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Feeding the gap: A comprehensive bibliometric review of food bank research

Benedetta Damiani[a], **Giordano Ruggeri**[a], **Stefano Corsi**[*,a]

[a] University of Milan, Italy

Abstract

This study presents a comprehensive bibliometric analysis of the food bank literature, highlighting the role of food banks in addressing the global challenges of food insecurity and waste. Food banks operate at the nexus of waste reduction and hunger alleviation, collecting excess food and distributing it through a network of charities to communities in need. This study traces the scholarly evolution of food banks, highlighting key trends, contributors, and thematic clusters from 1997 to 2022. Bibliometric mapping tools are used to examine the dynamic research landscape and identify influential authors, journals, and the geographical spread of contributions. The analysis reveals a significant increase in research output post-2015, correlating with the global agenda towards Sustainable Development Goals. The United States and Canada have emerged as leading contributors, with the research network indicating robust international collaborations. Thematic analyses through keyword co-occurrence, co-citation, and bibliographic coupling uncover the multidisciplinary nature of food bank studies, encompassing public health, social policy, and environmental sustainability. Key findings from co-citation and bibliographic coupling analyses indicate a shift towards a holistic understanding of food banks' roles within societal and policy frameworks, emphasizing health outcomes, operational strategies for managing food waste, and the socio-political impacts of austerity measures. This paper underscores

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* *Corresponding author*: Stefano Corsi - Dipartimento di Scienze Agrarie e Ambientali - Produzione, Territorio, Agroenergia - Università degli studi di Milano, Italy. E-mail: stefano.corsi@unimi.it.

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the importance of continued interdisciplinary research and innovative policy formulations to ensure that food banks effectively address the complex dynamics of food insecurity. Despite its limitations, this study offers a robust foundation for future exploration in this field, providing support for broader inclusivity and diversity in research.

Introduction

In an era where food insecurity and waste present paradoxical global challenges, food banks emerge as critical mediators in the pursuit of sustainable solutions (Household Food Insecurity and Hunger among Families Using Food Banks – ProQuest, n.d.). As non-profit entities, food banks operate at the intersection of waste reduction and hunger alleviation, embodying a dual-purpose mission that is as humanitarian as it is ecological (Thyberg *et al*., 2015) At their operational core, food banks are more than mere conduits of food redistribution. They collect excess food from different sources – ranging from farms, manufacturers, distributors, retail stores, consumers, and other entities – and ensure its safe and efficient distribution through a network of smaller charities and community agencies (González-Torre & Coque, n.d.). These partner organisations, in turn, distribute this nourishment to individuals and communities grappling with food scarcity (Starkey, Kuhnlein, Phd, *et al*., 1998).

This process varies across national contexts, reflecting the complexities of food insecurity and distribution logistics. In addition to their redistributive function, food banks often serve as direct service providers, supplying essential grocery items directly to beneficiaries (Campbell *et al*., 2013; Kicinski, 2012).

In the United Kingdom, the trajectory of food bank usage has dramatically increased. After 61,000 emergency food parcels were supplied in 2010/11, the number soared to 1.9 million by 2019/2020 (Bramley, 2021). The advent of the COVID-19 pandemic marked a stark increase in dependency on these services, with approximately 700,000 households, accounting for approximately 2.5% of all households in the UK, resorting to food banks before the pandemic struck.

Across Europe, 341 food banks have been actively engaged in fostering a circular food economy, emblematic of a unique blend of social responsibility and environmental conservation (FEBA, 2021). Despite a historical decrease in hunger rates, in 2021, an estimated 21% of the EU population, or approximately 95.4 million people, were still at risk of poverty or social exclusion, highlighting the persistent challenge of hunger on the continent (Davis *et al*., 2014).

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The concept of food banks has not undergone recent development. The first food bank was established in Arizona, USA, in 1966, with Europe following suit in 1984, inaugurating its first in Paris (Riches, 2002). In nations such as the USA and Canada, the role of food banks is particularly relevant (Dowler, 2001). The COVID-19 pandemic has intensified food insecurity and disrupted further food supply chains, elevating the importance of food banks in crisis response. In fact, only in 2020, according to FEBA members, 860,000 tonnes of food (+12% compared to pre-COVID-19 levels) were recovered, collected, sorted, stored, and redistributed to support 48,126 charitable organisations helping 12.8 million people in need (+34.7% increase compared to pre-COVID-19 levels). Moreover, global challenges such as the conflict in Ukraine have further aggravated the food crisis, driving up the costs of food, fuel, and fertilizers (Juneja *et al*., 2023).

The United Nations Food Price Index revealed that food prices in 2022 reached record highs, increasing nearly 13% since the conflict began. The confluence of climate change, civil unrest, and projected population growth to 9.7 billion by 2050 pose daunting challenges to food security and the sustainability of global agricultural systems (The Future of Food and Agriculture and Challenges, n.d.). These developments, alongside the Sustainable Development Goals (SDGs), highlight the imperative to reimagine food banks not only as emergency stopgaps but also as foundational pillars in a sustainable food ecosystem.

Since 2007, scientific inquiry into food banks has experienced a notable surge, signifying increasing interest among researchers in this domain. However, despite their critical role and recognition, the academic exploration of food banks has been somewhat fragmented, lacking a comprehensive, holistic analysis. While previous studies have examined food banks from disciplinary perspectives such as public health, social policy, and environmental sustainability, there has been little effort to consolidate these discussions into a unified framework. This study addresses this gap by providing a systematic bibliometric analysis that traces the trajectory of food bank research, mapping key contributors, dominant themes, and evolving research priorities.

This paper aims to fill this gap by providing a detailed bibliometric analysis of the scientific literature on food banks. We investigate the evolution of scholarly contributions in this field by examining publication and citation trends and identifying the most influential authors, journals, and contributing nations. Using bibliometric mapping tools, we delve into the dynamic emergence and progression of research themes, offering insights into the multifaceted challenges and potential avenues for future development in food banking. By identifying thematic clusters and research frontiers, our study offers critical insights into the shifting discourse surrounding food banks,

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revealing how they have evolved from emergency food assistance programs to integral components of broader socio-political and environmental discussions.

Through this analysis, we seek to investigate the significance of food banks in the contemporary context and offer a robust academic foundation for future research and policy development in this field.

The paper is organised as follows. The methodology section details the analytical approach and techniques employed in the bibliometric analysis, offering insights into the data collection and analysis processes used to investigate the literature of the last 25 years. The results section presents the study's key findings, delving into the emerging themes and trends identified in the research landscape. This section also provide a map of the most relevant papers thanks to a cluster approach, based on co-citation analysis and bibliographic coupling.

The last section encompasses synthesizes the insights from the analysis, discussing the socio-political dimensions of food banks and their evolution, with specific regards to the practical implications for policymakers and practitioners, summarizing the overall contributions of the paper to the existing body of literature, describing some limitations of the study.

