in a clear manner, and priorities remain only partially specified. The BR has worked to craft a shared identity image of landscape for the Turin area, by promoting the CollinaPo as a kind of unique experience to live within the park governed by *Ente Parco*, but this is not enough for the transformative human-nature interaction envisaged by UNESCO.

Making the shift from territorial branding to durable initiatives, aligned with the three functions of the MAB Programme, requires multiple interventions. The Piedmont Region, which has competence over regional parks, should act to harmonize the Reserve's objectives with those of: Monviso and Ticino Val Grande Verbano Biosphere Reserves, located in Piedmont too, across spatial, environmental, rural-development, and cultural policies, and promote the embedment of MAB priorities in enforceable instruments rather than leaving them aspirational.

To that end, it is necessary to recall that CollinaPo operates through a multilayered governance arrangement: the Assembly of member municipalities functions as a collegial political forum established by a memorandum of understanding, where mayors and park representatives are requested to set unified strategic directions and approve shared projects; while its deliberations are not legally binding on municipal land use, individual municipalities may subsequently incorporate MAB decisions into their planning frameworks, both for land-use measures and for social projects and related opportunities

More compact and responsible for the day-to-day activities is the Technical Secretariat, meant to formally bringing together municipal "referents" for each of the 9 sub-areas, representatives of the parks and the Secretary General. It translates Assembly guidance into operational strategies, develops integrated project proposals, monitors progress on the Biosphere Action Plan, and shall designate mayoral referents for the Reserve's activities to streamline decision-making.

Third, a parallel structure to the Technical Secretariat, the Executive Committee, meets with much more regularity and formally carries out policy steering, prioritizes actions, and oversees inter-institutional liaison; however, its coordination remit overlaps with the Secretariat's operational role, creating ambiguous lines of authority, diffusing accountability, and slowing the overall capacity of action of CollinaPo.

In conclusion, the institutional framework within which the CollinaPo Biosphere Reserve operates is one of Multi-Level Governance, confirming the validity of the theoretical basis of the present work. At the international level, UNESCO provides recognition and strategic guidance; a National Technical Committee ensures coordination and review; the Piedmont Region integrates and supports the Reserves across other pre-existing regulatory and planning frameworks; and, locally, municipalities and managing authorities coordinate CollinaPo through memoranda of understanding and collegial bodies, without creating new authorities or legal constraints but by networking existing institutions in innovative ways.

Nevertheless, in order to expand CollinaPo's possibilities, in line with the new Hangzhou Strategic Action Plan (2026–2035), which shifts emphasis from broad pledges to actionable, learning-oriented implementation within BRs, CollinaPo urgently requires a pragmatic organizational restart.

First, funds should be granted by one of the involved institutions; above all, the Piedmont Region. Second, multiple restructuring steps should occur. Specifically, the separation between the Executive Committee and the Technical Secretariat should be overcome, by consolidating the Secretariat mandate to act as an operational coordination hub or *cabina di regia*: it should translate the Assembly's twice-yearly guidance into rolling implementation memos, by installing new projects that align with the MAB Programme's principles, coordinate timelines and responsibilities across municipal and regional services, ensure alignment with ordinary planning instruments, and prepare the documentation required for national reporting and UNESCO periodic review under the new plan.

In addition, the composition of the Secretariat should be revised: beyond the Secretary-General, it should include (i) a Project Officer with demonstrated expertise in MAB governance and the CollinaPo context; (ii) a Youth Representative to favor intergenerational participation, as strongly requested by UNESCO; and (iii) a Macro-Area Representative, elected by and from the macro-areas, who also serves as the Assembly's liaison. The Macro-Area Representative may delegate representation, in case of absence, to another duly designated macro-area representative. This strengthens the delivery capacity while clarifying interfaces between technical coordination and political steering.

The Executive Committee, in turn, should be compacted and meant to develop CollinaPo's trjectories. It should meet less frequently, and should comprise the President of the MAB Reserve, based in the City of Turin, the Project Officer mentioned above, the Macro-Area Representatives, and, where appropriate, the Secretary-General. This streamlined composition preserves a clear steering function with a clearly delimited brief: 1) endorse the Secretariat's implementation measures; 2) secure inter-institutional alignment where statutory competencies intersect; 3) cooperate with research bodies to validate CollinaPo's activities, particularly regarding knowledge co-production, and for-communities benefit-sharing that the Secretariat will apply in project delivery; 4) confirm compliance with national MAB guidelines and the Hangzhou plan's expectations for adaptive management and periodic assessment, thereby ensuring that CollinaPo's governance routines are legally anchored in Italy's existing instruments yet operationally capable of delivering the program's functions.

2.2.2. (Not) proposing an Urban Food Policy for CollinaPo

The empirical component of this research began with the explicit aim of examining CollinaPo's CRFS in order to ultimately inform the formulation of a UFP tailored to the territory's needs and characteristics. The evidence, however, points to a less favorable window of opportunity for adopting a definitive Urban Food Policy and instead suggests the appropriateness of a broader, less fixed Urban-Regional Food Policy.

Taken together, the theoretical debates on the democratization of food governance and on hybrid governance arrangements discussed above problematize the rapid consolidation of authority within a single policy instrument, while empirical findings highlight CollinaPo's limited enforcement capacity and fragmented institutional mandates.

Therefore, despite the constrained policy space, these conditions motivate two alternative pathways.

2.2.2.1. The Consiglio del Cibo della Collina

First, this thesis proposes an actionable institutional design that shifts CollinaPo from experiencing sparse food-related initiatives to hosting a participatory food-governance regime, foreseeing clear roles and interfaces.

In this configuration, the CollinaPo Biosphere Reserve is fully considered as a knowledge-producing and governance-enabling infrastructure rather than a lawmaker: it generates territorial research, integrates ecological and socio-economic evidence, and prototypes innovative initiatives, as requested by the Hangzhou Strategic Plan.

More specifically, the Municipality of Turin, which holds the Presidency of CollinaPo, must lead the development of the URFP, aligning ongoing city processes with the broader knowledge generated by the BR. Drawing on the present research, it is evident that a relocalization of key agri-food supply chains, at least partial, as well as providing responses to other food system's challenges, is clearly feasible. Accordingly, the core task would be the experimentation of practices for a more local and better-governed food system, with the BR serving as research and learning site, rather than as a policy-making arena.

The BR would not "govern food" as a primary activity, but would support the Municipality of Turin, which, in dialogue with the assembly municipalities, could thereby regenerate the food system under more direct public oversight and control.

To this end, the proposal is to institute a *Consiglio del Cibo della CollinaPo* (CCC)[140], not embedded in the CollinaPo's structure, but supported as a standing participatory project that, as suggested by the Technical Guidelines of the BRs, might channel communities bottom-up needs and suggestions into a coherent policy suggestions framework: while this Council would not produce laws, its deliberations should be formally considered by the Technical Secretariat within a clear amount of time, which, in turn, should ensure adherence and transmission to Turin's URFP in dialogue with the Executive Committee with feedbacks and follow-ups made public.

The *Consiglio* must include the third sector, alongside farmers, eco-actors[141], research bodies, municipalities, and businesses, engaged through structured acknowledgment, mapping, and a written protocol that defines their role, regulates potential funding with disclosure and conflict-of-interest rules, and streamlines transparent dialogue and support.

This hybrid governance functions according to the debated three interdependent dimensions: (1) the structural hardware dimension provides the institutional skeleton, including the formal mandate of the *Consiglio del Cibo*, its procedural linkage to the Technical Secretariat, and its possibility of dialoguing with the Executive Committee; (2) the relational software dimension, that encompasses the social capacities should also concern the development of proper capacity to translate bottom-up proposals into operational guidance for action, in the hands of the City of Turin and with the support of the CollinaPo's Technical Secretariat; (3) multi-level alliances must take place to successfully bond the Consiglio with the other administrative scales vertically, and sectors horizontally, with specific reference to the *Città Metropolitana di Torino* and the *Regione Piemonte* first.

Although some may affirm that this mandate might conflict with the activities undertaken by the *Distretti del Cibo*, they would play complementary but non-overlapping roles that could integrate and not repeat. Food districts are territorial development and local-branding instruments geared to stimulate supply chains coordination, and to foster place promotion. They are not designed to exercise food-system governance, and, despite statutory references to food security,

[140] *Food Policy Council of CollinaPo*

[141] Eco-actors are private stakeholders, such as companies, landowners, and other operators, formally recognized by a Biosphere Reserve for voluntarily aligning their activities with the UNESCO MAB framework. They demonstrate both intent and implementation of sustainability principles in their contexts (Jacob & Hervé, 2022).

environmental impact, waste reduction, and landscape protection[142], current political frameworks tend to focus over the supply-chain and growth logics only.

The CCC, by contrast, is suggested as a standing participatory and learning arena embedded in one of multiple MAB's actions, and, standing on evidence, issues formal recommendations to the Turin-based, cross-sector Urban Food Policy.

2.2.2.2. A logo with multiple meanings

Another suggestion that emerged throughout the research, concerns a possible Reserve-endorsed logo governed by an innovative MAB Reserve Code that should function more as a formally regulated engagement instrument rather than a mere label: in other words, it should consist of a logo, holding a distinctive name and visual identity, explicitly non-UNESCO in denomination and graphics, licensed to producers and other eco-actors that subscribe to a codified set of environmental commitments.

The Code should operate across three broad domains: 1) Environmental performance and conservation stewardship, setting outcome-oriented requirements to improve river-corridor conditions and demonstrate sustained commitment to habitat protection and restoration; 2) Institutional cooperation and regulatory alignment, formalizing producers' willingness to engage with the competent ecological authorities and to embed stewardship obligations within existing plans and permits; 3) Food-system management, promoting integrated, place-based practices along the local value chain that reduce pressures on the environment while enhancing the resilience and public value of the territorial food system.

The proposed logo therefore establishes a contractual relationship between the managing system and producers that is cooperative in form and conditional in substance. Producers do not purchase a label; rather, they enter a time-bound license grounded in the Code, through which they commit to progressively improving environmental performance and to routine cooperation with the competent authorities of the river basin and the parks.

In exchange, the Reserve system recognizes them as eco-actors, grants the controlled use of the mark for visibility, and provides a structured interface to project pipelines, advisory services, and co-design of interventions. The relationship is a territory-level engagement that links farm management to the objectives of the Biosphere Reserves and to ordinary planning instruments.

[142] See the law at https://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.dataPubblicazioneGazzetta=2024-11-13&atto.codiceRedazionale=24A05958&elenco30giorni=false

Operationally, the mark can be integrated into the existing governance architecture without creating new entities. It would be first anchored to the April 2024 inter-BRs Protocol, which provides the legal–administrative basis for basin-wide coordination. Within this frame, the Po River Basin Authority (ADBPO) is designated as the Managing Authority: it operates the scheme on a day-to-day basis, issues calls, receives and screens applications, assigns verification, and grants, suspends, or revokes licenses strictly in accordance with the Code. Each Biosphere Reserve appoints a liaison to ensure territorial coherence with its Action Plan and ordinary planning instruments, while ADBPO consolidates these inputs into basin-level decisions and periodic reports.

At the national level, MASE[143] and MASAF[144] supply the public law anchoring: they set the minimum policy and legal parameters for the Code, define safeguards on the use of symbols and communications, ensure consistency with national strategies and the CAP framework, and, where permitted by law, recognize the mark within public programmers and calls. This sequencing, Protocol foundation, ADBPO management, BR liaisons for territorial alignment, and ministerial framing, keeps roles non-overlapping: operational management remains with ADBPO, territorial integration with the BRs, and policy coherence with the ministries.

Functionally, this creates a strongly acknowledged, nation-wide, producer–authority interface that today exists only in fragmented district formats: a standing, procedurally defined platform for dialogue, negotiation, and co-design that links farm management choices to the Action Plans of the BRs and to ordinary planning instruments. At the same time, the scheme endows the Po BRs with an operational motivation that supplies both identity and resources, thereby converting their coordinating role into continuous implementation capacity. Finally, it enables non-coercive intervention on production practices: producers can adopt stewardship commitments without drastic mandates, while the Managing Authority retains enforceability via conformity checks and suspension mechanisms.

In aggregate, the mark reduces the implementation gap, scales coordination beyond districts, and gives the BRs a pragmatic lever to drive the environmental transformations they are mandated to pursue.

[143] Ministero dell'Ambiente e della Sicurezza Energetica
[144] Ministero dell'agricoltura, della sovranità alimentare e delle foreste

3. Open questions for further research

Although this thesis provides some effective theoretical and empirical contributions, it also opens several significant avenues for more work to be undertaken.

First, reconceptualizing the city-region in the CRFS framework, as indicated here, through a set of bounding criteria that weave together questions of territoriality, critical scalar discussions, and urban-bioregional thinking represents a significant theoretical advancement; however, the next challenge is to try to operationalize the proposed framework in new governance contexts.

This will require systematic research that can compare and test how well the bounding criteria outlined here might perform in places where the city-region concept embraced more problematic connotations and where capacities for action are different, namely spaces where food data are absent. Cities of the Global South, which were not included in the original frame of reference for this research, are particularly important in this space of inquiry. Their evolving metropolitan structures contribute to blur the distinction between rural and urban, making them important laboratories for testing the adaptive potential of CRFS. In these contexts, the application of the CRFS framework could illustrate how food systems with respect to food relocalization, would possibly relate and come into being in city-regions that are so different from one another, broadly adapted in form in relation to the unique specific conditions. Grasping these various pathways is important for understanding how CRFS principles might support context-specific, territory-embedded processes of food-system relocalization that connect ecological limits to urban demand and governance innovation.

Second, research must not only cautiously reference agroecology but connect to it as a structural element of food-system transformation. In fact, agroecology integration in food systems should not be suggested, but encouraged from multiple research projects. From the beginning, this thesis has deliberately highlighted CRFS governance and conceptual architecture, leaving agroecology, in terms of ALAS model (López-García & González De Molina, 2021), out of consideration for purposes of analytical scope. The next step is to connect the two paradigms through a systematic translation of the principles of agroecological design inside CRFS, not because CRFS is preferable but because CRFS has already established structures that could accelerate the making of agroecology operational.

In fact, this integration relies on the need of moving beyond normative alignment to develop operational indications. Agroecology speculation about knowledge needs to become legible to governance systems through policy objects. Therefore,

the research agenda is double-faced for CRFS: first, to produce an ontology and metrics that make agroecological functions legible in CRFS-like food systems, in a way that shows how soil fertility, habitat mosaics, and short supply chains intersect with participatory governance norms. Second, to create institutional architectures that allow agroecology to spread into existing state administrative structures rather than as separate project testing.

The third most urgent direction for future research concerns the development of integrative predictive methodologies for the study of food systems. More detailly, research must move beyond descriptive mappings of territorial data concerning food insecurity and systemic fragility and embrace prevision-oriented modelling. While the mappings have provided indispensable groundwork for understanding the configuration of food systems, they are no longer sufficient to understand the dynamic relations and causal mechanisms that generate vulnerability. What is needed instead are analytical frameworks that address algorithms of forwarding to explain how current systems have emerged and where they are heading. At present, indeed, one of the main scientific limitations is the inability to integrate heterogeneous food systems ecological, economic, social, and institutional knowledge into a coherent interpretive model.

Bridging this fragmentation requires the design of predictive algorithms capable of simulating possible trajectories of sustainability for a given food system. Such tools should not rely solely on environmental variables but incorporate socio-economic, cultural, and governance dimensions, recognizing that food systems are hybrid socio-ecological constructs. A predictive, multi-variable algorithm of this kind could help identify the conditions under which a territory can reduce dependency on long, extractive supply chains and reorient its metabolism toward local, resilient, and equitable provisioning.

A further and conclusive future research consideration concerns the rhythm at which studies on UFP, CRFS, food planning in general, are currently being produced. The proliferation of research, projects, and pilot initiatives is impressive, yet their collective impact often remains fragmented. The issue, therefore, is not the scarcity of research, but its dispersion.

If inquiries proceed in parallel without structured exchange with the governance framework, they tend to reproduce similar methodologies, reiterate comparable findings, and ultimately yield little cumulative advancement. The result is a landscape rich in documentation but poor in synthesis, where the appearance of progress masks the persistence of institutional inertia. What is increasingly needed is less cycles of isolated case studies; rather, there should be collective efforts on

the systematic integration of existing research into coherent applicable operational platforms.

For this reason, the most urgent recommendation is not to expand the number of research domains, but to cultivate an infrastructure of research integration. Networks such as *AESOP For Sustainable Food Planning*[145], at the European level, and the *Rete Politiche Locali del Cibo*[146], within the Italian framework, already connect scholars and practitioners across urban and regional planning. By transforming dispersed investigations into shared, participated knowledge systems, such networks can provide the framework that food system research urgently requires to move from knowledge-producers to transformation-enhancers.

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[145] See https://aesopsfp.wordpress.com/

[146] See https://www.politichelocalicibo.it/

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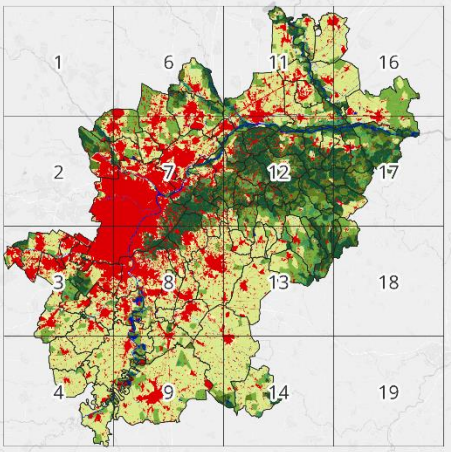
ANNEX A – Agriculture and ecology in CollinaPo

The composite map of CLC 2022, ISPRA, and HNV Farmland & Forests, CSR 2023–2027, IPLA, is placed here because it is too detailed, and therefore, too large, for the main text; see page 213 for the discussion.



