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Toward Evidence-Based Local Food Policy: An Agroecological Assessment of Urban Agriculture in Rome

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Abstract: Recent crises have highlighted the vulnerabilities of global supply chains and, consequently, a profound need for food system transformation. In this scenario, local food policy and agroecology arise as two different but converging paradigms capable of fostering an inclusive and sustainable transition of the food systems, especially in urban contexts. The purpose of this paper is to strengthen the relationship between these two paradigms by proposing agroecological assessment as a tool for formulating evidence-based local food policies. Considering the city-region food system of Rome (Italy) as a reference context, the paper proposes an adaptation of the Tool for Agroecology Performance Evaluation (TAPE) model on a sample of 20 farms to analyse urban agriculture and understand the extent to which it contributes to the transformation of the food system. Data processing shows that, in the city-region context of Rome, agroecological principles are not fully adopted by the majority of farms considered. In addition, farms with the highest agroecological level are those driven mainly by social factors and have a lower propensity for innovation. This could be read as a constraining aspect because it hinders and slows down the transformation process of food systems. However, these data turn out to be essential to the implementation of local food policy and in identifying pathways toward sustainability.

Keywords: food-policy; agroecology; assessment; urban agriculture

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1. Introduction

Recent crises, such as the COVID-19 pandemic, the Russian–Ukrainian conflict, the climate crisis, and growing food insecurity, have highlighted the vulnerabilities of global supply chains and, consequently, a profound need for food system transformation.

Over the last decades, the concepts of local food policy and agroecology have gained increasing relevance in the international scientific audience due to the emerging global challenges facing our planet (climate, biodiversity, hunger, and inequalities). They are progressively becoming more accepted as sets of knowledge and practices that can convert entire food systems by bringing together the environmental, economic, and social dimensions of sustainability and adopting a bottom-up approach based on local knowledge and participation.

Agroecology recognizes the interrelationships between people, agriculture, and nature, as well as the empowerment of farmers [1]. On the other hand, local food policies promote a systemic approach and the inclusion of food issues within all policy areas, including environment, health, and social inclusion [2]. Finally, both paradigms attempt to challenge the cultural and structural power dynamics existing in the current food system by reinforcing the self-organisation of food producers and consumers.

The goal of this article is to demonstrate the potential of the link between these two paradigms to transform food systems toward sustainability. In particular, the article

proposes an agroecological assessment methodology applied to urban agriculture in the city-region food system of Rome (Italy). The research provides an adaptation of the Tool for Agroecology Performance Evaluation (TAPE) developed by FAO in 2019. The survey was given to a sample of 20 farms adhering to "Alveare che dice sì!"—a short food supply chain organisation in Rome.

The results of the application of this methodology aim to inform the degree of agroecological transition of the selected farms, with particular attention to the relationship between city and countryside. The findings are noted to be relevant to the formulation and evaluation of the local food policy of the city of Rome, demonstrating that agroecological assessments might be essential to formulating evidence-based food policies and transforming the food system.

This article is structured in five sections, including the introduction, theoretical framework, materials and methods, results, discussion, and conclusions. Specifically, the section on the theoretical framework presents an analysis of the paradigms of local food policy and agroecology, focusing on the synergies between these two. In this section, the research also illustrates the food system of the city-region of Rome, which constitutes the case study. This is followed by an explanation of the methodology, i.e., the agroecological assessment adapted from the TAPE framework [3], and the results section. Finally, some discussion and conclusions are outlined.

2. Theoretical Framework

2.1. Local Food Policy

Local food policies (also called by the synonym "urban food policies") are defined as processes through which cities envision change in their food systems and in how they strive to achieve this change [4] (p. 6). Specifically, local food policies are characterised by a strong systemic and cross-sectoral approach that considers the interconnections between the social, environmental, and economic dimensions. In attempting to transform the food system, food policies aim to bring about changes in various sectors, such as education, health, social services, public procurement, economic development, land use, and agriculture.

Moreover, in the empirical contexts in which food policies were implemented, new governance dynamics occurred, such as participatory processes involving actors from civil society, public institutions, and the private sector.

According to Sonnino [5], urban food policies in Europe and North America are distinguished by four key characteristics, representing a significant change from the past. First, they are characterised by a systemic vision, which means embedding food issues in all policy areas. Second, they promote the concept of "new localism", since they emphasise the territorial dimension and consider the "city-region food system". Some scholars and practitioners [6] identify in the city-region food system a new "geographic entity" denoting a target area that goes beyond the administrative boundaries of the city and includes ecological and social connections with the surrounding area. Third, they foster a type of participatory governance that promotes community capacity-building and new governance dynamics, for example, through Food Councils [7]. Finally, "trans-local" networks are emerging, such as the Milan Urban Food Policy Pact (MUFPP), capable of extending the relevance of food policy both geographically and politically.

Finally, urban food policies aim to democratise and transform food systems by empowering citizens and facilitating their participation in food policy development and implementation.

2.2. Agroecology

Over the last 20 years, the concept of agroecology has gained increasing relevance among the international scientific audience. It is becoming a basis for converting entire agri-food systems by bringing together several aspects of sustainability [8] and adopting a bottom-up approach based on the knowledge and natural resources of local communities for agricultural production [9]. Agroecology recognizes the interrelationships between people, agriculture, and nature and the empowerment of farmers [1], due to its multidimensional

nature: as a science, as an innovative agricultural practice, and as a grassroots socio-political movement of small-scale producers [10].

Agroecology is rooted in practices, ecological farming projects, and phenomena of resistance to the spread of industrial agriculture by indigenous farmers in Latin America [11–13]. In 1928, Bensin [14] used this expression to refer to the application of the principles and concepts of ecology to agriculture. Starting in the 1970s, in response to the homologation dictated by the Green Revolution, agroecology began to take on connotations of an ideological nature, advocating an ecological view of agriculture through the inclusion of the concept of agroecosystem, understood as a harmonious combination of natural and artificial ecosystems. In the 1980s, attention was focused on the concept of "sustainability" related to the agricultural sector as a model capable of protecting natural resources [15].

In the 1990s, agroecology began to take on a social character in connection with critical reflection on food consumption patterns [16], focusing on the interrelationships between production, distribution, and consumption. In 2007, Gliessman redefined agroecology as a science that applies ecological concepts and principles to the design and management of sustainable agri-food systems. In particular, he formulated five levels that will be described in the next section [17]. Several sets of agroecological principles have been produced in the scientific literature [18–23], the most recent including those formulated by CIDSE [24], FAO [25], and INKOTA [26].

The implementation of these principles is useful not only to reduce the use of non-renewable resources [27], but also to activate endogenous development dynamics. In this context, agroecology proposes the foundations for defining new areas such as the foodshed and alternative food networks [28,29], both of which address the sustainability of food systems. In 2018, the FAO recognised agroecology as a significant approach to achieving the sustainability goals of agricultural and food systems, interpreting 10 elements as a guide for policymakers, farmers, and other stakeholders involved in planning, managing, and monitoring the agroecological transition [25]. These 10 elements are the starting point of the TAPE methodology, as will be explained later in Section 3 of the article.

In 2019, the High Level Panel of Experts on Food Security and Nutrition (HLPE) defined the 13 principles of agroecology[1] needed to operationalize the agroecological approach in the Performance Assessment Tool in Agroecology (TAPE) methodology. The convergence between the frameworks just outlined can be observed in Figure 1.