1. Materials and Methods

Bibliometric analysis is a set of methodologies that employs statistical tools to systematically chart a specific scientific field's development and intellectual landscape. Extensively used for dissecting vast volumes of scholarly literature, it employs a blend of quantitative and qualitative techniques to measure and monitor scientific outputs and to visualize the complex interrelationships within the academic literature (Porter *et al.*, 2002) (Donthu *et al.*, 2020, 2021a; Verma & Gustafsson, 2020).

This type of analysis has recently gained popularity due to the advancement, availability, and accessibility of bibliometric software and scientific databases such as Scopus and Web of Science (Donthu *et al.*, 2021a). This study is based on data retrieved from the Web of Science (WoS), a comprehensive database of scholarly literature focusing exclusively on articles across various disciplines. A systematic search was conducted within the WoS database to collate all pertinent articles on the subject. In July 2022, the search query used to collect the data were "food bank*" across titles, abstracts, and keywords to ensure a thorough and relevant collection of articles. Specific filters to refine the dataset were applied to collect exclusively articles published in scientific journals between 1997 and 2021 and written only in English. To further ensure relevance and precision, each title and abstract was manually reviewed, eliminating any articles that

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did not directly pertain to the topic of food banks. This selection process led to the identification of 563 papers written by 1,573 distinct authors.

Within bibliometric methodologies, two main groups of tools can be identified: performance analysis and science mapping. Performance analysis evaluates the impact of research outputs by examining metrics such as citation counts, h-indexes, and journal impact factors to identify influential authors, institutions, and countries within the food bank literature. This analysis highlights the contributions that have garnered significant attention and shaped the discourse within the field. Science mapping, on the other hand, visualizes the relationships and thematic clusters within a specific scientific domain. Specifically, keyword co-occurrence, co-citation analysis and bibliographic coupling were carried out in this research.

Keywords co-occurrence analysis examines the frequency and patterns of keyword usage across the literature, identifying terms that frequently appear together within the same documents or during certain periods. By mapping these co-occurrences, we can visualize the conceptual structure and thematic areas of the field, highlighting the main topics of interest and their interrelations. Keywords co-occurrence analysis is particularly valuable in revealing emerging research trends and the evolving vocabulary of a scientific domain; it allows researchers to discern the core themes that define the discourse and how these themes are interconnected, providing insights into the field's focus areas and potential directions for future research. This analysis complements co-citation and bibliographic coupling by offering a different lens through which to view the intellectual landscape, focusing on the language and terminology that shape the scholarly conversation around food banks.

Co-citation analysis was proposed by Small in 1973 (Marshakova, 1973; Small, 1973; Small & Crane, 1979; Small & Griffith, 1974) to capture literature contributions, decipher and map cumulative scientific knowledge and evaluate related research topics (Donthu *et al.*, 2021b). Two documents are deemed co-cited when they are present in the reference list of a third document; the intensity of their correlation is directly proportional to the number of papers in which they are concurrently cited (Ruggeri *et al.*, 2019). Cocitation analysis investigates the network formed by references that are cited together in multiple documents, offering insights into intellectual structure and dynamics (Braam *et al.*, 1991). This method divides a corpus of literature into clusters of articles frequently cited together, revealing patterns and connections that might not be immediately apparent (Cobo *et al.*, 2011). This methodology not only identifies the foundational papers within a field but also sheds light on how ideas and research have evolved, offering a comprehensive understanding of the field's intellectual lineage and current frontiers. Moreover, this analysis was employed to trace the connections

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among intellectual works and effectively map the evolutionary structure of scientific disciplines, uncovering the interrelationships and dynamic evolution of scholarly contributions within diverse fields of scientific inquiry.

Finally, bibliographic coupling explores connections between articles through their shared references, suggesting a relationship between papers that cite common sources (Glänzel & Czerwon, 1996; Jarneving, 2007; Vladutz & Cook, 1984). Unlike cocitation, which looks backwards at the field's intellectual heritage, bibliographic coupling is forward-looking, revealing current research trends and the emergence of new themes by analysing the interconnectedness of recent publications. In bibliographic coupling, the formation of clusters is based on the references that articles have in common, allowing for the identification of thematic linkages and intellectual trajectories within a research domain (Donthu *et al.*, 2021).

The application of a bibliometric approach to the analysis of food bank literature contributes to a more detailed understanding of this topic, as it not only highlights the growth of food bank research but also reveals significant shifts in thematic priorities. In particular, the descriptive data in Figures 1, 2, 3, and 4 illustrate the evolution of publications on food banks, highlighting the role of the most productive authors and journals, as well as the level of collaboration between countries. Furthermore, the timeline view of keyword co-occurrence analysis, shown in Figure 5, captures the changes in the most relevant topics over the considered period. Finally, the combined use of co-citation and bibliographic coupling provides a comprehensive view of the literature, encompassing both foundational studies and the most recent contributions. Bibliometric analysis provides a powerful means of systematically evaluating the evolution of scientific discourse. Unlike traditional literature reviews, which may be subject to selection biases, bibliometric tools enable a quantitative assessment of research trends, scientific networks, and keywords' evolution. This approach allows us to visualize the intellectual structure of food bank research and identify knowledge gaps that may not be immediately apparent in qualitative reviews. However, the reliance on citation frequency is one of the most relevant limitation of bibliometric methods, because they could overestimate the importance of mainstream topics and misrepresent the niche or emerging themes. A careful reading of the papers and an in-depth knowledge of the literature on food banks has allowed us to mitigate this endogenous limitation of the method.

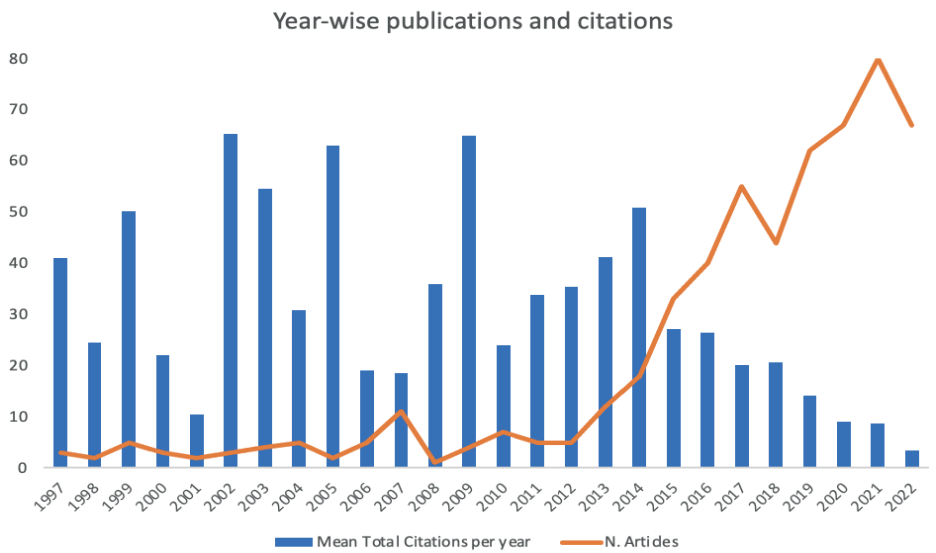
2. Results and Discussion

Figure 1 displays the total number of publications and the average number of citations per year between 1997 and 2022, showing a right-skewed

