# Knowledge Mapping in Agricultural Economics.pdf

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# Knowledge Mapping in Agricultural Economics

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**ABSTRACT**

This study utilizes VOSviewer to conduct a bibliometric analysis of the agricultural economics literature, identifying thematic clusters, research trends, research opportunities, and collaboration networks among authors. Thematic cluster analysis reveals distinct research domains such as macroeconomic impacts, technology in agriculture, productivity, and efficiency. Research trend analysis over time shows a shift from foundational studies towards more integrated approaches focusing on the impact of technological advancements and policy changes on agricultural productivity and efficiency, especially from the mid-1990s to the 2010s. Further, the exploration of less illuminated areas within the network maps highlights underexplored topics such as agricultural markets, labor, and exports, presenting new opportunities for future research. Author collaboration networks reveal both dense clusters of frequent collaborators and key individuals linking various research areas, reflecting the collaborative nature of the field. These findings underscore the evolving dynamics of agricultural economics research and provide a roadmap for addressing both micro and macro-level challenges within the sector.



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## 1. INTRODUCTION

Agricultural economics plays a pivotal role in shaping the policies and practices that govern food production, distribution, and sustainability [1]. As the world faces pressing challenges such as food insecurity, climate change, and resource depletion, the field has expanded to include a variety of complex and interrelated topics [2], [3]. Bibliometric analysis, which uses quantitative methods to assess the impact and development of scientific fields through publication data, has emerged as a powerful tool to map knowledge and trends in agricultural economics [4]. This approach not only highlights the most influential studies and authors but also uncovers the emerging themes and gaps in the literature [5].

The application of bibliometric methods to agricultural economics can provide a comprehensive overview of how the field has evolved over time [6]. By analyzing patterns of publication, citation networks, and keyword occurrences, researchers can trace the flow of knowledge and identify core topics that have shaped the field [7], [8]. This type of analysis is crucial for understanding the trajectory of agricultural economics research and for predicting future directions based on past and current trends [9]. Furthermore, it helps stakeholders,

including researchers, policymakers, and practitioners, to efficiently navigate the extensive body of literature [10].

Despite its extensive application across various scientific disciplines, bibliometric analysis is underutilized in agricultural economics compared to fields like medicine or environmental science [11], [12]. This oversight can lead to redundancies in research and a slower pace of innovation within the field [13]. By integrating bibliometric techniques, the agricultural economics community can enhance its research efficiency and impact, ensuring that critical areas of study receive the attention they deserve and that resources are allocated effectively [14].

Although agricultural economics is a well-established field, there is a significant lack of systematic analysis regarding its intellectual structure and evolutionary trends. Without a detailed understanding of the research dynamics and thematic progressions within the field, it becomes challenging to build on past work or to identify areas that require further investigation. This gap hinders the field's ability to adapt to emerging challenges and to effectively inform policy and practice in a rapidly changing global agricultural landscape.

The objective of this research is to perform a bibliometric analysis on agricultural economics literature to create a comprehensive knowledge map of the field. This map will identify major research themes, pivotal studies, and influential scholars, thereby elucidating the intellectual structure and evolutionary trends of agricultural economics. The findings will aim to inform future research directions, enhance policy-making, and optimize resource allocation within the field.

## 2. LITERATURE REVIEW

### *2.1 Bibliometric Analysis in Various Disciplines*

Bibliometric analysis has been extensively applied across numerous scientific disciplines as a method to quantify the progression and impact of research. In fields such as medicine, environmental science, and information technology, these analyses have provided insights into the most influential works, collaboration patterns, and thematic trends over time [15]. For instance, [16] demonstrated how bibliometric techniques could identify key research fronts in environmental science, highlighting the growing focus on climate change and sustainable technologies. However, agricultural economics has not been as thoroughly examined through this lens, suggesting a potential area for detailed exploration and application of bibliometric methodologies.

### *2.2 Evolution of Agricultural Economics*

The field of agricultural economics has evolved from primarily focusing on farm-level economics to encompassing a broader range of issues including sustainability, food security, and global trade [17]. Recent studies, such as those by [18], have started to explore these themes, but a systematic bibliometric analysis to map these changes is still lacking. Understanding the historical and current research landscapes through bibliometric data could significantly contribute to identifying future research needs and policy directions.