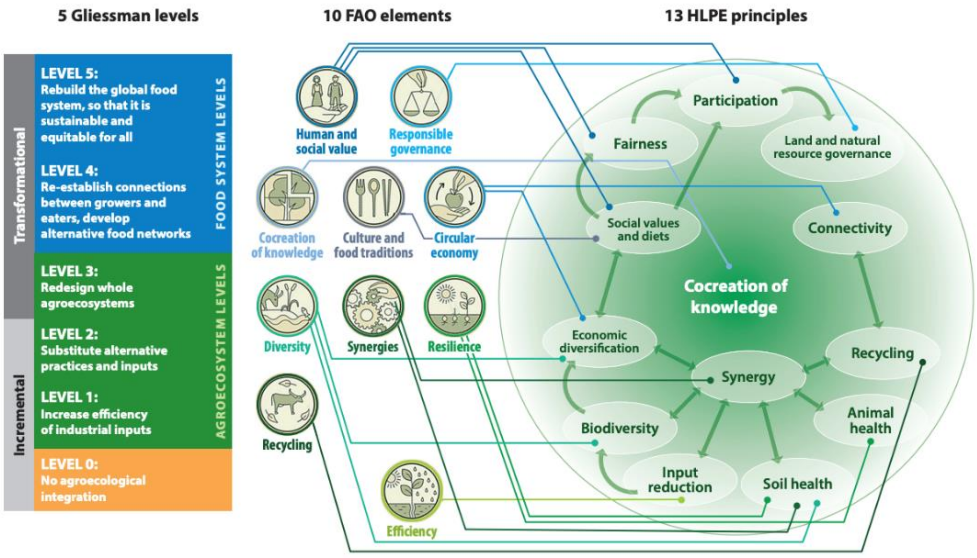


Figure 1. The correspondence within the 10 FAO elements, the 13 HLPE principles, and the 5 Gliessman levels. Source: [30].

2.3. Synergies between Food Policy and Agroecology

According to Gliessman [17], and as mentioned before, the agroecological transformation of the agri-food system passes through a process consisting of five steps:

1. Increasing input use efficiency;
2. Replacing conventional inputs and practices with agroecological alternatives;
3. Redesign the agroecosystem on the basis of a new set of ecological processes;
4. Restoring a more direct connection between producers and consumers;
5. Building a new global food system based on participation, democracy, equity, and justice (see Table 1), where only the last three steps are recognised as having real transformative capacity.

Considering these steps, agroecology offers a new multidisciplinary approach to transform food systems at the territorial level, considering the interconnections between dimensions (i.e., social and economic) and sectors (i.e., production and consumption). According to the agroecological approach, urban contexts and urban-rural relations assume a central role and become places of interest for all activists and researchers engaged in issues pertaining to agrarian issues and agroecological transitions [31–34].

Therein lies the convergence between local food policies and agroecology: both aim at an inclusive and sustainable transformation of the food system, reconsidering the interconnection between social, environmental, and economic dimensions (see Table 1, where the convergences between local food policy and the Gliessman agroecological food system principles are outlined). Not only that, but they also take into account a territorial approach based on local knowledge and participation, countering asymmetric power dynamics in the food system. However, while the former provides suitable governance tools to support the transition (i.e., food policy councils and participatory decision-making processes), the latter offers ecological principles to make food production and consumption more sustainable.

In empirical contexts, experiences in the field of urban agroecology [35] and farmers' participation in local food policies for the food system have converged and marked the rise of a new research agenda aimed at linking food sovereignty and urban movements.

Specifically, urban agroecology, understood as the expansion of urban agriculture, promises to overcome the unsustainable link between rural and urban-periurban activities [36]. This activity is considered central to both agroecology practices and food policy implementation.

Thus, considering the convergence of these two practices in transforming the city-region food system, this article aims to demonstrate how one can be functional with the other, particularly in the assessment and formulation of evidence-based policies.

Table 1. Convergences between local food policy and agroecology. Source: [37].

Food Policy Principles	Gliessman's Model Principles
1. Promoting healthy and balanced diets	Equity, justice
2. Accessibility to healthy diets	Equity, justice
3. Recognising the value of food sustainability	Participation, democracy
4. Developing short supply chains and diversification	Equity, justice, democracy
5. Waste reduction	Equity, justice
6. Adequate income levels for producers	Equity, justice, participation
7. Promoting the sustainable use of resources	Participation
8. Promoting specific territorial and landscape features	Participation, democracy
9. Strengthening urban-rural linkages	Participation, democracy
10. Participatory and shared governance	Democracy, participation, equity, justice

2.4. The City-Region Food System of Rome

Through a series of fragmented processes, the city of Rome has always been characterised by strong links between the urban population and local agriculture, until recent decades, when long industrialised food chains have become increasingly dominant [38], breaking down that traditional link between city and countryside. The weak commitment of the public sector, however, failed to stop the strong will of informal groups and organisations engaged in the attempt to create collective democratic dynamics for the transformation of the local food system [39]. There is a lot of excitement in the Roman context, with rapidly growing initiatives aimed not only at supporting conscious actions in line with the 2030 Agenda for Sustainable Development, but also building coordination between the different actors in the urban food system. In fact, the bottom-up process of the city's food policy, which involves a wide range of actors willing to build more resilient and sustainable development models, is being carried out. The proposal for a food policy for Rome stems from the desire of the promoting committee to bring together people and realities active in different spheres.

In 2019, the Terra! Association and Lands Onlus launched this proposal [40], i.e., an analysis and mapping of the Roman food system that aimed to highlight its criticalities and prospects, presenting the institutions with 10 operational principles to initiate a food policy aimed at sustainability, the protection of local producers, and the right to food. This event marked the beginning of a formal dialogue between the municipality and the group that culminated in the unanimous approval of Resolution 38/2021 by the Capitoline Assembly in 2021, laying the foundations for a food policy. Resolution 38 consists of the same principles outlined in the proposal and includes a commitment by the municipality to the following:

- The formulation of a strategic document of the Food Plan with vision, principles, and guidelines (Art. 2);
- The establishment of the Food Council (Art. 3);
- The establishment of a technical office for the implementation of the Rome food policy (Art. 4).

On 23 February 2022, the provisional Food Council took office, chaired by the President of the Environment Commission of the City Council, which initiated the creation of seven working tables related to the 10 operational objectives (Figure 2) of the proposal document well depicted by Marino and Mazzocchi [41] in the article 'The Evolution of Food Policy in Rome: Which Scenarios?'.

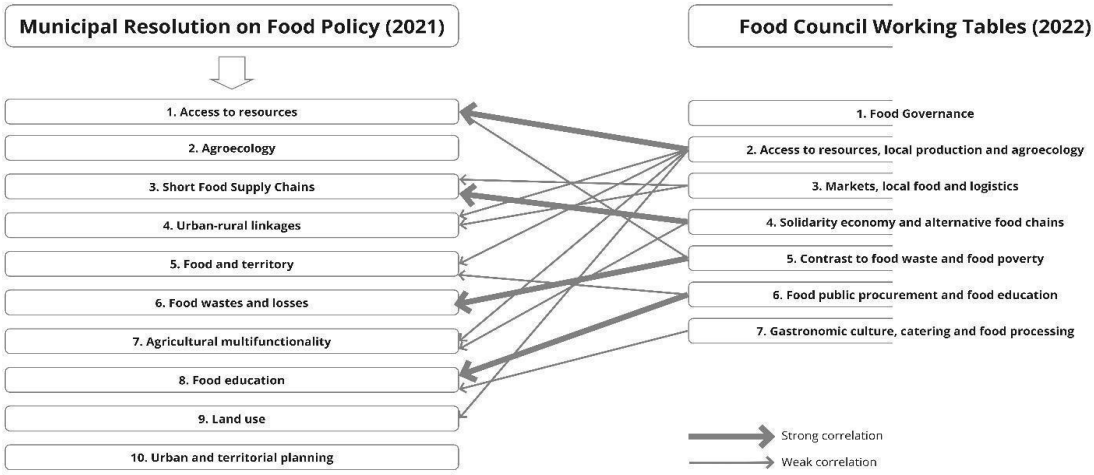


Figure 2. Connections between the working tables of the Food Council and the objectives envisaged in Resolution 38/2021. Source: [41].