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distribution in the number of articles published, indicative of continuous growth in research output. The emergence of food bank studies occurred in the early 2000s, but it gained significant attention as a research topic only since 2016, with an average of 49.5 yearly articles published in the last decade. The growing interest in food banking occurred concurrently with the release of the Sustainable Development Goals (SDGs) in 2015, which placed food banking as a practical food aid tool to achieve SDG 2 and SDG 12, namely, "No Hunger" and "Responsible consumption and production". The number of citations per year varies significantly during the entire period; not surprisingly, newer publications received fewer citations on average than older publications.

Figure 1 - Yearwise publication trend of papers related to food banks during 1997-2022

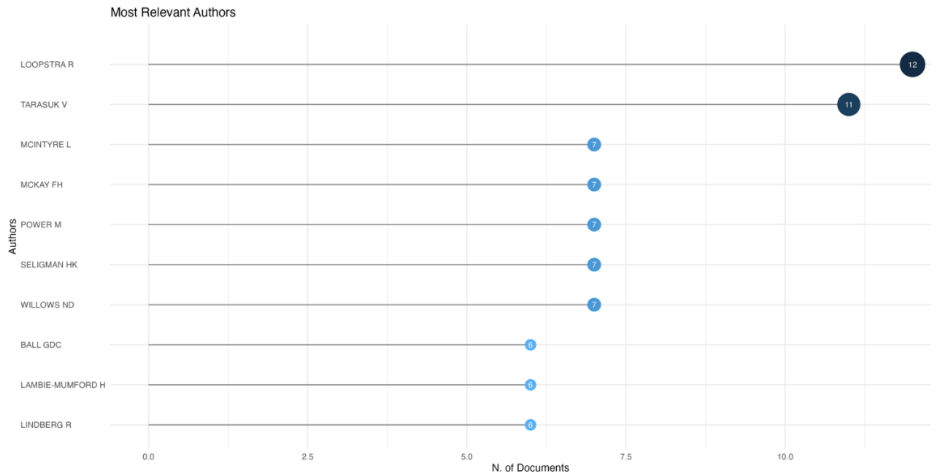


2.1. *Author and journal analysis*

In the exploration of key contributors within food bank-related research, we identified a total of 1,573 authors who have made significant contributions to this field. The most productive authors in terms of the number of publications are presented in Figure 2. Among these, two authors stand out for their prolific work. Loopstra is the most productive author, with a total of 12 articles, primarily centred on the interplay between food banks and food

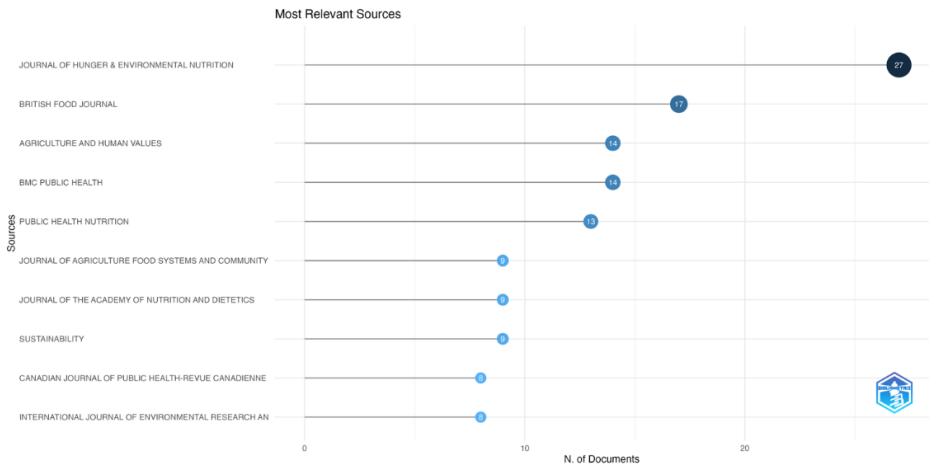
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Figure 2 - The 14 most productive authors from 1997 to 2022



insecurity in high-income countries, as well as examining the demographics of beneficiaries reliant on emergency food assistance. Tarasuk, who has authored 11 articles closely, focused her research on the integration and function of food banks within the Canadian welfare system.

Figure 3 - The ten most prolific journals during 1997-2022

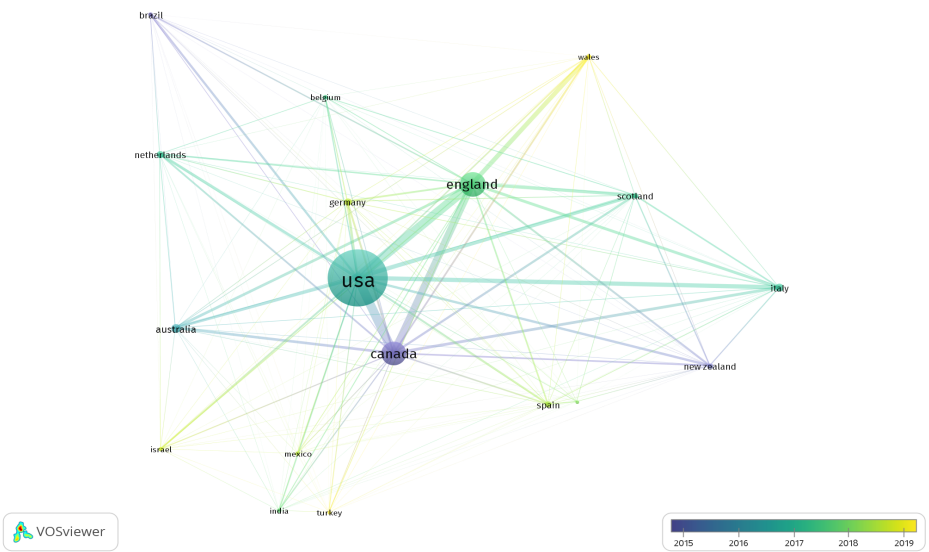


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Figure 3 offers a visual summary of the most relevant sources identified in our bibliometric analysis of food bank literature. The Journal of Hunger & Environmental Nutrition is the most prolific source, with 27 documents, indicating an important role in disseminating research on food banks and their intersection with environmental considerations. The British Food Journal and Agriculture and Human Values follow with 17 documents each, underscoring their significant contributions to the discourse on food banks, particularly in the context of food systems and societal values. With 14 and 13 documents, BMC Public Health, and Public Health Nutrition, respectively, reflect the growing recognition of food banks in the public health arena. All the other journals in Figure 3 contribute to a substantial body of research, highlighting the interdisciplinary nature of food bank studies and the diverse influence of these journals in shaping the dialogue around food security and the sustainability of food systems considering recent global crises.

