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Issues of Ensuring Food Security Among the Elderly Population: A Scientometric Review of Publications

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ABSTRACT

Food security among the elderly population is a pressing issue with multifaceted implications for health and well-being. The study aims to systematically map the global research landscape on food security among the elderly population and identify dominant thematic clusters, influential publications, and structural research gaps. A scientometric methodology was applied, combining descriptive statistics and network analysis using Scopus data for 1996-2024. Descriptive statistics and network analysis methods were employed using VOS viewer software for data processing and visualization. Descriptive statistics revealed a sharp acceleration in research output after 2011, with publication dynamics well captured by a 4th-degree polynomial model (R^2 = 0.9288). The research is highly interdisciplinary, spanning agricultural and biological sciences, medicine, and social Sciences. The United States, China, and the United Kingdom lead in publication output, while the Chinese Academy of Sciences (55 publications) and the National Natural Science Foundation of China (92 funded studies) are the key institutional and financial contributors. The analysis confirms the field's complexity and interdisciplinary nature and reveals critical gaps, particularly the lack of longitudinal and qualitative studies. A critical structural gap was identified between biological research and socio-policy studies, indicating limited integration across disciplinary boundaries. The systematized knowledge and identified research structure serve as a robust basis for policymakers and researchers to develop targeted interventions and define new, high-priority research directions.

KEYWORDS: Food Security, Elderly Population, Ageing Economics, Economic Vulnerability, Scientometric Analysis, Social Inequality, Evidence Mapping

SCSTI: 20.15.21

JEL Code: I38, J14, J18

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1. INTRODUCTION

Food security among the elderly population is a pressing issue with multifaceted implications for health, well-being, and societal dynamics. Conducting a scientometric analysis of research in this area is crucial for understanding the nuanced challenges and devising effective interventions.

Nutrition problems represent a fundamental aspect of food security among older adults. Factors such as decreased appetite, limited mobility, and health problems often hinder their ability to maintain a balanced diet. Poor nutrition not only exacerbates existing health conditions but also increases susceptibility to diseases, thereby compromising overall well-being. Economic factors further compound the issue, as limited financial resources may lead to food insecurity. Fixed incomes, rising food prices, and high healthcare costs force older individuals to make difficult choices, often compromising the quality and quantity of food they can afford. This economic strain exacerbates nutritional deficiencies and undermines health outcomes. Social isolation adds another layer of complexity to the issue. Many elderly individuals live alone or lack a robust support system, which can impede their access to nutritious food. Feelings of loneliness and isolation may also diminish their motivation or ability to shop for groceries and prepare meals, exacerbating nutritional challenges. Health status significantly influences food security among older people. Chronic illnesses, disabilities, and cognitive decline can diminish their capacity to shop, cook, and eat independently. These health-related limitations further exacerbate nutritional deficiencies and contribute to the cycle of food insecurity.

The purpose of this review is to provide a comprehensive overview of research related to food insecurity among older adults. Conducting a scientometric analysis of research on this topic is crucial for several reasons. Firstly, such an analysis provides a comprehensive overview of existing knowledge and research trends in the field of food security among older adults. By examining a wide range of scholarly publications, including academic articles, reports, and studies, researchers can identify gaps in the literature, emerging research themes, and areas that require further investigation. This insight is invaluable for informing future research directions and policy interventions to address food insecurity among older adults. Moreover, a scientometric analysis allows researchers to assess the impact and dissemination of existing research on food security among the elderly. By analyzing citation patterns, publication trends, and collaboration networks, researchers can gain insights into which studies have had the most significant influence and which areas of research are receiving the most attention. This information can help identify key stakeholders, potential collaborators, and opportunities for knowledge translation and exchange.

Additionally, conducting a scientometric analysis enables researchers to evaluate the effectiveness of interventions and policies aimed at improving food security among older adults. By examining changes in research output and citation rates over time, researchers can assess whether efforts to address food insecurity among older adults are yielding positive results and identify areas where further action is needed.

Conducting a scientometric analysis of research on food security among the elderly is essential for understanding the current state of knowledge, identifying research gaps, assessing the impact of existing interventions, and informing future research and policy efforts in this critical area.

2. LITERATURE REVIEW

Food security (hereinafter – FS) among the elderly population is fundamentally a nutritional issue, intrinsically linked to their health status and the physiological changes inherent to ageing. Food insecurity (hereinafter – FI), defined as the lack of consistent access to

sufficient quantities of safe and nutritious food, is a primary predictor of negative health outcomes among this demographic group.

When older adults are forced to ration or compromise on food quality, they may also fail to comply with vital medication regimens or use low-quality products, which consequently exacerbates their overall health status (Wolfe et al., 1996). Food insecurity is directly correlated with an increased risk of developing or exacerbating chronic conditions, such as type 2 diabetes, hypertension, and cardiovascular diseases (Cook & Jeng, 2009).

Furthermore, studies have established a clear association between FI and worsened mental health, including higher rates of depression, anxiety, and stress (Leroux et al., 2020). Age-related physiological changes, such as reduced appetite (anorexia of ageing), limited physical mobility, and dental issues, are significant barriers to maintaining a balanced and adequate diet. The systematic review by Zarei et al. (2021) confirmed that food insecurity in the elderly is significantly associated with low levels of vitamins and minerals and with overall insufficient intake of both micro- and macronutrients. Therefore, the issue extends beyond merely having a sufficient quantity of food; it crucially concerns the quality and nutritional density of the food.

In practice, older adults frequently face complex barriers to achieving adequate nutrition. Jones et al. (2009), in their review, highlighted obstacles such as a lack of nutritional education, low income, and transportation difficulties in accessing grocery stores. They emphasise the need to develop targeted interventions, such as food subsidy programs, meal delivery services, and educational initiatives, to improve dietary behaviours.

The issue of food insecurity is not confined to the home environment. An integrative review by Wang et al. (2017) focusing on access to food choices in residential aged care facilities revealed that, despite centralised food provision, residents often face limited choice and insufficient access to palatable alternatives. This factor compounds the risks of malnutrition and nutritional deprivation even within institutional settings, underscoring the importance of individualized care.

