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Original article

# The Significance of Hobby Gardens in Urban Agriculture: A Bibliometric Mapping of Thematic Structures and Future Potentials

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**Abstract**

Increased urbanization in recent years has weakened individuals' connection with nature and distanced city dwellers from food production processes. Rapid urbanization, extended agricultural systems, and long supply chains have both caused environmental problems and brought additional costs. Urban agriculture stands out as an approach that offers solutions to these problems and facilitates city dwellers' access to food and agricultural products; it aims to meet the city's food needs within and around urban areas, using urban resources. Within the scope of the sustainability of urban agriculture, hobby gardens play an important role by increasing city dwellers' interest in agriculture and creating agricultural awareness. This study aims to reveal the intellectual structure, main themes, and research trajectories of the academic literature on hobby gardens using bibliometric analysis and scientific mapping methods. Analyses conducted using articles obtained from the Scopus database covering the years 1989–2025 show that the unifying element of the field of hobby gardening is based on the concepts of "gardening" and "human." However, it was determined that the main driving force of the field is social and human dynamics such as "leisure time" and gender. This finding proves that hobby gardening research focuses on its role in human well-being, social life, and community interaction rather than a technical or agricultural focus. Nevertheless, technical topics such as "composting" and 'peat' were found to constitute a niche theme. Topics such as "urban planning" and "urban environment" were understood to represent a new research frontier for the field's future potential. This comprehensive map provides policymakers and academics with an evidence-based and strategic framework. The findings underscore the need for policies that support hobby gardens not only for their ecological benefits but also as vital centers for urban well-being and social resilience. The results of the study highlight the multidisciplinary role of hobby gardens in building sustainable cities.

**Keywords:** Urban Agriculture, Hobby Gardening, Bibliometric Analysis, Sustainability, Urban Well-Being.

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## INTRODUCTION

Rapid urbanization has distanced consumers from food production processes and deepened the problem of alienation from food systems (Stanley and Galbraith, 2024). Furthermore, extended agricultural systems and long supply chains have caused environmental problems and brought additional costs. In this situation, it is crucial to encourage the local production of agricultural food (Tümenbatur, 2022) and other agricultural products and short supply chains. Urban agriculture stands out as an approach that offers solutions to these problems and facilitates access to food and agricultural products for city dwellers (Orsini et al., 2020), and its importance is becoming increasingly clear.

Urban agriculture refers to agricultural production activities within and around urban areas that aim to meet the region's food needs by utilizing urban resources (Tandoğan and Özdamar, 2022). It offers an alternative to these problems by encouraging agricultural activities within and around cities (Kanbak, 2018), plays an important role in issues such as maintaining the urban-rural balance (Konyalı et al., 2025), ensuring food security (Farooq and Rashid, 2024), and the efficient use of agricultural land (İnan, 2025). Urban agriculture stands out as a holistic approach that includes food production, distribution, and consumption within or on the outskirts of cities (Azunre et al., 2019), supporting the preservation of the city's nature and landscape.

Hobby gardens, seen as a subcategory of urban agriculture, are important spaces that offer the potential to reconnect people with nature. These practices, which have a long history in Europe (Bell et al., 2016), have become widespread in Türkiye, particularly since the mid-1980s, parallel to urbanization (Aliağaoğlu and Alevkayalı, 2017). The international literature addresses the benefits of hobby gardens along three main axes: socio-cultural, environmental and economic, demonstrating a strong consensus on these issues.

Urban residents growing their own produce in hobby gardens provides both economic and social benefits. These areas also offer opportunities to understand the value of agricultural labor and connect with nature. Hobby gardens are places where users can spend quality time, experience agricultural activities, earn economic gains from agriculture, socialize (Durusoy and Mutuş, 2021), understand the concept of neighborhood, and develop culture (Kayasü and Durmaz, 2021; Yılmaz and Şahin, 2023; Şahin and Topçu, 2024; Tekin, 2025).

Academic studies on urban agriculture and hobby gardens have created a rich body of knowledge that highlights the multidimensional role of these areas in urban spaces. The international literature addresses the benefits of hobby gardens along three main axes: socio-cultural, environmental and economic, demonstrating a strong consensus on these issues.