As it is possible to see from Figure 2, 'Access to resources, local production and agroecology' is of considerable weight since it is simultaneously connected to several food

policy objectives. Therefore, food policy aims to use the agroecological approach to support innovation in local food systems through the involvement of different actors.

Turning our attention to the agricultural side, on the other hand, the municipality of Rome, the largest agricultural municipality in Italy, has a millennia-long agricultural and food history, with 45% of the area consisting of agricultural land. The relationship between the city and its agro-Roman productions, markets, operators, companies, and gastronomic traditions represents the identity elements of the city [42].

The strong pressure of urbanisation between 1990 and 2000 caused a 42% reduction in the utilised agricultural area (UAA); this trend was reversed between 2000 and 2010, with an increase in UAA of 14% [41] and a further increase of 5.72% between 2010 and 2020.

To date, a very important aspect that characterises agriculture in our country and which is also reflected at the regional and municipal level is represented by a dichotomy regarding the size of farms and the UAA [43,44], i.e., fewer but larger farms. The latest agricultural census [45] draws attention to the ongoing process of concentration of agricultural entrepreneurship.

The report confirms that the average size of farms has doubled over the period 1982–2020 in terms of UAA (from 5.1 to 11.1 average hectares per farm) and SAT (from 7.1 to 14.5 average hectares per farm). Shifting our gaze to the territorial boundaries of the Municipality of Rome, through an elaboration of regional data from 2020 and 2010 and municipal data from 2010 (Figure 3), it was possible to calculate an estimate of the municipal data in 2020 of the number of farms and UAA by UAA classes (from 0 to 19.99 hectares and from 20 to over 100 hectares).

The estimated data tell us that there were 1966.62 farms in 2020, with a decrease of 25.96% compared to 2010. Similarly, the UAA of small farms in 2020 is 7353.24, with a percentage change of −8.34 compared to 2010, while the UAA of large farms is 40,344.35, with a positive percentage change of 10.23. In relation to the distribution of holdings by classes of utilised agricultural area, holdings between 0 and 19.99 hectares occupy 15.42% of the UAA compared to 84.58% of large holdings (>20 and over 100 hectares). This shows that there is a strong prevalence of large farms (Figure 3), which are smaller in number but hold a high percentage of the UAA.

Figure 3. Comparison of agricultural enterprises and utilised agricultural area (UAA) in Rome in 2010 and estimation for 2020 (% and VA)[2]. Source: authors' elaboration.

Similarly, according to the latest ISPRA report [46], Rome is the city that consumes more soil on average than other cities, over 90 hectares, since 2006. In 2021, the city lost 95 hectares of previously natural or semi-natural soil, and more than half of the soil

consumption can be traced back to a form of transition classified as building site areas. In the same year, Rome also consumed soil for new built-up areas and for the expansion of quarry areas and paved areas for car parks or yards.

The observation of soil consumption is necessary because it is a phenomenon that generates negative effects on climate change, such as the loss of ecosystem functions, the increase of extreme phenomena and the modification of albedo and consequent positive forcing (heat islands). In a scenario like the one in Rome, where there is a lot of land consumption and land is increasingly concentrated in a few hands, the agroecological transition of urban and peri-urban agriculture acquires full relevance with respect to the implementation of food policy.

In essence, as part of a transformative process of the urban food system, the agroecological approach would lead to the reorganisation of the material flows and social and economic relations of the city-region food system context. In this sense, in the present paper, it was deemed interesting to understand and analyse a sample of companies in the Roman territory in order to verify the existence or absence of complementarities between the agroecological model and food policy. Furthermore, the data show us that the implementation of agro-ecological principles by companies is certainly essential, but in order to increase the significant impact on the entire ecosystem, a greater involvement of large companies that hold more UAA would be inevitable.

3. Materials and Methods

In order to investigate agroecological transition at the farm level, different methodologies have been developed in recent years [47–49]. FAO has developed the TAPE framework, launched in 2019 [3]. The TAPE (Tool for Agroecology Performance Evaluation) model as a performance evaluation method in agroecology is based on several existing evaluation frameworks. TAPE is a comprehensive tool that aims to measure the multidimensional performance of agroecological systems across different dimensions of sustainability in different contexts and at different scales, with the aim of supporting specific policy development in this regard. It uses a household- and farm-scale approach, but also captures information and provides results at the territorial level [3]. The TAPE model is a questionnaire structured in relation to the 10 elements or principles of sustainability, which are: Diversity, Cooperation and Knowledge Exchange, Synergy, Efficiency, Recycling, Resilience, Human and Social Values, Food Culture and Tradition, Responsible Governance, and Circular and Solidarity Economy (see Table 2). For each of these items, there are questions containing 5 response modes constructed according to a scale ranging from 0 to 4.

Table 2. Questions related to TAPE principles considered for the analysis. Source: authors' elaboration.

Question	TAPE Principle (10 Elements of Agroecology—FAO)
1	Diversity
2	Cooperation and knowledge exchange
3	Synergy
4	Efficiency
5 (5.1, 5.2)	Recycling
6	Resilience
7	Human and social values
8	Food culture and tradition
9	Responsible governance
10	Circular and solidarity economy

TAPE is based on the analytical framework called MESMIS (The Evaluation of Natural Resource Management Systems) [50], a reference evaluation framework generally used in Latin America, which provides principles and guidelines for the quantification and

integration of context-specific indicators through a multi-stakeholder participatory process. In our work, TAPE is the basic methodological tool from which the starting point for the agroecological analysis on Roman territory was made.

Considering that the TAPE model was created to measure the multi-dimensional performance of developing countries' agroecological systems across the different dimensions of sustainability, this work envisaged a re-adaptation of it to the western context and, more specifically, to the territorial food system of the city of Rome. In fact, the 10 elements or principles provided by the TAPE model were retained, intercepting for each of them a question (with the exception of the Recycling element, for which 2 questions were selected). Therefore, 11 questions covering the 10 agroecological principles were identified.

The research considered a sample of 20 farms belonging to "Alveare che dice sì!"[3]. It is a short food supply chain experience, comparable to a Solidarity Purchasing Group, in which there are no intermediary relationships. Producers and consumers meet in person for the sale, thus favouring direct relationships. The choice of farms was made considering that they belong to an innovative type of short food supply chain in which environmental, relational, social, and economic objectives should be fully integrated. Our hypothesis is that these farms' features contain elements from which valid principles can be extracted to guide the agroecological transition of the Roman agrifood system.

The questionnaire was administered in the period September–October 2022 to farms and processing companies in the Lazio area that fall within one of three "Alveare che dice sì!": "Marconi Roma", "Roma Monteverde", and "Roma bio appetito Spinaceto". The structure of the questionnaire was organised in 3 sections: a farm descriptive section, an agroecological section, and a section on the importance of participation in "Alveare che dice sì!" The first section includes a description of the main socio-economic and demographic characteristics of the farms, such as location, size, production address, legal form, and type of land ownership or labour units. In the second section, eleven questions were asked, corresponding to the ten agroecological principles of TAPE [3] (see Table 2).