Food insecurity among older adults is inextricably linked to their socio-economic status and specific behavioral patterns. The primary economic determinant is limited fixed income (pensions) combined with rising costs of living, particularly for housing and, most critically, healthcare. This forces many elderly individuals to make difficult compromises, often having to choose between purchasing necessary medications and buying nutritious food (Vilar-Compte et al., 2017). Hall (2005), for instance, noted that a significant portion of older adult households in the United States faced food insecurity precisely due to insufficient financial resources. This issue is compounded by the rising cost of healthy foods, making them unaffordable for low-income seniors.

Beyond economics, social isolation and the absence of a support system play a critical role. Older adults living alone or lacking close assistance often face difficulties accessing grocery stores (due to lack of transportation), preparing meals, and, as a result, are at a higher risk of food insecurity. The conceptual framework proposed by Wolfe et al. (1996) emphasized that food insecurity arises not only from income insufficiency but also from the complex interactions among health status, participation in food assistance programs, and lifelong experiences. Their model helps researchers understand why current assistance programs do not consistently achieve their goals.

On a behavioral level, changing dietary habits and inadequate market adaptation also affect food security. Alhammadi et al. (2021) highlighted the importance of understanding consumer behavior and the evolving preferences of older adults to develop products that are appropriate in terms of portion size and nutritional composition. Tailored food marketing and product development are essential for this group. In terms of solutions, Njeri (2021) emphasized that overcoming food insecurity requires multi-level strategies. These

range from government assistance (improving food programs and social security nets) and fostering strong family and community support to providing humanitarian aid and initiatives to increase nutritional literacy. Thus, effective strategies must address not only caloric deficits but also the deep-seated social and economic barriers facing the elderly.

The literature reviewed above confirms that food security among the elderly is a complex, multifaceted problem that cannot be solved through a single disciplinary approach. Research in this area is distributed across numerous fields, including medicine, sociology, economics, and nutrition science. This dispersed nature, while enriching the knowledge base, also poses a challenge for systematizing the accumulated findings.

Despite a significant body of research, including the foundational work of Franklin (2012), Burholt et al. (2012), Freiria et al. (2022), Mills (2021), Mavegam Tango Assoumou et al. (2022), Shahrin et al. (2019) there remain gaps in the scientific literature that significantly limit the development of truly effective interventions. First, most existing studies are primarily cross-sectional and provide only a snapshot of food insecurity at a given point in time, rather than allowing us to track its dynamics. Second, there are virtually no in-depth qualitative studies that allow us to understand the subjective experiences of older people, their coping mechanisms, and the subtle decision-making processes in situations of limited access to food. Third, the geography of research remains extremely limited. The bulk of empirical work is carried out in high-income countries, primarily in the USA, China, and the UK. This narrows the scope for generalizing results and makes it challenging to apply existing conclusions to low- and middle-income countries, where vulnerability patterns, institutional conditions, and socioeconomic factors may differ significantly.

Given that the field is rapidly developing yet remains fragmented, the primary challenge is not the lack of data, but the difficulty in systematizing, mapping, and assessing the impact of that data. Therefore, to address these critical structural gaps and provide a comprehensive overview, it is highly relevant and necessary to conduct a scientometric analysis. This quantitative approach will consolidate accumulated knowledge by mapping the field's structure, objectively pinpointing the main research trends, key authors, and, crucially, the missing directions where future research is most needed, and by evaluating the influence and dissemination of existing research through analysis of citation and collaboration patterns. This analysis will provide the required analytical structure and foundation for future research and targeted policy development, effectively filling the synthesis gap left by previous, more narrative reviews.

3. METHODOLOGY

The primary objective of this study is to systematically map the research landscape on food security among the elderly, requiring a methodology capable of quantitatively assessing the field's structure and dynamics. For this purpose, this paper employed a scientometric analysis, a robust quantitative and statistical approach designed to systematically delineate the research domain based on large-scale analysis of publication data (Macias-Chapula, 1998; Raan, 1997).

The choice of scientometrics is justified by its scope, which distinguishes it from more constrained review methods. A systematic review is primarily focused on synthesizing evidence to answer a specific, often clinical or narrowly defined, research question. While SRs provide high-level evidence synthesis, they do not inherently capture the structural evolution, collaboration networks, or quantitative impact metrics (e.g., citation flows) of an entire field. In contrast, scientometric analysis provides an objective and comprehensive mapping of the entire disciplinary landscape, identifying its historical development, current structure, and key influential actors. The terms bibliometrics and scientometrics are often used synonymously; however, we align with the view that

bibliometrics is an antecedent and often a subset of scientometrics, traditionally focused on the statistical analysis of publications (e.g., counting authors, documents, and journals). Scientometrics is a broader quantitative field that incorporates advanced techniques to evaluate the performance, effectiveness, and impact of scientific research (e.g., trend identification, citation flow analysis, and knowledge structure mapping).

Given that food security among the elderly is a rapidly evolving, fragmented, and interdisciplinary field, a traditional narrative or systematic review would be insufficient to capture its breadth. Therefore, scientometric analysis is the optimal methodology for this study. It allows us to quantify structural trends objectively, identify latent thematic clusters, detect collaboration lacunae (gaps), and assess the actual influence of foundational publications, thereby providing a holistic foundation for future scholarly and policy directions.

The data for the scientometric analysis were extracted from the Scopus database, which was selected due to its extensive coverage of peer-reviewed literature across all major disciplines (sciences, technology, medicine, social sciences, arts, and humanities), ensuring the capture of the interdisciplinary nature of the research area (Singh et al., 2021). The search was executed on Setember, 7, 2025 and covered the period from 1996 to 2024 to capture the historical evolution of the field from its early stages.

To conduct the bibliometric analysis, a search string was developed that was both accurate and replicable within the Scopus dataset. The focus was on publications in which the key concepts appeared in the title, abstract, or keywords. Accordingly, the following search string was applied: food security AND (elderly OR aging OR older adults OR senior citizens).

The initial dataset required refinement to ensure its quality and relevance. All non-research materials, such as editorials, letters, and book chapters, were excluded. At the same time, only scientific articles, review papers, and conference proceedings were retained, as these types of publications represent substantive research outputs. The search was further limited to English-language publications to maintain linguistic consistency and support the accuracy of subsequent analyses. This step is significant for visualizing the data in VOSviewer, as it ensures that the keywords and annotations can be reliably interpreted.