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6

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Legend

CollinaPo Biosphere Reserve

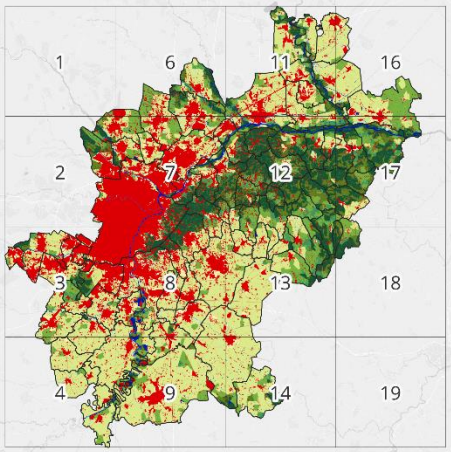
Corine Land Cover 2022

- Artificial surfaces
- Agricultural areas
- Water bodies

High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)

- 0 - 2 Low
- 2 - 4 Medium
- 4 - 5 High
- 5 - 10 Very high

0 5 10 km



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Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022

- Artificial surfaces
- Agricultural areas
- Water bodies

High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)

- 0 - 2 Low
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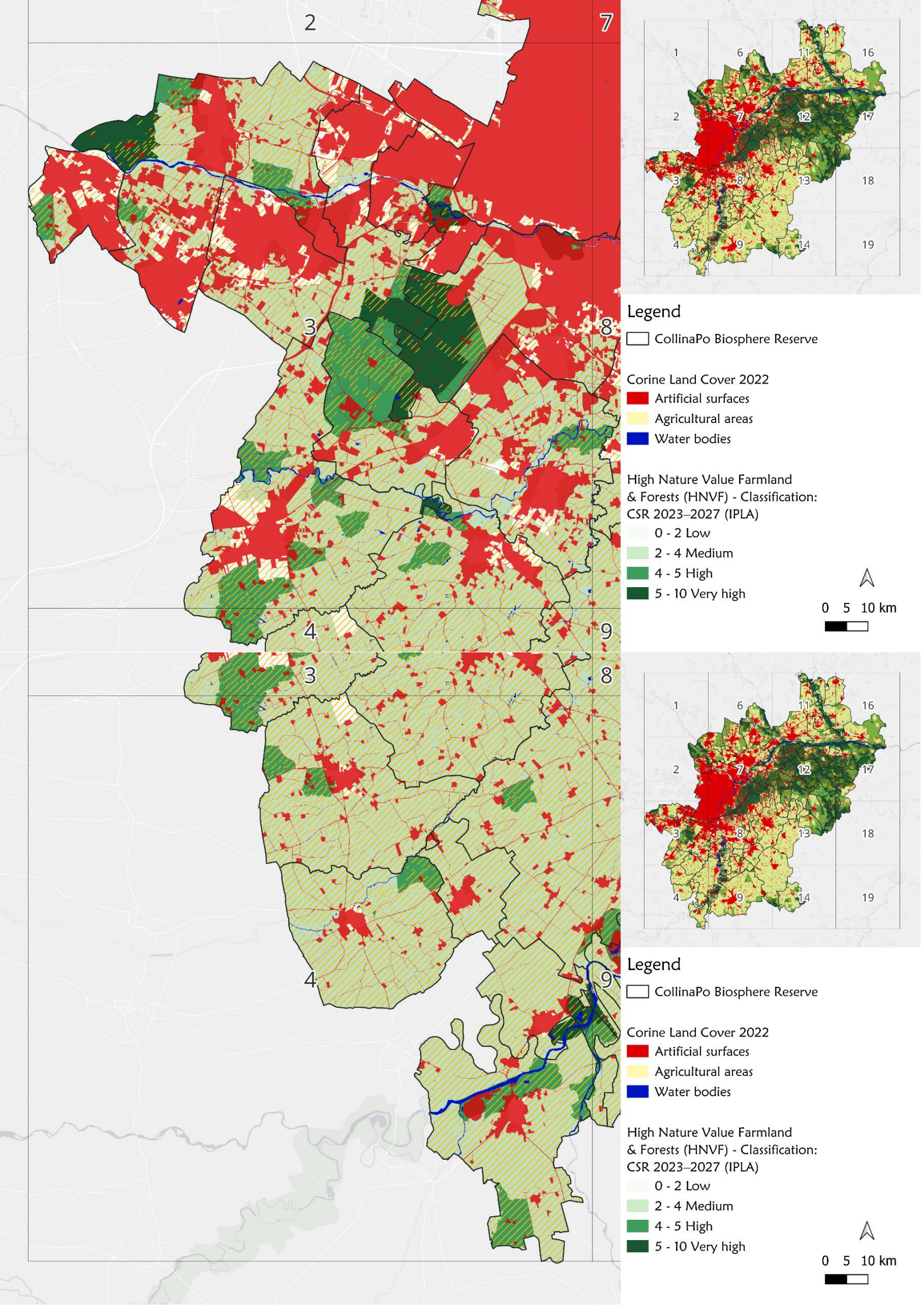
0 5 10 km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19
Legend
CollinaPo Biosphere Reserve
Corine Land Cover 2022
Artificial surfaces
Agricultural areas
Water bodies
High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)
0 - 2 Low
2 - 4 Medium
4 - 5 High
5 - 10 Very high
0 5 10 km
Legend
CollinaPo Biosphere Reserve
Corine Land Cover 2022
Artificial surfaces
Agricultural areas
Water bodies
High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)
0 - 2 Low
2 - 4 Medium
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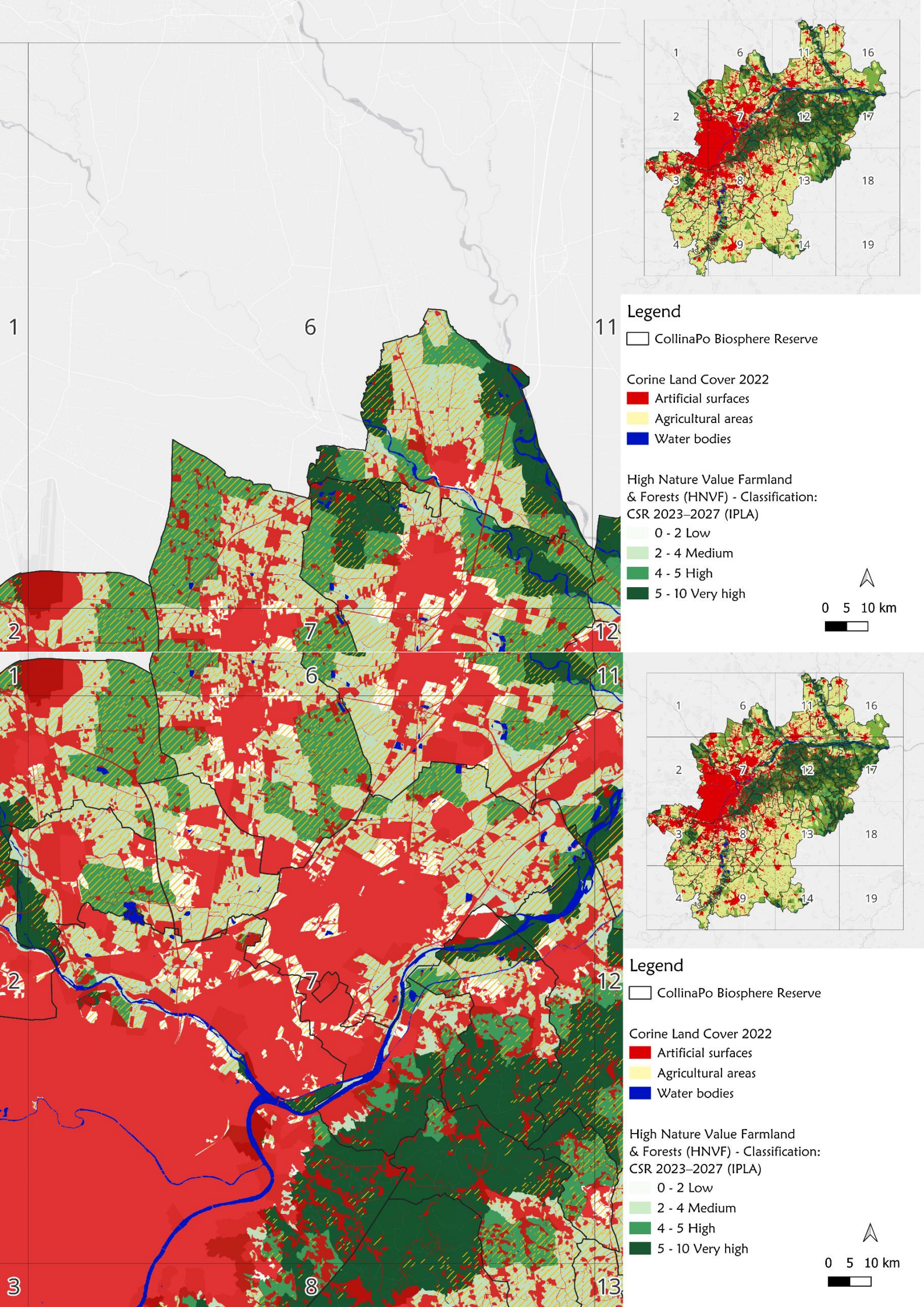
5 - 10 Very high
0 5 10 km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Legend
CollinaPo Biosphere Reserve
Corine Land Cover 2022
Artificial surfaces
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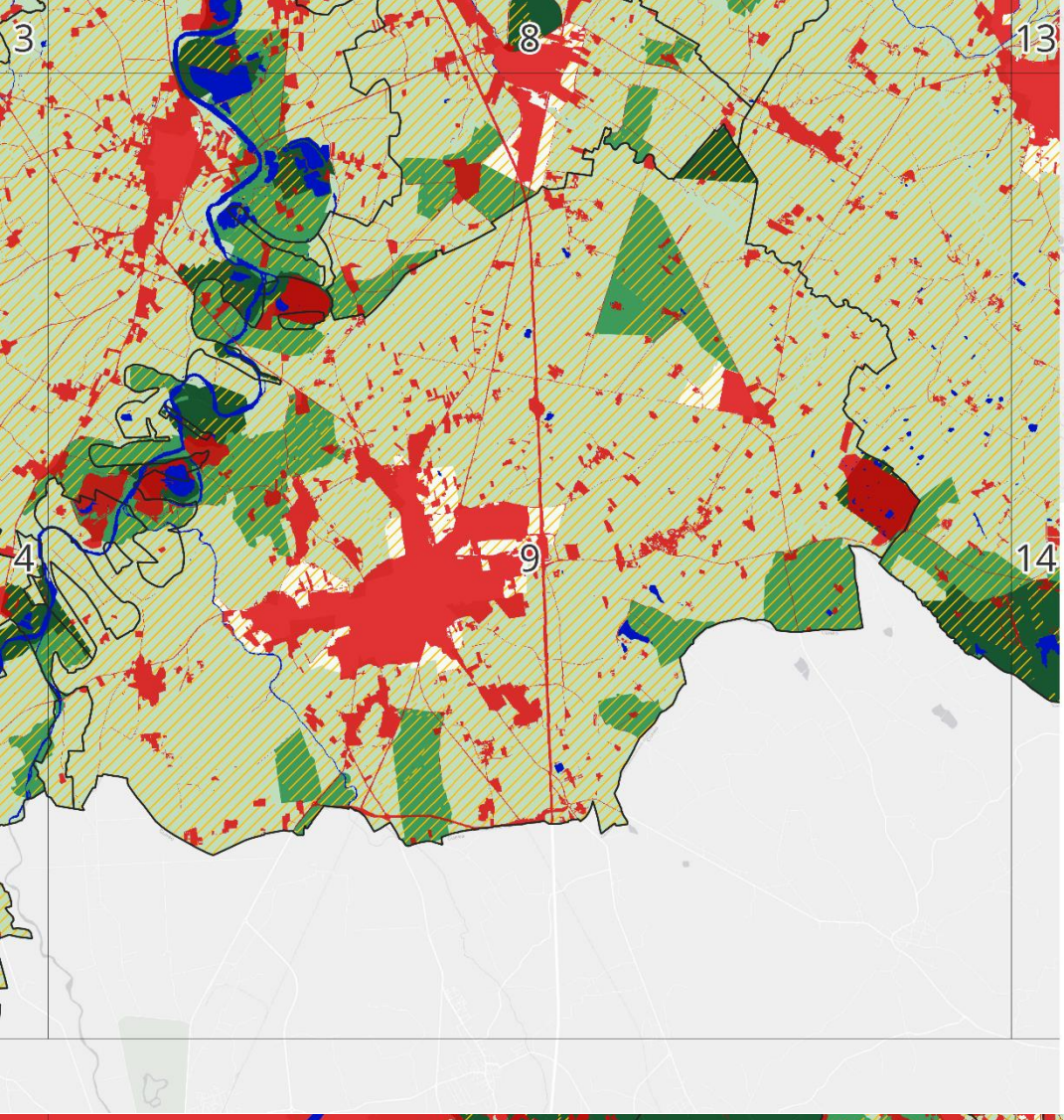
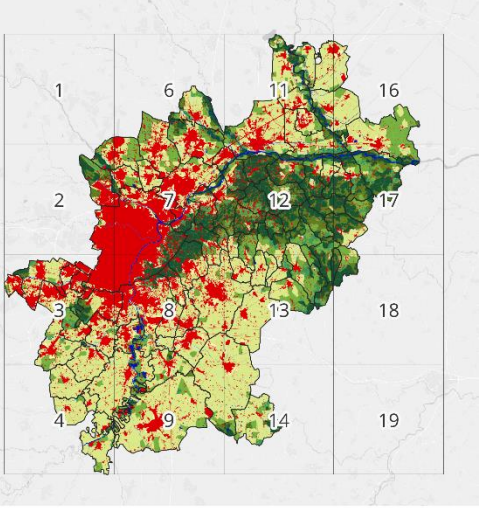
0 5 10 km





Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022
- Artificial surfaces
- Agricultural areas
- Water bodies

High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)
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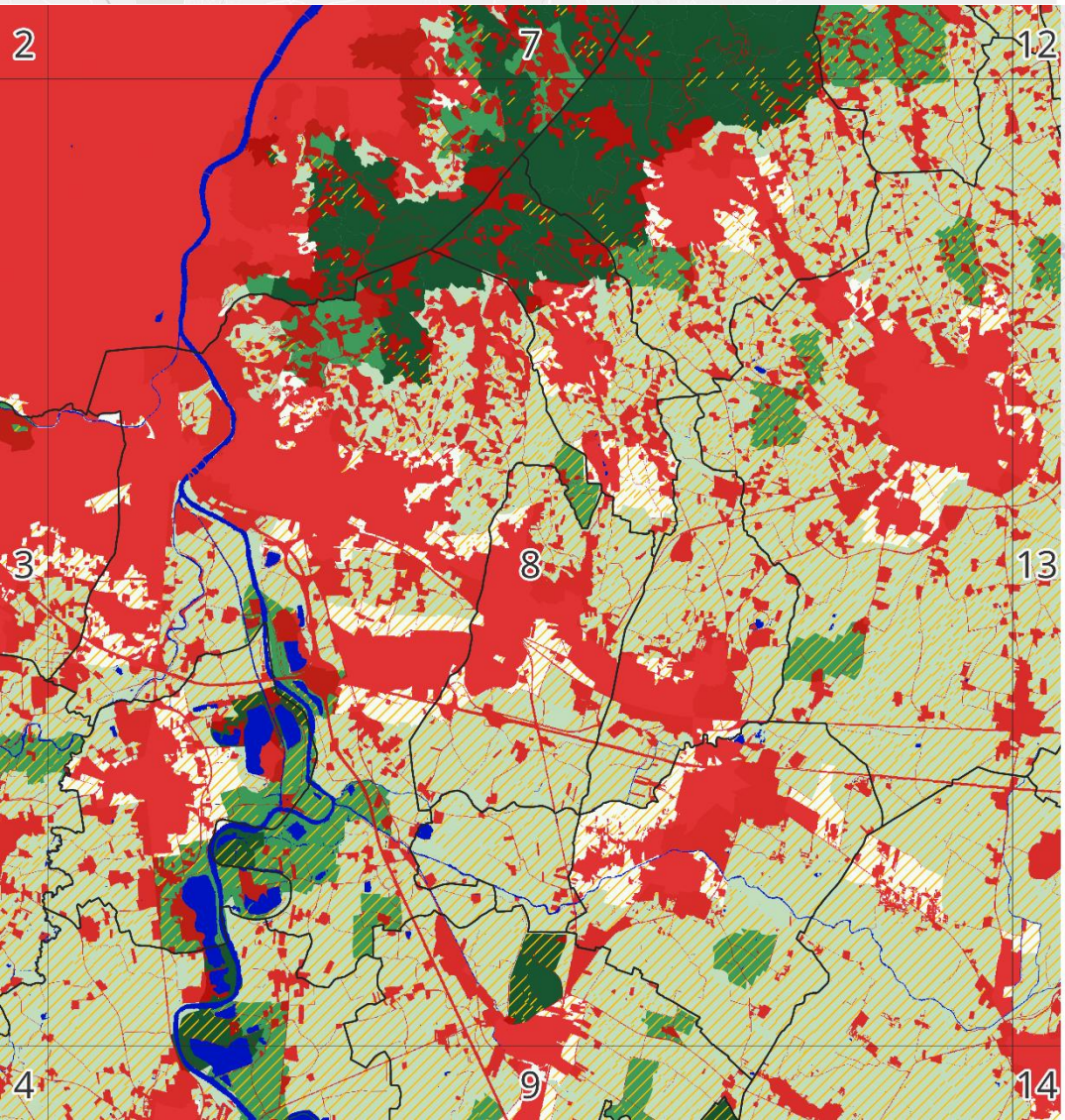
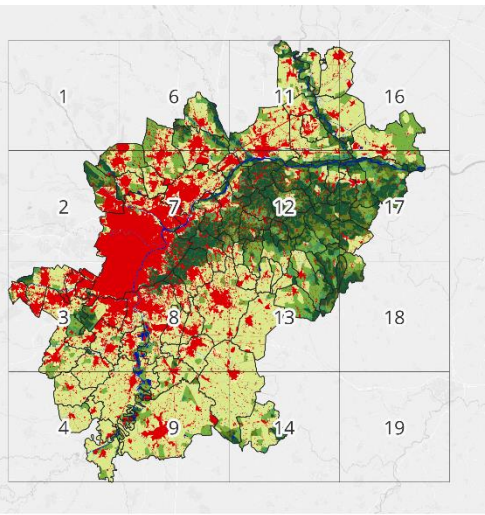
0 5 10 km





Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022
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- Water bodies