The most strongly documented impact in social and cultural terms is on individual and societal well-being. Meta-analyses have quantitatively demonstrated that gardening activities reduce conditions

such as stress and anxiety, encourage physical activity, and increase life satisfaction (Soga et al., 2017). Beyond these individual benefits, these spaces strengthen social capital by bringing together people from different socioeconomic groups (Veen et al., 2016). Environmentally, they are recognized as “green infrastructure" elements that support urban biodiversity and contribute to urban sustainability through practices like composting (Philpott and Bichier, 2017; Orsini et al., 2020). In economic terms, systematic reviews show that urban farming practices reduce food expenditures and increase dietary diversity, contributing to household food security (Warren et al., 2015).

Studies in Türkiye show significant parallels with these global trends, confirming positive effects on mental health and socialization (Yılmaz and Şahin, 2023). The role of local governments is critical at this point; hobby garden projects supported by municipalities have been seen to increase social welfare and support local development (Gökçe et al., 2022). Local governments, having recognized certain advantages of hobby gardens in tourism, etc. (Demiralay, 2023), wish to increase areas used for agriculture, such as hobby gardening, and improve their utilization. However, the literature on Türkiye also highlights a unique problem: the risks created by unplanned urbanization and the lack of a legal framework, which can lead to the uncontrolled spread of hobby gardens on productive agricultural land, causing speculation and ecological degradation (Kurtuluş and Turgut, 2019; Yurday et al., 2021).

Hobby gardens should be framed as multifunctional spaces that provide tangible contributions to the three core pillars of urban sustainability: economic, social, and environmental. From an economic perspective, these gardens facilitate the creation of ultra-short food supply chains, improving urban residents' access to fresh produce and potentially leading to modest reductions in household food expenditures. By promoting localization, a key principle in agricultural economics, they generate positive externalities by reducing the carbon footprint associated with food transportation. From a social perspective, these spaces act as platforms for strengthening social capital and community resilience, bringing together individuals from diverse socio-economic backgrounds and fostering neighborhood ties. Finally, from an environmental perspective, they not only serve as micro-havens for biodiversity but also enhance ecological awareness and environmental literacy by enabling residents to gain direct, hands-on experience with soil, water, and ecosystem cycles. These multifaceted contributions demonstrate that hobby gardens are a strategic tool in urban planning that should not be overlooked.

The limited number of studies that comprehensively and systematically examine the benefits of hobby gardens for urban agriculture forms the primary motivation for this research. While the existing literature is generally limited to descriptive analyses, there is a need for a holistic approach that reveals the intellectual structure, fundamental paradigms, and future research trajectories of this field. In this context, this study aims to go beyond traditional literature reviews and map the intellectual structure and conceptual framework of the scientific literature on hobby gardens using science mapping and bibliometric analysis methods. By quantitatively analyzing the fundamental research paradigms, driving

themes, and emerging topics, this study aims to develop a strategic framework for providing evidence-based recommendations to local governments and policymakers.

## MATERIAL and METHOD

### Material

In this study, science mapping and bibliometric analysis methods were employed to map the intellectual structure and conceptual framework of the field, based on academic studies conducted on hobby gardens. These methods were selected because they allow for a systematic and quantitative evaluation of large volumes of bibliographic data, revealing the intellectual structure, main themes, and research trajectories of a field. Science mapping provides a visual representation of conceptual relationships, while bibliometric analysis offers statistical insights into the dynamics and evolution of research. Together, they provide a comprehensive framework suitable for identifying both established and emerging themes in the literature. The analyses were performed using the R programming language (R version 4.4.1) and the bibliometrix package, which offers a comprehensive toolkit for such analyses(Aria and Cuccurullo, 2017; Çakmakçı et al, 2024).