The initial search turned up 1,023 articles. After this, this research applied all the filters and ended up with a final list of 949 docs. The work uploaded them in .csv format. Each document includes all the bibliographic info, such as the author's name, title, abstract, year of publication, where they work, where the research was conducted, and a list of other papers they cited. That way, it is ready for further scientific analysis and visualization later.

Descriptive statistics were generated using the analytical tools available in Scopus to obtain a quantitative overview of the research landscape. This included examining annual publication trends to trace the field's development over time, identifying the leading countries, institutions, authors, journals, and funding agencies, and classifying publications by their primary Scopus subject areas to highlight the field's interdisciplinary nature.

The network and cluster analysis were conducted using VOSviewer (version 1.6.20), which enabled a comprehensive visualization of the intellectual structure of the research field. Thematic clustering was applied to identify the semantic organization of the literature by examining the co-occurrence of key terms extracted from titles and abstracts. Full Counting served as the basis for term selection, and only concepts that appeared at least 5 times were included to ensure analytical relevance. The software employed the Association Strength normalization method, allowing the formation of distinct clusters through modularity optimization, with node sizes reflecting the relative frequency of each term.

Alongside thematic mapping, co-authorship and citation network analysis were used to trace

the structure of scholarly collaboration and the influence of individual publications. Author networks revealed groups of researchers who tend to work together, while citation linkages highlighted the foundational studies shaping the field, with the prominence of individual nodes reflecting their citation impact.

Several methodological limitations should be acknowledged. The analysis relied exclusively on the Scopus database, which, despite its broad disciplinary coverage and rigorous indexing standards, may omit relevant research published in regional or highly specialized outlets not included in its catalog. In addition, restricting the dataset to English-language documents ensured consistency and comparability but inevitably narrowed the linguistic and geographical diversity of the sample. These constraints were intentionally applied to maintain high data quality and internal coherence in the construction of large-scale network maps, though they may limit the absolute completeness of the scientometric representation.

4. Results

The descriptive analysis provides essential quantitative insights that, when interpreted alongside the existing literature, reveal the evolving priorities and structure of the research field. It aligns temporally with the publication of several foundational and highly cited works that significantly shaped the research agenda. For instance, the influential work by Franklin (2012), which explored the mediators of food insecurity and obesity, along with studies such as Burholt (2012), played a crucial role in bringing the topic into wider academic discourse. Although there was a peak in 2018–2020 followed by a decline, the overall trend since 1996 remains sharply upward, underscoring the growing global relevance of food security as a critical issue for aging populations. The analysis of publication confirms a significant increase in research interest since 2011 (Figure 1).

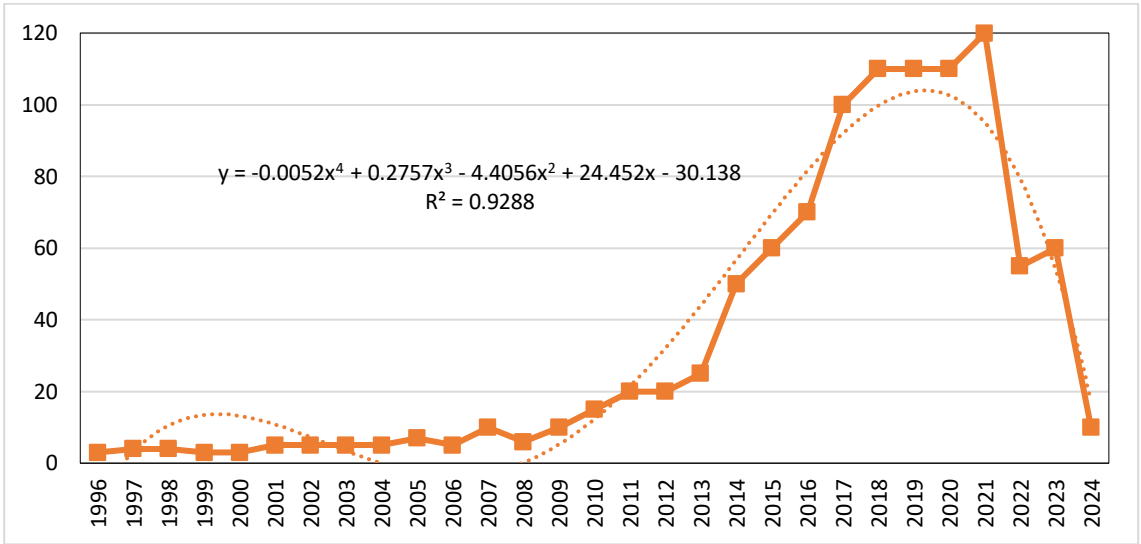


Figure 1. Temporal dynamics of publications

The temporal trend is mathematically confirmed by a 4th-degree polynomial fit. This model yields a coefficient of determination (R2) of 0.9288, indicating that the polynomial function accounts for over 92% of the variability in annual publication output. The high R2 value validates the observed pattern of accelerated exponential growth leading up to 2021, reinforcing the conclusion that the research field has experienced a profound surge in scholarly attention over the past decade.

The research exhibits a profoundly interdisciplinary nature, spanning several Scopus subject areas (Figure 2).