High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)
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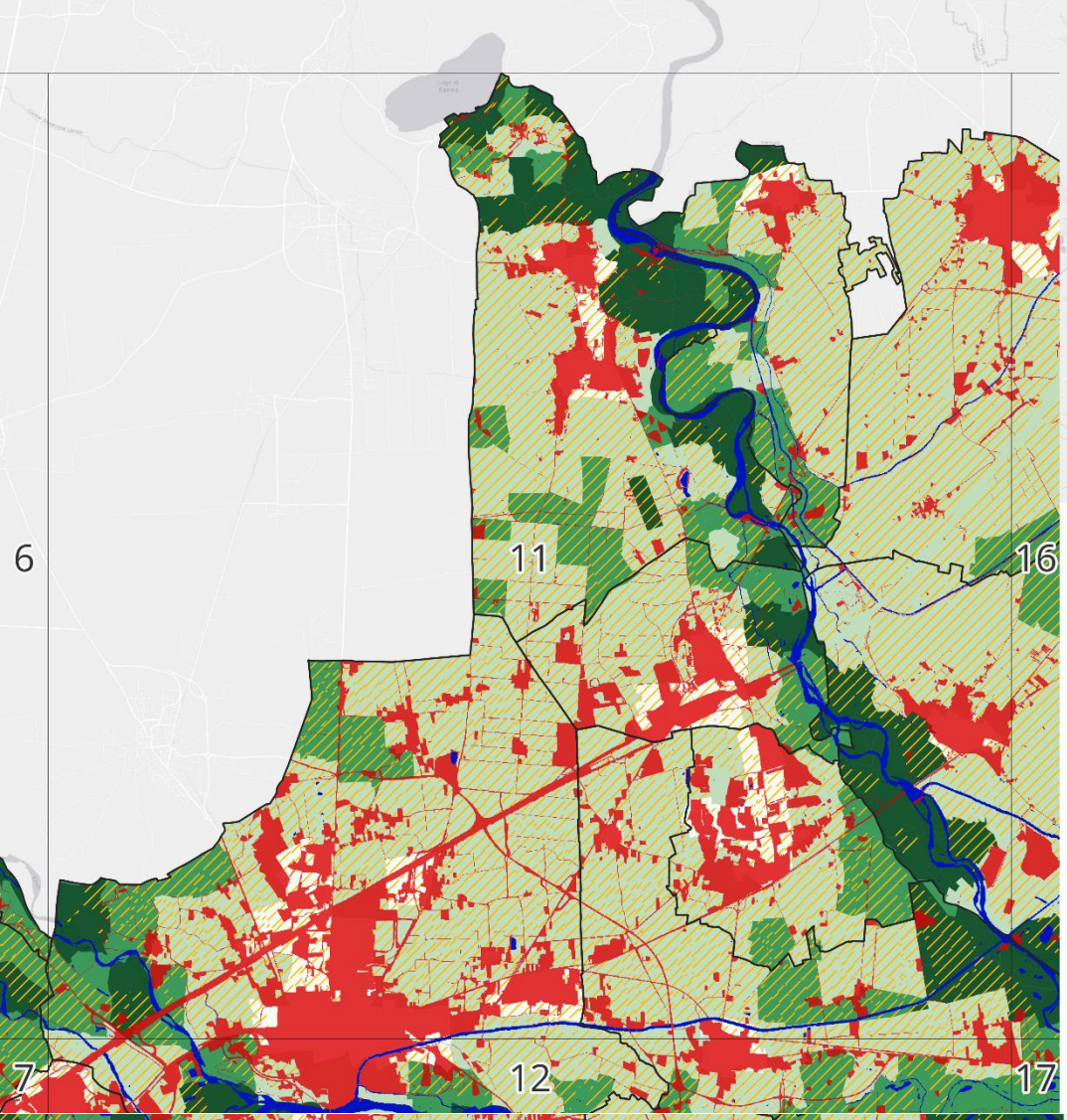

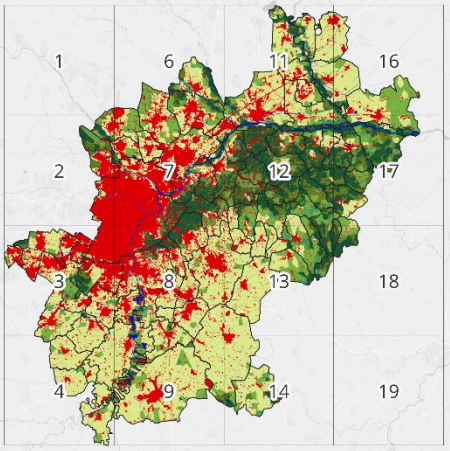

Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022
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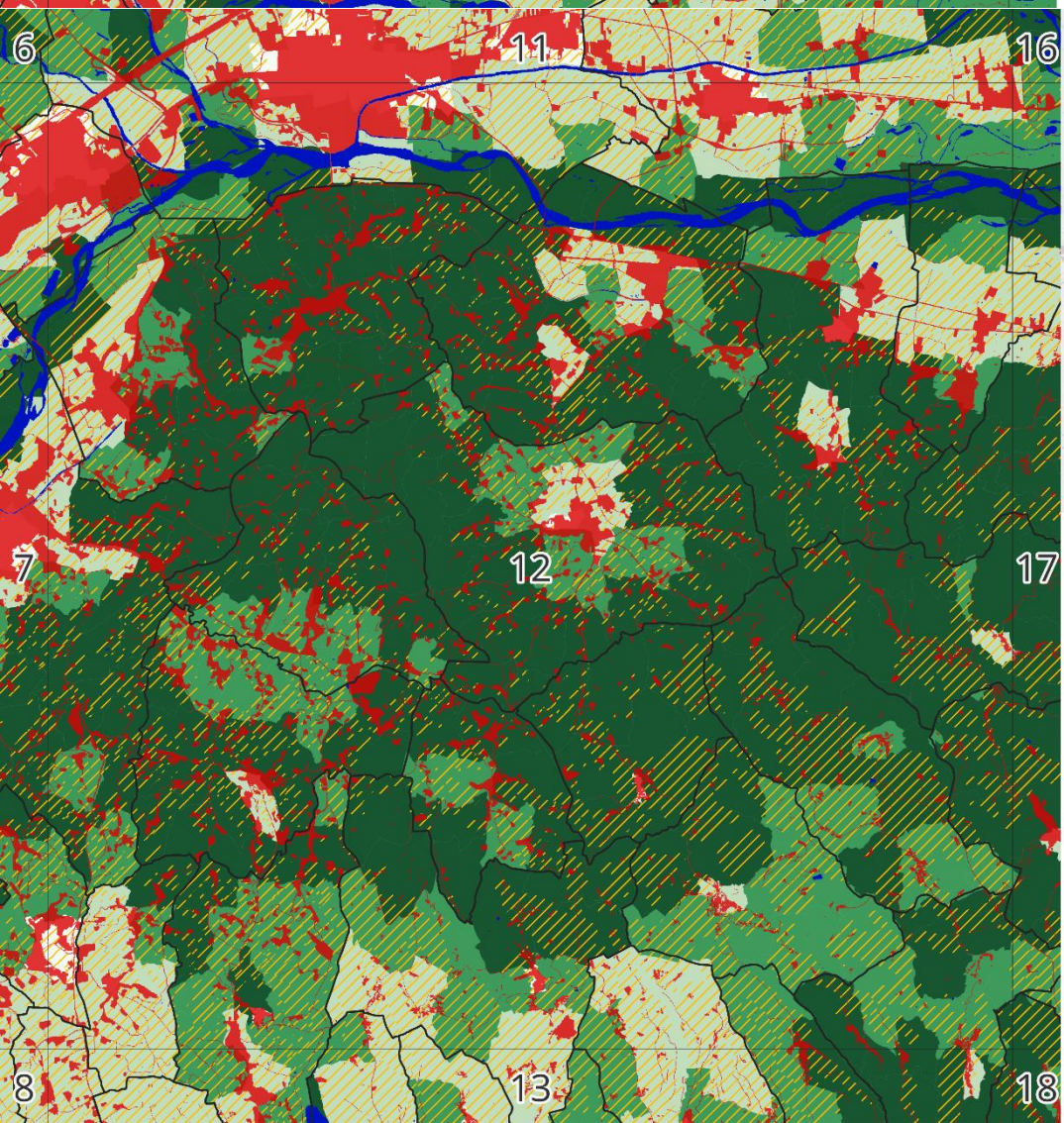

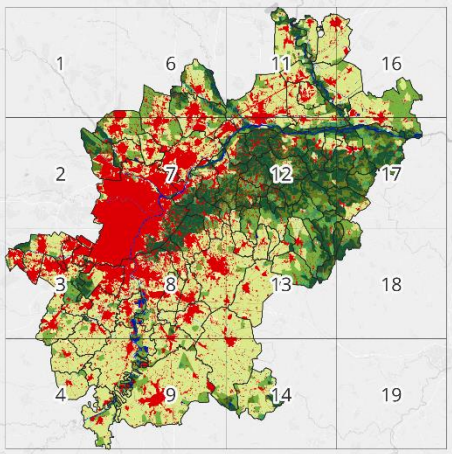

Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022
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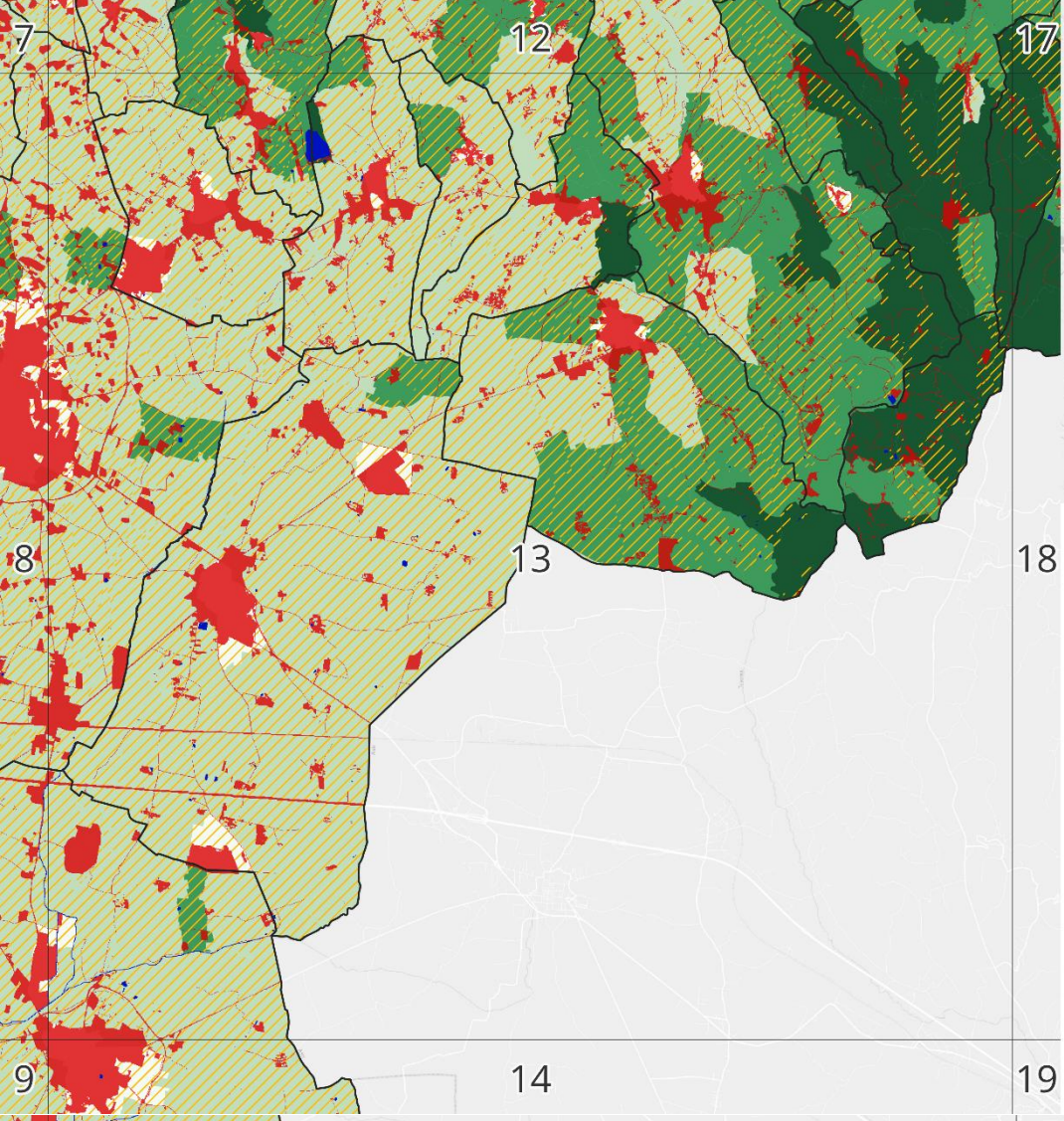

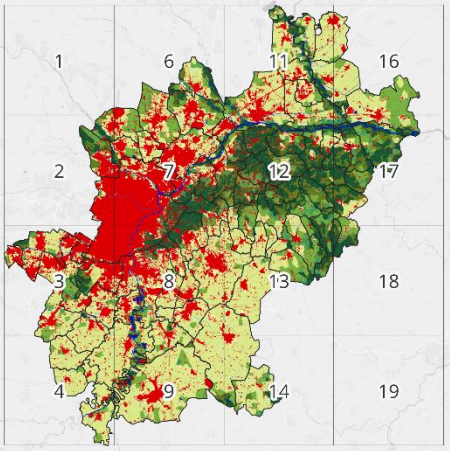

Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022
- Artificial surfaces
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High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)
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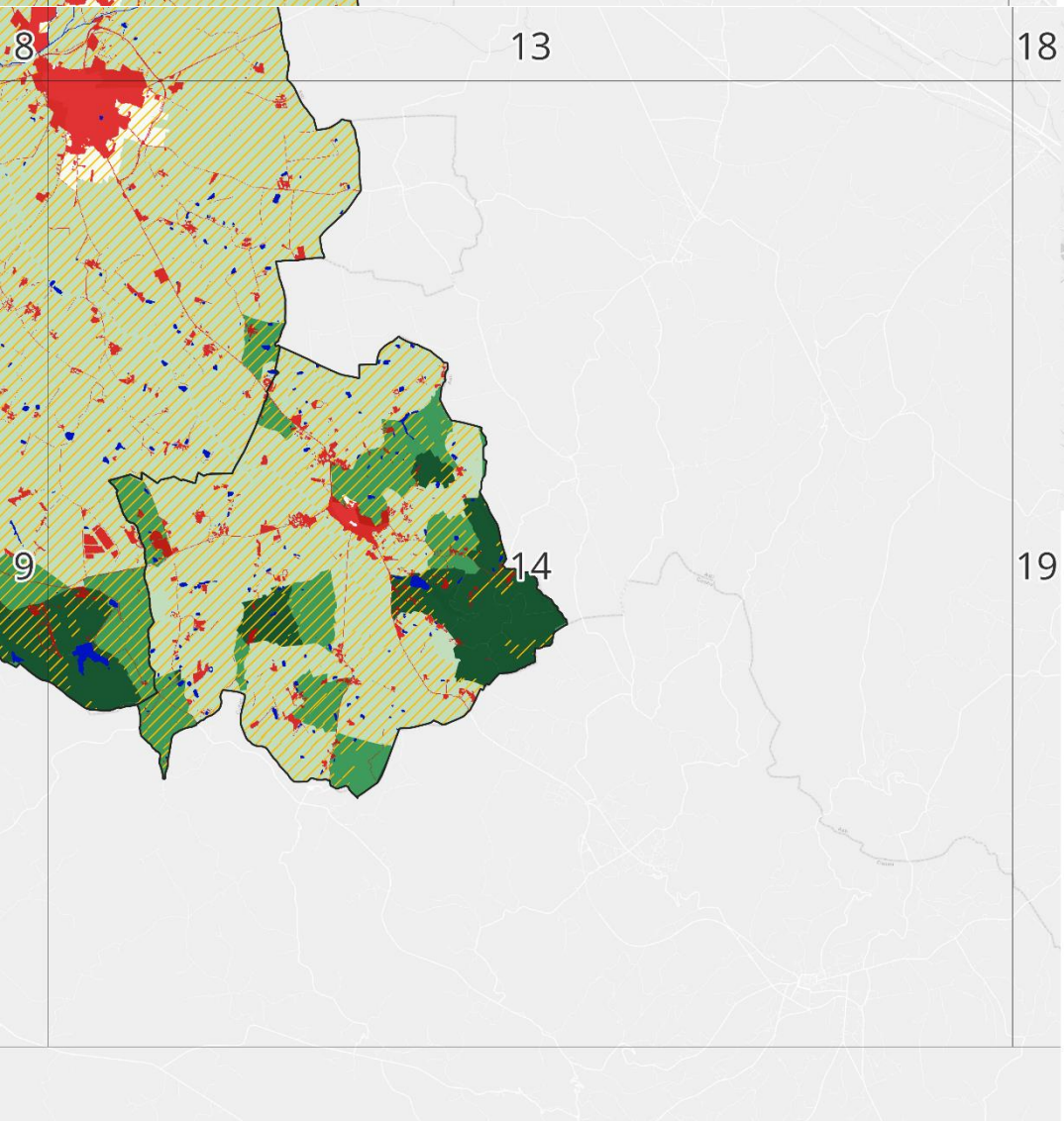

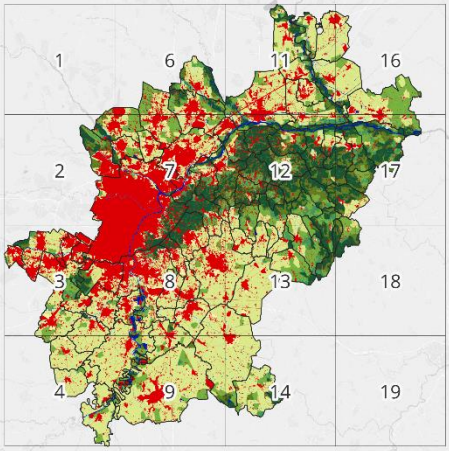

Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022
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- Agricultural areas
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High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)
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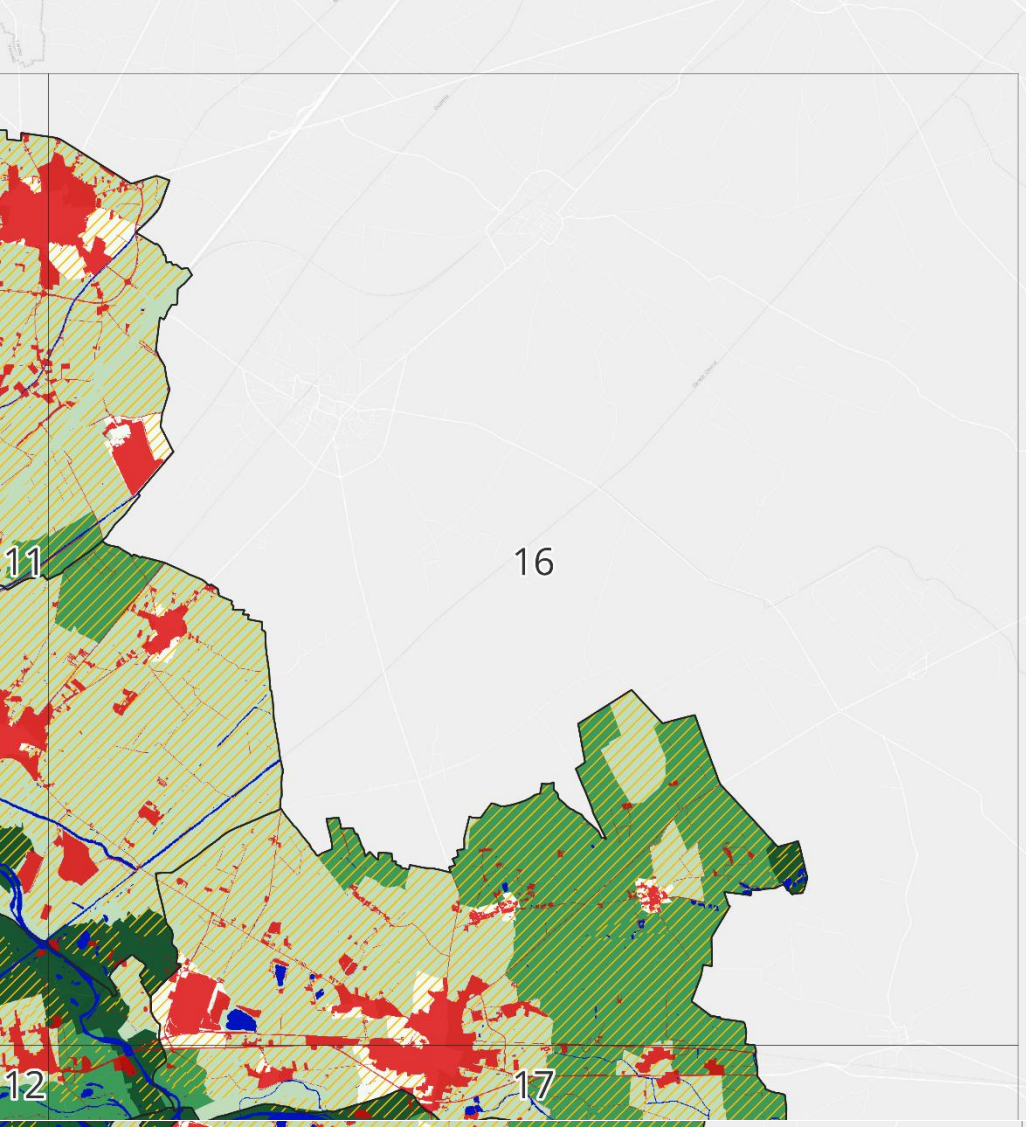