2.2. *Country analysis*

Figure 4 - Cooperation network of the 18 most productive countries



The network represented in Figure 4 provides a view of international contributions and collaboration in food bank research. The size of the nodes, representing different countries, is proportional to the number of publications

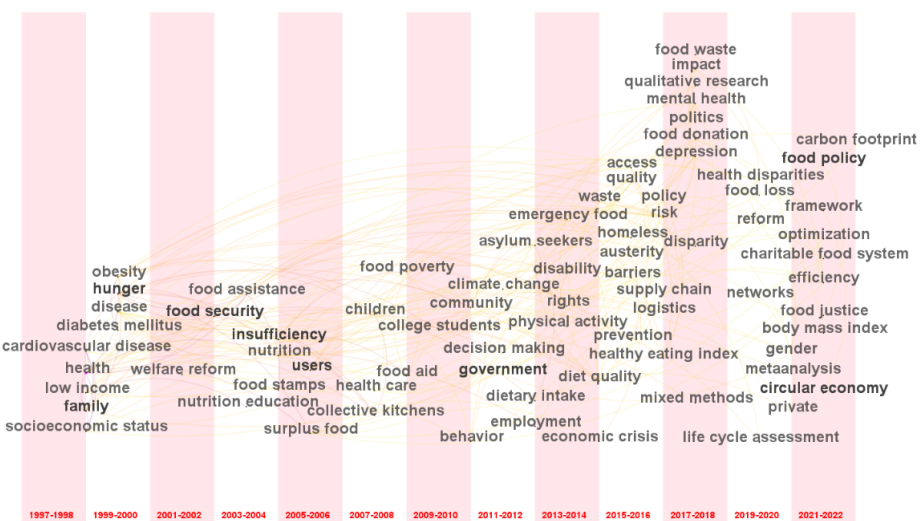
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from each nation, with the USA and Canada emerging as the most significant contributors in the field. This prominence is indicative of the extensive research activity related to food banks within these countries, reflecting their long-standing engagement with food insecurity and waste. The colour gradient of the nodes, ranging from blue to yellow, corresponds to the average year of publication, ranging from 2015 to 2019.

Lines connecting the nodes signify collaborative efforts between countries, and the thickness of these lines reflects the strength of the research ties. Notably, the USA is central to the network, demonstrating robust collaborative links with various countries and emphasizing its pivotal role in global food bank research. England, Canada, Germany, and Australia also display notable contributions and connections, highlighting their active participation in international research collaborations.

Developed countries, represented by larger nodes such as the USA, Canada, and England, dominate the network, indicating a greater volume of research output and a more extended history of established food bank systems. However, these nations are usually at the forefront of scholarly contributions for most research topics, reflecting their advanced research infrastructures. Conversely, smaller nodes from developing countries, such as Brazil, India, and Mexico, suggest that while developed countries may provide a foundation for research, there is an invaluable exchange with developing countries that can offer novel insights and adaptations suited to diverse global contexts.

Figure 5 - Timeline view of keyword co-occurrence analysis



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Figure 5 depicts the evolution of keywords in food bank research from 1997 to 2022. In the late 1990s, key themes emerged in the nascent literature on food banks, despite a modest number of publications. Initially, the literature was focused on fundamental issues of food security, health, and nutrition, with terms such as "hunger", "obesity", "food insecurity", "families", and "low income", representing the main keywords associated with food banks. This emphasis signals an early understanding of the links between food banks and broader public health and socioeconomic issues. These terms also reflect the initial focus on food banks as emergency measures to provide safety nets for vulnerable populations, particularly during economic downturns. Additionally, terms such as 'disease' and 'diabetes mellitus' highlight the link between food banks and health outcomes. Obesity and type II diabetes, which are conditions often associated with poor nutrition, point to the significance of food quality provided by food banks.

As the discourse matured in the early 2000s, terms such as "nutritional education", "insufficiency", and "nutrition" became prevalent, marking a significant transition in the perception of food banks from solely charity-based entities to integral components of broader social welfare systems. Additionally, the conversation expanded to encompass terms such as "welfare reform", "food stamps" and "food assistance", reflecting a growing recognition of the institutional and policy frameworks surrounding food banks. The appearance of 'surplus food' during this period also underscores an increasing concern with managing food resources.

From 2009 to 2016, the literature expanded to reflect the complexities of food bank operations against the backdrop of the financial crisis and heightened climate change awareness. Research during these years started to address the complexity of food bank operations and their role in public health and social welfare, as evidenced by the discussion around "diet quality" and "healthy eating index", reflecting concerns about the nutritional value of food distributed to those in need. The term "food poverty" becomes more prominent, emphasizing the socioeconomic dimensions of food insecurity. This period also saw a rise in terms such as "austerity", signaling the impact of economic policies on vulnerable populations and the increased reliance on food banks as safety nets. "Emergency food" emerges as a critical concept, highlighting the discussion around the shift in the perception of food banks as part of an essential response to immediate needs in times of crisis. This aligns with the appearance of "asylum seekers" and "homelessness" in the discourse, pointing to the broadening scope of food bank users due to global migration and housing instability. The period also notes an increased focus on "climate change", indicative of a growing consciousness about environmental impacts on food security. The term "supply chain" suggests a

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deeper exploration into the logistics of food distribution, including how food banks fit into the larger picture of food systems. Moreover, the expansion of the type of beneficiaries at the centre of food bank studies can be noted, from low-income families to families including "college students" and "communities".

The period from 2017 to 2022 shows an evolving and increasingly complex dialogue within the food bank research community, mirroring the pressing global challenges of this era. During these years, we observed a significant presence of terms such as "food waste" and "impact", reflecting a heightened focus on the environmental implications of food redistribution and the role of food banks in sustainable food systems. The terms "mental health" and "politics" suggest a more profound recognition of the psychological effects of food insecurity and the influence of political structures on the efficacy of food banks. This is complemented by the inclusion of "health disparities" and "depression", indicating an understanding of the broader health implications of hunger and poverty. The dialogue around "food policy", "carbon footprint", "life cycle assessment", and "circular economy" reveals an interdisciplinary approach to food bank research, integrating perspectives from public health, environmental science, and economic theory and highlighting the necessity for comprehensive policy frameworks to address the sustainability and efficiency of food banks in the face of global food system challenges. The increase in keywords such as "meta-analysis" and "mixed methods" indicates a methodological expansion, revealing a trend toward more comprehensive data analysis in food bank studies. The data presented in Figure 5 underscore the dynamic nature of food banks and their evolving roles in society. From their early days as emergency safety nets to their current positions as agents of change in public health and social reform, food banks have adapted to the shifting needs of communities. This evolution highlights the importance of continued research and policy development in ensuring that food banks effectively address the complex challenges of food insecurity in contemporary society.