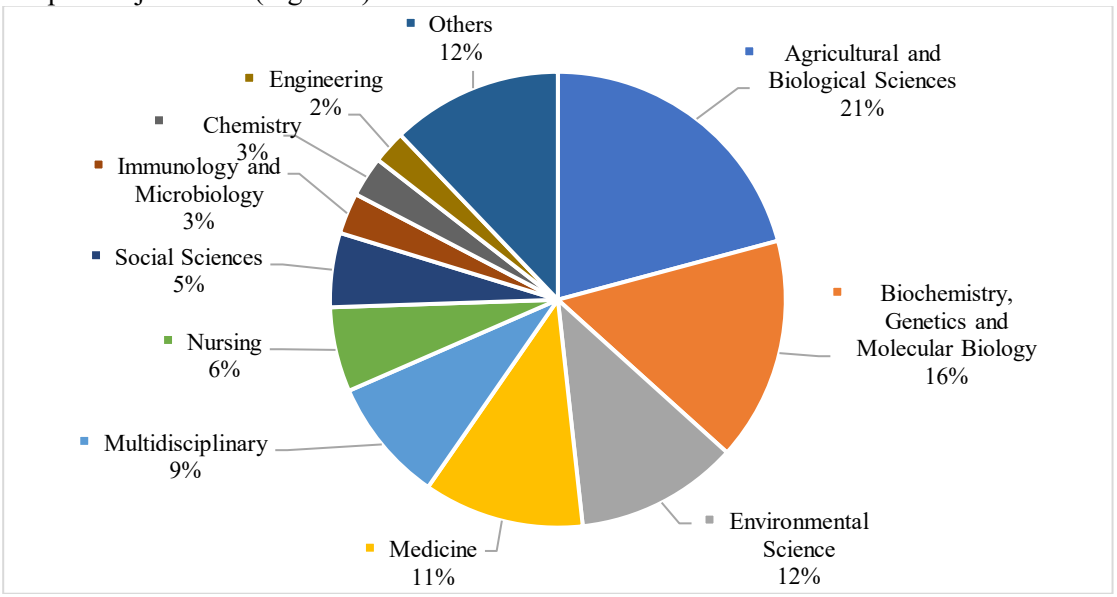


Figure 2. Subject area distribution

The top subject areas are Agricultural and Biological Sciences (20.8%), Biochemistry, Genetics and Molecular Biology (15.9%), and Environmental Science (11.6%), followed closely by Medicine and Social Sciences. The dominance of Agro-Biological Sciences suggests that research on elderly food security is no longer confined to outcomes (the end of the chain, such as malnutrition and health status) but is increasingly viewed through the lens of production, food quality, and environmental impact (the beginning of the chain). This multi-perspective approach confirms the problem's multifaceted complexity and the necessity of integrated, non-medical solutions.

The research exhibits a profoundly interdisciplinary nature, spanning several Scopus subject areas (Figure 3).

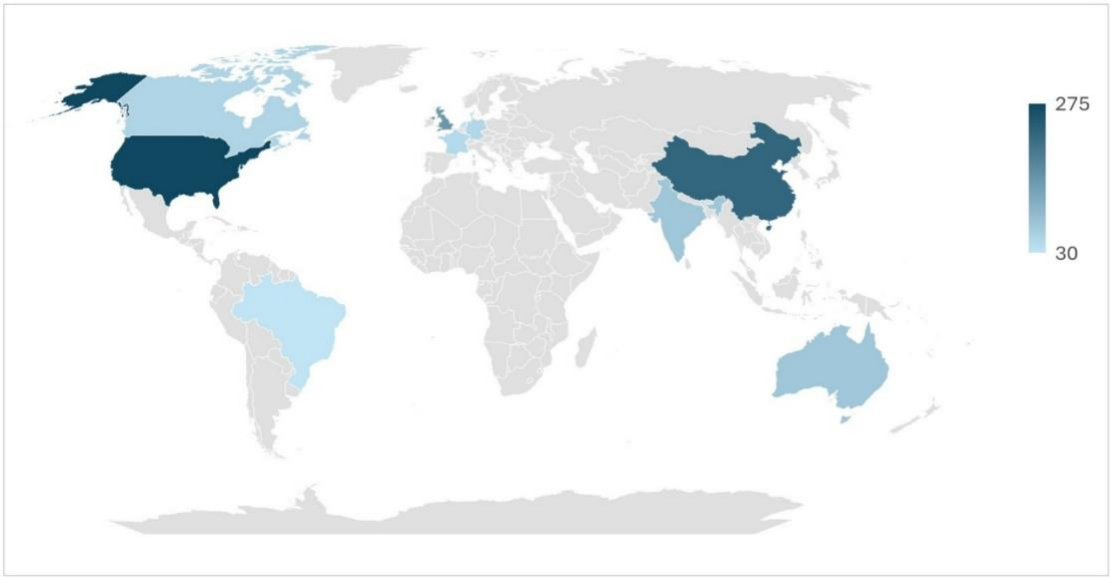


Figure 3. Global distribution of articles

The map reflects the global geography of research on food security for the elderly. The map shows that the largest concentration of publications is in the USA, China, and the UK, which are key centers of scientific activity. Canada, Australia, and several European countries also make significant contributions. A weaker representation is observed in the countries of Latin America, Africa and Central Asia, which indicates a significant regional imbalance in scientific attention to this problem. The top fields contributing to the research on food security among the elderly are Agricultural and Biological Sciences (21%), Biochemistry, Genetics and Molecular Biology (16%), and Environmental Science (12%). These are followed by Medicine (11%) and Multidisciplinary (9%) areas. This distribution underscores the necessity of a multi-perspective approach to the problem, moving beyond traditional medical and social sciences to include biological and environmental perspectives.

The analysis of author productivity revealed that a group of authors, including Ali, Long, Rizwan, and Zhang, ranks at the top in terms of contributions, each having published 6 documents (Figure 4).