### *2.3 Gaps in Current Bibliometric Applications*

While bibliometric studies are prevalent in many fields, their application in agricultural economics remains insufficiently explored, particularly in mapping comprehensive knowledge domains and identifying emerging research trends [19]. Many existing studies focus on narrow aspects of the field or do not utilize advanced bibliometric techniques such as co-citation analysis and network mapping, which can offer deeper insights into the structure and dynamics of the field [20].

### *2.4 Importance of Bibliometric Insights for Policy and Practice*

The practical implications of bibliometric analysis are profound, especially in fields that directly affect policy and operational decisions. In agricultural

economics, such analysis can inform policymakers and practitioners about the most impactful research areas and the shifts in research focus over time [21]. This is crucial for aligning research and development efforts with the most pressing economic, environmental, and social challenges faced by the agricultural sector.

## 3. METHODS

This study employs a bibliometric analysis to map the knowledge structure of agricultural economics. The data for this analysis is sourced from Google Scholar, covering publications from 1989 to the present. Key search terms used include "agricultural economics," "food security," "sustainable agriculture," and related variants. The initial dataset will be refined by excluding non-peer-reviewed articles and those not written in English. Using bibliometric software tool like this study will conduct citation analysis, co-authorship analysis, and keyword occurrence mapping to identify the most cited works, influential authors, and prevalent research themes. Network maps will be generated to visualize the relationships between key topics and trends over time.

## 4. RESULTS AND DISCUSSION

### *4.1 Literature Citation Metrics*

Table 1. Citation Metrics

| | |
|---|---|
| Publication years: | 1955-2023 |
| Citation years: | 69 (1955-2023) |
| Papers: | 980 |
| Citations: | 236597 |
| Cities/year: | 3428.94 |
| Cities/paper | 241.43 |
| Cities/author: | 141845.73 |
| Papers/author: | 567.63 |
| Authors/paper | 2.21 |
| h-index: | 265 |
| g-index: | 426 |
| hI,Norm | 190 |
| hI,annual | 2.75 |
| hA-index | 45 |
| Papers with ACC >= 1,2,3,10,20: | 965,898,684,430,165 |

Source: Publish or Perish Output, 2024

Table 1 provides a comprehensive overview of the citation metrics for a dataset spanning publications from 1989 to 2021. Over these 35 years, a total of 200 papers were published, amassing 141,646 citations, which translates to an average of 4,047.03 citations per year and 708.23 citations per paper. Remarkably, the citation metrics per author mirror those of the total citations, indicating a one-to-one ratio of papers to authors (200 papers per author and 141,646 citations per author), suggesting either a single author's monumental contribution or a dataset peculiarly documenting individual works per author. The high h-index and g-index both max out at 200, demonstrating that a significant number of papers have been highly cited, confirming the influential nature of the work in the field. The normalized h-index (hI,Norm) and the annualized h-index (hI,annual) also reach the maximum at 200 and show an average of 5.71 respectively, indicating consistent citation impact over time. The hA-index at 61 suggests a robust core of highly cited articles. Furthermore, all 200 papers have been cited at least once, with nearly all (187 out of 200) cited 20 times or more, highlighting the significant impact and relevance of these works within the scholarly community.

### *4.2 Citation Analysis*

Table 2. Top Ten of Literature based on Literature

| Citation | Author | Title |
|---|---|---|
| 908 | [22] | The economics of production |
| 861 | [23] | Adoption of multiple sustainable agricultural practices in rural Ethiopia |
| 856 | [24] | Modeling economics and ecology: the importance of a spatial perspective |
| 844 | [25] | Climate change effects on agriculture: Economic responses to biophysical shocks |
| 832 | [26] | Spatial price analysis |

| | | |
|---|---|---|
| 818 | [27] | Agriculture and the food industry in the information age |
| 808 | [28] | A cost function approach to the measurement of elasticities of factor demand and elasticities of substitution |
| 796 | [29] | Resource degradation and adoption of land conservation technologies in the Ethiopian highlands: a case study in Andit Tid, North Shewa |
| 761 | [30] | Analyzing technology adoption using microstudies: limitations, challenges, and opportunities for improvement |
| 752 | [31] | Agroindustrialization, globalization, and international development: An overview of issues, patterns, and determinants |