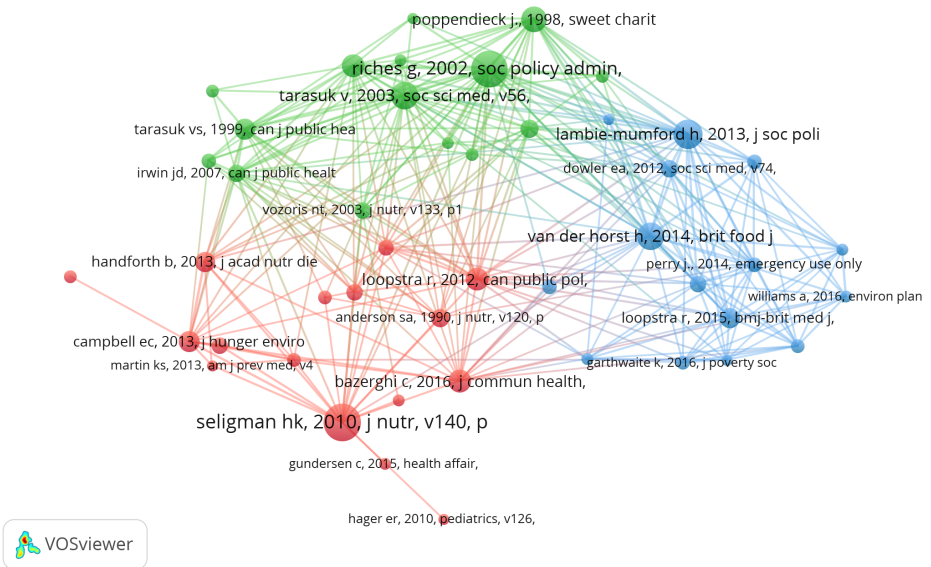
2.3. *Co-citation analysis*

Figure 6 shows the co-citation network of publications in food bank research, with the threshold of the minimum number of cited references set at 20. Each node in this network represents a scholarly work, with the node's size corresponding to the frequency of co-citation by other works within our dataset. Lines connecting the nodes – each representing co-citation relationships – illustrate the scholarly dialogue between these publications. The proximity of nodes suggests thematic similarities and shared discourse,

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with clusters of closely positioned nodes indicating a strong interconnection in research focus or methodology. Distinct colour groupings represent unique clusters identified by VOSviewer, each signifying a thematic concentration or a community of research with a common focus. The network contains 51 articles divided into three clusters, including 21 articles in the first cluster, 17 in the second and 11 in the last.

Figure 6 - Cocitation network analysis using VoSviewer



Cluster 1 – RED-The tight link between food banks and food insecurity

The documents in the first cluster delineate the interplay between food insecurity and food banks, emphasizing their pivotal role in emergency food provision. It includes foundational works, notably by Loopstra and Tarasuk, that have laid the theoretical groundwork for understanding food banks. Bazerghi, McKay, and Dunn's comprehensive review is particularly significant for highlighting the efficacy of food banks in alleviating food insecurity (Bazerghi *et al.*, 2016). Despite their efficiency, the review also identifies persistent challenges such as increasing client numbers, supply-demand mismatches, and resource mismanagement that impede food banks' capacity to meet all beneficiaries' needs comprehensively. The cluster further explored the multifaceted nature of food banks and food insecurity. Loopstra and Tarasuk (Loopstra & Tarasuk, 2012) delve into the barriers faced by

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individuals accessing food banks in Canada. Concurrently, Robaina and Martin analysed the interconnections between food insecurity, dietary inadequacies, and obesity among users of these banks (Robaina & Martin, 2013). Extending the scope, Seligman (Seligman *et al.*, 2010) investigated chronic diseases in low-income demographics, while Simmet (Simmet *et al.*, 2017) and Stuff (Stuff *et al.*, 2004) assessed the nutritional quality of food distributed by banks and the health status of food-insecure households, respectively. In addition, Kirkpatrick and Tarasuk (Kirkpatrick & Tarasuk, 2008) contributed a qualitative study on nutrition-based initiatives within the Feeding America Network food banks (Kirkpatrick & Tarasuk, n.d.). Notably, these studies predominantly originate from the United States and Canada, reflecting the prominence of these countries in food bank research.

Cluster 2 – GREEN-Canada as a case study of the political implications of charitable food assistance

Cluster 2 includes 15 papers primarily featuring Canadian research, with Tarasuk contributing five papers and Riches three. Additional Canadian scholars such as Kirkpatrick, Irwin, Starkey, Teron, and Vozoris echo a strong national focus. However, the common thread beneath this cluster extends beyond its geographical scope to explore charities' sociopolitical and governmental impacts on welfare systems and the limitations of food banks. Daponte and Bade (Daponte & Bade, 2006) critique the diminished U.S. governmental programs tackling food insecurity, which has resulted in a dependence on private food assistance, with charities compensating for the shortcomings of the public safety net. Kirkpatrick and Tarasuk (Kirkpatrick & Tarasuk, 2009) challenge public health practitioners to evaluate food aid programs critically and advocate for policy reforms aimed at securing adequate food resources for low-income families. Poppedieck argues that food banks have inadvertently allowed the persistence of poverty by assuming roles traditionally filled by public policy (Olson, 1999). Riches (Riches, 2011) and Tarasuk (V. Tarasuk, 2005) delve into the contradictory existence of food banks, suggesting that while they offer temporary relief, they also perpetuate the dependency on charity and hinder the political resolution of hunger. Furthermore, Tarasuk (V. S. Tarasuk, 2001) and Tarasuk and Eakin (V. Tarasuk & Eakin, 2003) observe that food banks often fail to address the root causes of poverty, leading to superficial palliation of the issue. Consumer perspectives are also explored, with Starkey (Starkey *et al.*, 1998) pioneering the investigation into the sociodemographic and nutritional profiles of Canadian food bank users – a line of inquiry extended by Teron and Tarasuk (Teron & Tarasuk, 1999), who examined consumer perceptions of charitable food assistance. Vozoris and Tarasuk (Vozoris & Tarasuk, 2003) discuss the complex health challenges faced by economically disadvantaged households.