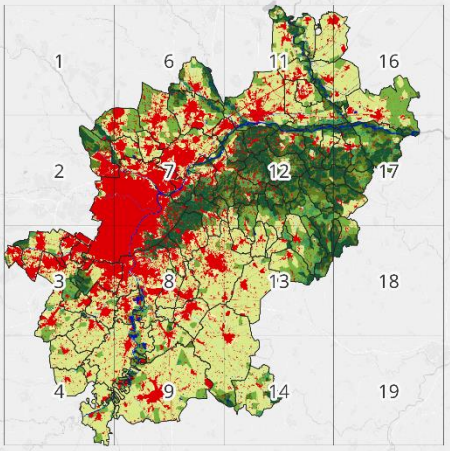

Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022
- Artificial surfaces
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- Water bodies

High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)
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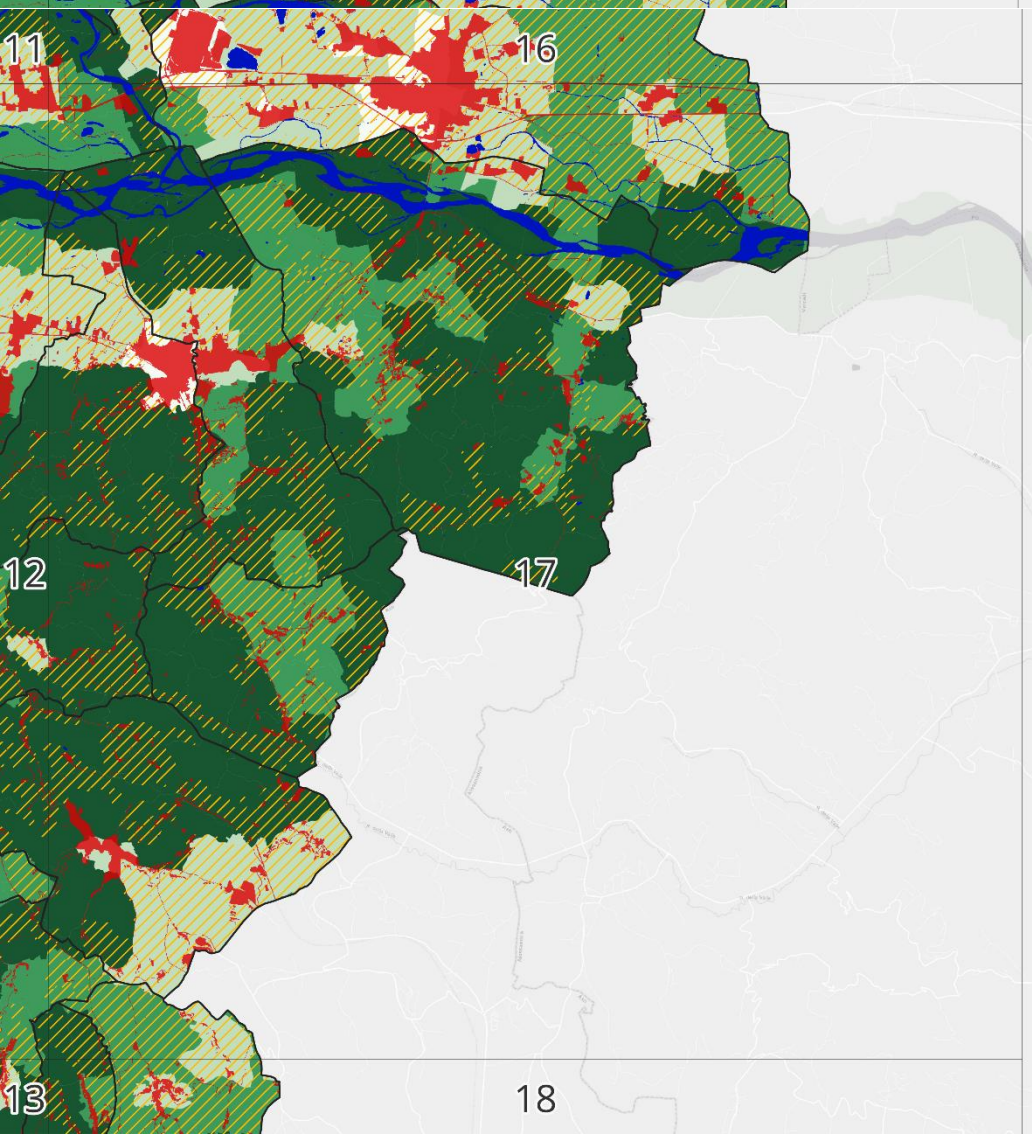
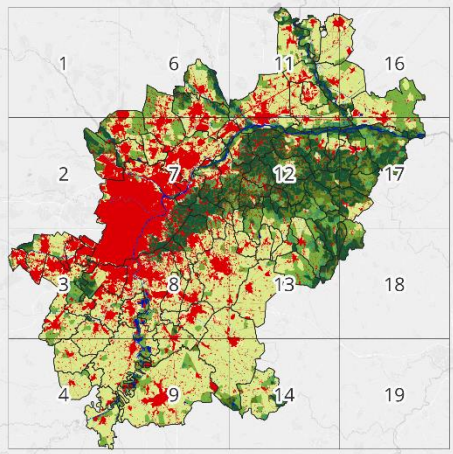
0 5 10 km





Legend

CollinaPo Biosphere Reserve

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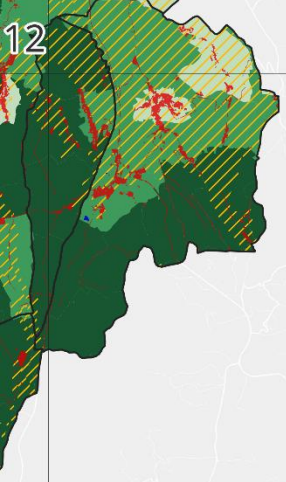
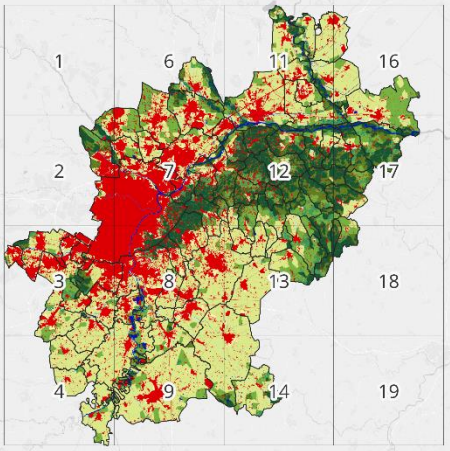
0 5 10 km





Legend

CollinaPo Biosphere Reserve

Corine Land Cover 2022
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- Water bodies

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- 0 - 2 Low
- 2 - 4 Medium
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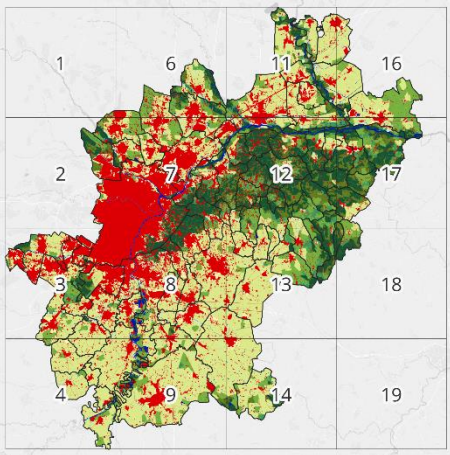
0 5 10 km



Legend

CollinaPo Biosphere Reserve

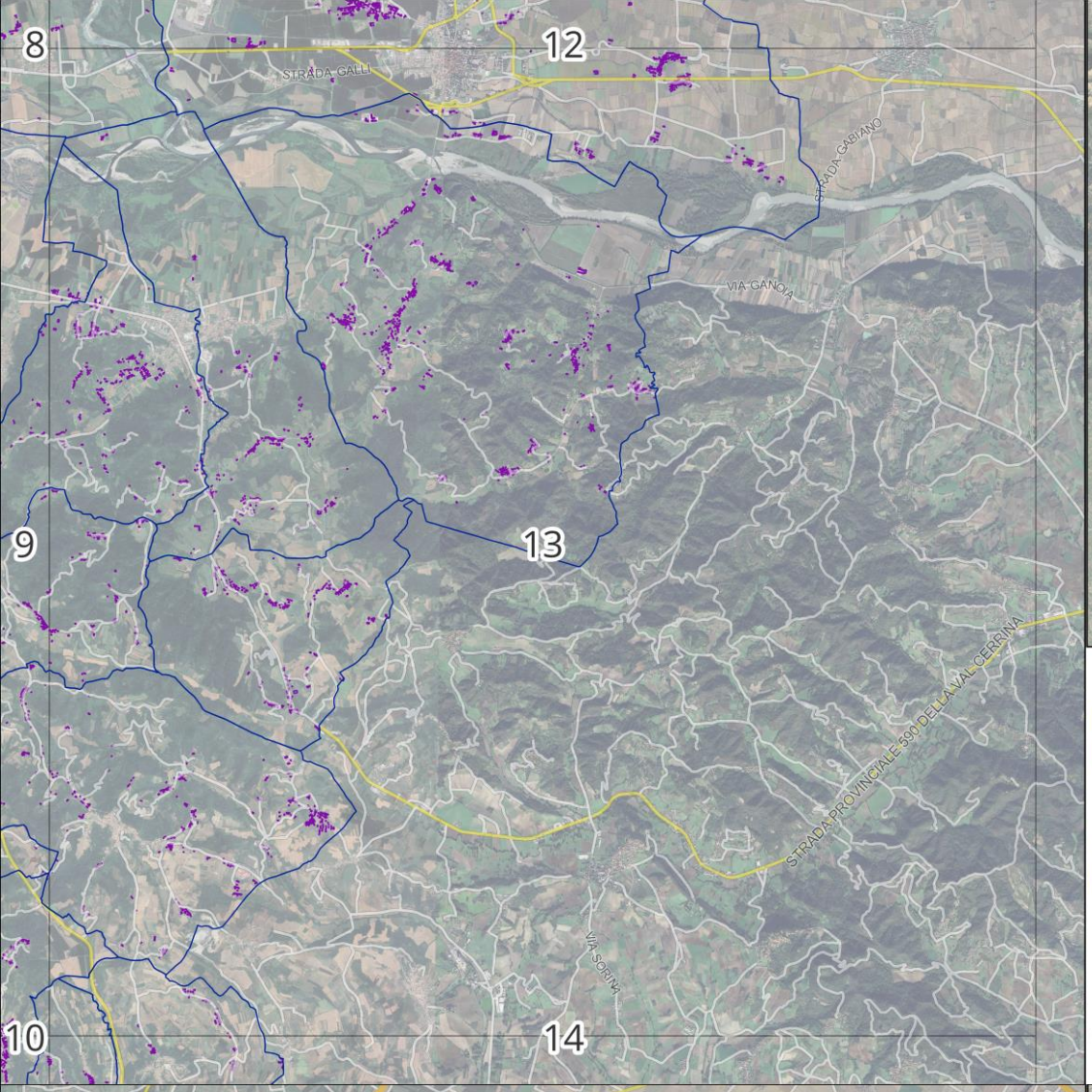
Corine Land Cover 2022
- Artificial surfaces
- Agricultural areas
- Water bodies

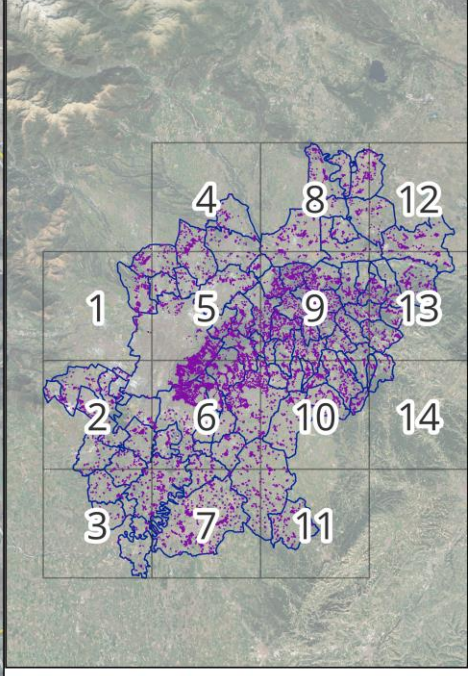
High Nature Value Farmland & Forests (HNVF) - Classification: CSR 2023–2027 (IPLA)
- 0 - 2 Low
- 2 - 4 Medium
- 4 - 5 High
- 5 - 10 Very high

0 5 10 km

ANNEX B – Food deserts in CollinaPo

The composite map of buildings with population, *Geoportale Piemonte*, and retailers, *Camera di Commercio*, is placed here because it is too detailed, and therefore, too large, for the main text; see page 308 for the discussion.

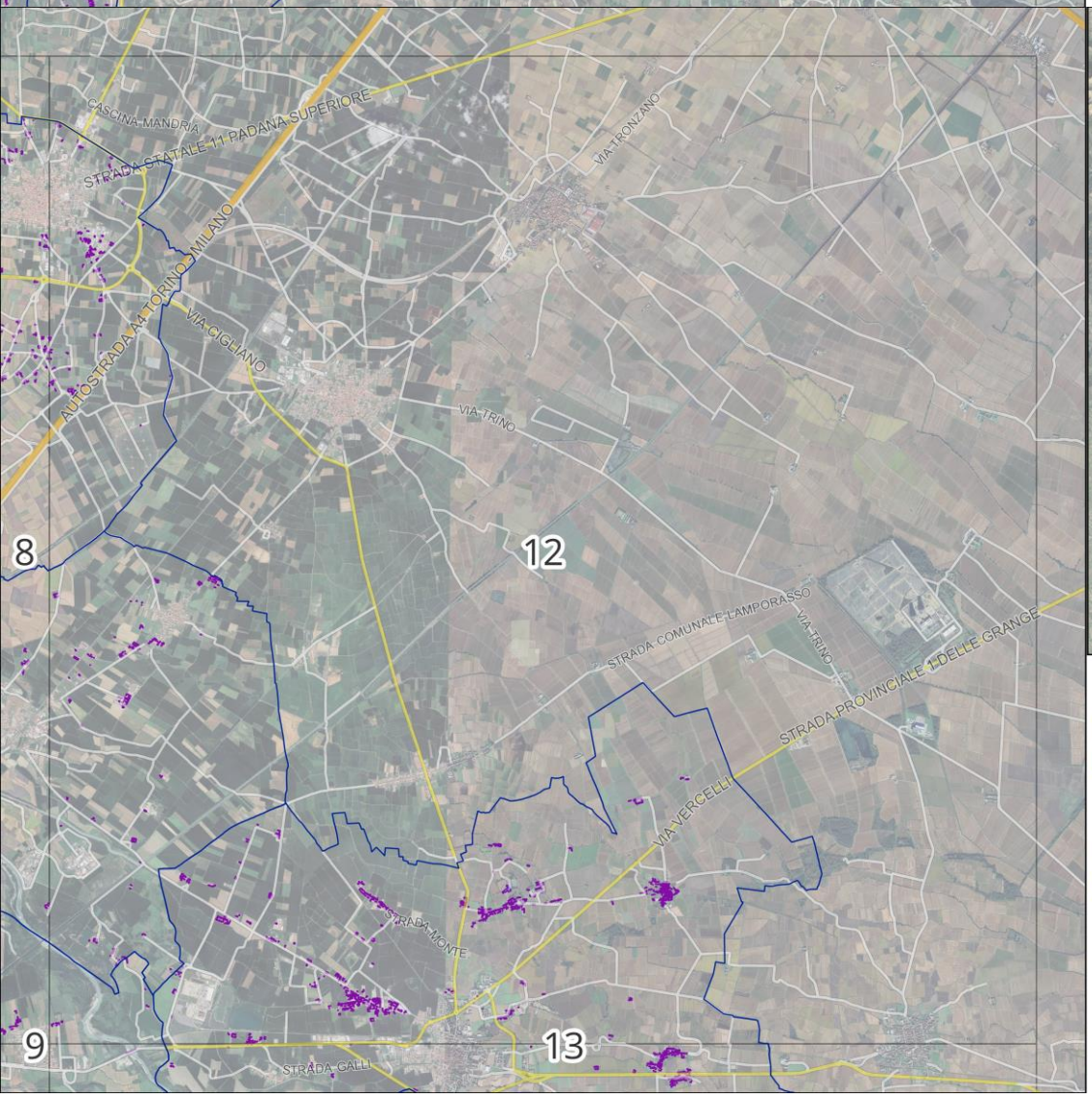


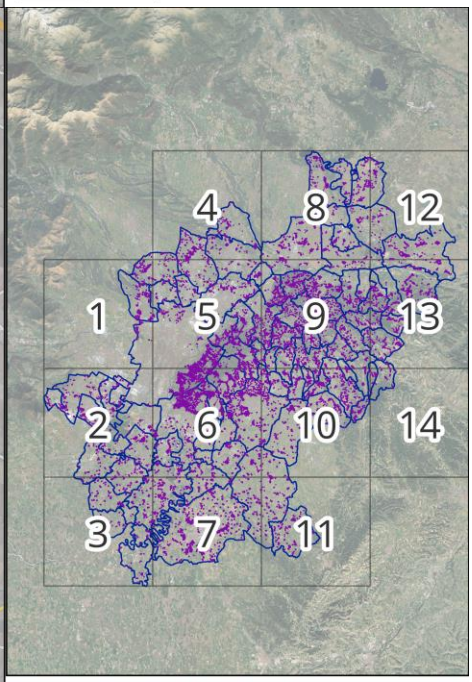


Legend

- CollinaPo Biosphere Reserve
- Buildings with population (2016) in food deserts
- Highways
- Main roadways
- Secondary roadways

