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REVIEW / DERLEME

Spatial Planning in the Transition of Food Systems: A Systematic Literature Review

Gıda Sistemleri Dönüşümünde Mekânsal Planlama: Sistematik Bir Literatür İncelemesi

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ABSTRACT

Recent declines in urban environments' resilience and sustainability capacities have initiated discussions on food systems within the literature on spatial planning. Integrating food-related considerations into the planning discipline has become increasingly important, aligning with its broader goals of fostering healthy communities and sustainable and liveable settlements. Planning tools, which serve as fundamental components of planning practices, hold significant potential to facilitate the transition towards sustainable and resilient food systems. This research aims to elucidate insights from the scientific literature on integrating food systems into spatial planning. The present study follows a systematic literature review based on the PRISMA protocol. Within this framework, descriptive (by year, subject area, research approach, and cross-cutting policy) and content analyses (by scale, space interface, food system component, spatial visibility of food, planning instrument, cross-cutting policy) were conducted on 157 papers. Mendeley, Maxqda, and VOSviewer analytical tools were used in the research. Findings reveal that integrating food systems into spatial planning requires diverse tools and approaches for reflecting the variability of planning systems and local contexts. This diversity suggests that no single approach is universally applicable. However, two key discussions for improving planning tools emerge: first, recognizing food production as a legitimate land use category to ensure its spatial allocation and continuity; second, addressing persistent practical challenges through systemic changes informed by the analysed studies. As a pioneering bibliometric analysis on integrating food systems into spatial planning, this research aspires to serve as a guiding content for future studies.

Keywords: Content analysis; descriptive analysis; food systems; spatial planning; systematic literature review.

ÖZ

Kentsel çevrelerin dayanıklılık ve sürdürülebilirlik kapasitelerinin azalması, mekânsal planlamada gıda sistemlerine ilişkin tartışmaları başlatmıştır. Gıdanın planlama disiplinine entegre edilmesi; sağlıklı topluluklar, sürdürülebilir ve yaşanabilir yerleşimlerin teşvik edilmesi hedefleriyle giderek daha önemli hale gelmiştir. Planlama uygulamalarının temel bileşenleri olan planlama araçları, sürdürülebilir ve dayanıklı gıda sistemlerine geçişi kolaylaştırma potansiyeline sahiptir. Bu araştırma, gıda sistemlerinin mekânsal planlamaya entegrasyonuna yönelik literatürden elde edilen bulguları açıklığa kavuşturmayı amaçlamaktadır. Çalışma, PRISMA protokolüne dayalı sistematik bir literatür incelemesini takip etmektedir. Bu kapsamda, betimsel analiz (yıl, bilimsel konu alanı, araştırma yaklaşımı ve araştırma çıktıları) ve içerik analizi (mekânsal ölçek, mekânsal arayüz, gıda sistemi bileşeni, gıdanın mekânsal görünürlüğü, planlama aracı, kesişen mekânsal politika) 157 makale üzerinde gerçekleştirilmiştir. Araştırmada Mendeley, Maxqda ve VOSviewer analiz araçları kullanılmıştır. Bulgular, gıda sistemlerinin mekânsal planlamaya entegrasyonunun, planlama sistemlerinin ve yerel bağlamların değişkenliğini yansıtmak için çeşitli araçlar ve yaklaşımlar gerektirdiğini ortaya koymaktadır. Bu çeşitlilik, evrensel bir yaklaşımın olmadığını göstermektedir. Bununla birlikte, iki önemli tartışma ortaya çıkmaktadır: İlk olarak, gıda üretiminin mekânsal tahsisi ve sürekliliği için meşru bir arazi kullanım kategorisi olarak tanınması gereklidir. İkincisi, incelenen çalışmaların rehberliğinde sistemik değişimlerle sürekli pratik zorlukların ele alınması önem arz etmektedir. Gıda sistemlerinin mekânsal planlamaya entegrasyonuna yönelik öncü bir bibliyometrik analiz olan bu araştırma, gelecekteki çalışmalar için yol gösterici bir içerik sunmayı hedeflemektedir.

Anahtar sözcükler: İçerik analizi; betimsel analiz; gıda sistemleri; mekânsal planlama; sistematik literatür incelemesi.

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TMMOB Şehir Plancıları Odası

1. Introduction

The foundation of comprehensive, forward-looking, and public interest-oriented spatial planning is rooted in the principles of liveability, sustainability, resilience, economic vitality, inclusivity, and the promotion of healthy human settlements (ECTP-CEU, n.d.; UN-Habitat, 2016). Spatial planning seeks to organise land use effectively to achieve these objectives and connect settlement systems (Wegener, 1998). Through this approach, it becomes feasible to foster liveable environments that meet the essential needs of communities. However, despite addressing housing, water, and air, food systems remain inadequately integrated into spatial planning frameworks, limiting their impact on planning theory and practice (Morgan, 2015).

Modernisation theory relegated food production to rural areas, excluding it from planning (Choguill, 1995; Mbiba, 1995). However, neoliberal policies have further marginalised food systems, linking urban food supplies to distant sources and increasing system vulnerabilities (Mason & Knowd, 2010; Schreiber et al., 2021). Today, however, this situation is changing. Recent crises such as climate change, pandemics, natural disasters and wars have highlighted these failures, intensifying concerns about urban resilience and sustainability (Cabannes & Cecilia, 2018). Consequently, food has become a more critical issue in spatial planning decision-making than ever before.

By the late 1990s, the spatial dimension of food systems within the urban environment was recognised (Pothukuchi & Kaufman, 1999), linking food to key planning concerns like transportation, land use, environment, economy, health, energy, and social justice (Morgan, 2009). As a result, it has become inevitable for food to be addressed within the planning discipline. Friedmann's (2011) view of planners as agents of systems change underscores the role of spatial planning in fostering sustainable and resilient food system transition.

Scientific research and policymakers acknowledge that food systems inherently interact with and shape spaces (Marsden & Sonnino, 2012; Sonnino, 2016; Van Haren et al., 2023). International agreements, such as the Milan Urban Food Policy Pact (MUFPP), the Sustainable Development Goals (SDGs), and the New Urban Agenda (NUA), not only support the transition towards inclusive, resilient, safe, and sustainable food systems but also explicitly call for the integration of food systems into spatial planning (MUFFP, 2015; UN, 2016; UN, 2017). However, recent studies show that this integration remains limited in both theory (Buchan et al., 2018; Morgan, 2015) and practice (Doernberg et al., 2019; Van Haren et al., 2023).

Therefore, the starting point of this research is the fact that agricultural lands are often excluded from spatial planning's theory and practice due to their legal distinction from urban areas and the exclusion of agricultural activities from urban land use plan decisions. However, planning tools, which are the fundamental indicators of planning practices, have the potential to facilitate the transition towards sustainable and resilient food systems. This research aims to highlight the insights from the scientific literature regarding the integration of food systems into spatial planning. Accordingly, the article poses two main research questions:

1. How is the relationship between spatial planning and food systems addressed in the literature?
2. Which planning tools are emphasised when integrating food systems into spatial planning?

The research methodology comprises a systematic literature review, descriptive and content analyses, utilising Mendeley, Maxqda, and VOSviewer as analytical tools.

The article is structured as follows: Section 2 outlines the methodological approach for the systematic review of the literature. Section 3 presents the results of the analyses of selected papers. Section 4 discusses the findings, and the article concludes with recommendations for future research.

2. Materials and Methods

This study aims to conduct a systematic literature review on how food systems can be integrated into the spatial planning process and which planning tools can be employed for this purpose to elucidate the transition towards sustainable and resilient food systems.

A systematic review involves a focused assessment of the literature using specific guidelines and reproducible methods to answer the research questions (Cooper et al., 2008; Grant & Booth, 2009). By systematically analysing, it allows for the mapping of certain trends as well as theoretical or practical aspects related to the research focus (Petticrew & Roberts, 2006). Additionally, it helps to identify gaps and uncertainties, thereby contributing to the development of new research areas (Zeng et al., 2022).

This study has been developed in three phases (Fig. 1). The first phase focuses on the identification of related documents in the literature, adhering to the guidelines of "Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)" (Moher et al., 2009). At the initial phase of the research databases, relevant keywords and exclusion criteria were defined. A search covering publications up to the end of 2023 identified 5,411 papers. After importing them into Mendeley and removing duplicates (n=916 sets of duplicates), the titles, keywords, and abstracts of the remaining papers were screened for relevance. Papers (n=3,164) that explored only the broader theoretical implications of food systems without discussing spatial planning, or vice versa, were deemed irrelevant to this study's focus on their integration. This pro-

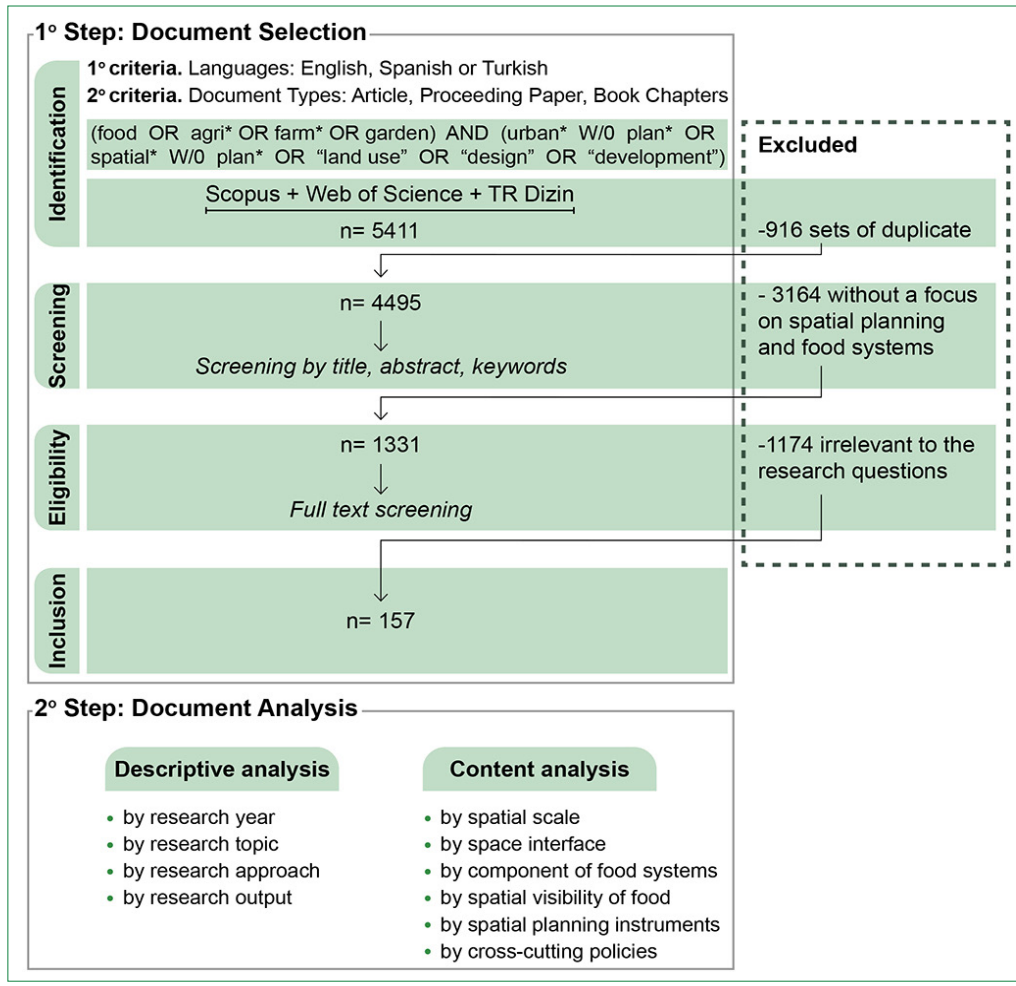

Figure 1. Methodological framework of review process (based on the PRISMA flow diagram).

cess resulted in 1,331 papers. Following a full-text review, an additional 1,174 papers were excluded due to their lack of relevance to the research questions. As a consequence, 157 papers were included in the research.