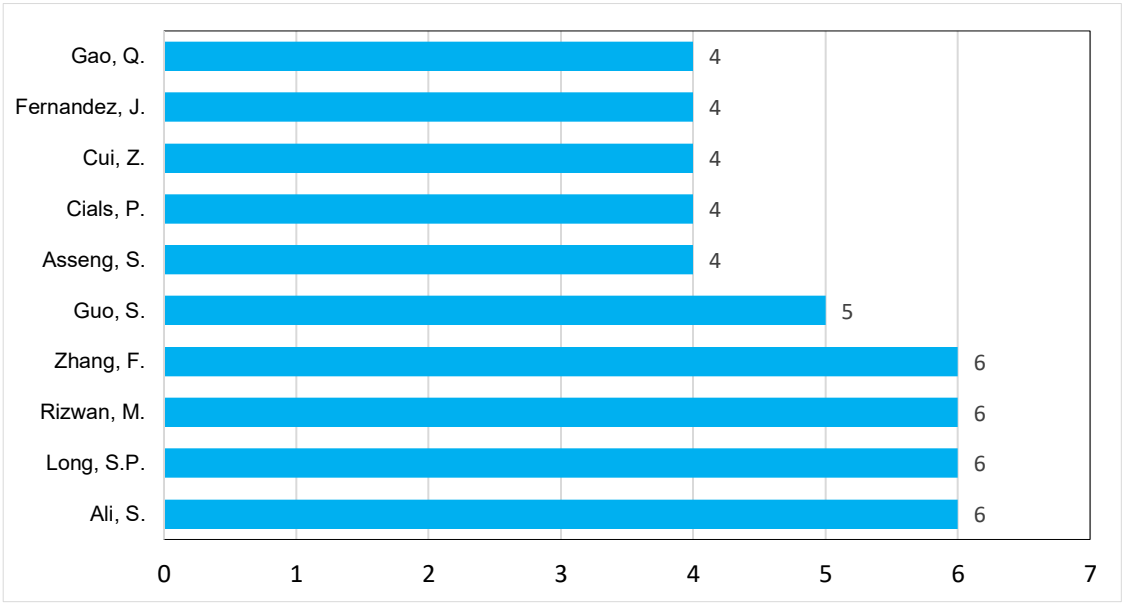


Figure 4. Author and affiliation productivity of publications

The horizontal distribution of productivity, in which no researcher forms a noticeable dominance in the number of publications, indicates two key features of the field's development. Firstly, such a structure is typical for relatively young or emerging research niches, where stable scientific schools and leading author centers have not yet developed. Secondly, this pattern is typical of highly interdisciplinary fields, where contributions are distributed among specialists from different fields - medicine, economics, agricultural sciences, and related disciplines - resulting in knowledge accumulating not around one or two "scientific giants" but through many parallel research lines forming a more uniform and fragmented structure for publication activity. The institutional analysis provides a powerful counterpoint to the author's findings on productivity (Figure 5).

The Chinese Academy of Sciences (hereinafter – CAS) is identified as the single most productive institution, contributing 55 publications. The CAS's overwhelming leadership, when juxtaposed with the distributed author output, suggests a high degree of vertical research integration within China.

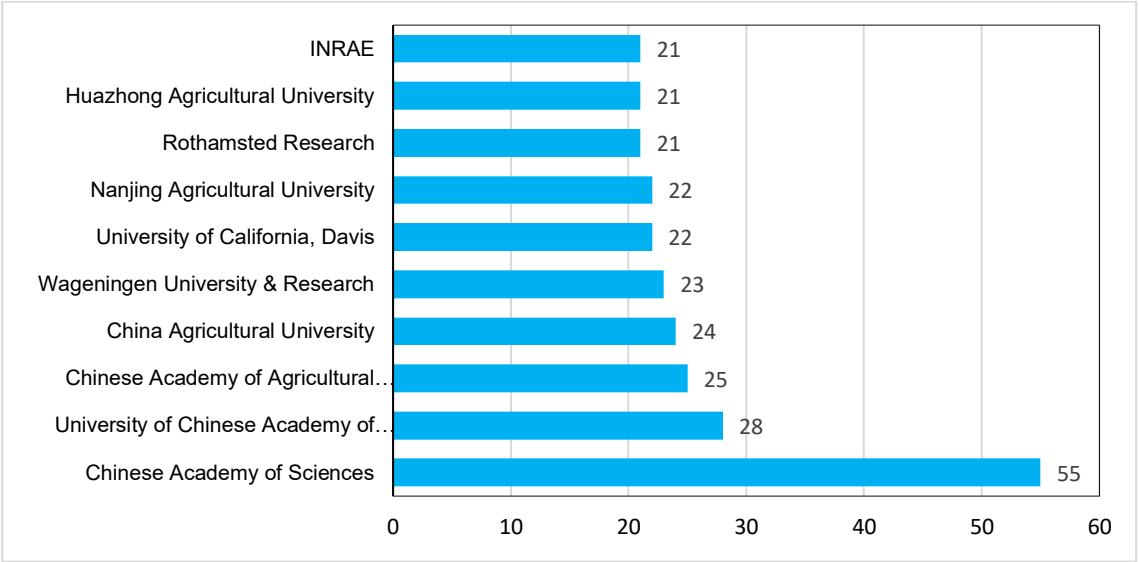


FIGURE 5. Institutional productivity of publications

This institutional dominance is directly linked to the analysis of funding sources, which identified the National Natural Science Foundation of China as the leading financial sponsor. This demonstrates a strategic, top-down approach that channels substantial national funding and institutional resources to support long-term, focused research on food security among the elderly, especially given China's demographic pressures.

This finding is crucial for understanding the geopolitical concentration of knowledge production in this domain. The analysis of funding bodies is crucial for understanding the strategic priorities and evolving nature of research investment (Figure 6).

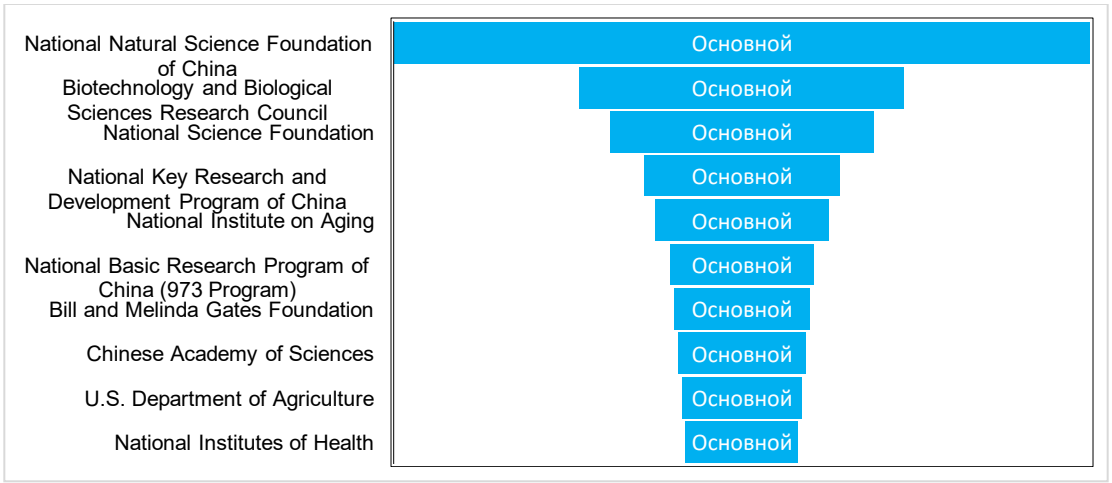


Figure 6. Funding sources of publications

The data confirms that the National Natural Science Foundation of China (92 publications) and the Biotechnology and Biological Sciences Research Council (43 publications) are the dominant sponsors. Interpretation of Funding Shift: The presence of other key funding organisations highlights a significant and necessary transition from purely agricultural or

biological funding to a comprehensive socio-medical and global investment model:

(1) Socio-Medical Focus: The involvement of the National Institute on Ageing (NIA), a core component of the U.S. National Institutes of Health, signals a clear focus on the medical and social determinants of ageing and food insecurity. This demonstrates recognition that food insecurity is a geriatric health crisis that requires public health and clinical research funding.