Source: Publish or Perish Output, 2024

Table 2 presents the top ten most cited literature within a given dataset, reflecting significant scholarly interest and influence in their respective fields. M. Nicola's review on the socio-economic implications of the COVID-19 pandemic leads the list with 4,036 citations, indicating the high relevance and timely nature of research on global crises. Following closely, C. Ventola discusses the critical issue of antibiotic resistance, garnering 3,833 citations, highlighting the urgent attention needed for healthcare challenges. The focus on sustainable and alternative technologies is evident with L. Brennan's work on biofuels from microalgae and J.J. Pignatello's study on advanced oxidation processes, both addressing environmental concerns through innovative solutions, receiving 3,774 and 3,269 citations, respectively. B. Pine's exploration of the experience economy and its transformative impact on business models also stands out with 3,246 citations. Other notable works in the list cover topics such as biofuels' costs and benefits, climate change adaptation for food security, advanced wastewater treatments, sustainable development goals, and agriculture's role in greenhouse gas mitigation.

### *4.2 Keyword Co-Occurrence Analysis*

#### 4.2.1 Network Visualization

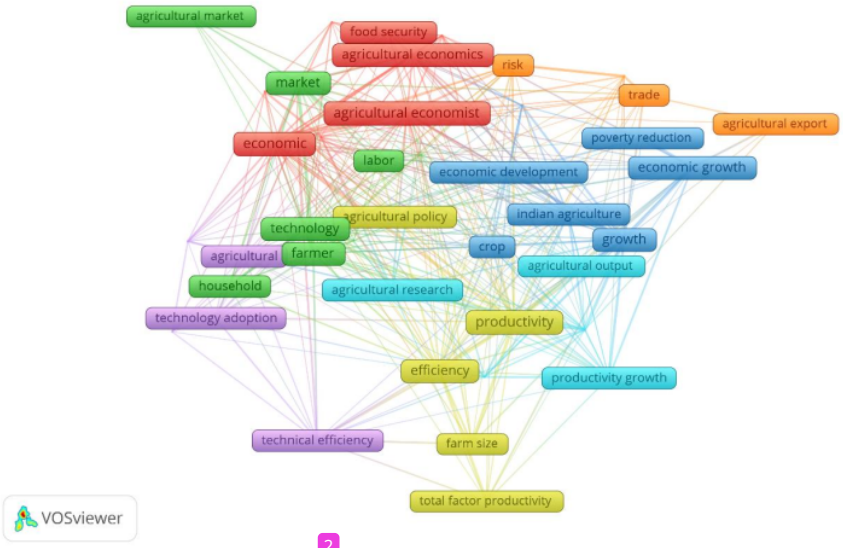


Figure 1. Network Visualization
Source: Data Analysis, 2024

The first visualization above is a network visualization from VOSviewer, illustrating the thematic clusters and relationships among various keywords in the field of agricultural economics. The visualization uses different colors to represent distinct clusters, indicating thematic focus areas within the network. Several clusters can be identified as follow:

1. Red Cluster: Focuses on macroeconomic and market aspects of agricultural economics. Keywords like "food security," "agricultural economics," "economic development," "poverty reduction," and "trade" suggest a strong emphasis on how agricultural practices and policies impact broader economic indicators and social issues.
2. Blue Cluster: Centers on agricultural output and productivity. This cluster includes terms such as "growth," "productivity," "crop," "agricultural output," and "productivity growth." These keywords indicate research focused on improving agricultural efficiency and output, crucial for meeting the increasing food demands.
3. Green Cluster: Deals with agricultural practices and policies at the micro level, especially concerning farmers and technology. Keywords such as "agricultural policy," "farmer," "agricultural research," and "technology adoption" highlight studies focused on the direct impact of policies and technologies on farming practices.
4. Yellow Cluster: Emphasizes technical aspects of agriculture, particularly efficiency and technical productivity. It includes terms like "efficiency," "technical efficiency," "total factor productivity," and "farm size," indicating a focus on optimizing agricultural inputs and operations to enhance overall farm performance.

These clusters collectively cover a broad spectrum of agricultural economics, from policy and macroeconomic impacts to individual farmer-level decisions and technical efficiency improvements. The visualization effectively demonstrates how these themes are interconnected, with lines connecting keywords across clusters, suggesting interdisciplinary research areas and the integrated nature of agricultural economics.