Each question contains five response modes, constructed on a Likert scale from 1 to 5. By combining the eleven questions, a composite indicator was created expressing the agro-ecological gradient of the farm, which can range from 10 to 50[4] or from 0 to 100 when expressed as a percentage. Based on the data obtained from the administration of the questionnaire to the farms that are part of "Alveare che dice sì!", it was possible to investigate the following:

1. Whether the agroecological model is found in farm management activities, i.e., in peri-urban agriculture;
2. Whether participation in "Alveare che dice sì!" has induced changes in an agro-ecological sense;
3. Analyse the agroecological characteristics of farms in the Roman context to extract principles that can inspire and guide the direction of the food policy process.

In the third and final section, the questions are aimed at investigating the aspect of participation in "Alveare che dice sì!", i.e., the motivations for joining "Alveare che dice sì!".

4. Results

4.1. Farm Structures

A total of 19 farms completed the questionnaire. Of these, 11 are sole proprietorships, i.e., consisting of a single working partner; 6 are simple agricultural companies; and only 1 is a corporation. The average farm size expressed in TFA (Total Farm Area) is 31.4 hectares. Of these, 78.3% are Utilised Agricultural Area (UAA). It should be noted that, among the farms considered, one has a TFA of 250 hectares, without which the average would be 19.2 hectares (see Table 3).

Table 3. Sample farm structures and main variables.

Variable	Data
Legal form	11 individual farms 6 simple agricultural companies 1 corporation
Utilised Agricultural Area (UAA)	Average: 24.5 hectares Minimum size: 0.5 hectares Maximum size: 220 hectares
Land ownership	5 on rent 9 private properties 4 mixed on rent/private properties 1 no land
Farming specialisation	11 multi-crop farms (mixed herbaceous and/or tree crops) 4 multi-breeding farms (different types of farming with milk and/or meat production) 4 mixed farms with crops and livestock
Labour Units	Total Labour Units: 73 Average Labour Units: 3.8 Minimum Labour Units: 1 Maximum Labour Units: 16
PDO or PGI products	3 farms (1 specialised in wine, 1 specialised in oil and 1 specialised in lamb)
Organic farming	6 conventional farms 5 certified organic farms 7 organic or biodynamic farms—not certified or verified through Participated Guarantee System

As for the distribution of UAA, the first quartile is found at 2.65 hectares, the second quartile at 7.5 hectares, and the third quartile at 25.5 hectares, thus highlighting the fact that the sample is characterised by the presence of half of the farms with a size close to the Italian average (8.4 hectares). It is observed that there is a concentration of farms in the smaller size classes: 40% have a UAA between 0 and 5 hectares, and 30% between 5 and 20 hectares. The larger farms (more than 20 hectares) concentrate almost 85% of the productive areas.

The distribution of holdings by type of land ownership is characterised by private ownership in about half of the cases, while the other half is evenly distributed between mixed ownership-rental and rent-only modes. Apart from a causal link between type of ownership and farm size, which would have to be demonstrated, the UAA ranges from 11.7 hectares for rental, 26.9 for mixed modes, and 33.4 in the case of land ownership. In 60% of cases, the farms have a production orientation based on vegetable crops (mixed herbaceous and/or arboreal) and mainly fresh market products, but also processed products such as oil and products in oil, jams, fruit juices, bakery products, and wine.

Twenty percent are specialised in animal production, with the production and marketing of dairy products and processed meat (mainly pork and beef). The remaining 20% of the farms have a mixed orientation with cultivation and breeding, and mainly fresh market products of vegetable and animal origin, processed meat, cheese, and oil. Only 20% of the sampled farms produce PDO-PGI products. Sixty percent of the farms have adopted 'non-conventional' production models (organic or biodynamic), while the remaining 40% adopt the conventional farming model. However, it should be noted that in the first group, non-certified forms or Participatory Guarantee Systems prevail; on average, these farms have an extension of less than 20 hectares. Smaller farms, having few financial resources to pay for certification and relying on trust (typical of direct sales), prefer not to have an

organic certification [51]. In terms of work units, the average is 3.8, of which about two thirds are family members.

Thus, the farms in the sample are characterised by a marked prevalence of family farming; in fact, about half of them employ only family workers, while in cases where salaried labour is present, this exceeds family labour in percentage terms on one farm. In all other cases where wage labour is employed, this amounts to about 41% of the total labour units. The degree of multifunctionality, despite the farms falling fully under peri-urban agriculture [52], is modest: only 26% have a complementary activity to primary production, mainly focused on agritourism as a supplementary source of revenue and internal re-utilisation of farm products.

4.2. Agroecological Gradients

Table 4 gives the results of the questionnaire with respect to the ten agroecological dimensions, built consistently with the TAPE theoretical reference model. Summing up, for each question, the frequencies of the answers with the highest agroecological gradient (medium-high and high), it emerges that the principles of Synergy and Food Culture and Tradition are the ones most pursued by the farms surveyed (12, in both cases). Next come Human and Social Values (11), Cooperation and Knowledge Sharing, Efficiency, Responsible Governance and Circular, and Solidarity Economy (10). The lowest values, obtained by summing the frequencies of the two response modes with the lowest agro-ecological gradient (medium-low and low), are consistently achieved by the principle of Renewables (14; only one farm has significant renewable energy production). Not very positive results were also seen for the Recycling and Resilience principles (both 7).

On the basis of the response patterns recorded by each farm with respect to the ten agro-ecological principles, it has been possible to obtain a synthetic indicator that assigns a score on a gradient from 0 to 100. Subsequently, the farms were ranked on three levels (low, medium, and high) through a subdivision into tertiles. The results show a distribution of tertiles, with the first level from 28.8% to 48.7%, the second from 48.8 to 60.0%, and the third from 60.1 to 100% (see Table 5).

Following the subdivision of the farms by low, medium, and high agro-ecological level, the average level for each agro-ecological principle of the farms belonging to the same level was calculated (see Figure 4).

Some considerations can be drawn by observing the characteristics of the farms that are placed in the high, medium, and low agroecological levels:

- The company size in terms of surfaces increases proportionally to the agroecological score; in fact, the average UAA is, respectively, for the low, medium, and high levels, equal to 7.08 hectares, 13.59 hectares, and 54.88 hectares. However, in terms of labour use, there are no substantial differences: companies with a low score have an average of 4 Work Units, while companies with a high score have an average of 4.5.
- Production specialisation is mixed for the low level, oriented towards fruit growing and horticulture for the medium level, and poly-livestock farming with arable land for the high level.
- Among the farms that register a high level, various diversification activities related to agricultural activity take place, in particular agritourism, which are more rarely present in the low and medium levels.
- Looking at the scores obtained on the 10 principles of TAPE agroecology, the major differences between the three levels are found in the themes of Resilience, Food Culture and Tradition, and Circular and Solidarity Economy. On the contrary, the three levels—high, medium, and low—are close in scores relating to Diversity, Efficiency and Responsible Governance.

Table 4. Frequencies (expressed in %) of the five response modes for each principle. The agroecological gradient is expressed by the colouring of the histograms, from the lightest and on the left (low gradient) to the darkest and on the right (high gradient). Source: authors' elaboration.