(2) Global and Policy Focus: The notable support from the Bill and Melinda Gates Foundation (18 publications) underscores the issue's elevation to a matter of global development and policy concern. Funding from such a foundation indicates that research is moving beyond national borders and specific demographics to address the problem in the context of global equity and sustainable development goals.

The funding portfolio confirms that research on food security among the elderly is no longer confined to the supply side (agriculture), but is now strategically supported by major bodies that prioritize comprehensive, integrated research that connects biological vulnerability, social policy, and global health outcomes. The network analysis conducted with VOSviewer goes beyond descriptive metrics to reveal the underlying structure and connectivity of the research field, thereby fulfilling the requirement for deeper analytical interpretation. The analysis of co-occurring terms identified four distinct thematic clusters, underscoring the field's highly interdisciplinary nature. The scientific significance lies in understanding the disparate knowledge domains. The analysis of co-occurring terms using VOSviewer revealed four primary thematic clusters, which define the intellectual structure of the field (Figure 7).

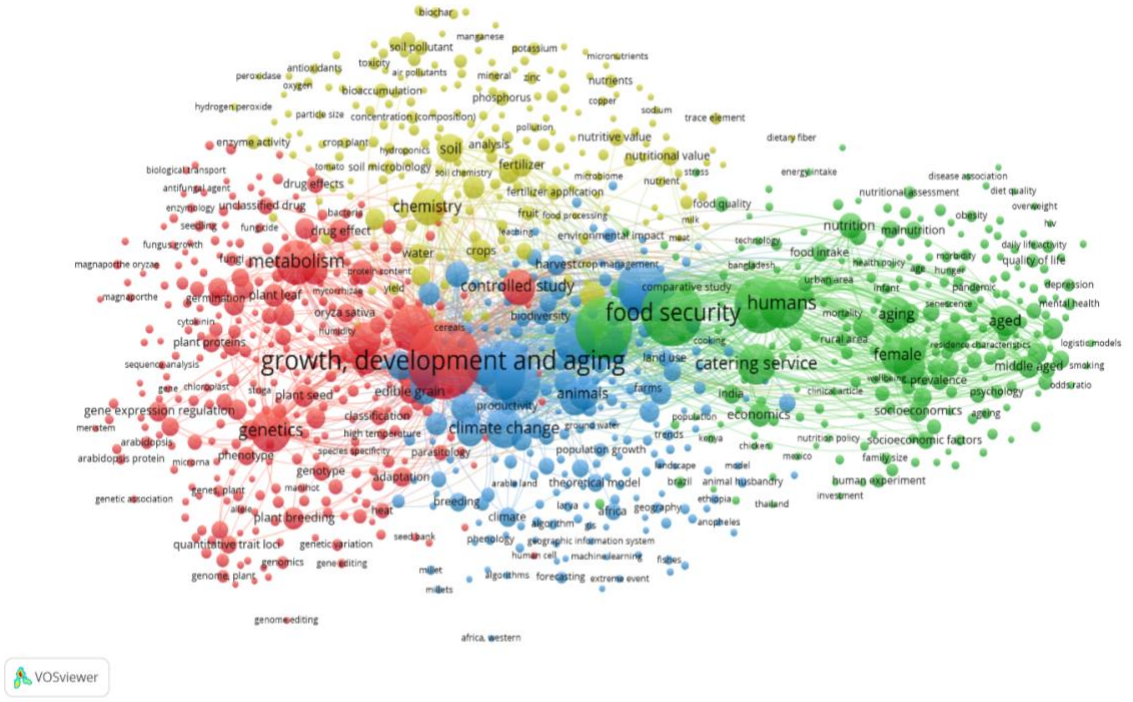


Figure 7. Thematic clustering of key terms

The scientific discussion requires a detailed interpretation of each cluster's focus and its relationship to the existing body of knowledge.

1. Green Cluster (Core Medical and Nutritional Outcomes). This cluster represents the core of the research, centered on terms such as "food security", "humans", "nutrition", and "malnutrition". Research in this domain primarily focuses on the direct health consequences of food insecurity and specific

nutritional deficiencies. It reflects the clinical and public health perspective, often utilizing national survey data to quantify the prevalence of malnutrition and associated chronic diseases. This aligns directly with the established findings linking food deprivation to negative health outcomes and non-compliance with medical regimens (Cook & Jeng, 2009; Zarei et al., 2021). The cluster's prominence confirms that the immediate health impact remains the most frequent and central research theme.

2. Pink Cluster (Socio-Demographic Context and Policy). This cluster groups terms such as "ageing", "aged", "health", "social policy", and "poverty". It emphasizes the social determinants of food security, highlighting the role of economic limitations, social support networks, and community services. This research area is heavily influenced by sociological and public policy frameworks. The findings in this cluster strongly resonate with the conceptual model proposed by Wolfe et al. (1996), which established that resource deficiencies and access limitations, rather than just a lack of food, are the key drivers of food insecurity among the elderly. Studies here often evaluate the effectiveness of government programs and community-based interventions.

3. Blue Cluster (Agro-Environmental and Supply Factors). The Blue Cluster, defined by terms like "soil analysis", "fertilizer", "climate change", and "food quality", addresses food security from a supply-side perspective. This orientation demonstrates a significant interdisciplinary shift, connecting the well-being of the elderly directly to global environmental changes and agricultural practices. The focus is on the quality, availability, and sustainability of the food chain, reflecting the growing understanding that diet quality is as critical as quantity. The research outputs here often intersect with the work of Alhammadi et al. (2021), who emphasized the need to understand consumer behavior and product development in the context of food supply constraints and changing food preferences among the older population.

4. Red Cluster (Biological and Genetic Aspects of Ageing). This cluster is characterized by fundamental biological terms like "growth", "development and ageing", "genetics" and "gene expression regulation". It focuses on the physiological mechanisms that govern appetite, nutrient absorption, and metabolism in old age. Research within this area seeks to understand how genetic predisposition and cellular aging processes contribute to unique nutritional requirements or vulnerabilities to food scarcity. While forming a distinct scientific domain, this cluster indicates a specialized focus, often divorced from practical policy implications.