#### *Data Set and Preprocessing*

The research dataset comprises bibliographic information from 27 articles obtained by searching the Scopus database with the keywords “TITLE-ABS-KEY ("hobby garden" OR "hobby gardening" OR "hobby gardens")”. his number represents the entire set of publications retrieved using the specified keywords, and no additional exclusion criteria were applied. Therefore, all 27 articles identified through the search were included in the analysis. The study focuses on articles published between 1989 and 2025 that directly include the searched keywords. Raw data were converted into a suitable data frame for analysis using the bibliometrix package. The analyses are based on the titles, abstracts, and author-assigned keywords of the articles, in addition to the " Keywords Plus" data indexed by Scopus. Scopus was chosen as the primary database for this study because of its broad coverage of international journals, especially in the fields of agriculture, social sciences, and environmental studies, which are closely related to hobby gardening research. Compared to Web of Science (WoS), Scopus provides a larger number of indexed journals and more comprehensive metadata, including abstracts and author keywords, which are essential for bibliometric analysis. While WoS could also be used as an alternative source, Scopus was preferred in this study due to its wider scope and compatibility with the bibliometrix package.

### Method

This section presents the methodological framework used in this study to explore the intellectual structure of hobby gardening research. A multi-stage analytical process was designed, combining

bibliometric analysis and science mapping techniques to systematically examine thematic patterns, relationships, and research dynamics within the field.

***Intellectual Structure Analysis***

To reveal the conceptual structure of the research field, its main research topics, and the relationships between these topics, a three-stage analysis process, detailed below, was followed:

***Word Frequency Analysis and Visualization:*** In the first stage, a word cloud was generated to identify the most dominant and frequently repeated concepts in the field. For this purpose, keywords located in the "Keywords Plus" field of the dataset were parsed, converted to lowercase for standardization, and their frequencies were calculated. After cleaning meaningless or general expressions (e.g., "article", "priority journal"), the concepts with the highest frequencies were visualized using the wordcloud2 package. This analysis provides an exploratory overview of the field's general thematic focus.

***Keyword Co-occurrence Network:*** A keyword co-occurrence network was constructed to reveal the connections between research topics and thematic clusters within the field. This analysis, based on the instances where two keywords appear together in the same article, was performed using the biblioNetwork() function of the bibliometrix package. The generated network was visualized using the Fruchterman-Reingold layout algorithm. This visualization enabled the identification of which concepts play a central role in the network, which concepts form specific research sub-areas (thematic clusters) by appearing together, and the relationships between these sub-areas.

***Thematic Map Analysis:*** Finally, to more deeply analyze the structure and strategic importance of research themes in the field, the thematic map technique was utilized (Cobo et al., 2011). This method positions research topics, consisting of keyword clusters (themes), on a strategic diagram according to two main dimensions:

*Centrality*; Located on the X-axis, this dimension measures the strength of a theme's interaction with other themes and indicates the theme's importance within the overall structure of the research field.

*Density*; Located on the Y-axis, this dimension measures the strength of internal links among the keywords constituting a theme and expresses how developed and integrated a topic is.

These two dimensions divide the map into four quadrants: motor themes (well-developed and important), niche themes (well-developed but more isolated), emerging or declining themes (less developed and less important), and basic/transversal themes (important but less developed). This analysis provides a powerful analytical framework for identifying the current intellectual focus of the field, as well as mature and developing topics.

## RESULTS and DISCUSSION

When examining the distribution of scientific productivity within the research area, a concentration in specific centers was observed at both author and country levels (Figure 1). A country-based analysis (Figure 1B) revealed that Hungary is the clear leader, contributing the most to the field with 5 publications. Hungary is followed by Türkiye with 3 publications and the United States with approximately 2.5 publications, respectively. Parallel to this geographical distribution, an examination of author-level productivity (Figure 1A) showed Andersen, J.K. and Christensen, T.H. as the most prolific researchers, each with two publications. They are followed by Scheutz, C., who has also made significant contributions to the field, and a group of other researchers with single publications. Considered as a whole, these findings indicate that the research area exhibits a geographically Central European-led dominance and an academic structure that, while guided by a few pioneering researchers, is enriched by broad international participation.

