Original Article

The Trend of Agribusiness Research Worldwide: A Bibliometric Analysis Based on the Scopus Database

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ABSTRACT

Agribusiness involves the multifaceted interactions among activities related to the supply, distribution, and marketing of agricultural goods. As agricultural value chains have evolved, so have the many facets of agricultural value chain analysis, such as management and market dynamics. The current study investigates the growing trend of agribusiness and related issues worldwide, focusing on developing agribusiness in developing countries. The research integrates the latest agribusiness, rural entrepreneurship, and rural self-employment research with sophisticated bibliometric analysis, showing trends and contributions in these sectors. Leading sources include in Agribusiness research "World Development," "PLOS ONE," and "Journal of Rural Development." Across different countries, with the USA, India, China, Australia, the UK, Canada, South Africa, Spain, Germany, and Brazil being the top-producing countries. However, developing countries have lower average income from agricultural sectors, and Africa needs more private investment to promote agribusiness in modernizing agriculture and the financial system. Finally, agribusiness is vital for mitigating economic crises and alleviating food shortages. Agribusiness can contribute to a more sustainable and prosperous future by integrating women and micro-credit programs.

Introduction

Agribusiness encompasses the supply and distribution of agricultural products through various supply chains (Imbiri et al., 2021). The term "agribusiness" was coined by John H. Davis during his speech titled "Business Responsibility and the Market for Farm Products" at the Boston Conference in 1955. Davis defined *agribusiness* as "the sum of all farming operations, including manufacturing and distribution of farm commodities combining food and fibre" (Chen et al., 2022). While the early concept of agribusiness focused primarily on production and distribution, the modern definition has gradually expanded to include management and marketing aspects. For example, Ricketts & Ricketts (2009) defined agribusiness as "the manufacture and distribution of farm supplies to the production agriculturist and the storage, processing, marketing, transporting, and distributing of agricultural materials and

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consumer products that production agriculturalists produced."

From the above definition, we observed that the depth and breadth of the term agribusiness expanded, and the research on agribusiness is growing day by day. Hence, the current study is an endeavour to investigate the growing trend of agribusiness and related issues worldwide and to make policy implications for developing agribusiness in the context of developing country context.

Agribusiness is closely related to rural entrepreneurship, microcredit, and self-employment in a country. Rural entrepreneurship indicates entrepreneurial initiative in rural areas and encompasses all entrepreneurial activities (Zhang et al., 2024). On the other hand, microcredit is the small amount of credit provided to people for doing business in local and rural areas, sometimes without any collateral (Mahedi et al., 2024; Uddin et al., 2022). However, self-employment is related to any business activities initiated by individuals with or without help from formal economic institutions (banks and other financial institutions) or organizations. Different countries have different forms of self-employment related to agribusiness and entrepreneurship. For example, after reforming the Chinese economy in the 1970s, off-farm jobs and employment have rapidly increased, and this has raised the incomes and productivity of the Chinese economy (Huang, 2022). China has successfully transformed its economy from agricultural-based to industrial-based, and in this transformation, the off-farm sector plays a vital role. Considering the significance of the entrepreneurial field, it's somewhat unexpected that there needs to be more focus on the emergence of the self-employment sector in rural China. This sector pertains to individuals involved in operating non-agricultural businesses. Remarkably, it was the most rapidly expanding segment of off-farm employment between 1988 and 1995. During this period, the number of self-employed individuals in rural China rose from 25 to 52 million, constituting nearly 40% of all new off-farm jobs (Vos & Cattaneo, 2021). Post-1995, the self-employment sector maintained a substantial growth rate, although the pace of its expansion moderated somewhat compared to migration (Al-Maruf et al., 2022; Pervez et al., 2024).