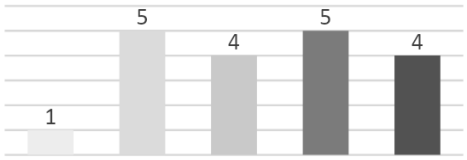
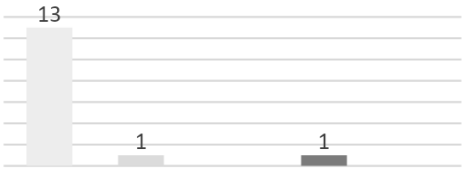
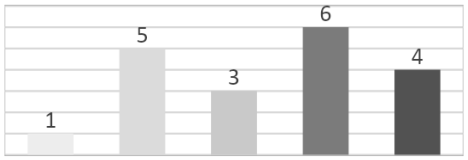
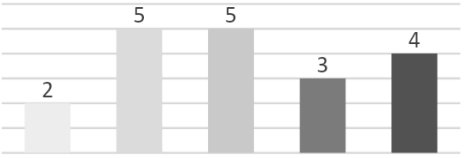
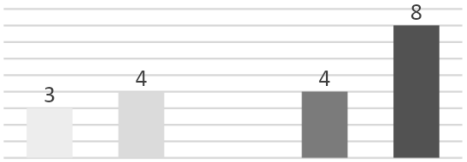
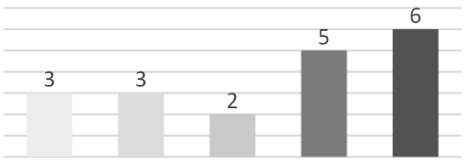
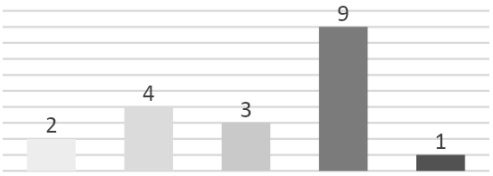
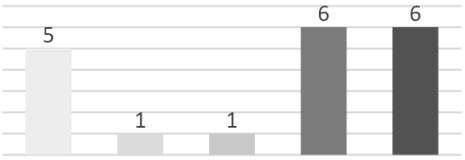
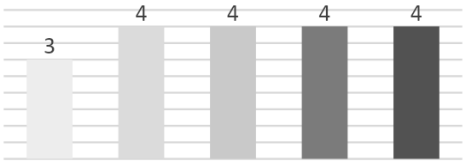
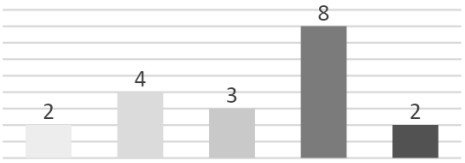
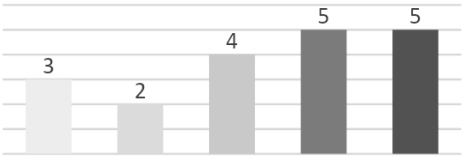
Diversity (1)	Recycling_renewable energy (5.2)
	
Cooperation and Knowledge Sharing (2)	Resilience (6)
	
Synergy (3)	Human and social values (7)
	
Efficiency (4)	Food culture and tradition (8)
	
Recycling_Water (5.1)	Responsible governance (9)
	
	Circular and solidarity economy (10)
	

Table 5. Tertiles, number of farms, and agroecological level classification. Source: authors' elaboration.

	No. of Farms	Average Score	Agro-Ecological Level
28.8–48.7%	6	40.4%	Low
48.8–60.0%	7	54.6%	Medium
60.01–100%	6	73.3%	High

Figure 4. Synthetic gradients for each agroecological principle, per agroecological level classification. Source: authors' elaboration.

4.3. Farm Strategies

An element little explored in the international literature is whether the path towards agroecological principles leads to changes in business strategy. Or, in other words, whether agroecology can represent a business strategy of adaptation to new market conditions and new consumer needs, especially in urban areas. To this end, an indicator was first developed to summarise the motivations that led the companies to join the food short supply chain of "Alveare che dice sì!". The questionnaire was structured to distinguish between social and, more strictly, economic motivations.

In particular, in the questionnaire, they were asked to evaluate, with a score from 1 to 5, the reasons that pushed the farm to join "Alveare che dice sì!". The options available were social and economic in nature. Among the first were envisaged: social commitment towards communities, the desire to promote greater access to quality products, and the desire to make consumers aware of their products and their approach. Among the latter, the following were envisaged: guaranteeing fair remuneration and improving market access. Considering the entire sample, the motivations that pushed the farms to join the short supply chain system under study are more of a social nature (desire to make the consumer aware of their products and their approach; desire to encourage greater access to quality products).

The least prevalent motivation is that relating to the search for fair remuneration. Based on the prevalence of economic or social motivations, or a balance between the two, farms have been classified into "Economic drivers", "Social drivers" and "Mixed drivers". Figure 5 shows that higher agroecological levels are correlated with a prevalence of social drivers, while low and medium agroecological levels are more balanced and characterised by a mix of motivations, both economic and social.

Another important aspect in order to explore the farms' strategies in relation to joining "Alveare che dice sì!" is the degree of innovation. The questionnaire asked whether participation in the "Alveare che dice sì!" short food supply chain has generated innovations in business management and planning models. Eight types of innovation were considered: (1) the type of final product; (2) the production processes; (3) digital innovation; (4) farm investments to be able to access "Alveare che dice sì" (machinery for transformation, transport, etc.); (5) processing/packaging of products; (6) circularity of production; (7) packaging; and

(8) greater protection of workers' rights. Innovation gradients were subsequently assigned based on the number of innovations activated: "weak" for one innovation, "medium–weak" for two innovations, "medium–strong" for three innovations, and "strong" for four innovations or more. The most widespread innovation is corporate investments to access the short supply chain, packaging, and digital innovation. Much less widespread has been the development of new production processes and, in no case, systems to guarantee better working conditions for the workforce employed. However, in this case, it was also possible to build a synthetic indicator based on the innovations made with respect to a potential list, in order to compare it with the agroecological level. Based on the responses received, four innovation levels were created: weak (only one innovation introduced), medium–weak (two innovations introduced), medium–strong (three innovations introduced), and strong (four innovations introduced). Eleven farms have a weak innovation level, five have a medium–weak level, two have a medium–high level, and only one has a high level.

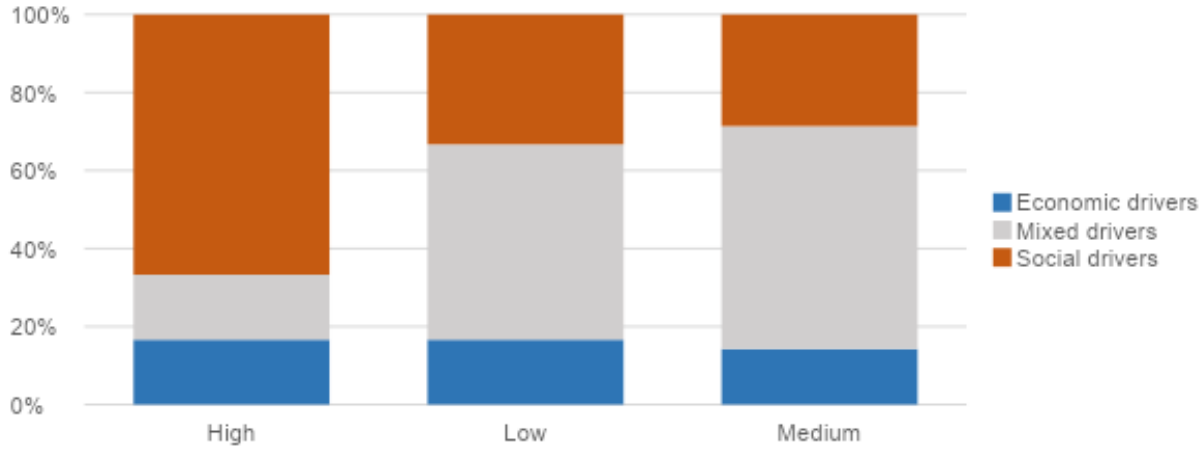


Figure 5. Correlation between agroecological level (high, low, and medium) and the drivers to be part of the "Alveare che dice sì!" short food supply chain. Source: authors' elaboration.