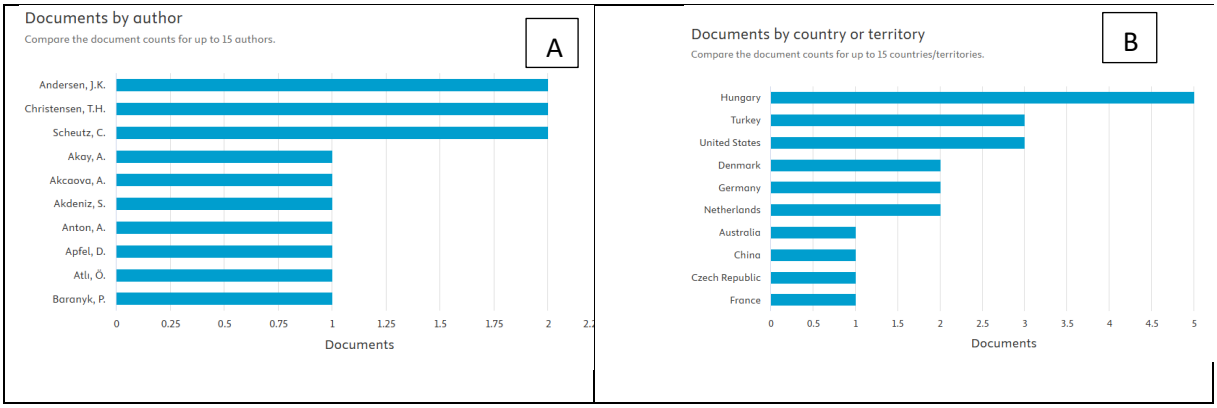


**Figure 1.** The distribution of scientific productivity in the research area: (A) most prolific authors and (B) most prolific countries.

When examining the characteristic features of publications in the research area, the literature exhibits a distinct structure in terms of both document type and interdisciplinary nature (Figure 2). An overwhelming majority of publications were identified as academic articles (81.5%) (Figure 2A). This indicates that knowledge in the field primarily advances through peer-reviewed and original research findings. When analyzing the interdisciplinary distribution (Figure 2B), the research is strongly concentrated in Environmental Sciences (20.8%) and Agricultural Sciences (16.7%). These two main axes are followed by Engineering (10.4%), with significant contributions from fields such as Social Sciences and Materials Science, clearly demonstrating the multidisciplinary nature of the topic. Consequently, it is understood that while environmental and agricultural sciences form the foundation of this field, it possesses a research identity nourished by various disciplines such as engineering and social sciences, primarily utilizing academic articles as its communication channel.

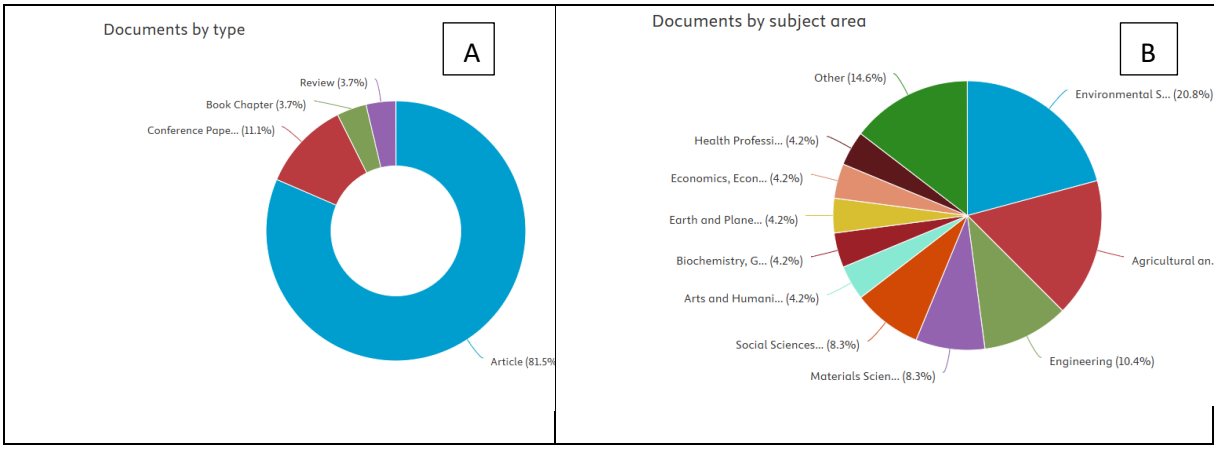


**Figure 2.** Characteristic distribution of publications in the research area: (A) by document type and (B) by discipline.