The second phase involved descriptive and content analyses of the 157 papers in Maxqda. The categorisation in Maxqda was derived based on the thematic alignment with the research questions, ensuring that the chosen categories effectively represented spatial planning dimensions and food systems components. This approach facilitated a systematic examination of recurring themes and trends across the dataset. The last phase, synthesising findings, derived insights related to the research questions.

3. Results

The findings have been examined through two main analytical perspectives. As shown in Figure 1, the descriptive and content analyses focus on cataloguing and summarising the findings related to the research questions without engaging in critical evaluation.

3.1. Descriptive Analysis

This analysis considered the distribution of the papers over time and across topics, approaches and outputs. Descriptive statistics have been used to observe publication trends and provide a regular overview of the publication ecosystem without engaging in critical analysis or evaluation.

3.1.1. Research Year

The earliest relevant paper dates back to 1982, however most publications have emerged after 2011, reflecting the growing interest in integrating food systems into spatial planning. As shown in Figure 2, although the low number of publications in 2023 does not render the sample statistically significant, there are notable increases in publications in 2017, likely due to the release of the SDGs and the NUA, and in 2022, likely due to the effects of COVID-19. Despite fluctuations, the overall trend indicates increasing attention to the research subject. However, it should be noted that the research subject constitutes only a small fraction of the broader field of "food systems" and "spatial planning."

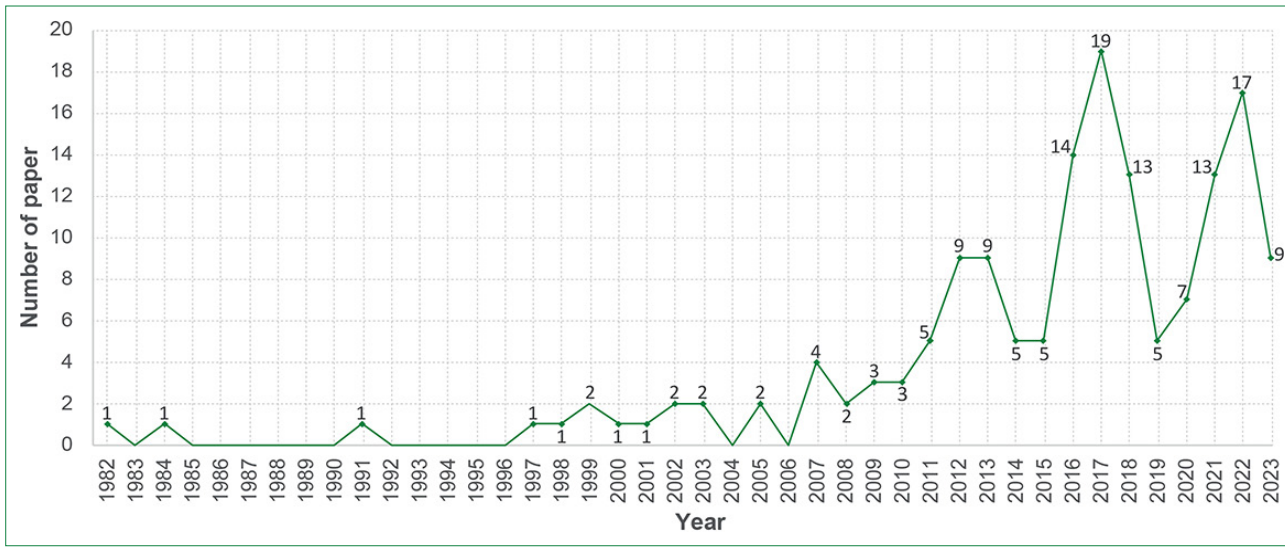

Figure 2. Analysis of publication year.

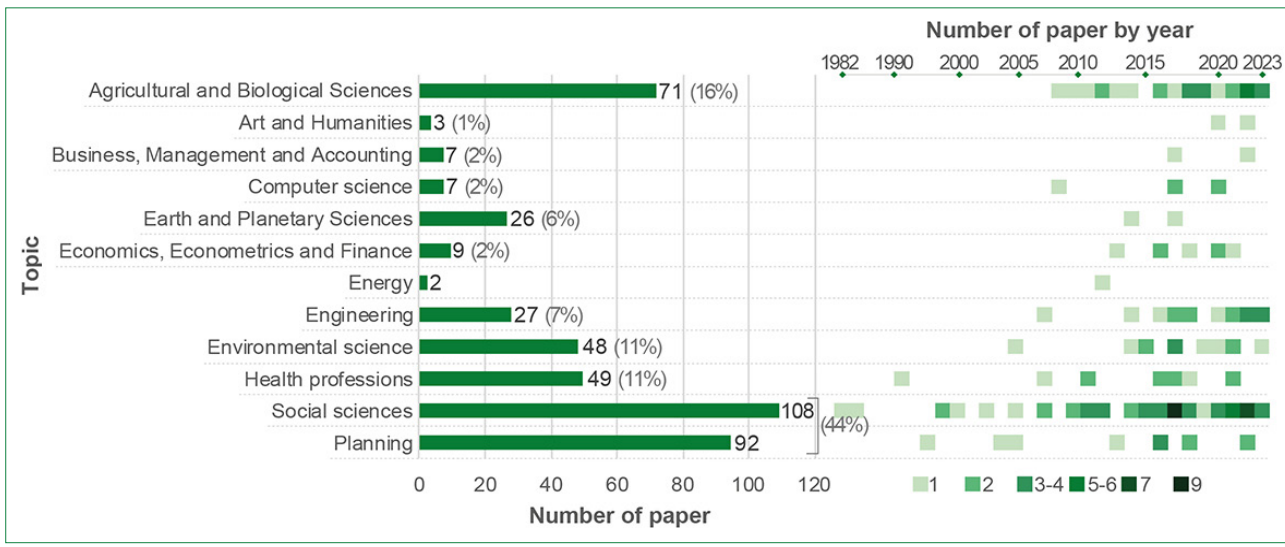

Figure 3. Analysis of research topic.

3.1.2. Research Topic

Research topic of the relevant literature shown in Figure 3 are classified according to the categories listed on Scimago Journal & Country Rank. Due to the scientific field of this research, planning is highlighted separately. According to this distribution, the majority of the research falls within the Social Sciences (including Planning), followed by Agricultural and Biological Sciences, Environmental Sciences, and Health Sciences.

Since 2015, interdisciplinary collaboration has increased, integrating planning with various disciplines to explore spatial forms that promote food access, security, and healthy nutrition, reflecting a synthesis of ideas and concepts across disciplines.

3.1.3. Research Approach

The practical approach focused on case studies is the most common research approach (Fig. 4). This trend supports Aubry et al. (2012)'s suggestion that integrating food systems into spatial planning is more about political will, sufficient information, and methods than global land scarcity in urban and peri-urban areas, emphasising the importance of practical research. This focus on case studies may also reflect the relatively new nature of the research subject, where policy and practice often precede or develop simultaneously with theory (Oulu, 2015). While practical approaches have been observed annually from 1982 to 2023, theoretical approaches have gained traction in urban planning and design after 2010, with concepts like Agricultural Urbanism (de La Salle & Hollanda, 2010), Food Urbanism (Verzone, 2012), Agrarian Urbanism (Waldheim, 2018),

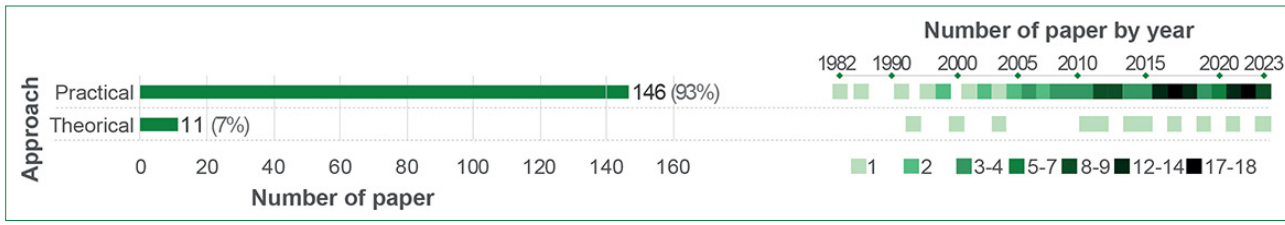

Figure 4. Analysis of research approach.

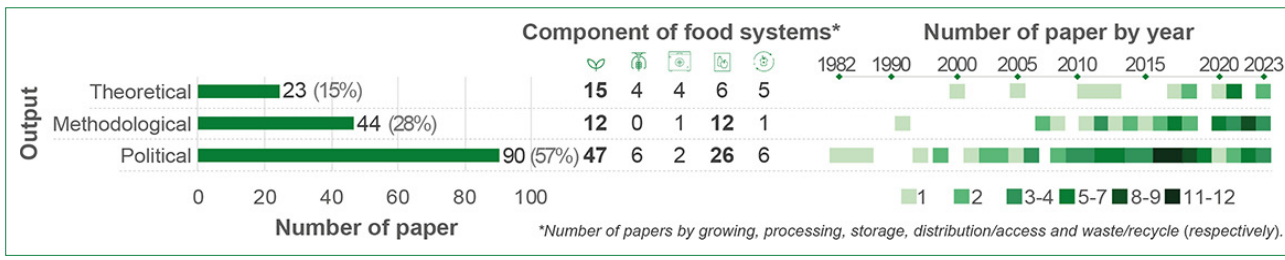

Figure 5. Analysis of research output.

and Agroecological Urbanism (Tornaghi & Dehaene 2020) emerging as examples of food-based planning theories.

3.1.4. Research Output

Figure 5 indicates that the majority of the studies contribute to policy development (Gasperi et al., 2016; Sietchiping et al., 2014), particularly strategies prioritising food production in spatial planning. Secondly, studies focusing on the development or integration of methodologies are also prominent. These methodologies also function as planning analysis&tools, guiding the development and management of food systems from an urban/regional development perspective. Methodological contributions can be classified as the analysis of current state (Tóth & Timpe, 2017), site selection (Klebl et al., 2022; Rogers et al., 2016), and scenario analysis (Tobias & Price, 2020; Zullo et al., 2023). Finally, studies contributing to theory development (Jansma & Wertheim-Heck, 2021) involve advancing existing theories within the specific research context or integrating theories from different scientific fields into the research subject. These ratios also confirm the development process of the emerging research area.

3.1.5. Co-occurrence of Keywords

VOSviewer was used to analyse the co-occurrence of keywords in the studies. Out of 536 keywords, 59 appeared two or more times. Keywords such as "urban agriculture," "urban planning," and "sustainability" have larger node sizes and higher values based on the connection strength calculated by the software. In contrast, keywords like "public space," "shrinking cities," and "food planning," which are located farther from the centre, represent relatively small research areas (Fig. 6a).