Figure 6 highlights that there is no direct correlation between a high agroecological level and the innovation gradient introduced into the farm. On the contrary, it is found that the only farm with an innovation gradient classified as strong falls into the low agroecological level classification.

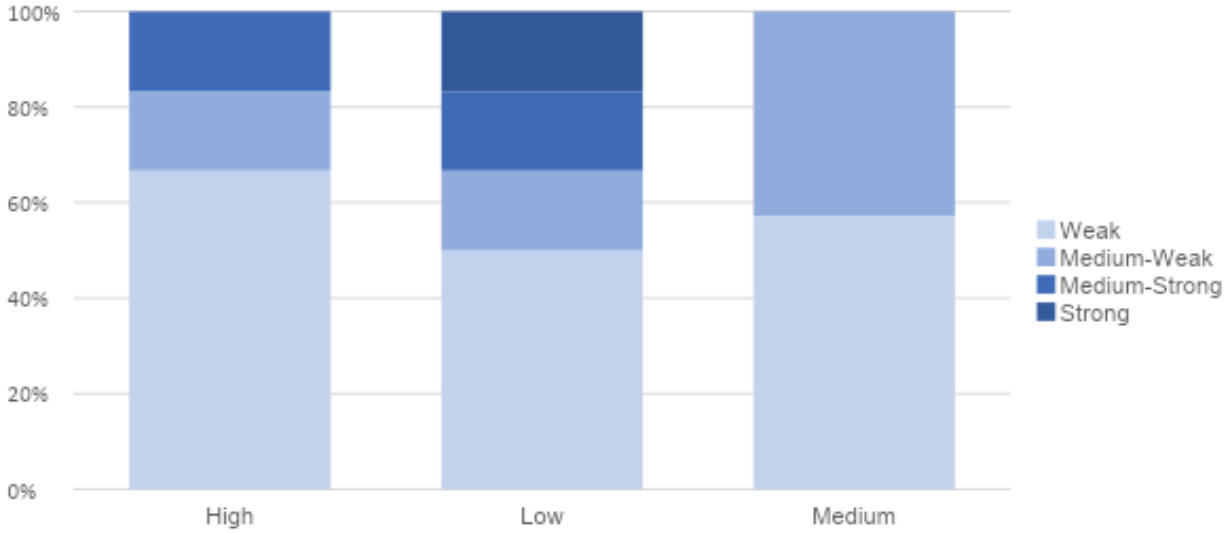


Figure 6. Correlation between agroecological level (high, low, and medium) and the gradient of innovations (from weak to strong) adopted to be part of the "Alveare che dice sì!" short food supply chain. Source: authors' elaboration.

Finally, the degree of innovation and the drivers have been correlated (see Figure 7). Also, in this case, an inverse relationship is highlighted between propensity for innovation and social motivations, while increasing the economic–mercantile component also increases—albeit in the context of a generally low propensity for innovation—the degree of innovation.

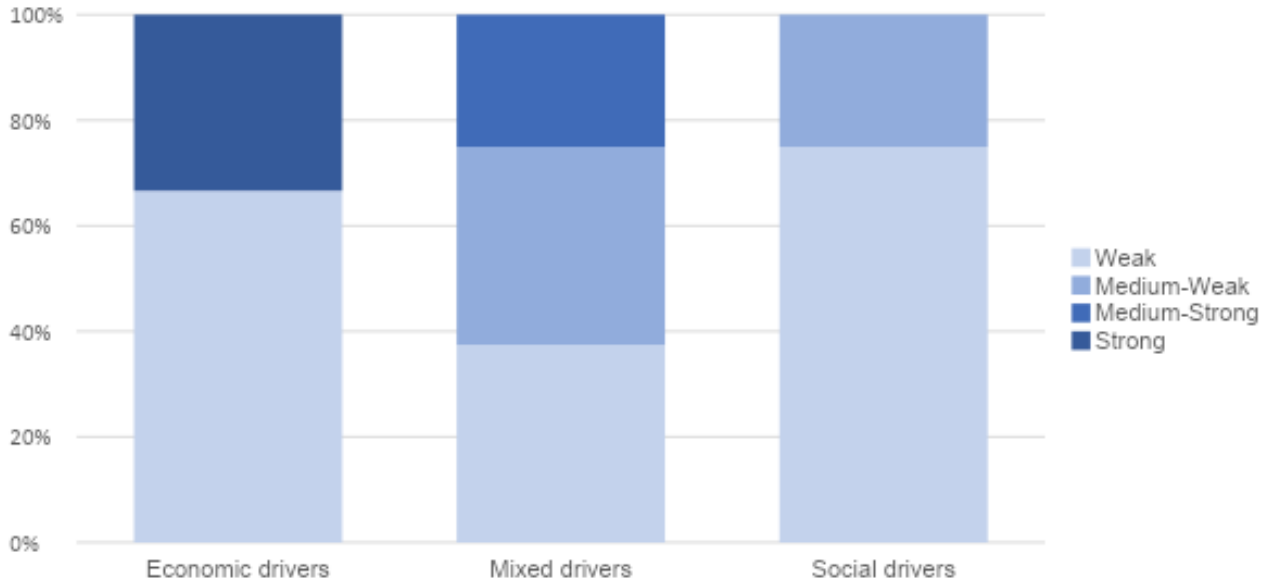


Figure 7. Correlation between degree of innovation and the drivers to be part of the "Alveare che dice sì!" short food supply chain. Source: authors' elaboration.

5. Discussion and Conclusions

The aim of this research work is to encourage the potential relationships between local food policies and agroecology through the application of an agroecological assessment methodology to a city-region context.

Throughout the article, the agroecological level of a panel of peri-urban farms around the city of Rome was measured. The research aimed to investigate in what types of farms agroecological principles are most widespread and how agroecology matches up with their business strategy.

The choice of a panel of farms working on proximity relationships (urban–rural linkages) is relevant because these relationships (which have always existed) are articulated today in innovative and transformative ways and because they are at the core of local food policies. The tool employed provides evidence for local food policy formulation and evaluation in light of the fully integrated multiscale systems approach from farm to region to globe that is necessary to enhance agroecology [29].

Regarding the agroecological gradient of the farms, it appears that farms are evenly distributed across the three levels (high, low, and medium). Also, some agroecological principles are pursued more than others (for example, Cooperation and Knowledge Sharing, and Sinergy). About the drivers (Social, Economic, or Mixed) of the farms to be part of the "Alveare che dice sì!" short food supply chain, the results show that higher agroecological levels are correlated with a prevalence of social drivers, while low and medium agroecological levels are more balanced and characterised by a mix of both economic and social drivers.

Regarding the innovations (from weak to strong) adopted by the farms to be part of the short food supply chain, there is no direct correlation between a high agroecological level and the gradient of innovation introduced on the farm. On the contrary, it is found that the only farm with an innovation gradient classified as strong falls into the low agroecological level classification. Regarding the connection between innovation and drivers, it is possible to observe an inverse relationship between propensity to innovate and

social motivations, while increasing the economic–mercantile component also increases the degree of innovation—albeit in the context of a general low propensity to innovate.