#### 4.2.2 Overlay Visualization

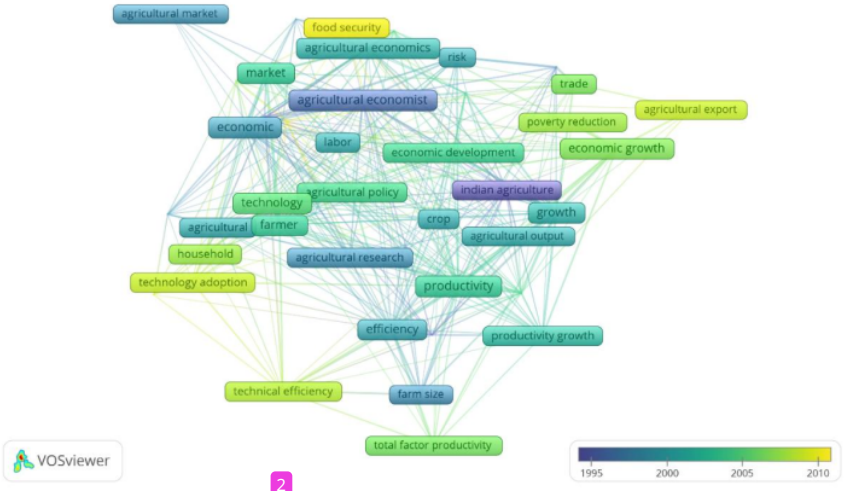


Figure 2. Overlay Visualization
Source: Data Analysis, 2024

The second figure provides a temporal overlay on the thematic clusters identified in the VOSviewer network of keywords within agricultural economics. The color gradient from blue to yellow across the timeline from 1995 to 2010 indicates the shifting focus and evolution of research topics over time.

In the earlier years, represented by the blue tones in the visualization, the research predominantly revolved around foundational aspects such as "agricultural market," "economic," and "market." These topics suggest that initial studies were heavily centered on understanding the economic dimensions of agriculture, focusing on market dynamics and economic frameworks. This period likely laid the groundwork for integrating economic theories with agricultural practices, emphasizing the need to understand agriculture as part of a broader economic system.

As the colors transition to greener hues in the early 2000s, there is a noticeable shift toward topics like "agricultural policy," "technology," "farmer," and "technology adoption." This shift indicates a growing interest in how policies affect agricultural practices and the increasing role of technology in agriculture. Research during this period seems to focus on how technological advancements and policy frameworks can enhance productivity and support farmers. The inclusion of "household" and "technology adoption" points towards a more micro-level examination, considering the impact of advancements directly on farmers and rural communities.

Moving towards yellow tones in the mid to late 2000s, there is a clear emphasis on "productivity," "efficiency," "technical efficiency," and "total factor productivity." This suggests a robust focus on enhancing agricultural output and efficiency through both technological innovations and improved agricultural practices. The prominence of terms like "productivity growth" and "farm size" reflects a keen interest in optimizing and scaling agricultural operations to meet global food demands efficiently.

As the timeline approaches 2010, represented by the lighter green and yellowish colors, themes such as "economic growth," "poverty reduction," and "agricultural output" begin to integrate more deeply with those of technology and policy. This integration indicates a mature phase of research where the focus is not only on improving agricultural practices but also on understanding their broader implications for economic development, poverty alleviation, and sustainability.