When examining the evolution of keywords (Fig. 6b), terms such as "sustainability," "food security," "policy," and "peri-urban agriculture" represent the early stages of research. Keywords emerging between 2018 and 2020 indicate a more intensive focus on food at the urban scale, with terms like "urban," "city," and "urban ecosystems." Keywords such as "urban regeneration," "shrinking cities," and "smart city" also suggest a connection between food and urban concepts. Additionally, there has been an increase in studies on food production locations, indicated by the emergence of keywords such as "community garden," "public space," "urban horticulture," and "urban fringe." The keyword "ecosystem services (ESs)" has recently emerged with high frequency, highlighting the significant interest in this subject in a short period. Keywords appearing from 2022 to the present also support ESs, including terms like "urban metabolism" and "nature-based solutions."

3.2. Content Analysis

This analysis considered the distribution of the papers in terms of relationships between space, food systems, and policy/planning. In the context of the research questions, it enhances the understanding of the scope of the literature, presenting a broad picture of its current state. Additionally, by systematically organising a large body of empirical and research evidence, it helps to identify trends and gaps for future research.

3.2.1. Spatial Scale

Food systems are integrated into spatial planning across various scales. This analysis indicates that urban-scale studies dominate, reflecting cities' key role in sustainable local food systems (Fig. 7). However, it is important to note that the dominance of urban-scale studies may stem from the inherent focus of urban planning as a discipline, which often prioritises urban areas over rural areas. Studies in metropolitan-scale—where land allocation among different uses is predominantly influenced by market dynamics—focus

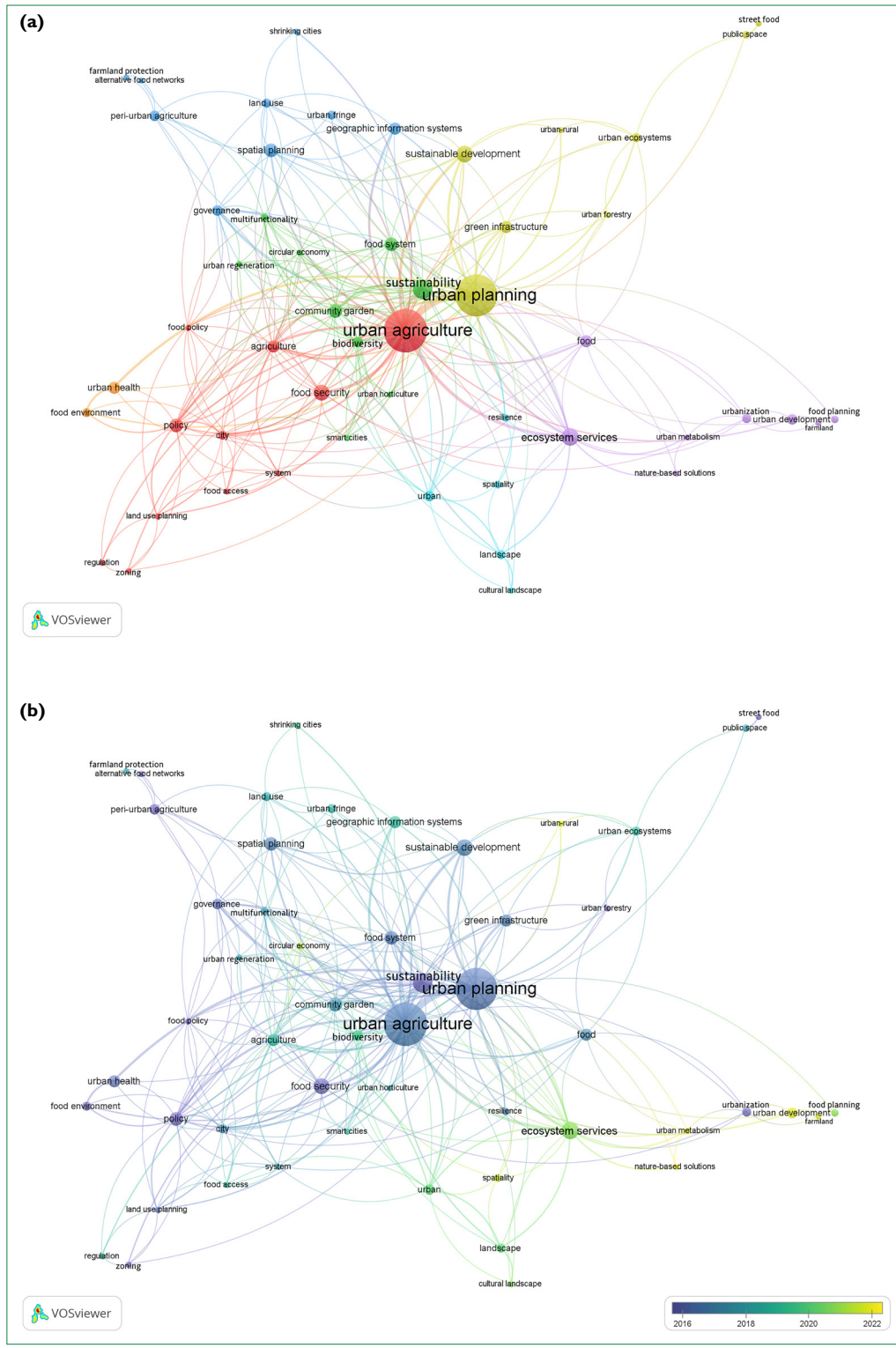

Figure 6. (a) The co-occurrence network for 59 keywords; **(b)** time-zone visualisation.

on enhancing local production and short food supply chains (Oliveira, 2022). Agriculture in metropolitan areas differs significantly from its non-urban counterpart, adapting more to urban pressures. Located in large metropolitan contexts, these areas gain greater importance due to the larger population they serve. Therefore, food systems should be incorporated into broader metropolitan or regional programmes (La Rosa, 2023). In neighbourhood-scale studies, permanent inte-

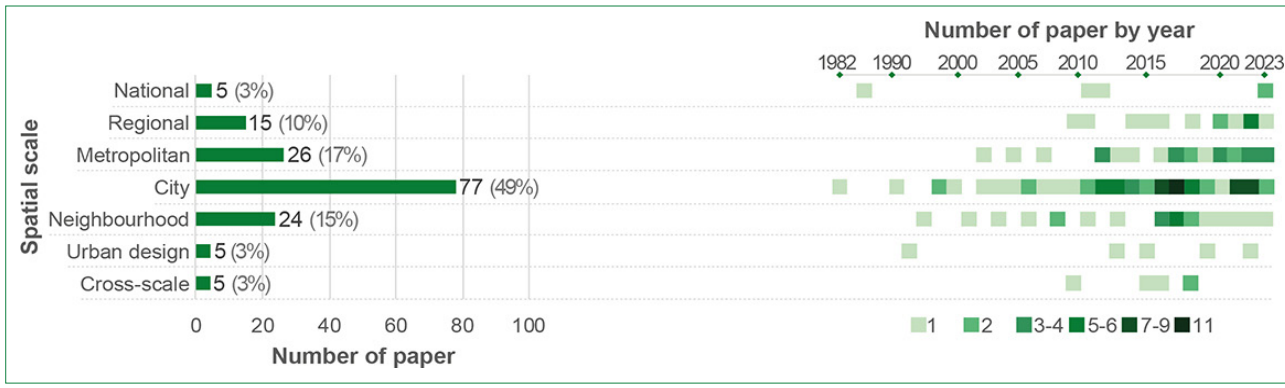

Figure 7. Analysis of scale.

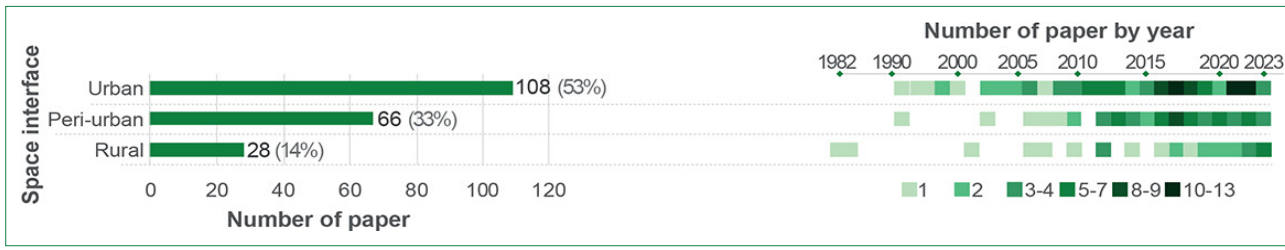

Figure 8. Analysis of space interface.

gration of growing areas into the urban texture is emphasised (Dubbeling et al., 2009). In terms of food access, restaurants, caterings (Zhang et al., 2022), and food hubs (Klebl et al., 2022) are considered as vital, for enhancing spatial vitality and quality of life. Additionally, it is observed that solutions are proposed through urban design components at both the neighbourhood and urban scales. For instance, De la Salle (2019) and Zhang et al. (2022) examine food systems from an urban design perspective, linking productive landscapes and food access spaces to streetscapes and public squares.

Dezio and Paris (2023) emphasise the need for integrated policies addressing production and agro-ecosystems at the regional level, though this scale remains underexplored. National and inter-scalar studies are represented equally. National-scale studies (Eraslan, 2023; Zhang et al., 2011) often focus on legal-administrative frameworks, while holistic approaches (Jakobsson & Dewaelheyns, 2018; Lovell, 2010) explore the interconnections across different scales.

3.2.2. Space Interface

Food systems establish themselves in highly urbanised areas, urban peripheries, and rural regions. Compared to other forms of agriculture, urban agriculture is spatially and functionally integrated into the urban systems (Tóth & Timpe, 2017). Therefore, as shown in Figure 8, urban areas are the most studied. The urban periphery is increasingly being considered as a space for planning and design experiments with the function of agricultural production (Basso et al., 2022). Studies focused on rural areas address agricultural lands as a form of land use (Westphal, 2001; Wheeler & Thompson, 2010) or explore the urban-rural links (Borelli et al., 2018; Dezio & Paris, 2023). However, it should not be overlooked that these studies approach the agricultural lands from a broader perspective, focusing on regional or metropolitan scales rather than specifically addressing rural settlement units.

3.2.3. Component of Food Systems

Food systems encompass all elements and activities related to the production and consumption of food products derived from agriculture, forestry, fishing or other (FAO, 2018; OECD, n.d.). In this context, production, processing, storage, distribution/access, and waste/recycling have been classified as spatialized components of food systems. Production is the most studied component (Fig. 9), reflecting the focus on repositioning it for urban supply (Mkwela, 2013; Zazo-Moratalla et al., 2023) and its shift toward multi-functionality for future sustainability and resilience (Jakobsson & Dewaelheyns, 2018). Most articles on specific production types focus on agri-food (Fig. 10), especially fruit and vegetables, for their high returns (Bohn et al., 2012). Following this, livestock farming, niche methods and traditional production are also addressed.