In a nutshell, farms with the highest agroecological level have a less "economistic" approach and are mainly driven by social factors. These farms have a lower propensity to innovate than those motivated by economic drivers and low agroecological levels. It is possible to observe a kind of polarisation between the economic and social motivations of farms, with the former being more innovative and the latter characterised by a higher agroecological level. Returning to theoretical assumptions, this agroecological analysis can inform the Rome food policy on urban agriculture farms and shed light on their motivations and degree of innovation. Also considering these data against the context of urban and peri-urban agriculture in Rome, it is possible to observe that there is a negative variation in the number of small farms, and most of the arable land belongs to large farms.

From a food policy perspective, it may be necessary to introduce policy tools to promote agroecology on small farms, as not all of them (as research shows) have a sufficient agroecological level. Furthermore, the promotion of agroecology should also target large farms, as they are more prone to innovation and represent the majority of urban and peri-urban agriculture.

In conclusion, the research emphasises the importance of promoting agroecological transition through local food policy at all levels. In particular, it should not only be promoted through drivers related to social factors, but should also be integrated into the business strategies of farms of all sizes. This article aims to be a starting point to promote the convergence of agroecology and local food policy paradigms, and in particular the use of agroecological assessment methodologies to inform urban food policy.

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Data Availability Statement: Data are contained within the article.

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Conflicts of Interest: The authors declare no conflicts of interest.

Notes

1 https://agritrop.cirad.fr/604473/1/604473.pdf (accessed on 20 August 2023).

2 The decision to classify farms into two categories (small size up to 19.99 hectares and large size > 20 hectares) is related to the characterisation of the Italian agricultural sector.

3 The choice of this sample stems from an interest in understanding the impact of farms on the agroecological transition process in the context of the territorial food system of the city of Rome. The sample is not intended to be representative of the entire Roman territory.

4 The composite indicator ranges from 10 to 50 as the two questions belonging to the principle of Recycling were considered combined for a total of 10 questions whose answers can range from 1 to 5.

References

1. Anderson, C.R.; Maughan, C.; Pimbert, M.P. Transformative agroecology learning in Europe: Building consciousness, skills and collective capacity for food sovereignty. *Agric. Hum. Values* **2018**, *36*, 531–547. [CrossRef]
2. Hawkes, C.; Parsons, K. Brief 1: Tackling Food Systems Challenges: The Role of Food Policy. 2019. Available online: https://www.city.ac.uk/__data/assets/pdf_file/0005/570443/7643_Brief-1_Tackling-food-systems-challenges_the-role-of-food-policy_WEB_SP.pdf (accessed on 12 May 2023).
3. FAO. TAPE Tool for Agroecology Performance Evaluation 2019—Process of Development and Guidelines for Application. Test Version, 2019, Rome. Available online: https://www.fao.org/agroecology/tools-tape/en/ (accessed on 2 June 2023).

4. Moragues, A.; Morgan, K.; Moschitz, H.; Neimane, I.; Nilsson, H.; Pinto, M.; Rohracher, H.; Ruiz, R.; Thuswald, M.; Tisenkopfs, T.; et al. Urban Food Strategies: The Rough Guide to Sustainable Food Systems, Document Developed in the Framework of the FP7 Project FOODLINKS. 2013. Available online: https://orgprints.org/id/eprint/28860/ (accessed on 17 February 2023).
5. Sonnino, R. Urban Food Geographies in the Global North. A Renewed Reading of the Food-City Relationship. 2017, p. 39. Available online: https://www.researchgate.net/profile/Brand-Caroline/publication/331588056_The_french_urban_food_issue_emergence/links/6086c0658ea909241e27a043/The-french-urban-food-issue-emergence.pdf#page=41 (accessed on 1 December 2023).
6. Blay-Palmer, A.; Santini, G.; Dubbeling, M.; Renting, H.; Taguchi, M.; Giordano, T. Validating the city region food system approach: Enacting inclusive, transformational city region food systems. *Sustainability* **2018**, *10*, 1680. [CrossRef]
7. Gupta, C.; Campbell, D.; Munden-Dixon, K.; Sowerwine, J.; Capps, S.; Feenstra, G.; Kim, J.V.S. Food policy councils and local governments: Creating effective collaboration for food systems change. *J. Agric. Food Syst. Commun. Dev.* **2018**, *8*, 11–28. [CrossRef]
8. Gliessman, S.R. Transforming food and agriculture systems with agroecology. *Agric. Hum. Values* **2020**, *37*, 547–548. [CrossRef] [PubMed]
9. Nicholls, C.I.; Altieri, M.A. Pathways for the amplification of agroecology. *Agroecol. Sustain. Food Syst.* **2018**, *42*, 1170–1193. [CrossRef]
10. Toledo, V.M. La agroecología en Latinoamérica: Tres revoluciones, una misma transformación. *Agroecología* **2011**, *6*, 37–46.
11. Guzmán, E.S. La participación en la construcción histórica latinoamericana de la agroecología y sus niveles de territorialidad. *Política Soc. Madr.* **2015**, *52*, 351–370.
12. Altieri, M.A.; Toledo, V.M. The agroecological revolution in Latin America: Rescuing nature, ensuring food sovereignty and empowering peasants. *J. Peasant Stud.* **2011**, *38*, 587–612. [CrossRef]
13. Holt-Giménez, E. *Campesino a Campesino: Voices from Latin America's Farmer to Farmer Movement for Sustainable Agriculture*; Food First Books: Oakland, CA, USA, 2006.
14. Bensin, B.M. Agroecological Characteristics Description and Classification of the Local Corn Varieties Chorotypes. Prague. 1925. Available online: https://books.google.com.hk/books/about/Agroecological_Characteristics_Descripti.html?id=AffJtgAACAAJ&redir_esc=y (accessed on 1 December 2023).
15. Belliggiano, A.; Conti, M. L'agroecologia come formula di sostenibilità e recupero dei saperi locali. *Perspect. Rural Dev.* **2019**, *2019*, 375–400.
16. Wezel, A.; Bellon, S.; Doré, T.; Francis, C.; Vallod, D.; David, C. Agroecology as a science, a movement and a practice. A review. *Agron. Sustain. Dev.* **2009**, *29*, 503–515. [CrossRef]
17. Gliessman, S.R. *Agroecology: The Ecology of Sustainable Food Systems*; CRC Press: Boca Raton, FL, USA, 2007.
18. Reijntjes, C.; Haverkort, B.; Waters-Bayer, A. *Farming for the Future: An Introduction to Low-External Imput and Sustainible Agriculture*; Ileia: Leusden, NL, USA, 1992.
19. Altieri, M.A. *Agroecology: The Science of Sustainable Agriculture*; Westview Press: Boulder, CO, USA, 1995.
20. Altieri, M.A.; Nicholls, C.I. Agroecology and the Search for a Truly Sustainable Agriculture. United Nations Environmental Programme, Environmental Training Network for Latin America and the Caribbean. Available online: https://www.agroeco.org/doc/agroecology-engl-PNUMA.pdf (accessed on 1 December 2023).
21. Stassart, P.M.; Baret, P.V.; Grégoire, J.C.; Hance, T.; Mormont, M.; Reheul, D.; Stilmant, D.; Vanloqueren, G.; Visser, M. L'agroécologie: Trajectoire et Potentiel. Pour une Transition vers des Systèmes Alimentaires Durables. 2012, pp. 25–51. Available online: https://orbi.uliege.be/bitstream/2268/130063/1/Agroecologie%20Stassart%20,%20Baret%20et%20al.%20GIRAF.pdf (accessed on 1 December 2023).
22. Dumont, B.; Fortun-Lamothe, L.; Jouven, M.; Thomas, M.; Tichit, M. Prospects from agroecology and industrial ecology for animal production in the 21st century. *Animal* **2013**, *7*, 1028–1043. [CrossRef] [PubMed]
23. Nicholls, C.I.; Altieri, M.A.; Vazquez, L. Agroecology: Principles for the conversion and redesign of farming systems. *J. Ecosys. Ecography* **2016**, *5*, 010.
24. CIDSE. The Principles of Agroecology. Towards Just, Resilient and Sustainable Food Systems. 2018. Available online: https://www.cidse.org/publications/just-food/food-and-climate/the-principles-of-agroecology.html (accessed on 6 April 2023).
25. FAO. Los 10 Elementos de la Agroecología Guía para la Transición Hacia Sistemas Alimentarios y Agrícolas Sostenibles. 2018. Available online: http://www.fao.org/3/i9037es/I9037ES.pdf (accessed on 15 March 2023).
26. INKOTA. Strengthening Agroecology. For a Fundamental Transformation of Agri-Food Systems. Position Paper Directed at the German Federal Government. 2019. Available online: https://webshop.inkota.de/node/1565 (accessed on 2 May 2023).
27. Pretty, J. Agricultural sustainability: Concepts, principles and evidence. *Philos. Trans. R. Soc. B Biol. Sci.* **2008**, *363*, 447–465. [CrossRef] [PubMed]
28. Paül, V.; Mckenzie, F.H. Peri-urban farmland conservation and development of alternative food networks: Insights from a case-study area in metropolitan Barcelona (Catalonia, Spain). *Land Use Policy* **2013**, *30*, 94–105. [CrossRef]
29. Renting, H.; Marsden, T.K.; Banks, J. Understanding alternative food networks: Exploring the role of short food supply chains in rural development. *Environ. Plan. A* **2003**, *35*, 393–411. [CrossRef]
30. Ewert, F.; Baatz, R.; Finger, R. Agroecology for a Sustainable Agriculture and Food System: From Local Solutions to Large-Scale Adoption. *Annu. Rev. Resour. Econ.* **2023**, *15*, 351–381. [CrossRef]