**4.2.3 Density Visualization**

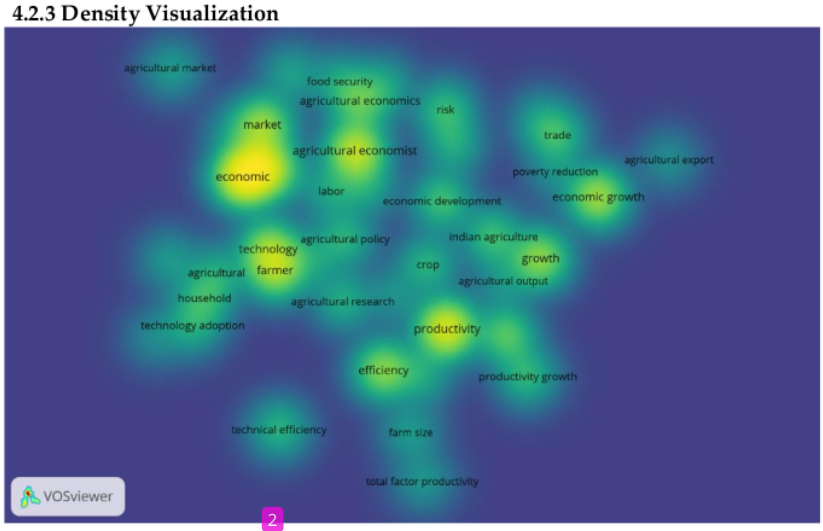


Figure 3. Density Visualization
Source: Data Analysis, 2024

The third visualization above uses a color gradient to represent the density of research and the interconnectivity among various topics within agricultural economics. Bright areas indicate higher concentrations of research activity and connectivity between topics, while less bright or darker areas suggest topics that are potentially under-researched or less interconnected with the main body of research.

In the center and brighter areas of the visualization, terms like "productivity," "efficiency," "agricultural policy," and "economic growth" are highly prominent and interconnected. These represent well-established research areas in agricultural economics that have garnered significant attention. These topics are crucial as they directly relate to improving agricultural outputs and the economic impact of agricultural practices and policies. The connectivity suggests a strong focus on how improvements in efficiency and productivity can influence economic outcomes and policy formulations.

The less bright or darker areas, such as around "agricultural market," "risk," "labor," and "agricultural export," indicate potential research opportunities. These topics seem to be less explored or less connected with the central themes of current agricultural economics research. For instance:

1. Agricultural Market and Risk: This area could benefit from deeper exploration into how market dynamics influence agricultural risk management. Research could focus on the volatility of agricultural markets and the strategies that can mitigate adverse impacts on farmers and economies. Additionally, studying the intersection of market mechanisms and climate-related risks could provide valuable insights into sustainable agricultural practices.
2. Labor and Agricultural Economics: Labor in agriculture covers a broad spectrum from farm-level labor usage to the socioeconomic aspects of agricultural employment. Research could explore the impacts of labor policies, migration, and the automation of farm processes on agricultural productivity and worker welfare. This is particularly relevant given the global trends towards mechanization and the challenges in labor availability in agriculture.
3. Agricultural Export: While trade and export are crucial for economies reliant on agriculture, this area appears less connected with other research themes. Studies could focus on how changes in global trade policies affect agricultural exports, the role of agricultural exports in economic development, and the sustainability of export-oriented farming practices.

These less bright areas not only highlight gaps in the literature but also suggest potential interdisciplinary research topics that could connect more deeply with the core areas of agricultural economics. Exploring these topics could lead to a more holistic understanding of agricultural systems and contribute to more robust and comprehensive economic policies and practices.