Studies that examined the distribution/access, focus on logistics (Cretella & Buenger, 2016; Marat-Mendes, 2022) or the location of physical spaces (Iñiguez-Gallardo et al., 2022; Murphy et al., 2016). The other components are addressed equally, covering topics such as the food industry for processing (Abouelfadl et al., 2014; Yang et al., 2016); cold storage as a supporting infrastructure for the food flow between pro-

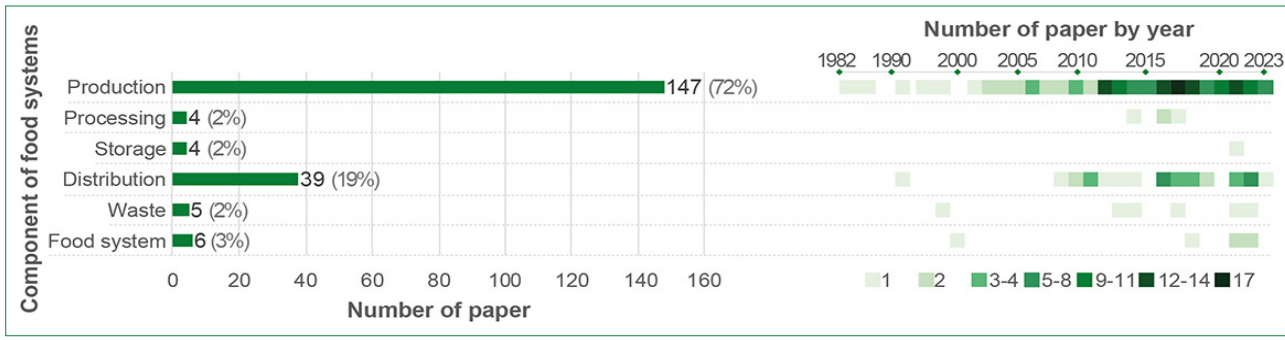

Figure 9. Analysis of components of food systems.

duction and distribution (Klebl et al., 2022; Mayrhofer, 2021); and the management of food waste and losses occurring at various steps of the supply chain (Asomani-Boateng & Haight, 1999; Steenkamp et al., 2021). Some studies, acknowledging the interdependent nature of the different stages of the food systems, have adopted an integrated approach that considers all components (Marat-Mendes et al., 2021b).

3.2.4. Spatial Visibility of Food

Each component of food systems occupies different spatial settings based on varied land uses (Fig. 11). (Peri-)Urban agriculture areas are designated for food production, planned and designed in various types, scales, and modality of tenure/usufruct depending on land use categories (La Rosa, 2023; Viljoen et al., 2015). Although some studies uniformly define (peri-) urban agriculture experiences, this diversity is evident in Figure 12. Another crucial space for production is land conservation zones, where some studies aim to protect rural agricultural lands (Kassis et al., 2021; Waegemaeker et al., 2023), while others focus on safeguarding (peri-)urban production areas from urbanisation (Baldini et al., 2022; Zazo-Moratalla et al., 2023).

The spatial organisation of food outlets profoundly impacts residents' food access (Wu et al., 2022). This is approached

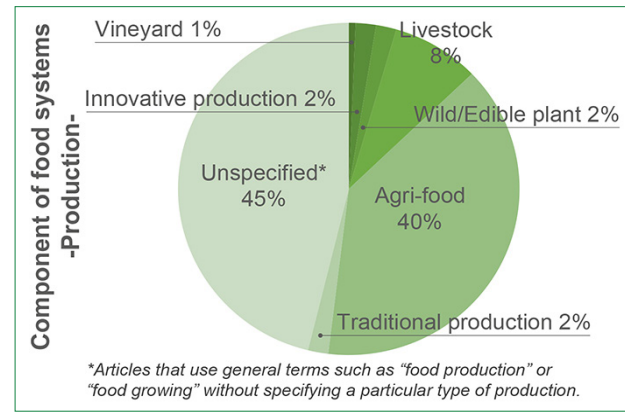

Figure 10. Detailed analysis of food production type.

in two ways: promoting food banks (Paddeu, 2017), collective kitchens (Pothukuchi & Kaufman, 2000), farmer/street markets (Ceylan & Erdoğan, 2023), and supermarkets (Wu et al., 2022) to enhance food access and security, or by restricting takeaway locations due to health concerns (White & Natelson, 2012).

Another aspect of food spatialisation includes technical infrastructure, such as transportation (Iñiguez-Gallardo et al., 2022; Marat-Mendes et al., 2021b) and wastewater systems (Raddad, 2022; Steenkamp et al., 2021). In the remaining articles,

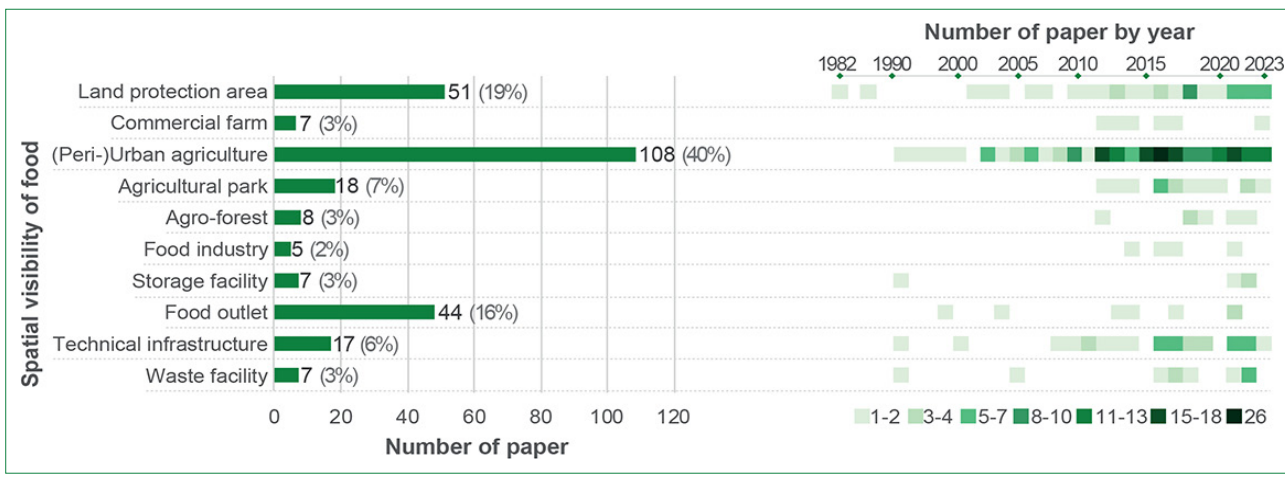

Figure 11. Analysis of spatial visibility of food.

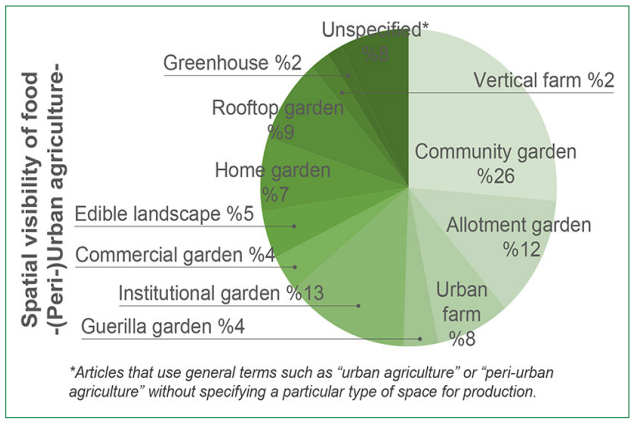

Figure 12. Detailed analysis of (peri-)urban agriculture typology.

the spatialisation related to production is carried out through agroforestry, agricultural parks, and commercial farms, while other components are positioned spatially as storage areas, processing facilities, and waste management areas.

3.2.5. Spatial Planning Instruments

Production activities are trying to find a place for themselves in the space in an unregulated manner due to planning tools that cannot go beyond protecting agricultural lands in rural areas. According to Meenar et al. (2017), this resultant policy gap has led to conflicts such as land tenure challenges (Brown & Jameton, 2000), debates on land use designations and zoning (Meenar, 2015; Thibert, 2012); and socio-legal divergence (Covert & Morales, 2014). It is acknowledged that planners and governments can support food systems' development through various planning and policy tools (Huang & Drescher, 2015). 48% of the planning tools discussed in the articles are already integrated into existing planning systems, while 52% are proposed or in development. This indicates that there is an ongoing development of new planning tools.

Planning tools are classified into five groups based on their uses. Spatial plans, the most frequently referenced (Fig. 13), aim to regulate land use and guide construction and implementation decisions (Toriro & Muziri, 2021). Under this category, master plans, zoning plans, land use plans, landscape plans, urban design plans, design guidelines, urban renewal/conservation plans, and rural plans are listed (Fig. 14). For instance, the Urban Master Plan for Barcelona prioritises ESs and agricultural land protection (Pirro & Anguelovski, 2017). The Comprehensive Master Plan of Turin introduced a new land use definition, designated as "Ecological Agriculture Areas" (Forte et al., 2022). Master or urban renewal plans are utilised to regulate and preserve food outlets (White & Natelson, 2012), while urban design plans focus on creating environments that integrate street life and food (Caramaschi, 2017). Design guidelines, typically supportive documents of master plans, include design principles and standards related to food systems for public and private spaces (Bohn & Viljoen, 2012; de la Salle, 2019).

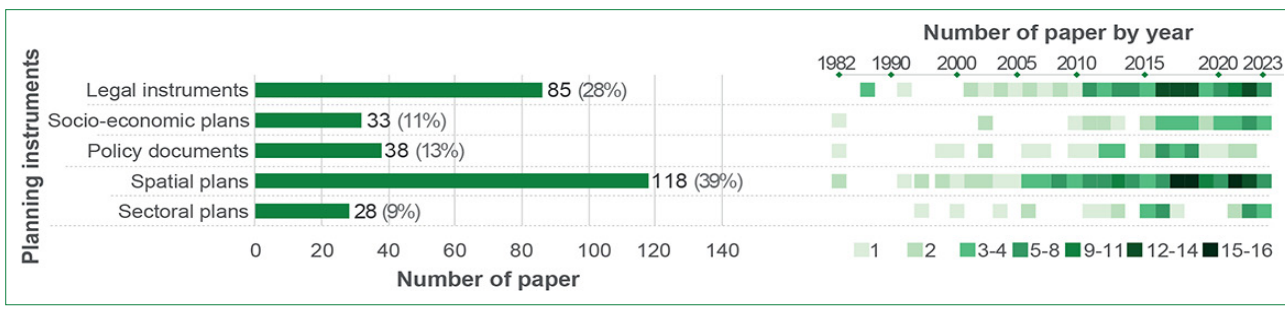

Figure 13. Analysis of spatial planning instruments.

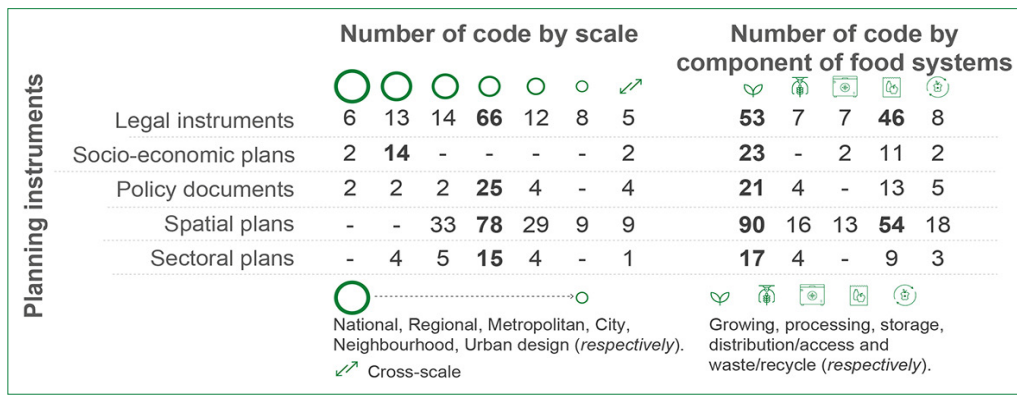

Figure 14. Analysis of relation between spatial visibility of food and scale/food components.