The analysis of co-occurring key terms, visualized in the network map, enabled the formal identification of four distinct thematic clusters, summarized in detail in Table 1.

Table 1. Thematic clusters of research on food security among the elderly population for 1996–2024

Cluster	Key focus	Central terms	Scientific significance and interpretation
Red Cluster	Biological and Genetic Aspects of Aging	"growth and aging", "genetics", "gene expression regulation", "drug effect"	This cluster shows research intersecting with fundamental life sciences. It addresses the physiological mechanisms of aging and how they influence nutritional needs.
Blue Cluster	Agro-Environmental Factors	"soil analysis", "fertilizer", "climate change", "food quality"	This highlights the research focus on the supply-side determinants of food security. It connects food availability and quality directly to agricultural production practices and environmental sustainability.
Green Cluster	Medical and Nutritional Outcomes	"food security", "humans", "nutrition", "malnutrition", "female", "male"	This is the core domain, focusing on the immediate impact of food security on health, dietary behavior, and clinical outcomes, including the study of gender differences in vulnerability.

Pink Cluster	Socio-Demographic Context and Policy	"agieng", "aged", "health", "social policy", "poverty"	This cluster addresses the social determinants of health and the necessity of policy-level measures (social policy, economic interventions) to mitigate food insecurity risks.
*Clusters were generated using VOSviewer analysis of co-occurring terms (minimum frequency threshold = 5). Full Counting was employed for term extraction.			

Note: compiled by the authors

The structural organization of the thematic map reveals a critical disconnect between two primary knowledge domains: the Red Cluster (Biological/Genetic) and the Pink Cluster (Socio-Demographic). The observed distance and limited linkages between the physiological determinants of aging and social policy frameworks represent a major structural limitation in the current body of research. This gap highlights a tendency for researchers to study either the internal, biological vulnerability of the elderly or the external, socio-economic factors, with insufficient integration between the two.

This separation poses a serious constraint on the development of effective integrated and interdisciplinary intervention programs. For instance, interventions based solely on social policies (Pink Cluster) may fail to account for the unique metabolic and genetic factors (Red Cluster) that dictate how individuals respond to specific dietary inputs. Conversely, biological research, without social context, remains purely theoretical. The absence of connectivity signifies a failure to produce truly translational research that can link genetic and physiological markers of vulnerability to targeted, contextualized social and economic interventions. Addressing this structural gap should be a high-priority direction for future scholarship, requiring a collaborative effort between molecular biologists, public health experts, and social scientists.

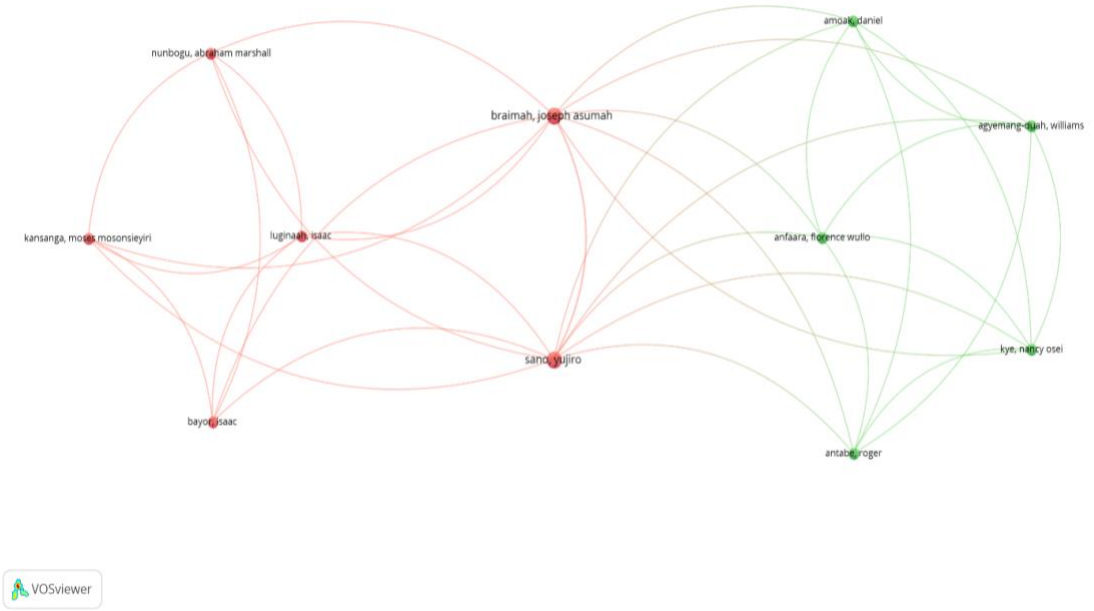


Figure 8. Co-authorship network analysis

The co-authorship network reveals the structure of collaboration within the field, grouping authors into clusters based on frequent joint publications. This analysis confirms that collaboration is largely contained within specific research groups, but also

highlights critical authors who facilitate inter-group knowledge flow.

Red Cluster (e.g., Kansanga, Luginaah, Bayoh). This cluster primarily focuses on public health outcomes and geographical disparities in food security, often using cross-sectional survey data from sub-Saharan Africa. For instance, Kansanga et al. (2022) published a study examining the spatial variability and determinants of food insecurity in specific regions, linking socio-economic indicators to access to food resources. Their research centers on applied public health and population-level risk assessment.

Green Cluster (e.g., Amoako, Agyemang, Antabe). Research in this cluster tends to focus on nutrition and clinical determinants, often analyzing specific dietary patterns and their relationships with health metrics such as non-communicable diseases. Their work frequently involves community-based data collection to evaluate the effectiveness of nutritional interventions or the impact of environmental changes on dietary behavior.

The author Samou Ajiro occupies a highly central position in the network, connecting the red and green clusters. This role is quantitative (high Betweenness Centrality) but also qualitatively significant:

(1) Quantitative Significance: The high centrality score indicates that Ajiro frequently collaborates with authors from both geographically/thematically distinct clusters, serving as a necessary node for information and methodology transfer between them.