The word cloud generated to explore the core conceptual focus and thematic structure of the research area demonstrates that the literature is shaped around several main axes (Figure 3). The analysis clearly shows that the concepts of "gardening," "composting," and "peat" constitute the core of the field with the highest frequencies. These fundamental activities are often discussed within the context of "periurban areas." This main axis is surrounded by sub-themes directly related to environmental and technical issues such as "soil quality," "environmental impact," "waste treatment," and "recycling." Furthermore, the prominence of terms like "humans," "household," and "leisure" strongly indicates that the research focus is not only on ecological processes but also on the social, human, and health-related dimensions of these processes. Holistically, this map shows that the field possesses a research identity that examines sustainable household practices such as gardening and composting in periurban areas, along with their impacts on waste management, soil health, and human well-being.


**Figure 3.** Conceptual map of the research area based on most frequently used keywords

The keyword co-occurrence analysis, which reveals the intellectual structure of the research area, demonstrates that the literature is structured around three distinct thematic clusters (Figure 4). Within

this structure, the first cluster, with concepts such as "composting," "waste treatment," and "environmental impact," represents the technical and environmental paradigm of the field. The second cluster, with terms like "leisure," "female," and "male," focuses on the social and well-being dimensions of the research. The conceptual bridge connecting these two main research branches is provided by the third cluster, centrally located and encompassing the concepts of "gardening" and "humans." Therefore, this network structure strongly proves that the field develops along two main axes—technical and social—but integrates around the central theme of "humans engaged in gardening," thereby acquiring a multidisciplinary and integrated identity.

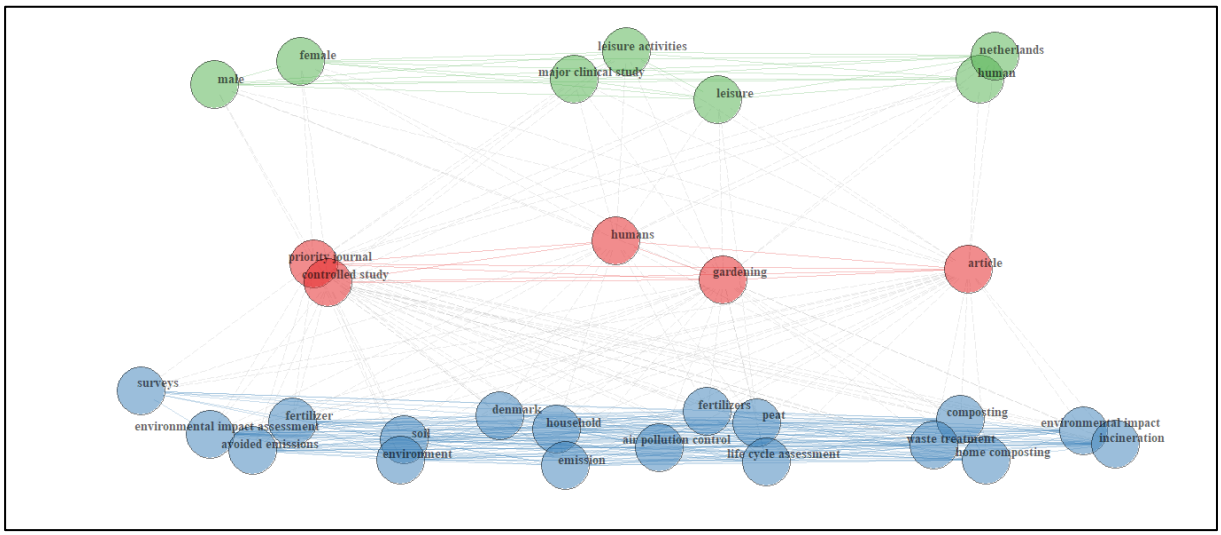


**Figure 4.** Thematic clustering network based on keyword co-occurrence analysis

The thematic map, revealing the strategic structure and intellectual evolution of the research area, demonstrates that the literature is built upon core themes such as "gardening" and "humans" (Basic Themes) (Figure 5). While these concepts, possessing high centrality, form the unifying backbone of the field, it is observed that "leisure" and gender-related social dynamics (female, male) constitute the motor themes (Motor Themes), driving the field's actual impetus on this fundamental ground. This structure proves that the research has a developed and central identity, focusing on the role of gardening in human well-being and social life rather than a purely technical focus. This strategically confirms that the social and human-oriented research cluster, identified in previous findings (Figure 4), is the most mature and important driving force of the field.