0 1 2 km

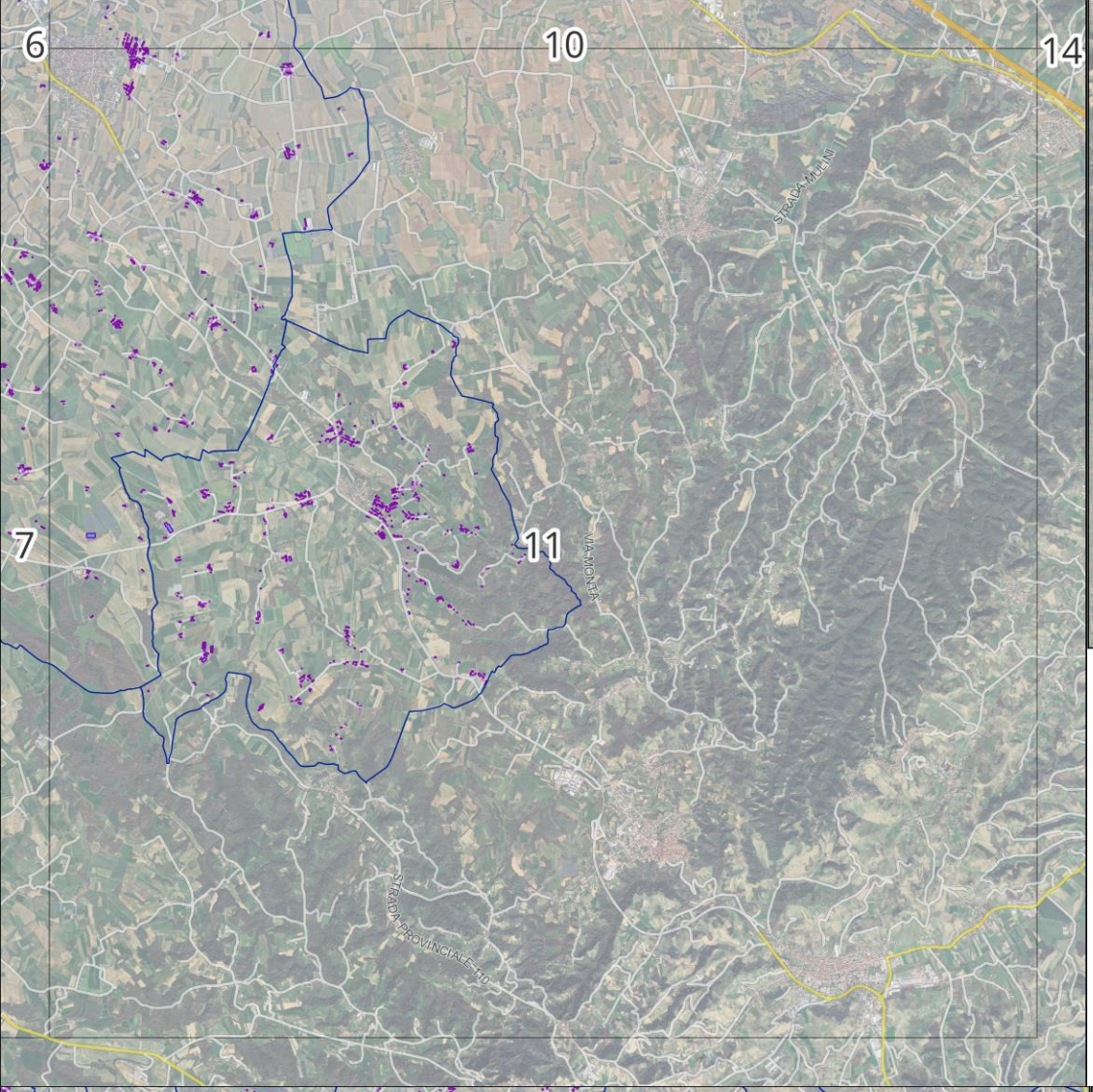


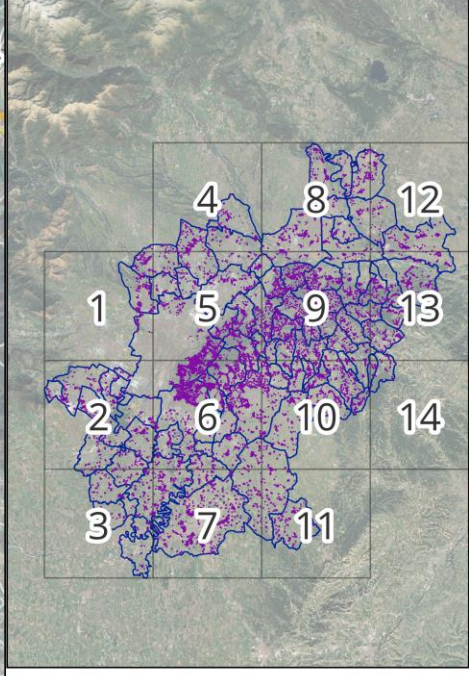


Legend

- CollinaPo Biosphere Reserve
- Buildings with population (2016) in food deserts
- Highways
- Main roadways
- Secondary roadways

0 1 2 km

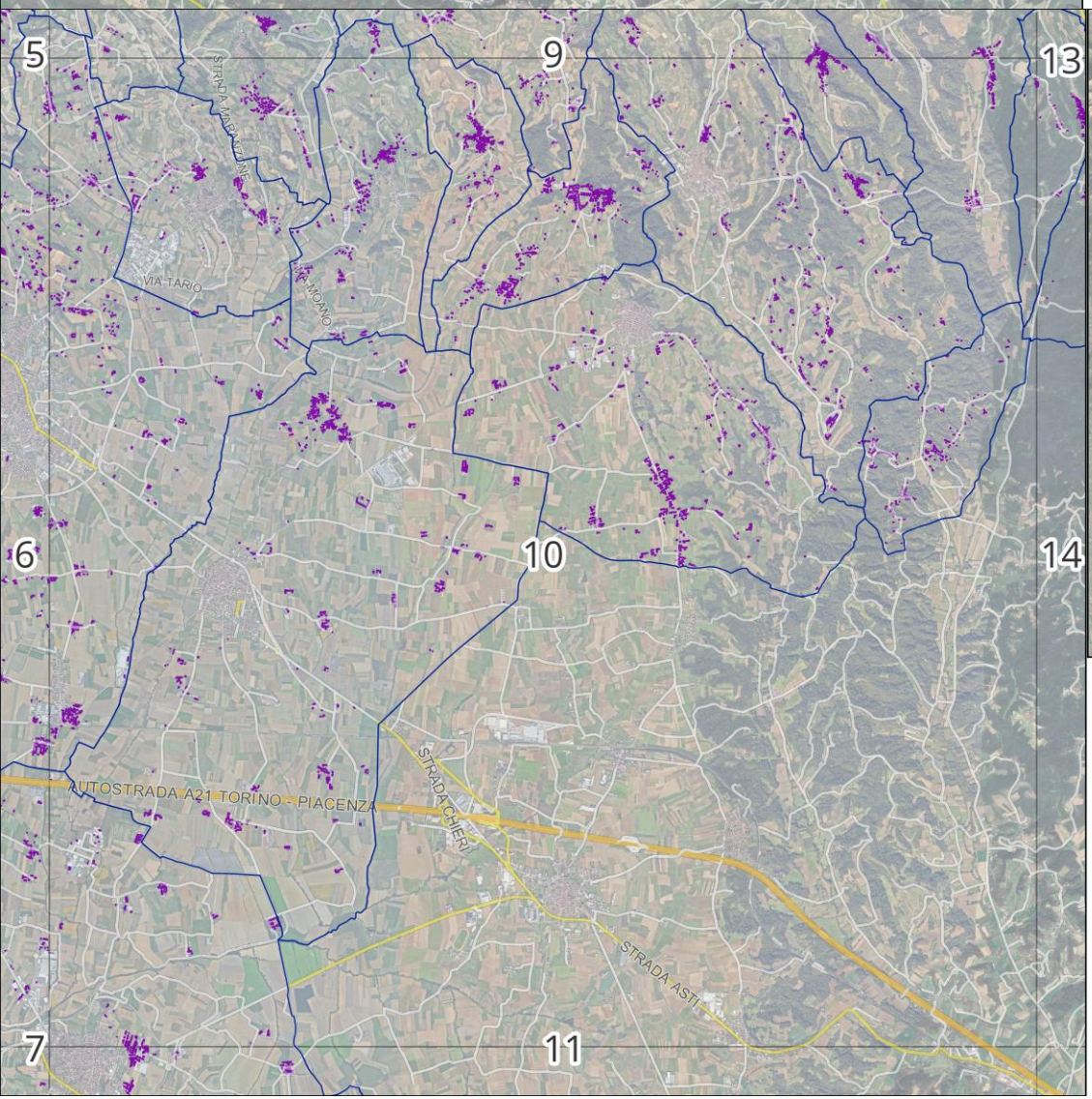


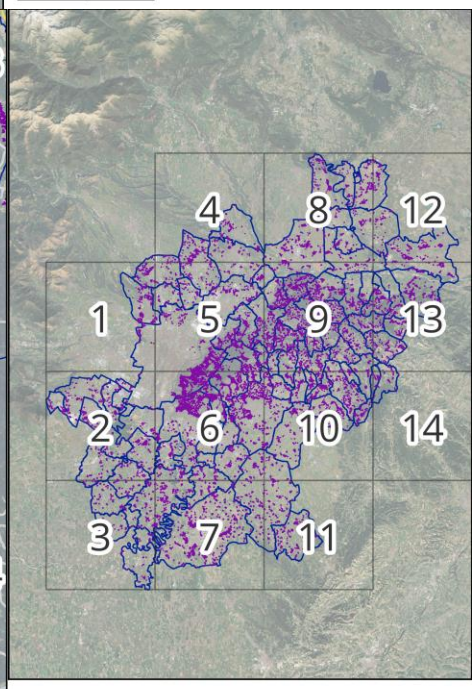


Legend

- CollinaPo Biosphere Reserve
- Buildings with population (2016) in food deserts
- Highways
- Main roadways
- Secondary roadways

0 1 2 km





Legend

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- Buildings with population (2016) in food deserts
- Highways
- Main roadways
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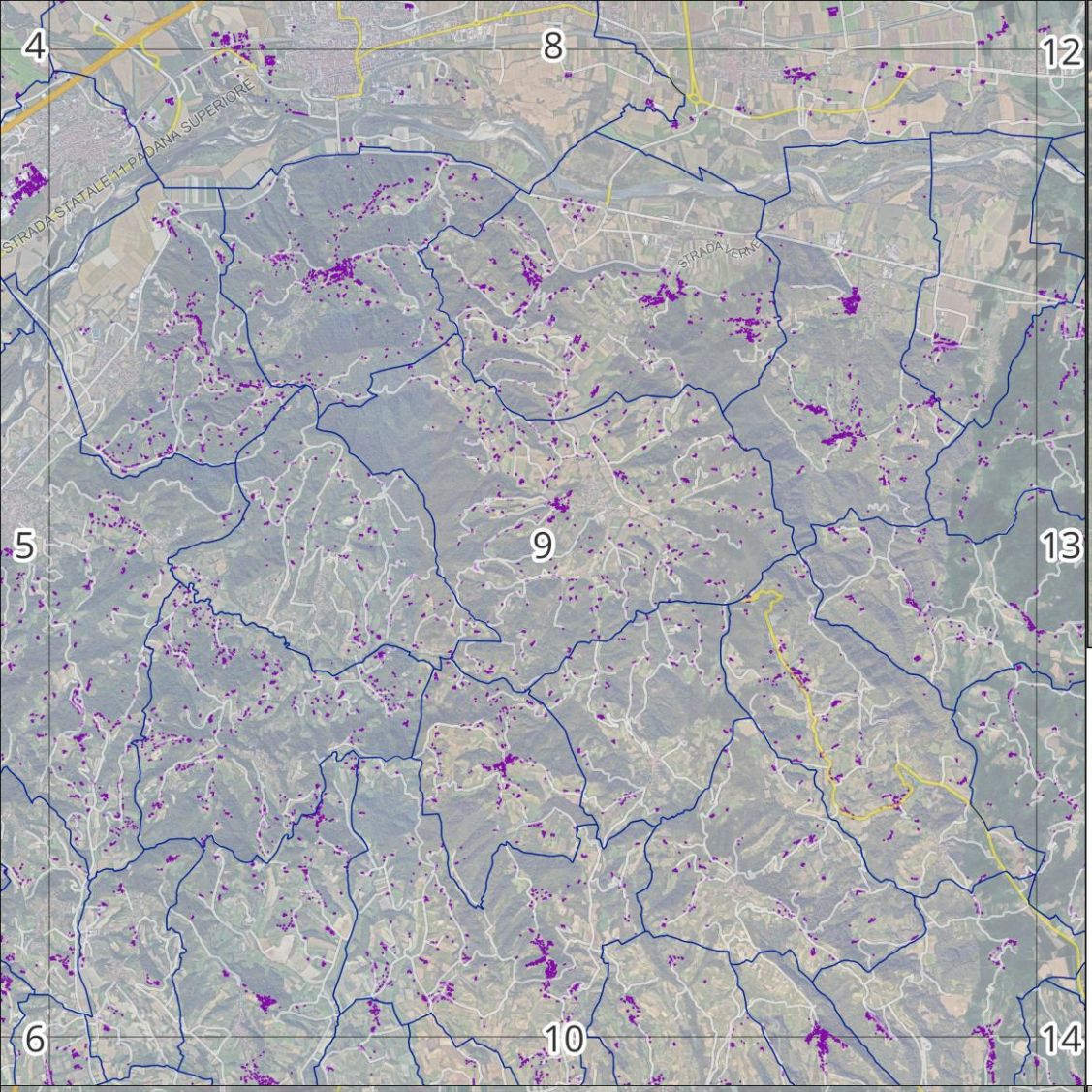
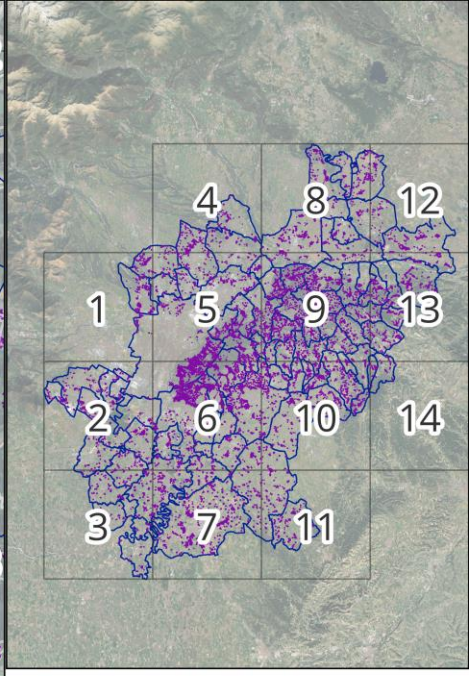
0 1 2 km





Legend

- CollinaPo Biosphere Reserve
- Buildings with population (2016) in food deserts
- Highways
- Main roadways
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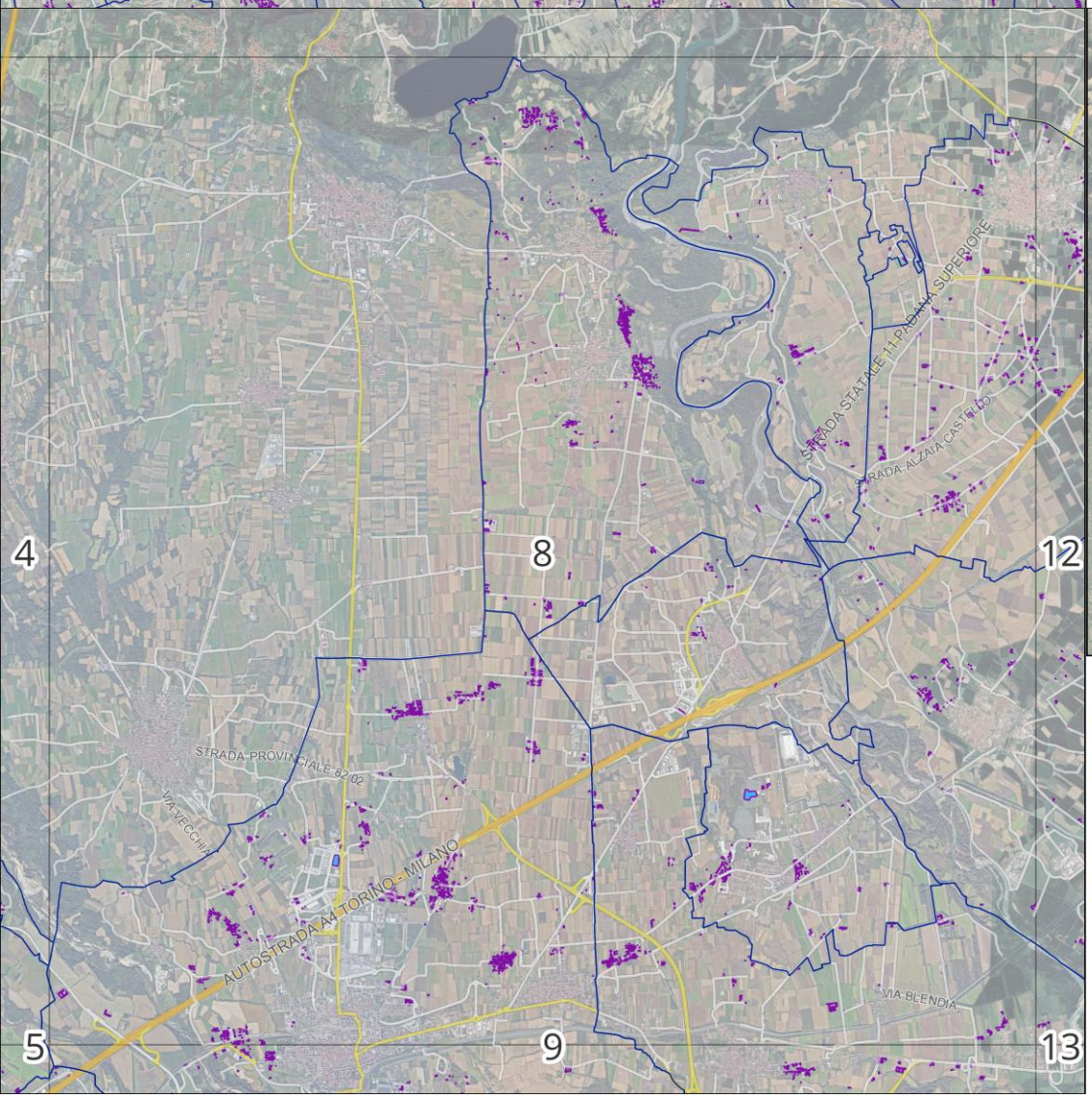
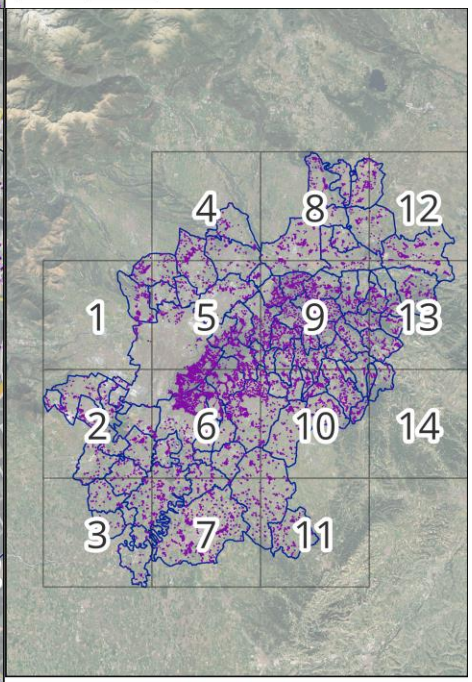
0 1 2 km