There are two common trends in agribusiness research. The first common trend is the vertical and horizontal integration of the food chain, also called agribusiness economics, and another common trend is an alternative food chain and a food-related governance structure called agribusiness management. The first trend of research appeared in the 1980s when Agribusiness Journal appeared in 1985 with the help of agricultural economics professionals (Lu & De Vries, 2021). In this realm, agribusiness focuses on economic analysis and value creation, considering the food and agricultural supply chain's biological, political, and cultural aspects (Pervez et al., 2017). The second trend of agribusiness research appeared in the 1990s when the International Agribusiness Management Association was formed, led by Ray Goldberg, aimed to foster agribusiness research and develop interaction between agricultural managers or practitioners and academics. Considering the above context, the actual trend of agribusiness research and the future research direction are not clear. Therefore, the basic research question of the study is "What is the current trend of agribusiness research worldwide, and what should policymakers know regarding agribusiness to develop a framework for developing agricultural sectors of the country?" The authors follow a bibliometric analysis regarding agribusiness research trends to answer the research question.

There is a global decline in agricultural production and an increase in unprofitable investments in this sector. Consequently, adopting scientific methods in agricultural product development becomes imperative, as it can mitigate economic crises and alleviate food shortages (Ado et al., 2020). Agribusiness encompasses the majority of farmers and operates as a dynamic system (Islam et al., 2019). It provides a robust scientific foundation, offering farmers opportunities through applying economic principles in organizing and managing agricultural enterprises. Agribusiness management has recently shifted towards renewable resources and the biological field, addressing various environmental challenges and embracing a closed-loop or circular economy.

The circular economy (CE) has gained popularity among scholars and policymakers to promote sustainability, emphasizing natural

resource reduction, reuse, and recycling (Islam et al., 2013). The excessive exploitation of these resources has led to soil, water, and air pollution, hindering agricultural productivity (Wang, 2022). Additionally, agribusiness is closely linked to the agro-industrial complex, involving management and corporate ownership.

Agricultural management or agribusiness works in agri-economics, and researchers are advancing this sector by blending it with the "Strategic Management" area (Pervez et al., 2024). The field of agribusiness strategic management is progressing, and the main focal point of agribusiness strategic management is to find the solution to complexities that arise within farms operating in the agri-economics and find a solution to farm's existence in the business. For example, in the case of strategy, the basic question is "Why are there firms?". This fundamental question indicates the basic reasons for a farm's existence, and this gives guidelines for strategic actions to survive in agribusiness. Similarly, a farm's existence depends on creating values and sustaining differentiated or having a competitive advantage in the market (Islam et al., 2020).

Agricultural production and food chains generally go with capital-intensive farming and need technological efficiency and logistical support from colossal production. This uncontrolled production negatively impacts the environment, and the social-political debate is growing because of climate change and environmental issues (Adnan et al., 2024).

An essential area of Agribusiness is the value chain and creating value for agricultural products. For producing final products, value-adding activities, including biological processes and market operations, need to be done. The value chain concept is dynamic, and it is regularly changing and closely related to strategic management. For example, a value chain can be done at the organizational unit or product level, which measures input-output ratios, defines the product's functional unit, and describes input-output flows. Value-chain orientation has five categories: market, relational, modular, captive, and hierarchical. Analyzing different value-chain concepts, Caly & Feeney (2019) identified the following characteristics:

- Value-chain embraces input-output activities.

- It includes both horizontal and vertical integration.

- It allocates final products to consumers, both problems and opportunities shared by value-agents value-chain power relations.

Agribusiness has different contributions to different nationalities. For example, in Brazil, agribusiness contributed 19.77% of the GDP in 2011, and it is a major contributor in generating employment and foreign exchange, with national jobs of 29.39% (Sun et al., 2025). Developing countries have lower average income from agricultural sectors. It is also true of Brazil, and it is found that the average income from agribusiness is lower than the other sectors, although it is the biggest contributor to foreign exchange. However, in the case of Africa, there is a fast growth trend in agribusiness observed in the last 40 years in terms of productivity and spatial development (Kumar et al., 2022). In Africa, private sectors are doing better in agribusiness than government initiatives, and Africa needs more private investment to promote agribusiness in modernizing agriculture and the financial system. In Kenya, the private sector has emerged in agribusiness since the 1990s, increasing 500 fertilizer wholesalers and 7,000 retailers, adding supply chains, and increasing competition among farmers in the fertilizer market (Jiang et al., 2022). Similarly, in Zambia, the small farmers in cotton production increased their production by almost double because of growing demand.