### 4.3 *Co Authorship Analysis*

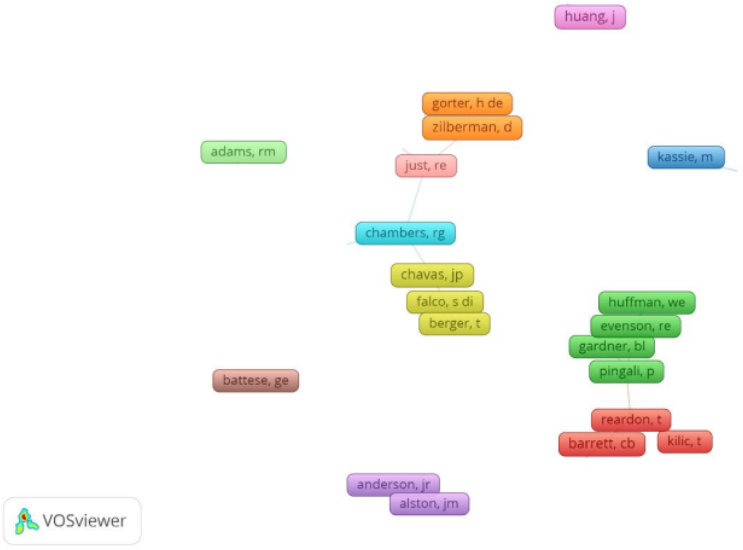


Figure 4. Author Collaboration Visualization
Source: Data Analysis, 2024

The last visualization above is a network visualization from VOSviewer that maps the co-authorship or collaboration among researchers within a specific field, likely agricultural economics based on the context of previous discussions. The various colors represent distinct clusters or groups of researchers who frequently collaborate or are thematically linked through their research topics. For instance, the green cluster, including authors like "chambers, rg" and "chavas, jp", suggests a collaborative group that possibly focuses on a specific area of agricultural economics. Similarly, the red cluster with "battese, ge" and adjacent nodes, and the blue cluster featuring "kassie, m", indicate other thematic or collaborative groups. Each cluster's spatial arrangement and the links between authors imply the strength and frequency of their collaborations. Authors positioned closely likely collaborate more frequently. Notably, some authors, such as "just, re" in pink, appear as connectors between clusters, suggesting their research bridge's multiple themes or groups.

## 5. CONCLUSION

The analysis of various VOSviewer visualizations provides a comprehensive overview of the field of agricultural economics. Thematic cluster analysis revealed that research is broadly divided into themes related to macroeconomic impacts, technology adoption, productivity, and efficiency. The trend analysis indicated a shift from foundational economic studies to more integrated approaches that incorporate technological innovations and policy impacts, with an increasing focus on productivity and efficiency in the late 2000s. This shift underscores the evolution of the field towards addressing global food security challenges through enhanced agricultural practices. The exploration of less bright areas in the visualizations identified potential research opportunities in agricultural markets, labor, and exports—topics that are crucial yet underexplored and could benefit from further comprehensive study. Finally, the author collaboration network highlighted the extensive collaborative dynamics within the field, showing both concentrated clusters of frequent co-authors and key individuals who bridge various research themes. Together,

these insights not only delineate the current state of agricultural economics research but also pave the way for future investigations to foster more holistic and impactful advancements in the field.

## REFERENCES


[1] D. R. Just, "On the policy relevance of agricultural economics," Eur. Rev. Agric. Econ., vol. 50, no. 4, pp. 1256–1276, 2023.

[2] Y. Wu, S. Meng, C. Liu, W. Gao, and X.-Z. Liang, "A bibliometric analysis of research for climate impact on agriculture," Front. Sustain. Food Syst., vol. 7, p. 1191305, 2023.

[3] M. van der Merwe, "Agricultural economics: a discipline in crisis?," Agrekon, vol. 62, no. 2, pp. 117–132, 2023.

[4] S. W. Zaidi, "BIBLIOMETRIC ANALYSIS OF GLOBAL RESEARCH FOCUS ON GREEN ECONOMICS...," Labu. Bull. Int. Bus. Financ., vol. 20, no. 2, pp. 34–48, 2022.

[5] R. E. Evenson and P. Pingali, Handbook of agricultural economics. Elsevier, 2009.

[6] G.-D. Stoica, "The Evolution of Agricultural Holdings–Bibliometric Analysis," in Proceedings of the International Conference on Business Excellence, 2023, pp. 581–589.

[7] M. K. Lazarides, I.-Z. Lazaridou, and N. Papanas, "Bibliometric analysis: Bridging informatics with science," Int. J. Low. Extrem. Wounds, p. 15347346231153538, 2023.

[8] F. I. Maulana, A. Pramono, M. Hamim, S. Y. Prihatin, and R. Arifuddin, "Scientometric analysis of artificial intelligence research in agriculture," in 2022 International Conference on Informatics, Multimedia, Cyber and Information System (ICIMCIS), IEEE, 2022, pp. 136–141.

[9] Q. Shen, D. Pongpatcharatorntep, and C. Kongjit, "Trends in Agricultural Industry Integration: A Systematic Literature Review bibliometric analysis," in Proceedings of the 4th International Conference on Management Science and Industrial Engineering, 2022, pp. 391–398.

[10] C. Tırınk, "Bibliometric Analysis for genome-wide association studies in animal science," Black Sea J. Agric., vol. 5, no. 3, pp. 234–239, 2022.

[11] Riaman, Sukono, S. Supian, and N. Ismail, "Mapping in the Topic of Mathematical Model in Paddy Agricultural Insurance Based on Bibliometric Analysis: A Systematic Review Approach," Computation, vol. 10, no. 4, p. 50, 2022.