Legend

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- Buildings with population (2016) in food deserts
- Highways
- Main roadways
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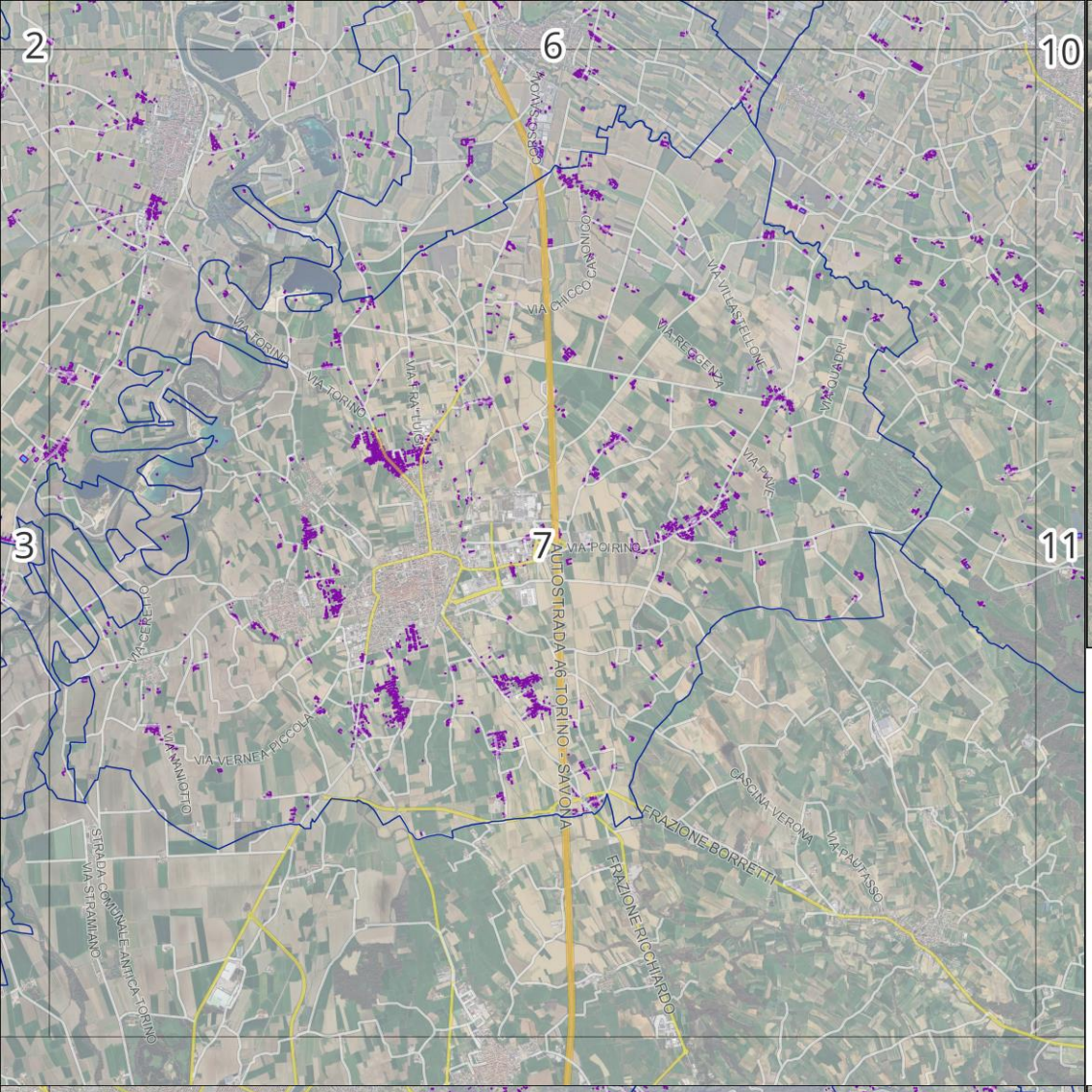
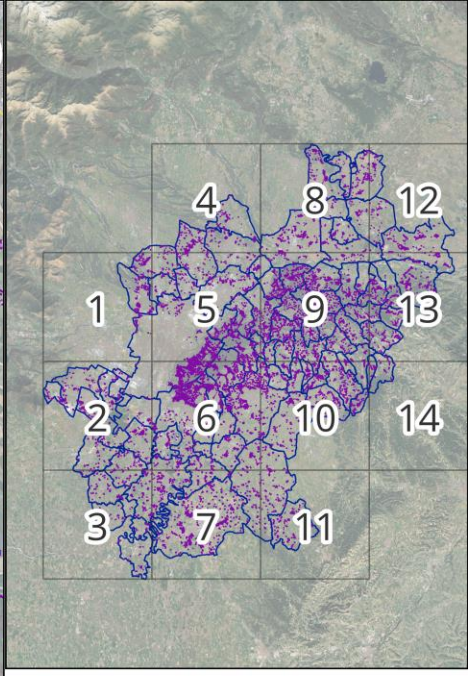
0 1 2 km





Legend

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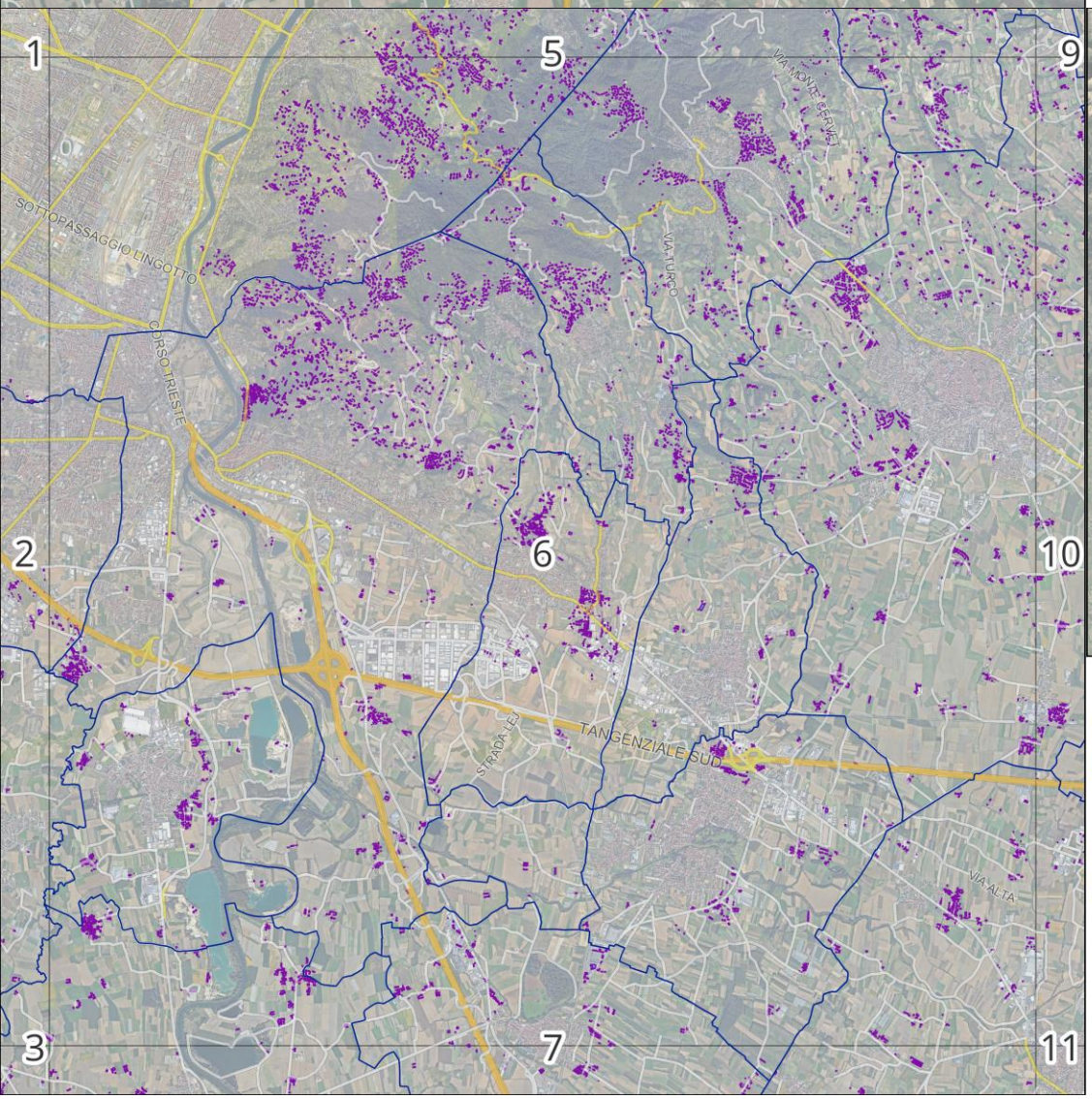
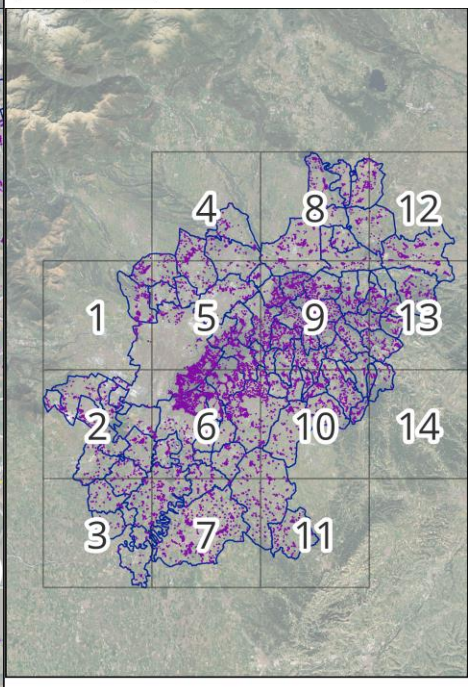
0 1 2 km





Legend

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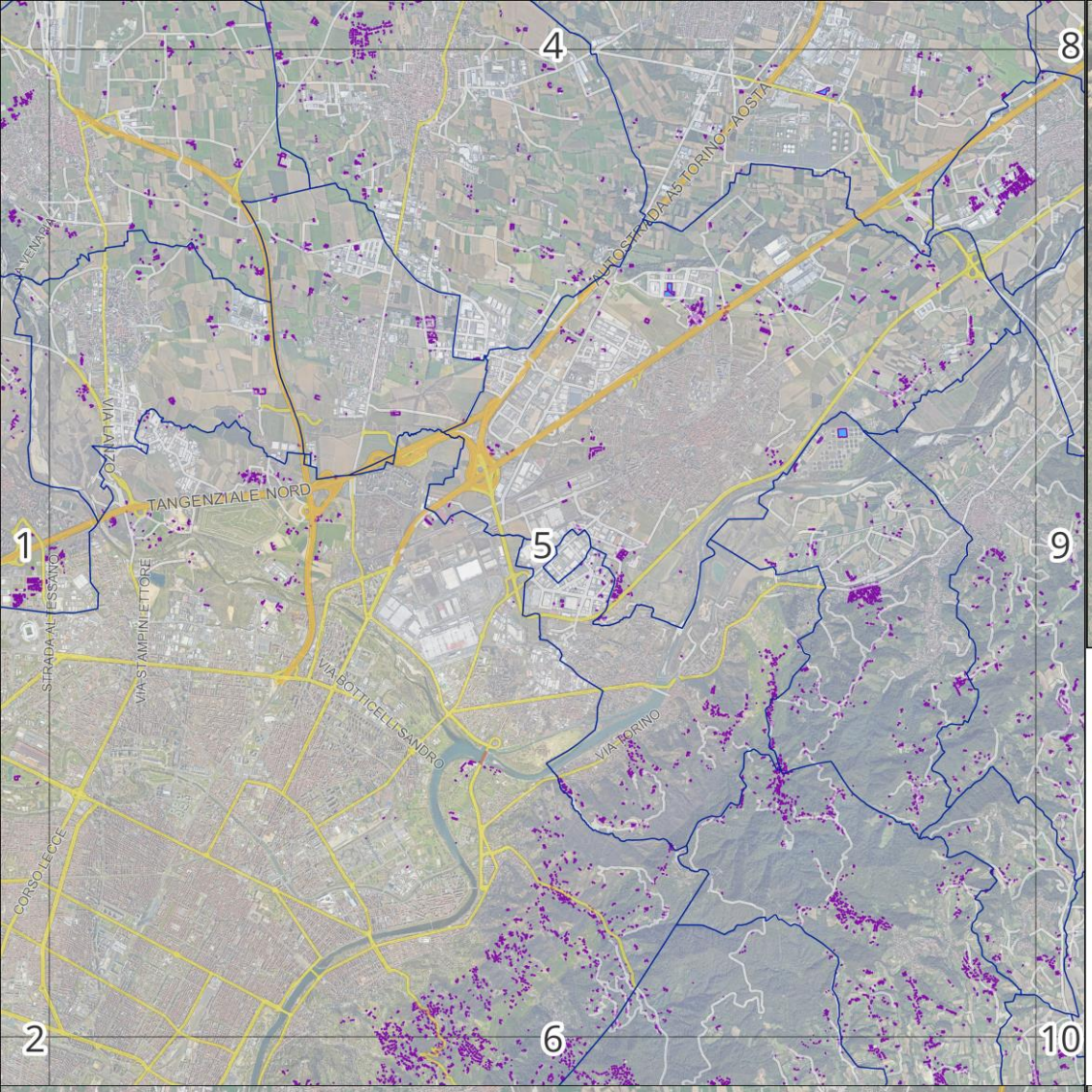

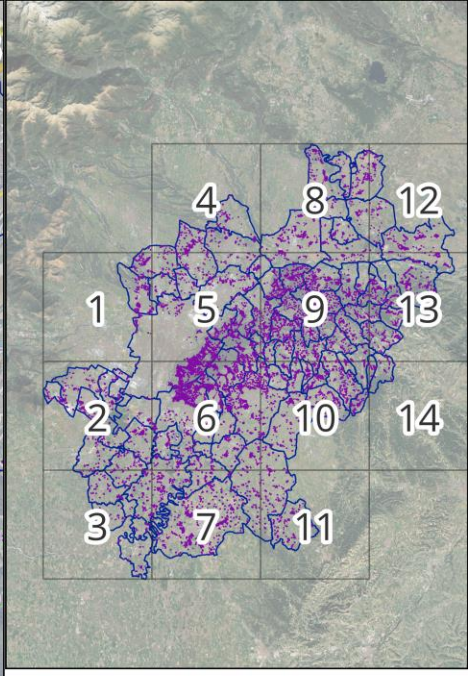

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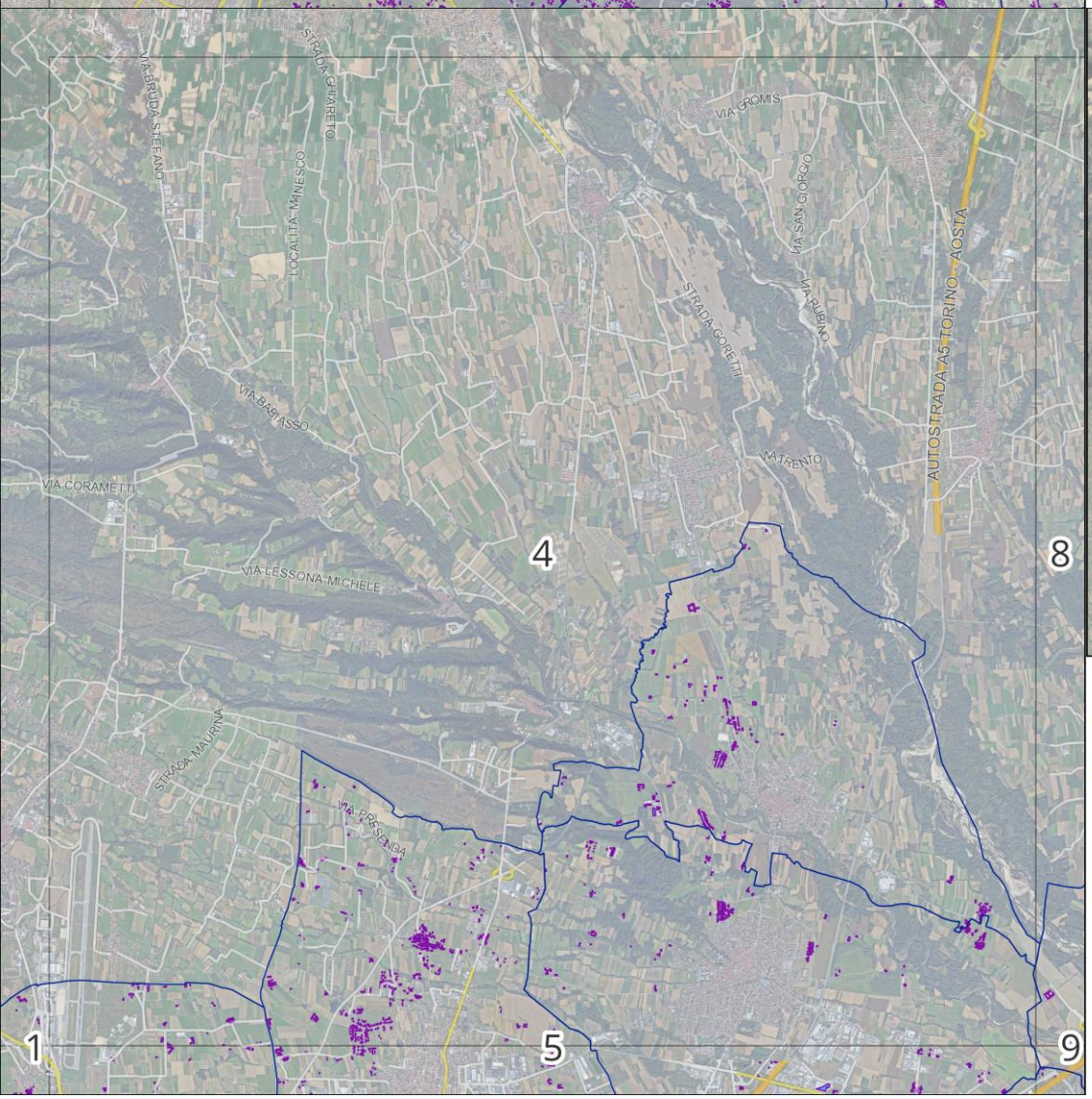
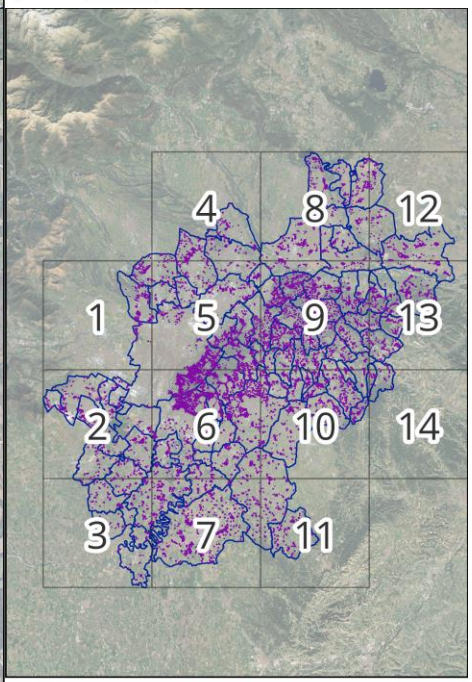
0 1 2 km