31. Tornaghi, C. Urban agriculture in the food-disabling city: (Re) defining urban food justice, reimagining a politics of empowerment. *Antipode* **2017**, *49*, 781–801. [CrossRef]
32. Vaarst, M.; Escudero, A.G.; Chappell, M.J.; Brinkley, C.; Nijbroek, R.; Arraes, N.A.; Andreasen, L.; Gattinger, A.; De Almeida, G.F.; Halberg, N.; et al. Exploring the concept of agroecological food systems in a city-region context. *Agroecol. Sustain. Food Syst.* **2018**, *42*, 686–711. [CrossRef]
33. Dyck, B.V.; Maughan, N.; Vankeerberghen, A.; Visser, M. Why we need urban agroecology. *Urban Agric. Mag.* **2017**, *33*, 5–6.
34. Weissman, E. Brooklyn's agrarian questions. *Renew. Agric. Food Syst.* **2015**, *30*, 92–102. [CrossRef]
35. AA.VV. Urban Agroecology. A Thematic Issue of the Urban Agriculture Magazine, No. 33. 2017. Available online: https://www.ruaf.org/ua-magazine-no-33-urban-agroecology (accessed on 15 January 2023).
36. Juncos, M.A. Assessing Agroecological Principles at the Intervale in Burlington, Vermont: A Case Study and Multimethod Research with a Participatory Approach in a Peri-Urban Socioecological System. 2021. Available online: https://yorkspace.library.yorku.ca/items/bb212e4a-17fa-43e9-bcee-44671f1c5c06 (accessed on 18 May 2023).
37. Marino, D.; Viganò, L. Agroecologia e politiche del cibo: Connessioni e sinergie nella ricerca di un processo di trasformativo dei food system. In *Agroecologia Circolare. Dal Campo Alla Tavola. Coltivare Biodiversità e Innovazione*; ReteAmbiente srl: Milano, Italy, 2021; pp. 85–91.
38. Cavallo, A.; Di Donato, B.; Marino, D. Mapping and assessing urban agriculture in Rome. *Agric. Agric. Sci. Procedia* **2016**, *8*, 774–783. [CrossRef]
39. Ledant, C. Urban Agroecology in Rome. *Urban Agriculture Magazine*, 33 November 2017.
40. Lands Onlus, Terra Onlus, Una Food Policy per Roma. 2019. Available online: https://www.politichelocalicibo.it/wp-content/uploads/2019/10/Una-Food-Policy-per-Roma.pdf (accessed on 13 June 2023).
41. Marino, D.; Mazzocchi, G. L'evoluzione della Food Policy a Roma: Quali Scenari? Re|Cibo, 1(1). 2022. Available online: https://ojs.unito.it/index.php/recibo/article/download/7400/6222/ (accessed on 17 September 2023).
42. Cannata, G.; Cavallo, A. *Ripensare Roma e Il Suo Sistema Agroalimentare, in Rapporti Collana Ateneo*; Giapeto Editore; Unversitas Mercatorum: Rome, Italy, 2021.
43. Cavallo, A.; Di Donato, B.; Guadagno, R.; Marino, D. The agriculture in Mediterranean urban phenomenon: Rome foodscapes as an infrastructure. In Finding Spaces for Productive Cities. In Proceedings of the 6th AESOP Sustainable Food Planning Conference, Leeuwarden, The Netherlands, 5–7 November 2014.
44. Cavallo, A.; Marino, D. Assessing the connections between farming, food, and landscape planning in the development of sustainable urban policies: The case of Rome. In Proceedings of the International Conference on "Changing Cities": Spatial, Morphological, Formal & Socio-Economic Dimensions, Grafima, Thessaloniki, 8–21 June 2013.
45. ISTAT. 7° Censimento Generale Dell'agricoltura, Istat, Roma, 2022. Available online: https://www.istat.it/it/censimenti/agricoltura/7-censimento-generale (accessed on 25 October 2023).
46. Munafò, M. Consumo di Suolo, Dinamiche Territoriali e Servizi Ecosistemici. Edizione 2022. Report SNPA 32/22. Available online: https://www.snpambiente.it/snpa/consumo-di-suolo-dinamiche-territoriali-e-servizi-ecosistemici-edizione-2022/ (accessed on 18 October 2023).
47. Geck, M.S.; Crossland, M.; Lamanna, C. Measuring agroecology and its performance: An overview and critical discussion of existing tools and approaches. *Outlook Agric.* **2023**, *52*, 349–359. [CrossRef]
48. GIZ. *Analyses of Socio-Economic and Environmental Effects of Agroecological Practices: A Methodological Guidance*; Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: Bonn, Germany, 2023.
49. Namirembe, S.; Mhango, W.; Njoroge, R.; Tchuwa, F.; Wellard, K.; Coe, R. Grounding a global tool—Principles and practice for agroecological assessments inspired by TAPE. *Elem. Sci. Anth.* **2022**, *10*, 00022. [CrossRef]
50. López-Ridaura, S.; Masera, O.; Astier, M. Evaluating the sustainability of complex socio-environmental systems. The MESMIS framework. *Ecol. Indic.* **2002**, *2*, 135–148. [CrossRef]
51. Cuéllar-Padilla, M.; Ganuza-Fernandez, E. We don't want to be officially certified! Reasons and implications of the participatory guarantee systems. *Sustainability* **2018**, *10*, 1142. [CrossRef]
52. Marino, D.; Mastronardi, L.; Giannelli, A.; Giaccio, V.; Mazzocchi, G. Territorialisation dynamics for Italian farms adhering to Alternative Food Networks. *Bull. Geogr. Socio-Econ. Ser.* **2018**, *40*, 113–131. [CrossRef]