(2) Qualitative Significance: Ajiro's function as a "bridge" helps to fill crucial interdisciplinary gaps. By connecting authors focused on public health risk assessment (Red Cluster) with those specializing in clinical/nutritional outcomes (Green Cluster), this author facilitates the creation of integrated studies. These integrated studies, which are otherwise rare (as noted in the thematic gap analysis), allow for research to simultaneously identify the geographical and socio-economic risks of food insecurity and analyze the resulting clinical and nutritional consequences, moving the field towards a more holistic, cause-and-effect understanding.

This analysis confirms that while research collaboration is often localized, key individuals actively mediate knowledge transfer (Figure 9).

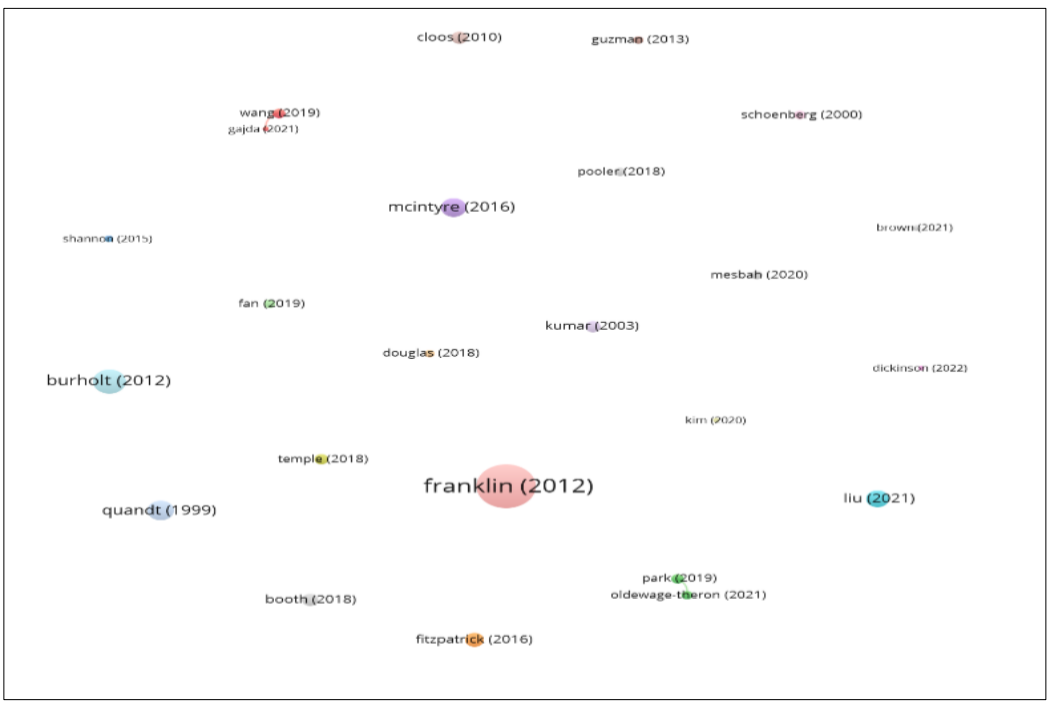


Figure 9. Citation network analysis

The citation network map confirms the field's intellectual lineage by identifying the articles that have exerted the greatest influence on subsequent research. The analysis unequivocally identifies Franklin (2012) as the most cited publication in the corpus, as evidenced by the largest node in the network. Its high citation count confirms its status as a foundational work and a critical intellectual touchstone for researchers entering the domain.

Substantive Analysis of Franklin (2012): Paradigm Shift. The profound influence of Franklin's work stems from its paradigm-shifting contribution. Before 2012, research often treated food insecurity primarily as an undernutrition or poverty problem. Franklin (2012) provided a crucial mediation, demonstrating that food insecurity, particularly among vulnerable populations, is significantly associated with obesity and poor dietary quality rather than solely with caloric deficit. This finding challenged the prevailing simplistic view by showing that food-insecure individuals often consume energy-dense, nutrient-poor foods due to economic constraints, leading to a dual burden of malnutrition and obesity. By connecting the socio-economic phenomenon of food insecurity to complex health outcomes like obesity, the paper broadened the scope of research and legitimized the interdisciplinary study of the topic across medicine, nutrition, and sociology. This analytical shift established the need to consider food access and quality alongside financial accessibility.

Other Key Influencers: The network also highlights other highly cited works, including Burholt (2012), which provided early frameworks for understanding rural vulnerabilities, and later influential papers like McIntyre (2016) and Liu (2021). These publications collectively defined the core research questions and methodological approaches adopted by the next generation of scholars.

5. Conclusion

The primary objective of this study was successfully achieved through a comprehensive scientometric analysis of 949 publications (1996–2024), providing an objective and quantitative mapping of the research landscape concerning food security among the elderly.

This research confirms the multifaceted and interdisciplinary nature of the problem, with key findings distributed across several domains:

(1) The accelerated growth of publications post-2011, influenced by foundational works such as Franklin (2012), confirms the increasing global urgency and recognition of this issue.

(2) The VOSviewer analysis successfully delineated four core thematic clusters (Biological/Genetic, Agro-Environmental, Medical/Nutritional, and Socio-Demographic). This formal structural mapping represents a significant theoretical contribution, providing an empirical framework for researchers to conceptualize the problem beyond single-discipline approaches.

(3) The identification of the United States and China as leading contributors and the author Samou, Ajiro as a central collaborative bridge highlights the geopolitical and institutional dynamics driving the research agenda.

The most significant contribution and scientific novelty of this analysis is the formalized identification of critical structural gaps in the existing body of knowledge. The limited connectivity observed between the biological (Red Cluster) and socio-demographic (Pink Cluster) research domains highlights a lack of integrated, truly translational studies. Furthermore, the analysis confirms the need for more longitudinal and qualitative studies to capture the temporal variability and subjective experiences of food insecurity.

Based on these findings, future research should prioritize:

(1) Developing complex models that link biological vulnerability factors to the effectiveness of specific social and economic policies.

(2) Utilizing qualitative methods (e.g., in-depth interviews) to provide a rich, contextual understanding that complements quantitative research.

(3) Shifting the research focus towards underserved regions to improve the global generalizability of findings.

The insights generated by this scientometric analysis serve as a vital roadmap for policymakers and funding agencies to allocate resources efficiently and to establish integrated strategies to improve food security for the elderly worldwide.

AUTHOR CONTRIBUTION

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