Legend

- CollinaPo Biosphere Reserve
- Buildings with population (2016) in food deserts
- Highways
- Main roadways
- Secondary roadways

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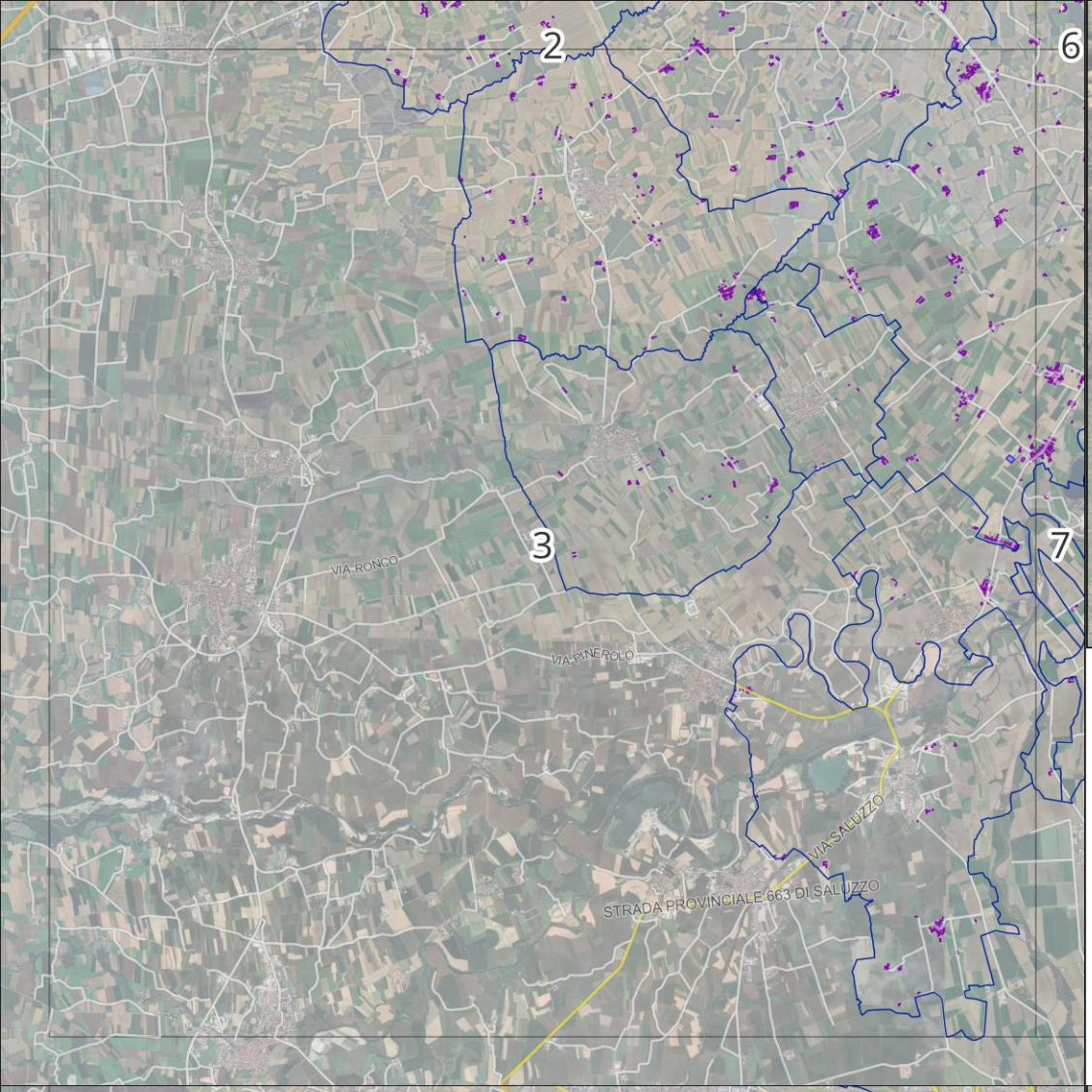

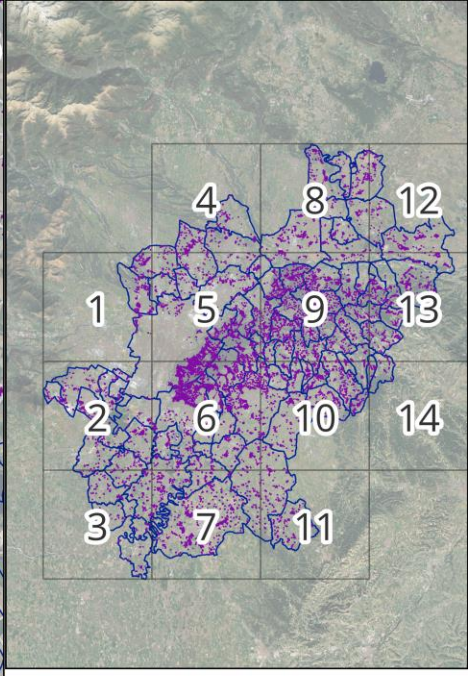

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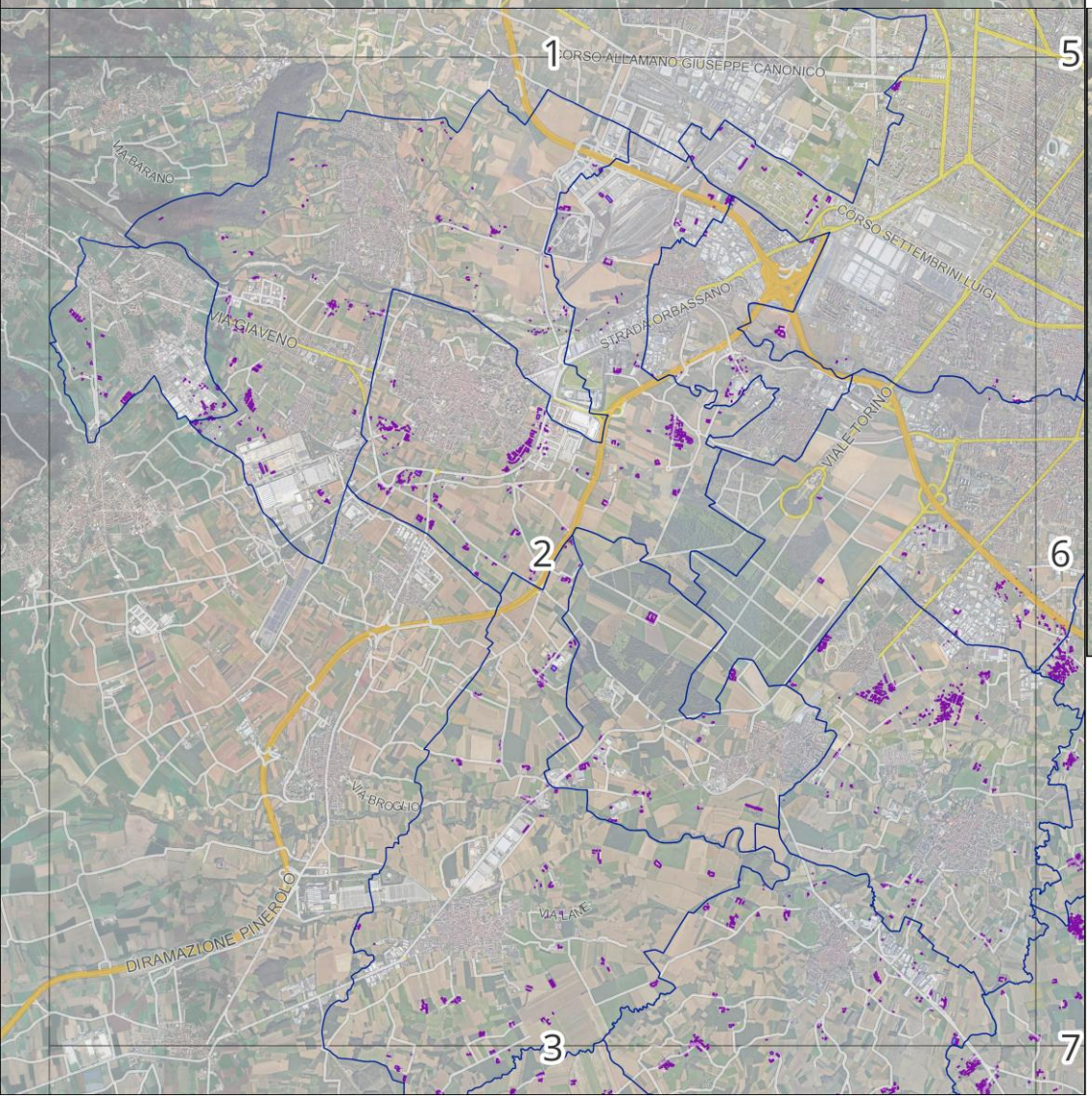

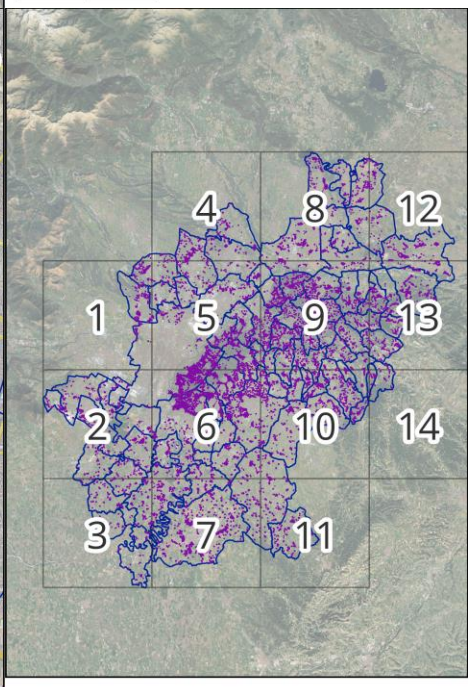

Legend

- CollinaPo Biosphere Reserve
- Buildings with population (2016) in food deserts
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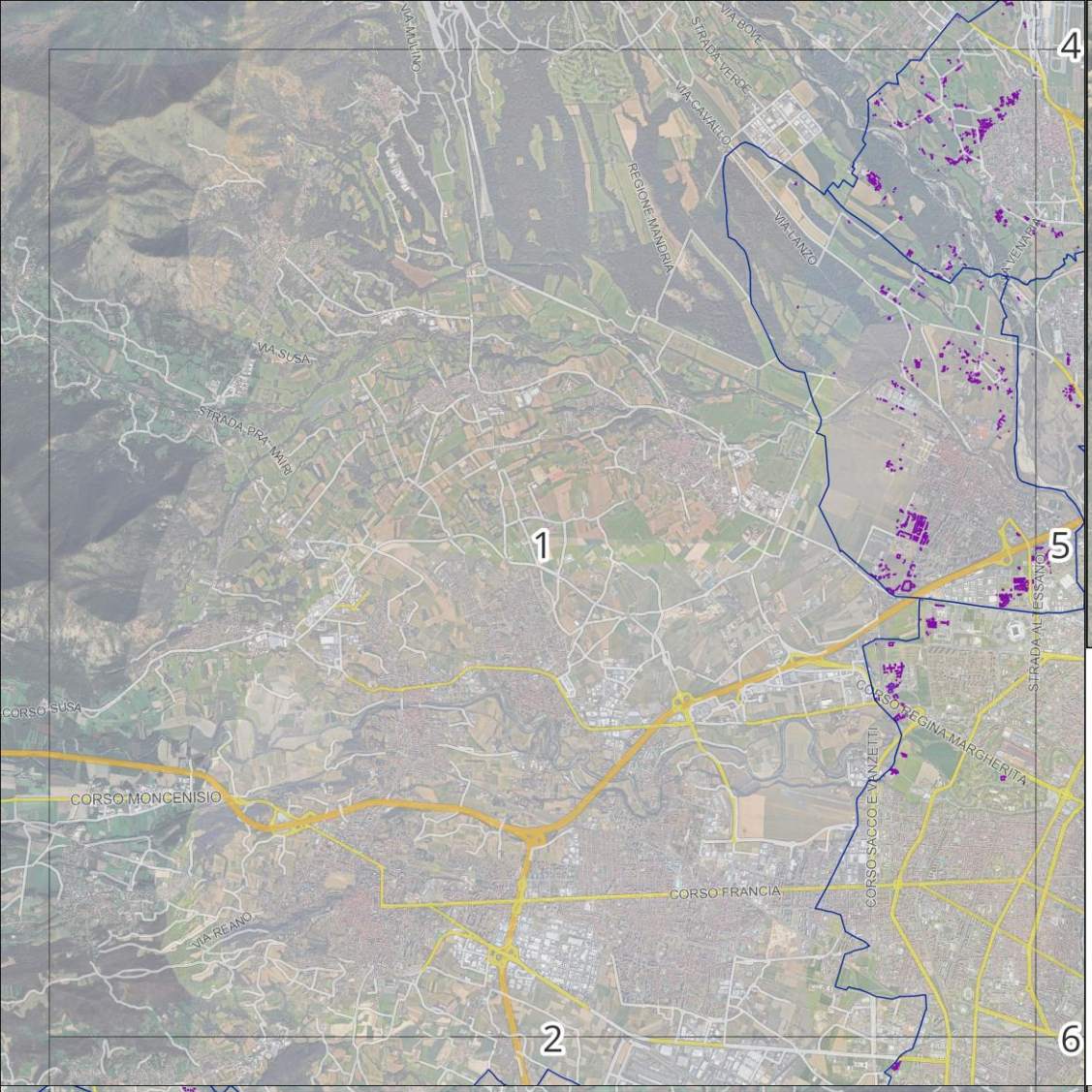