Agricultural production and innovation are also increasing in Asia. For example, in India, maize, wheat, and rice cultivation increased almost doubled from 1990 to 2010, while cotton production improved almost threefold (Shahzad et al., 2021). Private sector investment and research in agribusiness in India are also increasing similarly. For instance, private sector investment was US$54 million in 1994/95 and increased to US$250 million in 2008/09, and in the same era, the biotechnological industry and research and development (R&D) also increased ten times. In an investigation of pulse-based sustainable models, Kumar et al. (2019) found that participatory farming increases pulse production in India. However, it is opined that the agricultural public investment and expenditure in India have developed gradually in the last 60 years was, not as remarkable as the other sectors

(Pradhan et al., 2023). In the case of Malaysia, although poverty reduced from 59% to 19.3% from 1970 to 1990, poverty among the farmers remains obdurate at a large scale. One of the most common aspects of agribusiness is the involvement of women and micro-credit programs. In a study, Ahmed et al. (2011) found that women in Bangladesh were involved in microcredit programs, and this involvement improved their socio-economic condition and generated more income for rural women.

The current research is important for several reasons. First of all, the study integrates the latest research on agribusiness, rural entrepreneurship, and rural self-employment with sophisticated bibliometric analysis, which shows the research trends and contributions in these sectors. This study provides a good understanding of the fields and offers a good research direction. Secondly, the research also investigates the gaps in the current trend in agribusiness research and related fields, which need to be streamlined for better policy implications. Finally, the study will provide good insights regarding agribusiness and related research fields.

Research Methodology

Researchers have used thorough scientific mapping approaches. Biblioshiny is a distinctive open-source R package with user-friendly web applications (Haque et al., 2023). It is one of several statistical and graphical techniques that are accessible. The bibliometric analysis utilized in this work uses the bibliometrics package, which comes with R. VOS viewer is a complex visualization tool used to build and visualize bibliometric networks. When establishing a "net" object in the R Programming Environment, the VOS viewer employs built-in R techniques (Kabir et al., 2024). We utilized the Scopus database for this investigation, which spanned 2013 through 2023. The Scopus is a well-known and respected source of bibliographic data among scientists. In the first step, we gathered 3005 papers using the topic keywords "rural" or "Agriculture*" AND "agribusiness" OR "entrepreneur*" OR "firm" OR "self-employment". For the bibliometric study, each publication's record and references are exported, leaving 2916 articles after duplicates have been removed. The search was conducted on July 26, 2023. After getting raw data, the data cleaning and analysis was conducted from August to December 2023. Figure 1 shows the detailed research process, which consists of five parts.

Results and Discussion

Description of the data

The bibliometric information of interest can be seen in Table 1, showing academic papers regarding agricultural or rural entrepreneurship. The data covers the years 1947 to 2023 and was compiled from 2916 papers that were published in 1717 journals, books, and other publications. This corpus has an average yearly growth rate of 6.66% which shows a gradual rise in publications over time. The average age of the papers is 11.5 years, indicating a mix of more current and older information. Each work receives an average of 16.88 citations, indicating high importance among academics. A total of 101,235 sources are cited in the texts. The papers' 7937 Keywords Plus and 5918 Author's Keywords' highlight the various themes addressed in their content. Eight thousand one hundred eighty-nine people contributed to the writing, and 730 wrote single-authored pieces. Collaboration is expected since there are 3.13 co-authors on average for each document. A global viewpoint is evident from the 18.76% of international partnerships. The materials include a range of formats, demonstrating the diversity of academic contributions in this area. These include articles, monographs, book chapters, conference papers, and reviews.