It is widely accepted that by-laws have the most significant impact on food systems (Miedema, 2019). Legal instruments encompass laws, regulations, and legislations, norms and standards, expropriation, transfer of development rights, land use rights, and planning permits. The articles discuss changes in the status of land parcels related to production, resulting from the revision of planning regulations.

Philadelphia's planning reform, for example, created a new urban agriculture land use category (Meenar et al., 2017). Similar regulatory updates have been made in Lisbon (Simon, 2023) and Sydney (Corkery & Osmond, 2020). Other noteworthy regulations include France's PAEN (the protection perimeter of peri-urban agricultural and natural areas) procedure, which secures non-urbanized lands for food systems (Kassis et al., 2021), and Switzerland's agricultural land protection programme (Tobias & Price, 2020).

Norms and standards within regulations also play a role in shaping food systems. For example, Bologna includes urban agriculture as an urban standard in renewal projects (Forte et al., 2022), while Cleveland ensures community garden access within walking distance (Coppola, 2018). In England, "takeaway management zones" restrict the proximity of new takeaways to educational institutions (White & Natelson, 2012). Food systems connect to "Public Outdoor Recreational Standards" designed to meet urban recreation needs (Wadumestrige Dona et al., 2022). Long-term land access is crucial for producers. Planners can address land ownership using existing tools like land banks, transfer of development rights, or conservation easements, or by developing new ones (Meenar et al., 2017; Rose, 1984; Wang et al., 2023).

Policy documents offer opportunities to incorporate production areas into urban development zones, especially in developing countries, while supporting the reorganisation of productive areas in developed regions (Viljoen et al., 2015). Policy documents include the planning frameworks and planning, land, rural, and food policies. Rotterdam's policy document, called "Food and the City Agenda", promotes urban agriculture (Cretella & Buenger, 2016). Milan uses urban renewal policies to implement urban gardens (Forte et al., 2022). Policy documents are also effective in protecting local food outlets (White & Natelson, 2012). As shown in Figure 14, policy documents are concentrated at the urban scale. At the national level, the English Planning Policy Statement addresses rural sustainability (White & Natelson, 2012).

Socio-economic plans include national and regional strategies and frameworks, spatial development frameworks, land management plans, regional plans, and rural development plans. China's national farmland protection system focuses on agricultural land management through land use control, integrated with regional zoning to optimise production, living and ecological areas (Wang et al., 2023). In Cape Town, the Provincial Spatial Development Framework incorporates food-sensitive planning principles and guidelines for regional development (Battersby, 2017). A regional renewal plan emphasising agriculture and local supply chains as catalysts for revitalising marginal areas is proposed by Dezio and Paris (2023).

Sectoral plans are the least discussed planning tools, typically focusing on transportation, green spaces, and waste management. Plans integrating production areas into green spaces are common, such as Turin's Green Infrastructure Plan emphasising urban agriculture (Forte et al., 2022). In transportation, sectoral plans often address road infrastructure for food distribution (Marat-Mendes, 2022) and public transit to enhance food access (Su et al., 2017). Cape Town, for example, has neighbourhood waste management plans targeting urban organic waste and wastewater (Steenkamp et al., 2021).

3.2.6. Cross-cutting Policies

Food systems serve as entry points for achieving development goals like ecological vitality, social justice, economic development, and public health (Battersby, 2017; Wu et al., 2022). Additionally, considering planning and food systems together represents a transition process in which the various sectoral dimensions of public policies can be integrated and reconciled in a cohesive manner (Oliveira, 2022). This analysis examines how food systems are addressed under various policy topics within spatial policies developed by governments.

The integration of food into spatial planning is central to sustainability and ecology agendas (Fig. 15). Jones and Beza (2018) argue that food planning and security should be measurable outcomes within strategic policies and legislation. Likewise, sustainable food production practices are promoted in environmental policies as tools for biodiversity conservation, ESs, agro-ecosystem resilience, and ecological connectivity (Baldini et al., 2022; Basso et al., 2022).

The second key policy topics are economy and quality of life. Since each component of food systems is an economic sector, cities and regions leverage them for local economic development. Walker (2015) compares the rapidly growing Vancouver with the shrinking Detroit, highlighting how urban agriculture can contribute to economic development despite differing economic paths. Additionally, production and distribution practices address market trends such as recreation (Mélice Dias & Marat-Mendes, 2020), tourism (Yang et al., 2016), and creative industries (Cretella et al., 2016). Many policies aimed at enhancing quality of life focus on public health. Jakobsson and Dewaelheyns (2018) connect the adoption of productive gardens by cities with broader debates on green spaces and public health.

Resilience policies have been addressed within the context of climate change and natural disasters. For instance, food production areas in Vancouver neighbourhoods are asso-

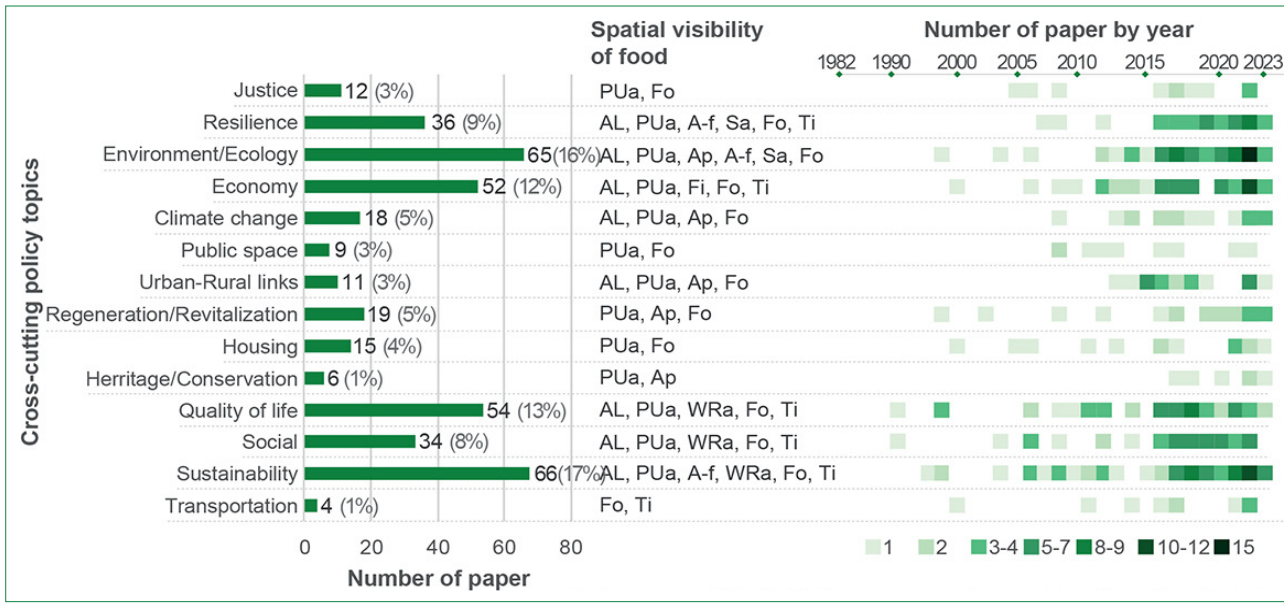

Figure 15. Analysis of cross-cutting policies.

AL: Agricultural land; PUa: (Peri-)Urban agriculture; Ap: Agricultural park; A-f: Agri-forest; Fi: Food industry; Sa: Storage area; WRa: Waste/Recycle area; Fo: Food outlet; Ti: Tecnical infrastructure.

ciated with enhancing resilience by mitigating the impacts of climate change (Roehr & Knuigh, 2009). According to Iñiguez-Gallardo et al. (2022), climate-resilient cities must ensure access to essential goods and services, such as food markets. In relation to natural disasters, the conversion of vacant lands into productive areas in New Orleans after Hurricane Katrina (Kato et al., 2016) and community gardens in Christchurch following the 2010/11 Canterbury Earthquakes (Shimpo et al., 2019) demonstrate the importance of food systems in post-disaster recovery.

Social policies aiming to create social cohesion through forms of social agriculture (Basso et al., 2022), and justice policies aiming to ensure social justice through urban agriculture visions (Pothukuchi, 2017), generally focus on disadvantaged residents.

Vacant urban lands, abandoned industrial buildings, and overlooked informal spaces, like derelict street and railway edges, present significant opportunities for spatial transformation and revitalization policies (Corkery & Osmond, 2020). Miner and Raftery (2012) advocate for productive place-making to reintegrate these areas into urban spaces. Residential areas can be addressed within transformation and housing policies to create new units. Production areas are integrated into these policies through strategies that ensure spatial diversity, permeability, and well-being (Basso et al., 2022; Dubbeling et al., 2009).

Policies aimed at mitigating the impacts of climate change are also addressed independently of the aforementioned resilience policies. For instance, in Portugal, national programmes to combat climate change include urban agriculture as a substrategy (Simon, 2023).

Future urban-rural links are expected to form a continuum rather than a relationship between separate entities (Viljoen et al., 2015). Consequently, food systems that integrate urban and rural areas are key in land management policies (Sietchiping et al., 2014). An example of heritage/conservation policy is the South Milan Agricultural Park, which serves as a conservation tool to protect rural heritage and agro-landscapes (Forte et al., 2022). While food logistics and access are closely tied to transportation policies, this connection is underexplored, as Marat-Mendes et al. (2021b) similarly note that Lisbon's transportation system lacks an integrated approach with the food systems.

4. Discussion

The analysis shows that integrating food systems into spatial planning involves various tools and approaches, reflecting the inherent diversity of planning systems and local dynamics. This diversity indicates that no single approach is universally applicable. However, two potential avenues for enhancing the effectiveness of planning tools emerge from this study, which are directly tied to the research questions. First, addressing both research questions, the production component should be reconsidered as a legitimate land use category, allowing for the spatial allocation of production activities within planning frameworks. This ensures their continuity throughout the plan's implementation. Second, in response to the second research question, it is evident that while spatial planning tools are available, practical challenges hinder their application. Drawing on the experiences from the papers analysed, these challenges are synthesised below to highlight the systemic changes required for more effective planning tools.

4.1. Food Production as a Land Use in Spatial Planning

In spatial planning, components of food systems other than production have well-defined land use classifications: industrial zones for processing and storage, logistics centres and technical infrastructure for distribution, commercial areas for markets and restaurants, and facilities for waste management. Typically, land for food production is allocated to rural areas and large agricultural parcels. However, as detailed in 3.2.4 Spatial visibility of food, production activities span diverse spatial settings, including (peri-)urban agriculture, agricultural parks, and conserved agricultural lands, but often lack formal recognition in spatial planning frameworks.

Additionally, 3.2.2 Space interface underscores the diverse spatial contexts—urban, peri-urban, and rural—in which food systems operate. It reveals that production areas in peri-urban and rural spaces are frequently neglected or undervalued in planning decisions, leading to land use conflicts and reduced agricultural continuity. To prevent loss of land access for production and ensure agricultural continuity, it is crucial to reconsider and formally integrate agriculture into spatial planning as a recognised land use decision (Gasperi et al., 2016). Integrating production into spatial planning as a distinct land use can be approached in several ways.