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Cluster 3 – BLUE-The context and profile analysis of food banks' beneficiaries

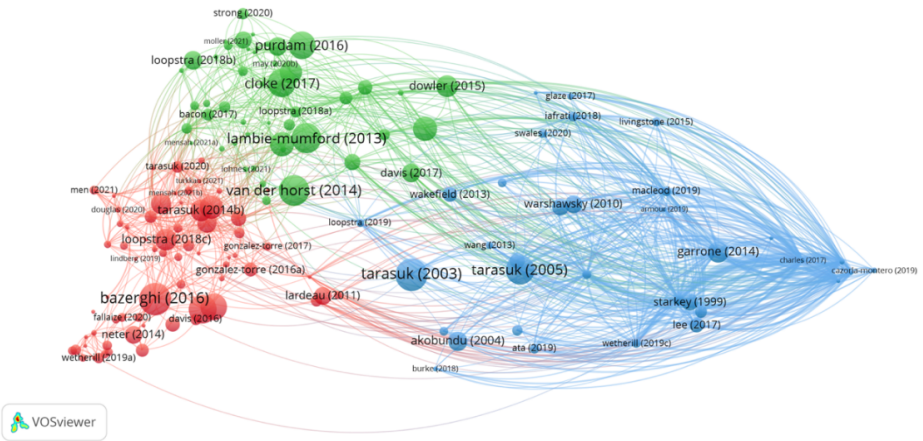
The third cluster centers on the sociopolitical context and beneficiary profiles of food banks, with a particular focus on the United Kingdom. This cluster draws on the expertise of UK-focused authors such as Dowler, Lambie-Mumford, Loopstra, Purdam, and Perry. Perry (Perry *et al.*, 2014) pioneered the investigation into the causes behind food bank usage and potential interventions by investigating the precipitating factors of food bank use and potential mitigation strategies. Garthwaite (Garthwaite *et al.*, 2015a) delve into the health dimensions of British food bank users and provide an ethnographic perspective on their livelihood. Purdam (Purdam *et al.*, 2016a) underscores the stigmatization surrounding poverty and malnutrition through surveys and case studies. Dowler's work probes the sociopolitical determinants affecting food access in impoverished Irish and UK households (Dowler & Lambie-Mumford, 2015). Some of the documents in this cluster specifically focus on recipients of food banks and examine their political, social, and economic context within the United Kingdom. Lambie-Mumford advocated for a human rights-based approach in food policy research, (Lambie-Mumford, 2013) while Lambie-Mumford and Dowler provided a critical assessment of food aid knowledge in the UK (Dowler & Lambie-Mumford, 2015). The research in this cluster expands to include beneficiary profiles in other regions, with Van der Horst assessing the social status and emotional responses of food bank users in the Netherlands. In Canada, Loopstra depicted food bank users as a significant subset of the food-insecure population, detailing their characteristics and advocating for strategic approaches to UK food insecurity that address its socioeconomic roots (Loopstra & Lalor, 2017). Riches (2014) examines the emergence of food charities and corporate-sponsored food banks in affluent societies, questioning their efficacy in curbing the rise of hunger and food poverty (Riches & Silvasti, 2014). Cloke *et al.* (Cloke *et al.*, 2016) present an alternative view of food banks as spaces fostering political and moral values.

2.4. *Bibliographic coupling*

Figure 7 displays the network structure resulting from the bibliographic coupling analysis, showing the 150 most prominent articles within the full network. This intricate network is organized into three primary clusters of interconnected research, each representing a collective thematic focus within the field. The largest cluster consisted of 67 articles, the second contained 49 articles, and the last contained 34 articles.

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Figure 7 - Bibliographic coupling using VoSviewer



Cluster 1 – RED-The health and nutritional implications of food banks and their barriers to the right to health

The first cluster, comprising articles from 2009 to 2022, addresses the health, well-being, and nutritional impacts of food insecurity. The documents in this cluster examined the triple burden of malnutrition, including undernutrition, micronutrient deficiencies, and obesity, and its associations with global health challenges. Stowers highlighted disparities in food access and representation (including unequal access to unhealthy food, media stereotypes about food pantry clients, community mistrust, lack of inclusion in food bank leadership, and limited access to information), contributing to obesity risk in food insecure populations (Stowers *et al.*, 2022). This cluster also explored specific at-risk groups, such as those with type 2 diabetes, with Cheyne evaluating an intervention aimed at these individuals within food banks (Cheyne *et al.*, 2020).

Several studies have assessed the expansion of access to healthy foods in food pantries, including Chapnick who investigated the factors that help or hinder the expansion of access to healthy foods in food pantries, (Chapnick *et al.*, 2019) and Bryan, who analysed the nutritional value of food parcels (Bryan *et al.*, 1980). Neter provide insights into Dutch food bank recipients' perceptions of food parcel content and dietary impact, (Neter *et al.*, 2020) while Chiu assess health outcomes between food bank users and nonusers (Chiu *et al.*, 2016). The nutritional quality of food parcels, benchmarked against Dutch dietary guidelines, was explored by Neter (Neter *et al.*, 2016). Nutrition -focused initiatives in the U.S. that aim to address health disparities among food aid clients are discussed by Wetherill (Wetherill *et al.*, 2019)

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The predominant focus of public health-related articles is on Canada and the U.S. In Canada, Tarasuk authored two significant papers in 2014 examining the role of food banks in the welfare system. The first paper critiques the deep integration of food banks into the Canadian welfare landscape, arguing that their growth has coincided with the erosion of the welfare state. This highlights how these volunteer-run, extragovernmental food assistance programs have become supplements to publicly funded social assistance, potentially undermining them (Tarasuk *et al.*, 2014a). The second paper questions the efficacy of food banks in addressing food insecurity, pointing out their role as the primary source of immediate relief in the absence of public programs or policy interventions in Canada (Tarasuk, 2014) but also noting their limitations.

McIntyre (2016) explore public health perspectives on food waste (Mcintyre, 2010), while in the U.S., the impact of federal policies on healthy food donations to food banks was reviewed by Hudak, who investigated the regulatory environment of such donations (Hudak *et al.*, 2022).

The role of food banks during the COVID-19 pandemic has also been a focal point. Higgins *et al.* (analysed accessibility changes to food services in Hamilton, Ontario, emphasizing their critical support during economic disruptions (Higgins *et al.*, 2020). Janda highlighted the escalation of food insecurity in the U.S. as a public health concern due to the pandemic (Janda *et al.*, 2021). Men and Tarasuk report on federal assistance programs aimed at mitigating the pandemic's impact, including funding for food charities (Men & Tarasuk, 2021). Finally, Hudak evaluate pandemic-related policies promoting healthy food donations and their variability across states (Hudak *et al.*, 2022).

Cluster 2 – BLUE-The role of food banks within the decade of Austerity in the UK

The articles in the second cluster critically examine the repercussions of UK austerity policies on food bank reliance and the broader landscape of food insecurity. This paper presents a detailed inquiry into the complexities food banks face and the demographic nuances of their clientele. The second cluster presents a thematic synthesis of how austerity measures in the UK have intensified the reliance on food banks, signifying deeper socioeconomic and policy-related issues. This collection of research provides a cohesive argument that austerity has not only led to a quantitative increase in food bank usage but also qualitatively transformed the role of food banks in the social welfare landscape. At the heart of this cluster is a critical examination of the complex relationship between public policy and food insecurity: collectively, these studies reveal that food banks, while pivotal in immediate hunger relief, have become embedded within a system that increasingly

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delegates welfare responsibilities to charitable organizations, raising concerns about the sustainability of this model.