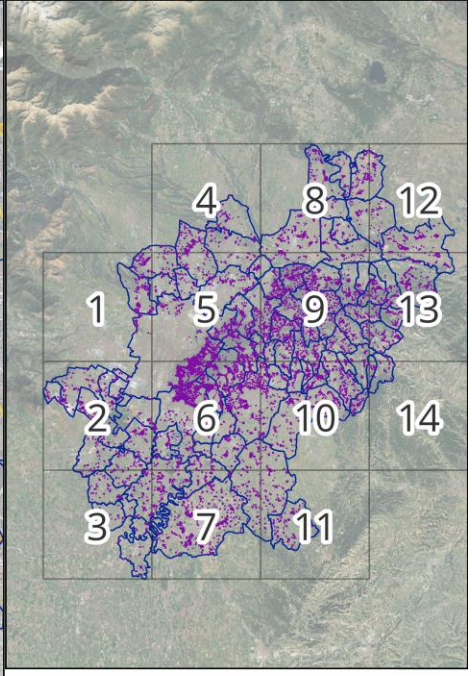

Legend

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- Buildings with population (2016) in food deserts
- Highways
- Main roadways
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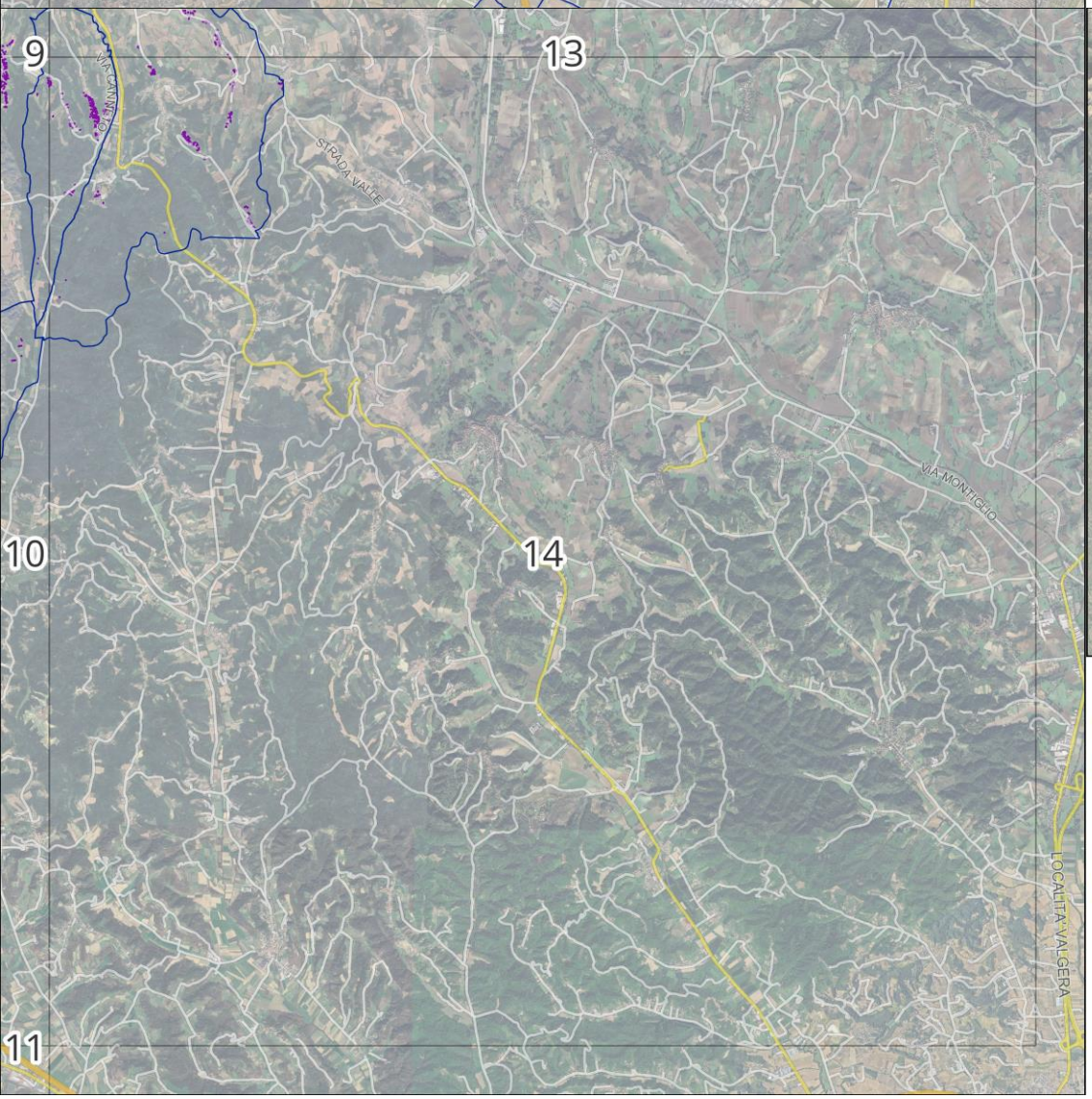
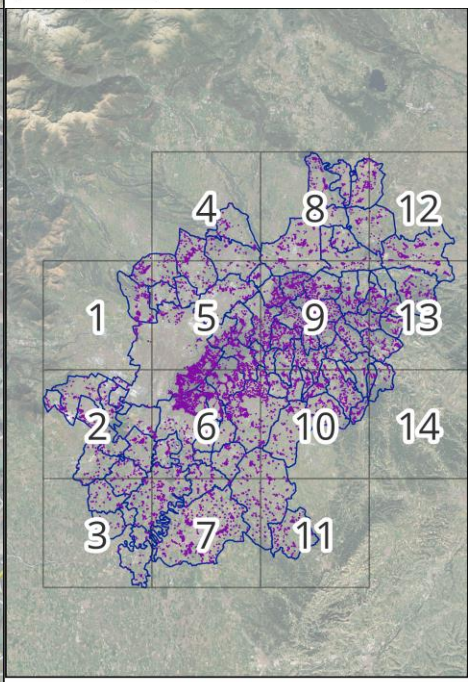
0 1 2 km





Legend

- CollinaPo Biosphere Reserve
- Buildings with population (2016) in food deserts
- Highways
- Main roadways
- Secondary roadways

0 1 2 km

ANNEX C – Research questions

Italian translation:

1) Funzione del MAB
   a) Quali sono, a suo avviso, i principali obbiettivi del MAB UNESCO Collina Po?
   b) Come valuta l'impegno del MAB Collina Po nel promuovere la conservazione ambientale?
   c) Ha notato dei cambiamenti entro questo impegno nel corso dei 10 anni di esistenza del MAB Collina Po?
   d) Quali?
   e) Come giudica l'impegno del MAB Collina Po nel coinvolgere le diverse comunità locali?
   f) Quali soggetti ritiene che siano maggiormente attivi entro il MAB Collina Po?

2) Impatto del MAB
   a) Ha notato cambiamenti nel territorio Collina Po dopo il conseguimento del riconoscimento MAB UNESCO?
   b) Se sì, quali?
   c) Crede che il MAB Collina Po abbia influenzato la percezione della popolazione di questo territorio riguardo la sostenibilità ambientale?
   d) Se sì, attraverso quali azioni o iniziative?
   e) Quali forme di collaborazione tra produttori sono emerse a partire dal MAB Collina Po?
   f) Quali forme di collaborazione tra associazioni del territorio sono emerse a partire dal MAB Collina Po?
   g) Quali forme di collaborazione tra comuni sono emerse a partire dal MAB Collina Po?
   h) Ci sono stati cambiamenti positivi portati dalla creazione del MAB Collina Po?
   i) Se sì, quali?
   j) Ci sono stati effetti negativi o inaspettati direttamente dovuti alle attività del MAB Collina Po?

3) Riconoscibilità del MAB
   a) Quanto ritiene sia conosciuto il MAB Collina Po tra gli amministratori locali/le imprese/la popolazione locale/le associazioni?

b) Ci sono stati momenti o eventi specifici che hanno aumentato la notorietà del MAB Collina Po?
c) Se sì, Quali?
d) In che modo pensa che il MAB Collina Po possa migliorare la sua visibilità e riconoscibilità tra la popolazione che vive sul suo territorio?

4) Cibo e MAB

a) Quanto ritiene che il tema del cibo sia rilevante nel contesto del MAB Collina Po?
b) Vi sono state attività legate al cibo direttamente organizzate dal MAB Collina Po?
c) Vi sono state attività legate al cibo organizzate da altri attori ma cui il MAB Collina Po ha attivamente partecipato?
d) Se il MAB realizzasse una politica del cibo, quali soggetti dovrebbero essere coinvolti?

English translation:

1) Function of the MAB

a) In your opinion, what are the main objectives of the UNESCO MAB Collina Po?
b) How do you assess the commitment of MAB Collina Po to promoting environmental conservation?
c) Have you noticed any changes in this commitment over the 10 years of MAB Collina Po's existence?
d) If so, which ones?
e) How do you judge MAB Collina Po's efforts to engage the various local communities?
f) Which stakeholders do you think are the most active within MAB Collina Po?

2) Impact of the MAB

a) Have you noticed changes in the Collina Po area after it received the UNESCO MAB designation?
b) If yes, which ones?
c) Do you think MAB Collina Po has influenced how people in this area perceive environmental sustainability?
d) If yes, through which actions or initiatives?

e) What forms of collaboration between producers have emerged since MAB Collina Po was established?
f) What forms of collaboration between local associations have emerged since MAB Collina Po was established?
g) What forms of collaboration between municipalities have emerged since MAB Collina Po was established?
h) Have there been positive changes brought about by the creation of MAB Collina Po?
i) If yes, which ones?
j) Have there been any negative or unexpected effects directly due to MAB Collina Po's activities?

3) Recognition of the MAB

a) How well known do you think MAB Collina Po is among local administrators/businesses/the local population/associations?
b) Have there been specific moments or events that increased the visibility of MAB Collina Po?
c) If yes, which ones?
d) In what ways do you think MAB Collina Po could improve its visibility and recognizability among the population living in its territory?

4) Food and the MAB

a) How relevant do you consider the topic of food within the context of MAB Collina Po?
b) Have there been food-related activities directly organized by MAB Collina Po?
c) Have there been food-related activities organized by other actors in which MAB Collina Po actively participated?
d) If MAB were to develop a food policy, which stakeholders should be involved?

ANNEX D – List of stakeholders

The complete list of stakeholders is placed here because it is too detailed for the main text. In the following tables, stakeholders are referenced only by the numeric codes used in the power–interest–size analysis and in the network analysis; see pages 376 and 379 for the discussion.

N.	Power-Interest-Size Analysis
1	MAB UNESCO COLLINAPO
2	ATLANTE DEL CIBO DI TORINO METROPOLITANA
3	CITTÀ METROPOLITANA DI TORINO
4	CONSORZIO DELLE RESIDENZE REALI SABAUDE
5	GAL BASSO MONFERRATO ASTIGIANO
6	DISTRETTO DEL CIBO DEL CHIERESE E CARMAGNOLESE
7	QUFOOMA
8	VISIT PIEMONTE/TORINO
9	CORONA VERDE
10	VENTO
11	FONDAZIONE CAMPAGNA AMICA
12	COLDIRETTI TORINO
13	CIA AGRICOLTORI DELLE ALPI
14	CONFAGRICOLTURA TORINO
15	SLOW FOOD
16	PUNTO AL CIBO
17	ORME ETS – ORTI METROPOLITANI
18	GASTORINO
19	L'ALVEARE CHE DICE SÌ
20	ISTITUTO PER LE PIENTE DA LEGNO E L'AMBIENTE (IPLA)
21	ARPA PIEMONTE
22	UNIVERSITÀ DI TORINO
23	POLITECNICO DI TORINO
24	UNIVERSITÀ DI SCIENZE GASTRONOMICHE
25	CENTRO DI STUDI E RICERCA SUL CIBO SOSTENIBILE
26	IIS B. VITTONE SEDE AGRARIA
27	CANTINA SPERIMENTALE DEL CENTRO BONAFUS
28	CASCINA LE VALLERE
29	CENTRO DI EDUCAZIONE AMBIENTALE DI CASCINA RESSIA (C.E.A.)
30	CAAT CENTRO AGROALIMENTARE TORINO
31	DNV-GL
32	AZ. PAOLO MARIA MOSCA
33	CASCINADIMAGGIO AGRITURISMO
34	PESO NETTO
35	FORME CANONICHE APS
36	FONDAZIONE MIRAFIORI
37	PRO NATURA TORINO
38	RECIPROCAMENSA
39	ASSOCIAZIONE IMPOLLINATORI METROPOLITANI
40	ANEMOS ITINERARI DEL VENTO
41	ASSOCIAZIONE CULTURALE PEPPINO IMPASTATO - CARMAGNOLA
42	AMICI DEL CALCARE DI GASSINO - CACO3 GA
43	ANDREIPERBOSCHI (CORDOVA)
44	ANIMAMONDO APS
45	ASD DI TUTTI I SENTIERI
46	CENTRO STUDI COLLINA PO (PRO LOCO GASSINO)
47	COMITATO PER LA SALVAGUARDIA DEL LAGO ARIGNANO
48	COMITATO CITTADINI PER LA TUTELA E IL TRASPORTO SOSTENIBILE
49	DI TUTTI I COLORI
50	FIAB MUOVITI CHIERI
51	FRUTTETO DI VEZZOLANO
52	ASSOCIAZIONE RUBENS (CENTRO HYGGE)
53	IL CUBO
54	IL TUO PARCO
55	LA CONTRADA SCS
	LA FORNACE SPAZIO PERMANENTE - DI MUNLAB ECOMUSEO
56	DELL'ARGILLA
57	MULINO DI ARIGNANO
58	MUSEO DELLE CONTADINERIE
59	PERFARE ODV BALDISSERO T.SE
60	PLASTIC FREE PINO
61	PRO LOCO GASSINO T.SE
62	SGUARDO NEL VERDE
63	SOUL SHELTER APS
64	STILE MACROBIOTICO CHIERI

N.	Network Analysis
1	MAB UNESCO COLLINAPO
2	DISTRETTO DEL CIBO DEL CHIERESE E CARMAGNOLESE
3	ATLANTE DEL CIBO DI TORINO METROPOLITANA
4	VISIT PIEMONTE/TORINO
5	CORONA VERDE
6	PUNTO AL CIBO
7	GASTORINO
8	ISTITUTO PER LE PIENTE DA LEGNO E L'AMBIENTE (IPLA)
9	ARPA PIEMONTE
10	UNIVERSITÀ DI TORINO
11	POLITECNICO DI TORINO
12	IIS B. VITTONE SEDE AGRARIA
13	CASCINA LE VALLERE
14	PRO NATURA TORINO
15	RECIPROCAMENSA
16	CENTRO STUDI COLLINA PO (PRO LOCO GASSINO)
17	IL TUO PARCO
18	CITTA' DI TORINO
19	COMUNE DI MONCALIERI
20	COMUNE DI PINO TORINESE
21	COMUNE DI CARIGNANO
22	COMUNE DI CARMAGNOLA
23	CIÒ CHE VALE (CSA CIÒ CHE MANGIO)
24	ENTE DI GESTIONE DELLE AREE PROTETTE DEL PO PIEMONTESE
25	DIREZIONE AGRICOLTURA - REGIONE PIEMONTE
26	COMPAGNIA DI SAN PAOLO
27	FONDAZIONE CRT
28	IREN
29	SMAT
30	LINKS FOUNDATION

65	STORIA E FUTURO
66	TERRA BOSCHI E GENTE
67	TERRE DI NESSUNO
68	UNIVERSITÀ POPOLARE ARTINMOVIMENTO
69	LVIA - IN CIBO CIVITAS
70	CASCINA FALCHERA
71	BEELAB
72	ASSOCIAZIONE SOLIDARIETÀ ORTI FAMILIARI
73	FONDAZIONE DELLA COMUNITÀ CHIERESE
74	CASCINA CACCIA
75	GAS VERRUA SAVOIA
76	CIRCOLO MARGOT
77	ASSOCIAZIONE DI PROMOZIONE SOCIALE PININ PACOT
78	APS “IN COLLINA - TURISMO NEL CUORE DEL PIEMONTE”
79	ASSOCIAZIONE TURISTICA PRO LOCO LA LOGGIA
80	ASSOCIAZIONE TURISTICA PROLOCO LOMBRIASCO
81	ASSOCIAZIONE TURISTICA PRO LOCO DI MAZZÈ
82	ASSOCIAZIONE TURISTICA PROLOCO PIOBESI TORINESE
83	ASSOCIAZIONE TURISTICA PRO LOCO RIVALTA DI TORINO
84	ASSOCIAZIONE TURISTICA PRO LOCO DI SAN MAURO TORINESE
85	ASSOCIAZIONE TURISTICA PRO LOCO MANSIO QUADRATA
86	ASSOCIAZIONE TURISTICA PRO LOCO DI VERRUA SAVOIA
87	ASSOCIAZIONE TURISTICA PRO LOCO VILLASTELLONE
88	ASSOCIAZIONE TURISTICA PRO LOCO DI VIRLE PIEMONTE
89	MONTALDO CULTURA
90	SAPORI DI SCIOLZE
91	UN CUOR DI PEPERONE
92	COMITATO MANIFESTAZIONI OSASIO
93	CITTA' DI TORINO
94	COMUNE DI CAVAGNOLO
95	COMUNE DI MONCALIERI
96	COMUNE DI PINO TORINESE
97	COMUNE DI CARIGNANO
98	COMUNE DI RONDISSONE
99	COMUNE DI CARMAGNOLA
100	COMUNE DI SETTIMO TORINESE
101	COMUNE DI ARAMENGO
102	COMUNE DI CHIVASSO
103	ANCI
104	COOP
105	UNPLI PIEMONTE (PRO LOCO)
106	CIÒ CHE VALE (CSA CIÒ CHE MANGIO)
107	TURISTI E VISITATORI
108	FACOLT – FRUTTICOLTORI ASSOCIATI COLLINA TORINESE
109	ENTE DI GESTIONE DELLE AREE PROTETTE DEL PO PIEMONTESE
110	REGIONE PIEMONTE
111	DIREZIONE AGRICOLTURA - REGIONE PIEMONTE
112	ATTUAZIONE PROGRAMMI RELATIVI AI SERVIZI DI SVILUPPO - REGIONE PIEMONTE
113	PROVINCIA DI ASTI
114	PROVINCIA DI CUNEO
115	PROVINCIA DI VERCELLI
116	CAMERA DI COMMERCIO
117	ENTE NAZIONALE RISI
118	COMPAGNIA DI SAN PAOLO
119	SMAT
120	FONDAZIONE CRT
121	BANCOALIMENTARE
122	IREN
123	SMAT
124	LINKS FOUNDATION

ANNEX E – The food system of CollinaPo Biosphere Reserve

This annex compiles the addressed framework of the CollinaPo food system, which is too detailed for the main text. The system is described across seven supply-chain stages and six drivers' groups, each linked to measured indicators. Also, three major political dimensions are considered.

The multi-level framing specifies the drivers (Piedmont Region; Italy), the supply chain scope (CollinaPo), and the political dimensions (Turin; CollinaPo; Piedmont Region). In the following tables, elements are presented in concise form and regard the discussion that takes place in pages 250-336.

The Food System of CollinaPo Biosphere Reserve

RIGHTS

1. The rights of workers
2. The rights of people who consume food

PARTICIPATION

1. The grassroot initiatives
2. A network of food initiatives

REGIMES

1. Geographical Indications
2. Distretti del cibo
3. The phenomenon of foodification
4. Attempts of Urban Food Policies

Political dimensions:
1) Turin
2) CollinaPo
3) Piedmont Region

PRODUCTION

1. Utilized Agricultural Area (UAA) under production
2. Agricultural production by specialization area
3. Number of farms cultivating crops for animal feeding
4. Livestock Unit (LSU) production
5. Livestock Unit by specialization area
6. Number of livestock heads per livestock farm
7. Age profile of farmers
8. Number of farmers by declared genders

PROCESSING

1. Distribution of agri-food enterprises
2. Processing enterprises represented by type of processed food
3. N. of processing enterprises by type of processed food

LOGISTICS

1. Spatial distribution of logistic hubs

WHOLESALE

1. Total number of wholesalers
2. Typology of wholesalers
3. Distribution of wholesalers

RETAIL

1. N. of specialized retailers
2. Typology of specialized retailers
3. Spatial distribution of specialized retailers
4. N. of non-specialized retailers
5. Typology of non-specialized retailers
6. Spatial distribution of non-specialized retailers
7. Spatial distribution of retailers dedicated to specific diets (e.g. organic, vegan, ethnic)
8. Spatial distribution of farmers' markets
9. Overall distribution and density of food retailers
10. Buildings with population experiencing food desert conditions

CATERING

1. Spatial distribution of bars
2. Spatial distribution of restaurants
3. Typology of restaurants

WASTE

1. Kilograms of food waste

Supply Chain:
1) CollinaPo

BIOPHYSICAL AND ENVIRONMENTAL

1. Rain precipitations
2. Surface air temperature
3. Land degradation
4. Land consumption

DEMOGRAPHIC

1. Population variation
2. Age of farmers

POLITICA AND INSTITUTIONAL

1. Agricultural and rural development policies
2. Cohesion and structural development funds
3. Extraordinary and competitive measures

SOCIO-CULTURAL

1. Vegetarianism and veganism
2. "Free from" diets
3. Illness-related diets

ECONOMIC AND MARKET

1. Number of active farms and economic sizes
2. Size of Utilized Agricultural Area
3. Import-export dimension
4. Net population's purchasing power
5. Number of tourists
6. Accomodation infrastructure

TECHNOLOGICAL, INNOVATION AND INFRASTRUCTURE

1. Stages' automatization
2. Distribution of logistics

Drivers:
1) Piedmont Region
2) Italy

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