- One approach is to formally recognise production as a legitimate land use and prioritise it as part of urban infrastructure (Corkery & Osmond, 2020; Meenar et al., 2017). Marat-Mendes et al. (2021b) and Zazo-Moratalla et al. (2023) show that regulations defining production areas within urban contexts protect land use rights. Planning-related legislation can define the functions and typologies of food systems, establish criteria for the designation and protection of areas, and outline governance responsibilities (Morán Alonso & Fernández de Casadevante, 2014). Additionally, legends dedicated to food systems in spatial plans can help reduce urbanisation pressures and limit land consumption, as food production is seen as a major component of land use. However, Forte et al. (2022) caution that rigid functional planning may not effectively address contemporary urban needs.
- A second approach integrates food production into planning as a temporary land use, allowing adaptation to the dynamic needs of urban development. This method promotes short- or medium-term occupancy licences, rather than permanent ownership or user rights (Forte et al., 2002; Tóth & Timpe, 2017). However, this approach can create long-term uncertainty for production continuity, as it lacks provisions for land tenure security or improvement.
- The final approach combines production areas with other urban functions to promote multifunctional land use (Jansma & Wertheim-Heck, 2021). For instance, these areas could be integrated into new housing projects (Gasperi et al., 2016; Howe, 2002) or urban green spaces, supporting green infrastructure strategies like green belts or corridors (Jahr et al., 2021; Simon, 2023; Tóth & Timpe, 2017). Concepts like "Continuous Productive Urban Landscapes" (Viljoen et al., 2015) and "Edible Green Infrastructure" (Russo & Cirella, 2020) aim to integrate food production into multifunctional urban space networks. However, agriculture must be recognised as part of green infrastructure (Tóth & Timpe, 2017); otherwise, as in the Copenhagen plan (Waegemaeker et al., 2023), agricultural areas may be converted to recreational uses. This calls for a re-evaluation of green space concepts regarding production areas.

4.2. Barriers Hindering Spatial Planning Tools

3.2.5 Spatial planning instruments highlights a range of tools, such as master plans, planning laws, and socio-economic plans, which could support food systems. However, it also underscores the practical challenges of implementation, including competing land use priorities, legal complexities etc. Furthermore, as demonstrated in section 3.2.6 Cross-cutting policies, the intersection of food systems with multiple policy domains, including sustainability, development, and social equity, often leads to conflicts between priorities and the resulting inconsistencies. Thus, it is crucial to discuss both the critical issues that hinder the inclusion of production initiatives in spatial planning and the barriers that undermine the effectiveness of existing planning tools.

- One major issue is the competition for land and soil between housing, transportation, and green spaces (Pirro & Anguelovski, 2017), which threatens productive areas within urban boundaries as well as prime croplands on the urban periphery and in rural areas. Converting agricultural land into urban areas is generally less costly than redeveloping existing urban spaces or repurposing abandoned infrastructure, leading to planning decisions which favour land consumption and expansion (Martin & Marsden, 1999; Zullo et al., 2023). This trend raises concerns about food security and maintaining food self-sufficiency (Tobias & Price, 2020).
- Another challenge is the legal complexity surrounding ownership, land uses, rights, and regulations. The clear division between public and private ownership often excludes shared arrangements (Blomley, 2005). Since production activities, especially on vacant lands, often occur at the intersection of public and private properties. Thus, a hybrid form of ownership—or even a third legal category—might be needed to accommodate these informal arrangements (Corkery & Osmond, 2020).
- A third barrier is the tension between local priorities and national policy in decision-making. Local governments may find their ability to implement planning regulations constrained by higher-level authorities (Rahilly

et al., 2024), making existing planning tools ineffective. Specifically, when appeals for planning permissions are escalated to higher authorities, decision-making dynamics can shift. Additionally, inconsistencies between scale, planning tools, and timing can arise. For instance, changes in land use might occur during the gap between plan approvals by different institutions at various scales, potentially invalidating planning decisions (Pérez-Campaña & Valenzuela-Montes, 2015).

5. Conclusion

Recognising spatial planning as a fundamental step in the transition towards more sustainable and resilient food systems, this systematic review explores the level and/or way of integration of food systems into spatial planning by analysing 157 academic articles, within a representative sample of academic literature. The review clarifies the scope of existing research, highlights critical issues, and suggests future research directions. As the subject is still in its exploratory phase, there is a need for more in-depth discussion at all planning levels to develop a comprehensive process linking food systems with spatial planning. Future research should facilitate the vision of a planning system that incorporates food issues from the outset.

5.1. Limitations of the Study

Although the three most comprehensive databases were used, some important publications from other sources may have been overlooked. Additionally, considering only peer-reviewed articles may have a similar problem. Besides, even though an extensive search strategy was established for scanning, rural studies may have been excluded due to the urban focus of planning discussions. Nevertheless, using the term "spatial planning" was deemed more appropriate, as it encompasses not only urban areas but also agricultural lands that are often excluded from planning boundaries. This approach reduces the uncertainty of missing relevant studies. Lastly, although this article focuses on the implementation of food systems transitions within spatial planning, it excludes questions regarding "who implements" and "with which financial instruments" to limit its scope. Due to the multidimensional and complex nature of food systems, food governance is a research subject on its own. Despite these limitations, this study provides a comprehensive view of the relationship between food systems and spatial planning, and can be a pioneering bibliometric analysis conducted within this scope.

5.2. Looking to the Future

Research on integrating food systems into spatial planning and its tools is a nascent but evolving field. The review indicates that existing planning tools are being enriched by new proposals. Future research should at least shed light on the following aspects:

- The current focus of the researches predominantly lies in food production and urban scale. This indicates that the studies are conducted within a constrained framework. However, the complex and interdependent nature of food systems necessitates a holistic reconsideration of the issue.
- It is recognized that the scope of reconnecting cities with local food production extends far beyond the agricultural lands on the urban periphery. Policies related to food production and agro-ecosystems shape regional systems, thereby requiring an integrated approach. Hence, future research must not overlook the intermediary role of the regional scale in aligning national and local levels within visions and strategies.
- Urban policies are typically addressed at the municipal level, while agricultural and rural development policies are considered at national and regional scales. As a result, agricultural policies often fall outside the purview of sensitive spatial planning. However, given that urbanisation processes are multidimensional and multi-scalar, extending beyond city boundaries, the inclusion of rural areas in spatial planning is critical for the food systems transition.
- ESs are an emerging subject in the integration of food systems into spatial planning. Considering that food systems activities may not always be ecosystem-friendly, the inclusion of ESs provides significant support at the implementation level.
- Finally, despite some recommendations, there is still limited space for innovative tools and practices within the rigid and hierarchical structure of existing planning tools. To address this, food systems need to be reimagined through flexible planning instruments. This would foster more innovative efforts for the food systems transition in terms of rural and urban spatial planning, governance models, and integrated design approaches across scales.

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References

Abouelfadl, S., Ouda, K., Atia, A., Al-Amir, N., Ali, M., Mahmoud, S., Said, H., & Ahmed, A. (2014). A new sustainable city in the Egyptian western desert: Gardens' City. *WIT Transactions on Ecology and the Environment, 181*. https://doi.org/10.2495/EID140281

Asomani-Boateng, R., & Haight, M. (1999). Reusing organic solid waste in urban farming in African cities: A challenge for urban planners. *Third World Planning Review, 21*(4), 411-428. https://doi.org/10.3828/twpr.21.4.55371841137847u14

Aubry, C., Ramamonjisa, J. Dabat, M.-H., Rakotoariso, J., Rakotondraibe, J., & Rabehariso, L. (2012). Urban agriculture and land use in cities: An approach with the multi-functionality and sustainability concepts in the case of Antananarivo (Madagascar). *Land Use Policy, 29*, 429–439. https://doi.org/10.1016/j.landusepol.2011.08.009

Baldini, C., Marasas, M. E., Tittonell, P., & Drozd, A. A. (2022). Urban, peri-urban and horticultural landscapes – Conflict and sustainable planning in La Plata district, Argentina. *Land Use Policy, 117*, 106120. https://doi.org/10.1016/j.landusepol.2022.106120

Basso, S., Biagi, P.D., & Crupi, V. (2022). Downscaling food system for the 'public city' regeneration—An experience of social agriculture in Trieste. *Sustainability, 14*, 2769. https://doi.org/10.3390/su14052769

Battersby, J. (2017). Food system transformation in the absence of food system planning: The case of supermarket and shopping mall retail expansion in Cape Town, South Africa. *Built Environment, 43*(3), 417-430.

Bohn, K., & Viljoen, A. (2012). The CPUL City Toolkit: planning productive urban landscapes for European cities. In A. Viljoen and J. S. C. Wiskerke (Eds.), *Sustainable food planning: evolving theory and practice* (pp. 479-493). Wageningen Academic Publishers. https://doi.org/10.3920/978-90-8686-187-3_38

Borelli, S., Conigliaro, M., Quaglia, S., & Salbitano, F. (2018). Urban and peri-urban agroforestry as multifunctional land use. In J. C. Dagar and V. P. Tewari (Eds.), *Agroforestry: Anecdotal to modern science* (pp. 705-724). Springer. https://doi.org/10.1007/978-981-10-7650-3_28

Caramaschi, S. (2017). Counteracting food deserts. The potential for mobile food vending in regenerating contemporary cities. *Proceedings of the 11th International Conference on Urban Regeneration and Sustainability, 12*(4), 744–751. https://doi.org/10.2495/SDP-V12-N4-744-751

Ceylan, B., & Erdoğan, A. (2023). Pazar yeri yerseçim-planlama-tasarım ölçütleri ve COVID-19 sonrası için bir ön değerlendirme. *Planlama Dergisi, 33*(1), 15-39. https://doi.org/10.14744/planlama.2022.98216

Coppola, A. (2018). Projects of becoming in a right-sizing shrinking city. *Urban Geography*. https://doi.org/10.1080/02723638.2017.1421391

Corkery, L., & Osmond, P. (2020). Legal frameworks for urban agriculture: Sydney case study. *Journal of Property, Planning and Environmental Law, 13*(3), 218-235. https://doi.org/10.1108/JPPEL-06-2020-0030

Cretella, A., & Buenger, M. S. (2016). Food as creative city politics in the city of Rotterdam. *Cities, 51*, 1–10. http://dx.doi.org/10.1016/j.cities.2015.12.001

de la Salle, J., & Holland, M. (Eds.). (2010). *Agricultural urbanism: Handbook for building sustainable food & agriculture systems in 21st century cities*. Libri Publishing.

de la Salle, J. (2019). Great food streets: planning and design for urban magnetism in post-agricultural cities. *Urban Design International, 24*, 118–128. https://doi.org/10.1057/s41289-019-00094-6

Dezio, C., & Paris, M. (2023). Three case studies of landscape design project of Italian marginal areas. An anti-fragile opportunity for an integrated food governance in a post Covid perspective. *Cities, 135*, 104244. https://doi.org/10.1016/j.cities.2023.104244

Dubbeling, M., Bracalenti, L., & Lagorio, L. (2009). Participatory design of public spaces for urban agriculture, Rosario, Argentina. *Open house international, 34*(2), 36-49.