The cluster critically evaluates the role of food banks within the austerity-driven welfare paradigm, suggesting a systemic shift wherein food banks are increasingly becoming substitutes for formal social support mechanisms. Lambie-Mumford's empirical work links the rise in food bank usage directly to austerity policies (Lambie-Mumford & Sims, 2018), while Garratt suggests that user estimations underestimate the true reliance on these services due to methodological oversights (Garratt, n.d.). May expand this discourse to rural areas, evidencing that food bank use is not solely an urban phenomenon but rather a nationwide challenge exacerbated by austerity (May *et al.*, 2020b).

Research within this cluster delves into the intricacies of food bank clientele vulnerabilities, with Loopstra presenting a nuanced analysis of those disproportionately affected by austerity, such as individuals with disabilities or mental health issues (Loopstra, 2018a). This is complemented by comprehensive demographic analyses from Power (Power *et al.*, 2020) (Power *et al.*, 2018) which revealed the diversity of food bank users and the exclusion of certain groups, highlighting the need for inclusive food distribution policies. This synthesis highlights the nuanced health perspectives of food bank users, portrayed in studies such as Garthwaite, which assess the health perceptions and challenges faced by users during a public health crisis (Garthwaite *et al.*, 2015). Dowler and Thompson further explored the intersection of food insecurity with health, linking budgeting constraints in food-insecure households to adverse health outcomes (Thompson *et al.*, 2018) (Dowler & Lambie-Mumford, 2015).

The emotional and psychological dimensions of food bank use are poignantly captured by Purdam who interrogate the denial of poverty among food bank users (Purdam *et al.*, 2016). The scrutiny of food bank referral systems by May (May *et al.*, 2019, 2020) and the critical perspectives of Strong (2019) add depth to the analysis of the complex dynamics within food banks and their broader social implications (Strong, 2019).

The lived experiences of food bank users are vividly brought to light through the contributions of Douglas and Clair who provide insights into the struggles with housing insecurity and food access. (Douglas *et al.*, 2015) (Clair *et al.*, 2020). Loopsta contribute to the socioeconomic discourse, examining the fallout from punitive unemployment insurance sanctions on food bank reliance (Loopstra, 2018).

Amidst this rich tapestry of research, the COVID-19 pandemic has introduced additional layers of complexity. Oncini evaluated the adaptive responses of food banks to the crisis (Oncini, 2021), and Möller took a Foucauldian perspective to analyse the power dynamics reshaped by the pandemic within UK food banks (Möller, 2021).

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Cluster 3 – GREEN-Food banks as a tool to progress towards responsible consumption and production

This cluster critically examines the intersection between food waste, the operational mechanisms of food banks, and their contributions to mitigating food insecurity, directly engaging with the SDGs of "No Hunger" and "Responsible Food Consumption". This finding underscores the pivotal role of food banks in managing food oversupply by redistributing surpluses to charitable organizations, as foundational work by Tarasuk and Eakin (Tarasuk & Eakin, 2005) suggests. The cluster articulates a multifaceted narrative that not only highlights the operational challenges and strategies of food banks but also situates them within a broader context of sustainability, policy innovation, and community empowerment.

Hermsdorf delve into the nuances of food waste in Germany, attributing it to oversupply and overconsumption, thereby identifying a critical area where food banks can intervene (Hermsdorf *et al.*, 2017). Brock and Davis explored the intricate balance between the demand and supply of food, emphasizing the importance of inventory management in food banks (Brock & Davis, 2015). This analysis is complemented by Garrone's Italian case study, which assesses the donation process of surplus food to food banks, highlighting logistical considerations and the need for efficient collection strategies (Garrone *et al.*, 2014). Iafrati (Iafrati, 2018) provides an insightful examination of food banks in England, focusing on their sustainability in balancing demand and supply. Jereme *et al.* (Jereme *et al.*, 2017), in their Malaysian study, argue for the strategic establishment of food banks to alleviate food insecurity and its adverse impacts, suggesting a geographically informed approach to food bank operations.

The cluster also sheds light on gleaning as an effective method to reduce food waste, supported by Vitiello (Vitiello *et al.*, 2015), who noted its dual role in supporting food banks and empowering communities towards self-sufficiency, marking a shift towards food justice and security. Polackova and Poto (Polackova & Poto, 2017) call for a re-evaluation of the discourse around food waste prevention, advocating for new terminology that reflects the evolving landscape of food security challenges. Kinach, Parizeau, and Fraser (Kinach *et al.*, 2020) explore the incentives for food donation through tax credits in Ontario, examining policy mechanisms that encourage food redistribution. Finally, Trzaskowska (Trzaskowska *et al.*, 2020) emphasized the critical role of guidelines in managing the quality of food components near or after their minimum durability dates, aiming to mitigate food waste through regulatory standards.

The combined use of co-citation and bibliographic coupling analyses provides a comprehensive understanding of both the intellectual foundations and the current research trajectories on food banks.

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Together, these analyses reveal a dynamic and evolving research landscape. Initial scholarly attention focused predominantly on food banks as responses to food insecurity and poverty, often framed within the broader context of welfare retrenchment. The focus on specific areas, namely Canada and UK, testifies to a certain concentration and productivity of researchers in these countries. It is also very interesting how the profiling of beneficiaries characterizes one of the cluster, to demonstrate a certain stigmatization of those who need food aid.

Over time, however, research has expanded to explore the broader implications of food banking, including its intersections with public health, nutrition, environmental sustainability, and social justice. Notably, recent studies have investigated how food banks operate within systems of food waste management, their role in addressing dietary inequality, and their place within austerity-driven welfare regimes. The bibliographic coupling frames food banks in a novel perspective of welfare regulator, capable of converting surpluses into supplementary support for food security, thus providing a role as a social equalizer.

3. Discussions, Conclusions and Limitations

The bibliometric analysis of the literature concerning food banks from 1997 to 2022 revealed significant trends, key contributors, and thematic clusters that provide a comprehensive overview of the field's evolution. The increasing volume of publications, especially post-2015, aligns with the global momentum towards achieving sustainable development goals (SDGs), underscoring the critical role of food banks in addressing "No Hunger" and promoting "responsible consumption and production". The distribution of publications over the years shows a right-skewed trend, highlighting a continuous expansion in this field of study, with an average of 49.5 articles published annually in the last decade. This trend signifies the recognition of food banks as practical tools for food aid within the broader context of sustainable food systems. The literature on food banks has greatly grown during the last decade, along with its multidisciplinary nature. Recent developments have highlighted the essential role of food banks in the improvement of food insecurity and food waste. Moreover, the uncertainty in food systems following COVID-19, the Russian invasion of Ukraine and the worsening of the global economic situation have exacerbated inequalities; therefore, there is a need for food banks that can help end households' food insecurity and poverty.