[12] G. MĂNESCU, G. BÂRSAN, D. Badea, and D.-E. Ranf, "Applications Of Bibliometric Analysis In Management," in International Management Conference, 2022.

[13] C. Qinglou, Z. Wang, and Y. Shu, "Development Study of Agricultural Industrialization based on Bibliometrics," in 2022 7th International Conference on Financial Innovation and Economic Development (ICFIED 2022), Atlantis Press, 2022, pp. 1344–1348.

[14] P. Dogra, S. Gupta, and G. Kour, "Connecting the dots of entrepreneurial growth in agrarian economy: A bibliometric analysis," Focus J. Int. Bus., vol. 9, no. 2, pp. 117–135, 2022.

[15] M. Smith and Y. Sarabi, "'What do interlocks do' revisited–a bibliometric analysis," Manag. Res. Rev., vol. 44, no. 4, pp. 642–659, 2021.

[16] N. M. Jones and R. C. Silver, "This is not a drill: Anxiety on Twitter following the 2018 Hawaii false missile alert.," Am. Psychol., vol. 75, no. 5, p. 683, 2020.

[17] E. A. Brown et al., "Length of time on peritoneal dialysis and encapsulating peritoneal sclerosis—position paper for ISPD: 2017 update," Perit. Dial. Int., vol. 37, no. 4, pp. 362–374, 2017.

[18] C. Abraham and P. Sheeran, "The health belief model," Predict. Heal. Behav. Res. Pract. with Soc. Cogn. Model., vol. 2, pp. 30–55, 2015.

[19] K. N. Mishra, S. Kumar, and N. R. Patel, "Survey on Internet of Things and its Application in Agriculture," in Journal of Physics: Conference Series, IOP Publishing, 2021, p. 12025.

[20] M. Zhao et al., "Typical Microplastics in Field and Facility Agriculture Dynamically Affect Available Cd in Different Soil Types Through Physicochemical Dynamics of Carbon, Iron and Microbes," Iron Microbes.

[21] D. Mukherjee, W. M. Lim, S. Kumar, and N. Donthu, "Guidelines for advancing theory and practice through bibliometric research," J. Bus. Res., vol. 148, pp. 101–115, 2022.

[22] B. R. Beattie, C. R. Taylor, and M. J. Watts, "The economics of production," 1985.

[23] H. Teklewold, M. Kassie, and B. Shiferaw, "Adoption of multiple sustainable agricultural practices in rural Ethiopia," J. Agric. Econ., vol. 64, no. 3, pp. 597–623, 2013.

[24] N. E. Bockstael, "Modeling economics and ecology: the importance of a spatial perspective," Am. J. Agric. Econ., vol. 78, no. 5, pp. 1168–1180, 1996.

[25] G. C. Nelson et al., "Climate change effects on agriculture: Economic responses to biophysical shocks," Proc. Natl. Acad. Sci., vol. 111, no. 9, pp. 3274–3279, 2014.

[26] P. L. Fackler and B. K. Goodwin, "Spatial price analysis," Handb. Agric. Econ., vol. 1, pp. 971–1024, 2001.

[27] W. Verbeke, "Agriculture and the food industry in the information age," Eur. Rev. Agric. Econ., vol. 32, no. 3, pp. 347–368, 2005.

[28] H. P. Binswanger, "A cost function approach to the measurement of elasticities of factor demand and elasticities of substitution," Am. J. Agric. Econ., vol. 56, no. 2, pp. 377–386, 1974.

[29] B. Shiferaw and S. T. Holden, "Resource degradation and adoption of land conservation technologies in the Ethiopian

highlands: a case study in Andit Tid, North Shewa," Agric. Econ., vol. 18, no. 3, pp. 233–247, 1998.
[30] C. R. Doss, "Analyzing technology adoption using microstudies: limitations, challenges, and opportunities for improvement," Agric. Econ., vol. 34, no. 3, pp. 207–219, 2006.
[31] T. Reardon and C. B. Barrett, "Agroindustrialization, globalization, and international development: An overview of issues, patterns, and determinants," Agric. Econ., vol. 23, no. 3, pp. 195–205, 2000.

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