Eraslan, Y. (2023). İmar hukuku yönünden seralı şehirleşme. *TAAD, 14*(55). https://doi.org/10.54049/taad.1328423

Forte, A., Gottero, E., & Cassatella, C. (2022). How urban food gardening fits into city planning. *Tema Journal of Land Use, Mobility and Environment, 15*(3), 397-413. https://doi.org/10.6092/1970-9870/9056

Gasperi, D., Pennisi, G., Rizzati, N., Magrefi, F., Bazzocchi, G., Mezzacapo, U., Centrone Stefani, M., Sanyé-Mengual, E., Orsini, F., & Gianquinto, G. (2016). Towards regenerated and productive vacant areas through urban horticulture: Lessons from Bologna, Italy. *Sustainability, 8*(12), 1347. https://doi.org/10.3390/su8121347

Huang, D., & Drescher, M. (2015). Urban crops and livestock: The experiences, challenges, and opportunities of planning for urban agriculture in two Canadian provinces. *Land Use Policy, 43*, 1–14. http://dx.doi.org/10.1016/j.landusepol.2014.10.011

Iñiguez-Gallardo, V., Loján Córdova, J., Ordoñez-León, A., & Reyes-Bueno, F. (2022) Food markets and free fairs as contributors for designing climate resilient cities: A study case in Southern Ecuador. *Sustainability, 14*, 7214. https://doi.org/10.3390/su14127214

Jahrl, I., Moschitz, H., & Salomon Cavin, J. (2021). The role of food gardening in addressing urban sustainability – A new framework for analysing policy approaches. *Land Use Policy, 108*, 105564. https://doi.org/10.1016/j.landusepol.2021.105564

Jakobsson, A., & Dewaelheyns, V. (2018). Contemporary interpretation of the meaning and heritage of early 20th century private gardens: From an historical reflection to a future outlook in planning. *Urban Forestry & Urban Greening, 30*, 210–219. https://doi.org/10.1016/j.ufug.2018.02.003

Jansma, J. E., & Wertheim-Heck, S. C. O. (2021). Thoughts for urban food: A social practice perspective on urban planning for agriculture in Almere, the Netherlands. *Landscape and Urban Planning, 206*, 103976. https://doi.org/10.1016/j.landurbplan.2020.103976

Jones, D. S., & Beza, B. B. (2018). Food-sensitive urban planning Australian perspectives. In J. Zeunert and T. Waterman (Eds.), *Routledge handbook of landscape and food* (pp. 393-408). Routledge. https://doi.org/10.4324/9781315647692-27

Kassis, G., Bertrand, N., & Pecqueur, B. (2021). Rethinking the place of agricultural land preservation for the development of food systems in planning of peri-urban areas: Insights from two French municipalities. *Journal of Rural Studies, 86*, 366–375. https://doi.org/10.1016/j.jrurstud.2021.07.003

Kato, Y., Andrews, S., & Irvin, C. (2016). Availability and accessibility of vacant lots for urban cultivation in post-Katrina New Orleans. *Urban Affairs Review*, 1–31. https://doi.org/10.1177/1078087416659157

Klebl, F., Walthall, B., & Vicente-Vicente, J. L. (2022) Planning for sustainable food communities: An optimal spatial allocation study of food hubs considering the 15-min city concept—The case of LebensMittelPunkte in Berlin. *Frontiers Sustainable Food Systems, 6*, 913412. https://doi.org/10.3389/fsufs.2022.913412

La Rosa, D. (2023). New forms of urban agriculture in metropolitan areas: Examples from Italy. In J. Breuste et al. (Eds.), *Making green cities: Concepts, challenges and practice* (pp. 159-175). Springer. https://doi.org/10.1007/978-3-030-73089-5_10

Lovell, S. T. (2010). Multifunctional urban agriculture for sustainable land use planning in the United States. *Sustainability, 2*, 2499-2522. https://doi.org/10.3390/su2082499

Marat-Mendes, T., Isidoro, I., Catela, J., Pereira, M., Borges, J. C., Lopes, S. S., & Henriques, C. (2021b). Drivers of change: How the food system of the Lisbon Metropolitan Area is being shaped by activities, initiatives and citizens needs towards a sustainable transition. *Cidades, Comunidades e Territórios*, 41-62. https://doi.org/10.15847/cct.20490

Marat-Mendes, S. (2022). Étienne de Groër: Planning the Lisbon Garden City Region. In C. Brisotto and F. Lemes de Oliveira (Eds.), *Re-imagining resilient productive landscapes: Perspectives from planning history* (pp.131-154). https://doi.org/10.1007/978-3-030-90445-6_7

Martin, R., & Marsden, T. (1999). Food for urban spaces: The development of urban food production in England and Wales. *International Planning Studies*, *4*(3), 389-412. http://dx.doi.org/10.1080/13563479908721749

Mayrhofer, R. (2021). Planning for vita activa—Labor, work, and action in a communal urban gardening project in Vienna. *Sustainability, 13*, 9864. https://doi.org/10.3390/su13179864

Meenar, M., Morales, A., & Bonarek, L. (2017). Regulatory practices of urban agriculture: A connection to planning and policy. *Journal of the American Planning Association*, *83*(4), 389-403. http://dx.doi.org/10.1080/01944363.2017.1369359

Mélice Dias, A., & Marat-Mendes, T. (2020). The morphological impact of municipal planning instruments on urban agriculture. *Cidades, Comunidades e Territórios, 41*, 156-176. https://doi.org/10.15847/cct.20485

Miedema, K. (2019). Grow small, think big: designing a local food system for London, Ontario. *Urban Design International, 24*, 142–155. https://doi.org/10.1057/s41289-019-00095-5

Miner, R. C., & Raftery, S. R. (2012). Turning brownfields into "green fields": Growing food using marginal lands. *WIT Transactions on Ecology and The Environment, 162*, 413-419. https://doi.org/10.2495/EID120361

Mkwela, H. S. (2013). Urban agriculture in Dar es Salaam: a dream or reality? *WIT Transactions on Ecology and The Environment, 173*. https://doi.org/10.2495/SDP130141

Morán Alonso, N., & Fernández de Casadevante, J. L. (2014). A desalambrar. Agricultura urbana, huertos comunitarios y regulación urbanística. *Hábitat y Sociedad, 7*, 31-53. http://dx.doi.org/10.12795/HabitatySociedad.2014.i7.03

Murphy, M., Badland, H., Javad Koohsari, M., Koohsari, M. J., Astell-Burt, T., Trapp, G., Villanueva, K., Mavoa, S., Davern, M., & Giles-Corti, B. (2016). Indicators of a health-promoting local food environment: a conceptual framework to inform urban planning policy and practice. *Health Promotion Journal of Australia*. http://dx.doi.org/10.1071/HE15098

Oliveira, R. (2022). FoodLink—A network for driving food transition in the Lisbon Metropolitan Area. *Land, 11*, 2047. https://doi.org/10.3390/land11112047

Paddeu, F. (2017). Legalising urban agriculture in Detroit: a contested way of planning for decline. *Town Planning Review, 88*(1), 109-129. https://doi.org/10.3828/tpr.2017.9

Pérez-Campaña, R., & Valenzuela-Montes, L. M. (2015). Protection of periurban agricultural landscapes: Vegas and Deltas in Andalucía. In R. Gambino and A. Peano (Eds.), *Nature policies and landscape policies: Towards an alliance* (pp. 165-172). Springer. https://doi.org/10.1007/978-3-319-05410-0_18

Pirro, C., & Anguelovski, I. (2017). Farming the urban fringes of Barcelona: Competing visions of nature and the contestation of a partial sustainability fix. *Geoforum, 82*, 53–65. http://dx.doi.org/10.1016/j.geoforum.2017.03.023

Pothukuchi, K., & Kaufman, J. (2000). The food system: a stranger to the planning field. *Journal of the American Planning Association, 66*(2), 113–124. https://doi.org/10.1080/01944360008976093

Pothukuchi, K. (2017). "To allow farming is to give up on the city": Political anxieties related to the disposition of vacant land for urban agriculture in Detroit. *Journal of Urban Affairs*. https://doi.org/10.1080/07352166.2017.1319239

Raddad, S. H. (2022). Strategic planning to integrate urban agriculture in Palestinian urban development under conditions of political instability. *Urban Forestry & Urban Greening, 76*, 127734. https://doi.org/10.1016/j.ufug.2022.127734

Roehr, D., & Kunigk, I. (2009). Metro Vancouver: Designing for urban food production. *Berkeley Planning Journal, 22*, 61-70.

Rogers, C. M., & Hiner, C. C. (2016). Siting urban agriculture as a green infrastructure strategy for land use planning in Austin, TX. *Challenges in Sustainability*, *4*(1), 39-53. https://doi.org/10.12924/cis2016.04010039

Rose, J. G. (1984). Farmland preservation policy and program. *Natural Resources Journal, 24*(3), 591-640.

Russo, A., & Cirella, G. T. (2020). Edible green infrastructure for urban regeneration and food security: Case studies from the Campania Region. *Agriculture, 10*, 358. https://doi.org/10.3390/agriculture10080358

Shimpo, N., Wesenerb, A., & McWilliam, W. (2019). How community gardens may contribute to community resilience following an earthquake. *Urban Forestry & Urban Greening, 38*, 124–132. https://doi.org/10.1016/j.ufug.2018.12.002

Sietchiping, R., Kago, J., Zhang, X. Q., Augustinus, C., & Tuts, R. (2014). Role of urban–rural linkages in promoting sustainable urbanization. *Environment and Urbanization ASIA*, *5*(2), 219-234. https://doi.org/10.1177/0975425315577170

Simon, S. (2023). The role of Design Thinking to promote a sustainability transition within participatory urban governance: Insights from urban agriculture initiatives in Lisbon. *Urban Governance, 3*, 189-199. https://doi.org/10.1016/j.ugj.2023.05.003

Steenkamp, J., Cilliers, E. J., Cilliers, S. S., & Lategan, L. (2021). Food for thought: Addressing urban food security risks through urban agriculture. *Sustainability, 13*, 1267. https://doi.org/10.3390/su13031267

Su, S., Li, Z., Xu, M., Cai, Z., & Weng, M. (2017). A geo-big data approach to intra-urban food deserts: Transit-varying accessibility, social inequalities, and implications for urban planning. *Habitat International, 64*, 22e40. http://dx.doi.org/10.1016/j.habitatint.2017.04.007

Tobias, S., & Price, B. (2020). How effective is spatial planning for cropland protection? An assessment based on land-use scenarios. *Land, 9*, 43. https://doi.org/10.3390/land9020043

Toriro, P., & Muziri, C. (2021). Food and city planning management in Zimbabwe. In P. Toriro, and I. Chirisa (Eds.), *Environmental resilience: Food and the city–Zimbabwe* (pp. 117-134). Springer. https://doi.org/10.1007/978-981-16-0305-1_8

Tóth, A., & Timpe, A. (2017). Exploring urban agriculture as a component of multifunctional green infrastructure: Application of figure-ground plans as a spatial analysis tool. *Moravian Geographical Reports*, *25*(3), 208-218. https://doi.org/10.1515/mgr-2017-0018

Viljoen, A., Schlesinger, J., Bohn, K., & Drescher, A. (2015). Agriculture in urban design and spatial planning. In H. de Zeeuw and P. Drechsel (Eds.), *Cities and Agriculture: Developing Resilient Urban Food Systems* (pp. 88-120). Routledge.