The analysis of international contributions and collaboration networks highlights the United States and Canada as leading contributors to food

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bank research. This prominence reflects the extensive research activities and long-standing engagement with issues of food insecurity and waste in these countries. Moreover, the network analysis reveals robust collaborative ties, particularly with the USA at the center, indicating that a vibrant international research community focused on food bank studies. The collaboration between developed and developing countries enriches the global understanding of food banks, suggesting that diverse socioeconomic contexts offer valuable insights and novel approaches to food aid.

The analysis of WoS categories and journals revealed that the study of food banks is highly multidisciplinary, as confirmed by further in-depth analysis. The evolution of research themes, as depicted through the timeline of keywords, illustrates the dynamic nature of food bank studies. Initially, centred on basic issues of food security and health, the discourse has broadened to encompass topics such as welfare reform, climate change, and sustainability. This thematic expansion reflects the complex challenges faced by food banks and the need for integrated solutions that address food insecurity within the framework of sustainable development.

The co-citation analysis and bibliographic coupling conducted within this study have provided a multidimensional view of the scholarly landscape surrounding food bank research, revealing interconnected themes, pivotal contributions, and evolving trends that have shaped the discourse from 1997 to 2022. From the co-citation analysis, a clear delineation of three primary research clusters emerges, each representing distinct aspects of food bank research: the operational challenges and health implications associated with food banks, their sociopolitical context within austerity measures, and the strategies for enhancing food security and sustainability.

This segmentation underscores the multidisciplinary nature of food bank research, spanning public health, social policy, and environmental sustainability. Bibliographic coupling further emphasizes the significance of these thematic clusters, presenting a network of research that not only delves into the immediate logistical and health-related challenges of food banks but also explores their broader implications within societal and policy frameworks. The prevalence of studies focused on the health outcomes of food bank users and operational strategies for managing food waste indicates a shift towards a more holistic understanding of food banks' roles in society. Both analyses collectively highlight the dominant role of the United States and Canada in food bank research, reflecting these countries' long-standing engagement with food insecurity issues. However, the international collaboration network suggests that insights and methodologies from these regions are being integrated with global perspectives to address food insecurity in diverse socioeconomic contexts.

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The co-citation and bibliographic coupling analyses underscore the evolving nature of food bank research, which has grown to encompass a wide range of issues, from health implications and operational challenges to sociopolitical impacts and sustainability concerns. This evolution reflects a broader understanding of food banks not only as emergency interventions but also as integral components of a comprehensive strategy to combat food insecurity and promote sustainable food systems. The findings call for ongoing interdisciplinary research to adapt food bank practices to contemporary challenges and opportunities, ensuring their effectiveness in addressing the complex dynamics of food insecurity in the modern world.

The findings of the study support the view that food banks are increasingly embedded within broader socio-political dynamics. The expansion of food bank activity, particularly in high-income countries, reflects a significant shift from state-centered welfare provision to charity-based models of food aid. This trend has been widely discussed in the literature as symptomatic of welfare retrenchment, where structural responses to poverty and food insecurity are replaced by voluntary, often under-resourced, interventions.

At the same time, food banks are being reframed not only as emergency responses, but as institutional actors contributing to global policy agendas, particularly Sustainable Development Goals 2 ("Zero Hunger") and 12 ("Responsible Consumption and Production"). The growing multifunctionality of food banks suggests the need for a more systemic and policy-integrated approach, in which food banks are not isolated actors but part of coordinated strategies addressing both immediate needs and structural causes of food insecurity.

Although the two analysis map very well the literature, some gaps in the literature emerge. In fact, most of the publications identified in both the co-citation and bibliographic coupling networks originate from high-income countries, namely Canada, the United States, and the United Kingdom. This geographical concentration suggests that existing knowledge may be limited in scope, shaped by specific welfare models and socio-economic contexts that are not generalizable globally. Despite their different nuances, the three countries are fully included among the democracies with the greatest liberal economic orientation. It would be very interesting to understand how food banks work even in countries that can be identified as social democracies, where welfare systems function more pervasively.

Moreover, There is also a great lack of knowledge and understanding of how food banks work in countries where informal networks and bottom-up initiatives play a fundamental role in coping with food insecurity, in particular in the Global South.

Finally, the role of food banks must also be reconsidered in light of climate change and its multifaceted impacts on food systems. Extreme weather

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events and declining agricultural productivity are likely to intensify food insecurity, particularly among already vulnerable populations, especially in less developed countries. Moreover, by diverting surplus food from landfills and redistributing it to those in need, food banks play a role in reducing greenhouse gas emissions associated with food waste, aligning with climate mitigation goals. However, this ecological function is still under-theorized in the literature, and further research is needed to explore how food banks can be better integrated into climate adaptation and sustainability frameworks.

Interdisciplinary research and cross-sectoral dialogue are essential to move beyond short-term mitigation towards durable, equitable food system transformations.

This study has several limitations. First, publications that have not been cited are not of poor quality, and surely, some interesting pieces of research have been omitted from this analysis because they have not been cited enough or for several other reasons. Moreover, probably because of culture and the predominance of Western institutions, some articles written outside the Western Hemisphere were not considered because of disparities in citation practices. In fact, even if uneven, the predominant body of research was to be found among a limited number of countries; since it is more common for authors to reference other familiar authors and institutions, they can be attributed to the circumscribed nature of the field, but one the other could have overemphasized bias in the research. Furthermore, the databases can be biased towards studies in the English language and issues surrounding multiauthorship.

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Benedetta Damiani
Univesity of Milan, Department of Agricultural and Environmental Science
Via Celoria, 2 – 20133 Milano, Italy
E-mail: benedetta.damiani@unimi.it
She is a research fellow and holds a Masters in Environemtnal and Food Economics from the University of Milan. Her research interests include food banks and cariríty food actions, sustainable agrifood systems, mutual funds in agriculture.

Giordano Ruggeri
University of Milan, Department of Agricultural and Environmental Science
Via Celoria, 2 – 20133 Milano, Italy
E-mail: giordano. ruggeri@unimi.it
He earned his PhD in Agricultural Economics at the University of Milan, where he now conducts research that blends behavioral and experimental economics with micro-data analysis. His work focuses on food-consumption choices and the economics of sustainable farming systems.

Stefano Corsi
University of Milan, Department of Agricultural and Environmental Science
Via Celoria, 2 – 20133 Milano, Italy
E-mail: stefano.corsi@unimi.it
He holds a PhD in Agricultural Economics from the university of Milan. Associate Professor in Agricultural Economics at the University of Milan, his current research interests include the analysis of sustainable agrifood chains in developed and developing countries, wine economics and gender analysis in the agrifood system.

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