The other quadrants of the map illuminate the specialized sub-branches and future potential trajectories of the field. Specifically, technical topics such as "composting" and "peat" are understood to form a niche theme (Niche Theme), mature within itself but remaining more isolated, especially concentrated in Denmark. In contrast, subjects like "periurban area" and "urban planning" appear to be emerging themes, representing a new research front with the potential for the field to integrate with urban studies. In this context, it is noteworthy that Hungary, as the most prolific country, is also located

in the emerging themes quadrant, indicating that its contributions are concentrated on these new and promising topics rather than the mainstream of the field.

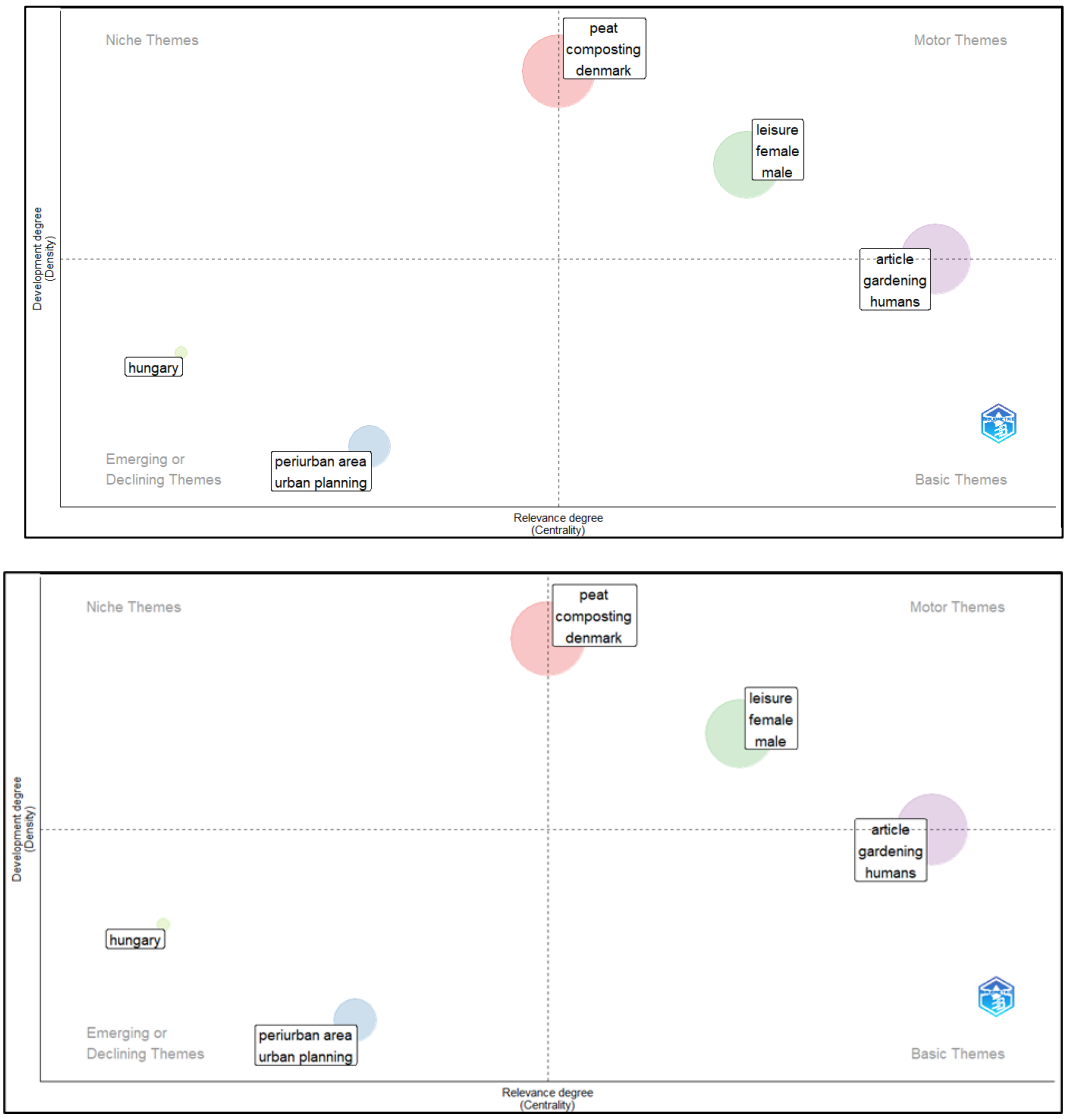


**Figure 5.** Strategic diagram and thematic evolution of the research area

## CONCLUSION

This study provides an original response to the problem arising from urbanization's separation of individuals from nature and food production processes by mapping the intellectual structure of the hobby garden literature. Going beyond traditional literature reviews, our bibliometric analysis has systematized the scattered information in the field, revealing the fundamental paradigms, dynamics, and potential future trajectories of this multidisciplinary field.

The most fundamental finding of our analysis is that the intellectual structure of hobby garden literature is shaped around key human-centric themes such as 'health and well-being,' 'community,' and 'education,' rather than technical agricultural activities. The high centrality of the 'community' theme, in particular, confirms that the role of hobby gardens in building social cohesion and social capital is increasingly recognized in empirical research. Similarly, the prominence of the 'education' theme supports the function of these spaces as 'living laboratories' that provide urban dwellers with ecological awareness and practical agricultural knowledge. Conversely, the fact that technical issues like "composting" remain a 'niche' area while "urban planning" is an "emerging theme" suggests the field is seeking deeper integration with urban systems, but this integration is not yet mature. Our analysis also implies that the food security dimension has not yet achieved the same level of centrality, suggesting a critical gap for future research to investigate the direct economic contributions of hobby gardens to urban food systems.

In light of these evidence-based findings, several recommendations for local governments and policymakers can be made:

*Reframing Policies with a Human-Centered Approach:* Given that social dynamics are the driving force in this field, local governments should position hobby gardens not only as production spaces but also as community centers that support education, social interaction, and mental health. Projects should prioritize social inclusion and community building as much as agricultural productivity.

*Strategic Integration into Urban Planning:* To mitigate the risk of these areas becoming disconnected from urban infrastructure, hobby gardens must be legally and strategically integrated into zoning plans and urban green infrastructure strategies. This will ensure they transition from temporary spaces to permanent, integral parts of the urban fabric.

This paper provides a general framework for hobby gardens; however, more in-depth field research is needed. Future studies should focus on conducting qualitative and quantitative research in municipalities with established hobby gardens to examine how these areas are utilized by their users and to measure their socio-economic benefits and contributions to urban agriculture and food security. Ultimately, our findings provide strong evidence for policymakers to view hobby gardens not merely as

recreational areas, but as integral components of urban health, social integration, and environmental education strategies.

**Additional Declaration**

***Author Contributions***

Conceptualization, O.İ. and D.Ç.B.; methodology, Y.Ç. and D.Ç.B.; software, Y.Ç.; validation, O.İ., D.Ç.B. and Y.Ç.; formal analysis, Y.Ç.; investigation, D.Ç.B., Y.Ç. and O.İ.; resources, D.Ç.B., Y.Ç. and O.İ.; data curation, Y.Ç.; original draft preparation, D.Ç.B. and O.İ.; review and editing, D.Ç.B. and O.İ.; visualization, D.Ç.B.; supervision, D.Ç.B.; project administration, D.Ç.B., Y.Ç. and O.İ. All authors have read and agreed to the published version of the manuscript.

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***Responsible Artificial Intelligence Statement***

In this study, the authors claim that AI methods were used solely to improve the clarity and readability of the article through language editing. No AI methods were used in creating original content, conducting literature reviews, performing data analysis, or formulating scientific conclusions. Responsibility for the entire content of the article rests solely with the authors.

***Conflicts of Interest***

The authors declare that there are no conflicts of interest related to the publication of this study.

***Ethics Approval***

In all processes of this study, the principles of Pen Academic Publishing Research Ethics Policy were followed.

This study does not require ethics committee approval as it does not involve any direct application on human or animal subjects.

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