Waegemaeker, J., Primdahl, J., Vanempten, E., Søderkvist Kristensen, L., Rogge, E., & Vejre, H. (2023) The role of food production in planning for open space: post-war planning of the rural–urban fringes of Copenhagen and Brussels. *European Planning Studies, 31*(10), 2235-2253. https://doi.org/10.1080/09654313.2023.2212021

Wadumestrige Dona, C. T. G., Mohan, G., & Fukushi, K. (2022). A sustainable pathway towards prioritization of multifunctional benefits in urban agriculture contributing to shrinking cities in developing countries - An empirical case of Sri Lanka. *Current Research in Environmental Sustainability, 4*, 100183. https://doi.org/10.1016/j.crsust.2022.100183

Walker, S. (2015). Urban agriculture and the sustainability fix in Vancouver and Detroit. Urban *Geography, 37*(2), 163–182. https://doi.org/10.1080/02723638.2015.1056606

Wang, N., Hao, J., Zhang, L., Duan, W., Shi, Y., Zhang, J., & Wusimanjiang, P. (2023). Basic farmland protection system in China: Changes, conflicts and prospects. *Agronomy, 13*, 651. https://doi.org/10.3390/agronomy13030651

Westphal, J. M. (2001). Managing agricultural resources at the urban-rural interface: a case study of the Old Mission Peninsula. *Landscape and Urban Planning, 57*, 13-24.

Wheeler, A. R., & Thompson, S. M. (2010). The future health and environmental sustainability of South East Queensland: an evaluation of the Regional Plan. *Australian Planner, 47*(3), 152-161. https://doi.org/10.1080/07293682.2010.508203

White, H., & Natelson, S. (2012). Good planning for good food: mechanisms within the English planning system to support sustainable food and farming. In A. Viljoen and J. S. C. Wiskerke (Eds.), *Sustainable food planning: evolving theory and practice* (pp. 507-516). Wageningen Academic Publishers. https://doi.org/10.3920/978-90-8686-187-3_40

Wu, S.; Qin, L.; Shen, C.; Zhou, X., & Wu, J. (2022). Food retail network spatial matching and urban planning policy implications: The case of Beijing, China. *Land, 11*, 694. https://doi.org/10.3390/land11050694

Yang, Z., Hao, P., Liu, W., & Cai, J. (2016). Peri-urban agricultural development in Beijing: Varied forms, innovative practices and policy implications. *Habitat International, 56*, 222e234. http://dx.doi.org/10.1016/j.habitatint.2016.06.004

Zazo-Moratalla, A., Orellana-McBride, A., & Cerda-Inostroza, C. (2023). Agricultura urbana en barbecho. Concepciones en la planificación urbana chilena. *Eure, 49*(147), 1-25. http://dx.doi.org/10.7764/eure.49.147.06

Zhang, Y., Li, X., Jiang, Q., Chen, M., & Liu, L. (2022). Quantify the spatial association between the distribution of catering business and urban spaces in London using catering poi data and image segmentation. *Atmosphere, 13*, 2128. https://doi.org/10.3390/atmos13122128

Zhang, X., Wu, Y., & Shen, L. (2011). An evaluation framework for the sustainability of urban land use: A study of capital cities and municipalities in China. *Habitat International, 35*, 141e149. https://doi.org/10.1016/j.habitatint.2010.06.006

Zullo, F., Di Pietro, G., Cattani, C., & Montaldi, C. (2023). Urban planning vs. agricultural production: A study on the Po Valley. *Land, 12*, 902. https://doi.org/10.3390/land12040902

Additional References

Blomley, N. (2005). Flowers in the bath tub: boundary crossings in the public-private divide. *Geoforum, 36*(3), 281-296. https://doi.org/10.1016/j.geoforum.2004.08.005

Brown, K. H., & Jameton, A. L. (2000). Public health implications of urban agriculture. *Journal of Public Health Policy, 21*(1), 20–39. https://doi.org/10.2307/3343472

Buchan, R., Cloutier, D.S. & Friedman, A. (2019). Transformative incrementalism: Planning for transformative change in local food systems. *Progress in Planning, 134*. https://doi.org/10.1016/j.progress.2018.07.002

Cabannes, Y., & Marocchino, C. (2018). Food and urban planning the missing link. In Y. Cabannes and C. Marocchino (Eds.), *Integrating food into urban planning* (pp. 18-59). London, UCL Press; Rome, FAO. https://doi.org/10.14324/111.%209781787353763

Choguill, C. (1995). Urban agriculture and cities in the developing world. *Habitat International, 19*(2), 149–150.

Cooper, H. M., Hedges, L. V., & Valentine, J. C. (Eds.) (2008). The handbook of research synthesis and meta-analysis (2nd ed.). Russell Sage Foundation.

Covert, M., & Morales, A. (2014). Formalizing city farms: conflict and conciliation. In V. Mukhija and A. Loukaitou-Sideris (Eds.), *The informal American city: Beyond taco trucks and day labor* (pp. 193–208). MIT Press.

Dinç, S., Türkay, Z., & Tezer, A. (2023). Integration of local agri-food systems in spatial planning: Foodshed assessment through ecosystem services. In B. Banachowicz (Eds.), *Integrated Planning in a World of Turbulence: 35th AESOP Annual Congress* (pp. 721-745). https://proceedings.aesop-planning.eu/index.php/aesopro/issue/view/17

Doernberg, A., Horn, P., Zasada, I., & Piorr, A. (2019). Urban food policies in German city regions: An overview of key players and policy instruments, *Food Policy, 89*, 101782.

ECTP-CEU. (n.d.). *International Agreement and Declaration by the National Institutes and Associations of Professional Town Planners within the European Economic Community*. https://ectp-ceu.eu/about-us/complete-charter/

FAO (2018). *Sustainable food systems: Concept and framework*. https://openknowledge.fao.org/server/api/core/bitstreams/b620989c-407b-4caf-a152-f790f55fec71/content

Friedmann, J. (2011). *Insurgencies: Essays in planning theory*. Routledge.

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal, 26*, 91–108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

Lozano, S., Calzada-Infante, L., Adenso-Díaz, B., & García, S. (2019). Complex network analysis of keywords co-occurrence in the recent efficiency analysis literature. *Scientometrics, 120*, 609-629. https://doi.org/10.1007/s11192-019-03132-w

Marsden, T., & Sonnino, R. (2012). Human health and wellbeing and the sustainability of urban-regional food systems. Current Opinion in Environmental Sustainability, 4, 427–30.

Mason, D., & Knowd, I. (2010). The emergence of urban agriculture: Sydney, Australia. *International Journal of Agricultural Sustainability, 8*(1-2), 62–71. https://doi.org/10. 3763/ijas.2009.0474

Mbiba, B. (1995). *Urban agriculture in Zimbabwe: Implications for urban management and poverty*. Avebury, Aldershot.

Meenar, M. (2015). Nonprofit-driven community capacity-building efforts in community food systems. *Journal of Agriculture, Food Systems, and Community Development, 6*(1), 77–94. https://doi.org/10.5304/jafscd.2015.061.006

Moher, D., Liberati, A., Tetzla, J., Altman, D. G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine, 6*, e1000097. https://doi.org/10.1371/journal.pmed.1000097

Morgan, K. (2009). Feeding the city: The challenge of urban food planning. *International Planning Studies, 14*(4), 341-348, https://doi.org/10.1080/13563471003642852

Morgan, K. (2015). Nourishing the city: The rise of the urban food question in the Global North. *Urban Studies, 52*(8), 1379–1394, https://doi.org/10.1177/0042098014534902

MUFFP-Milan Urban Food Policy Pact. (2015). *Milan Urban Food Policy Pact and Framework for Action*. https://www.milanurbanfoodpolicypact.org/

OECD (n.d.). *Food systems*. https://www.oecd.org/en/topics/policy-issues/food-systems.html

Oulu, M. (2015). Climate change governance: Emerging legal and institutional frameworks for developing countries. In W. Leal Filho (Ed.), *Handbook of climate change adaptation*, Springer.

Petticrew, M., & Roberts, H. (2006). *Systematic reviews in the social sciences: A practical guide*. Blackwell Publishing. https://doi.org/10.1002/9780470754887

Pothukuchi, K., & Kaufman, J. (1999). Placing the food system on the urban agenda: The role of municipal institutions in food systems planning. *Agriculture and Human Values, 16*, 213–224.

Rahilly, J., Williams, A., Chang, M., Cummins, S., Derbyshire, D., Hassan, S., Huang, Y., Keeble, M., Liu, B., Medina-Lara, A., Mytton, O., Savory, B., Schiff, A., Sharp, S. J., Smith, R., Thompson, C., White, M., Adams, J., & Burgoine, T. (2024). Changes in the number and outcome of takeaway food outlet planning applications in response to adoption of management zones around schools in England: A time series analysis. *Health & place, 87*, 103237. https://doi.org/10.1016/j.healthplace.2024.103237

Schreiber, K., Hickey, G. M., Metson, G.S., Robinson, B. E., & MacDonald, G. K. (2021). Quantifying the foodshed: A systematic review of urban food flow and local food self-sufficiency research. *Environmental Research Letter,* 16. https://doi.org/10.1088/1748-9326/abad59

Sharifi, A., & Yamagata, Y. (2016). Principles and criteria for assessing urban energy resilience: A literature review. *Renewable and Sustainable Energy Reviews, 60*, 1654–1677. https://doi.org/10.1016/j.rser.2016.03.028

Sonnino, R. (2016). The new geography of food security. Exploring the potential of urban food strategies. *The Geographical Journal, 182*(2), 190–200. https://doi.org/10.1111/geoj.12129

Thibert, J. (2012). Making local planning work for urban agriculture in the North American context: A view from the ground. *Journal of Planning Education and Research, 32*(3), 349–357.

Tornaghi, C., & Dehaene, M. (2020). Agroecology and sustainable food systems the prefigurative power of urban political agroecology: Rethinking the Uubanisms of agroecological transitions for food system transformation. *Agroecology and Sustainable Food Systems, 44*(5), 594–610. https://doi.org/10.1080/21683565.2019.1680593

UN. (2015). *Sustainable Development Goals*. https://sdgs.un.org/goals

UN-Habitat. (2017). *New Urban Agenda*. https://habitat3.org/wp-content/uploads/NUA-English.pdf

Van Haren, C., Kumar, I., Cormont, A., Terwisscha, C., Rooij, B., Islam, S., & Verweij, P. (2023). The role of spatialisation and spatial planning in improving food systems: Insights from the fast-growing city of Dhaka, Bangladesh. *Sustainability,* 15. https://doi.org/10.3390/su15043423

Verzone, C. (2012). The Food urbanism initiative. In A. Viljoen and J. S. C. Wiskerke (Eds.), *Sustainable food planning: Evolving theory and practice* (pp.517–532). Wageningen Academic Publishers. https://doi.org/10.3920/978-90-8686-187-3_41.

Waldheim, C. (2018). Industrial economy and agrarian urbanism. In P. Viganо, C. Cavalieri, and M. Barcelloni Corte (Eds.), *The horizontal metropolis between urbanism and urbanisation* (pp. 47–53). Springer Link. https://doi.org/10.1007/978-3-319-75975-3_4

Wegener, M. (1998). GIS and spatial planning. *Environment and Planning B: Planning and Design Anniversary Issue, 25*, 48–52.

Zeng, X., Yu, Y., Yang, S., Lv, Y., & Sarker, M. N. I. (2022). Urban resilience for urban sustainability: Concepts, dimensions, and perspectives. *Sustainability*, 14, 2481. https://doi.org/10.3390/su14052481