Influential Publications

A summary of academic papers and their bibliometric metrics are presented in Figure 2. The table lists the papers' names and the years they were published. The total number of citations (Total Citations) and the average number of citations per year (TC per Year), the average number of sources the article has received yearly since its publication, is provided for each work. In addition, the normalized total citations (Normalized TC), which represent the number of sources an article receives annually after adjusting for the average number of citations per paper in the dataset, are supplied. This table offers insightful information on the influence and effect of these articles over time within their respective disciplines, showing those with consistently high levels of citations and impact in comparison to the average.
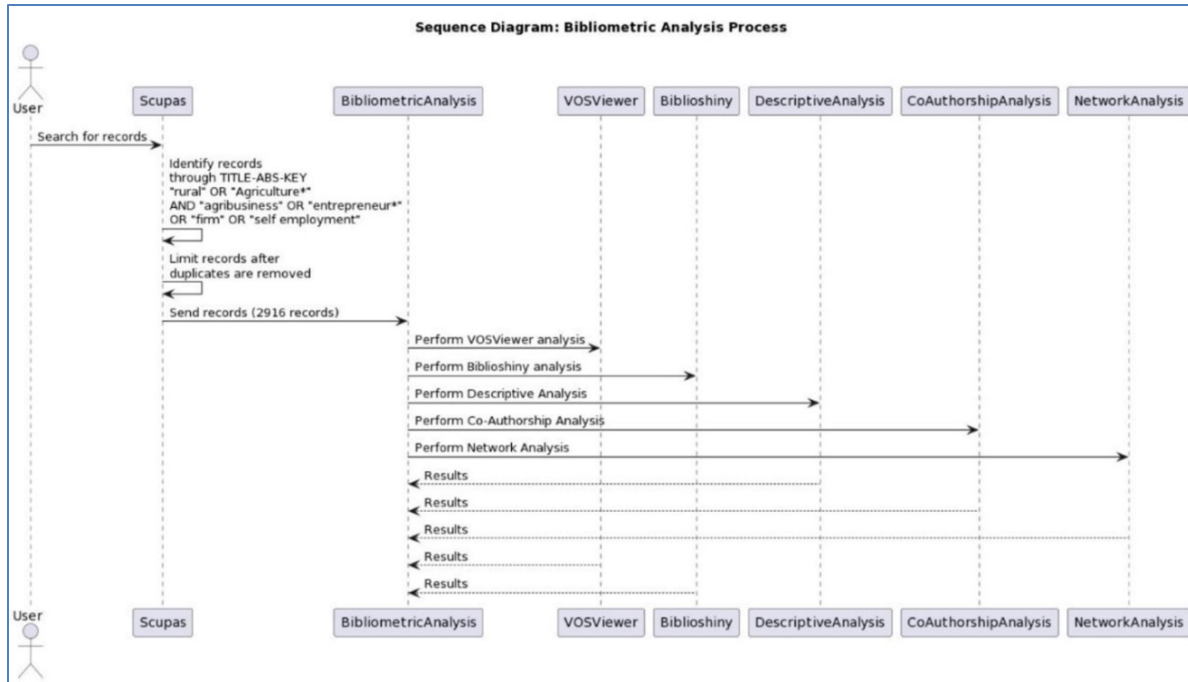
Fig. 1. Research Methodologies of the Study. Source: Original material for the study

Table 1. Descriptive Statistics for The Dataset

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1947:2023
Sources (Journals, Books, etc.)	1717
Documents	2916
Annual Growth Rate %	6.66
Document Average Age	11.5
Average citations per doc	16.88
References	101235
DOCUMENT CONTENTS	
Keywords Plus (ID)	7937
Author's Keywords (DE)	5918
AUTHORS	
Authors	8189
Authors of single-authored docs	730
AUTHORS COLLABORATION	
Single-authored docs	767
Co-Authors per Doc	3.13

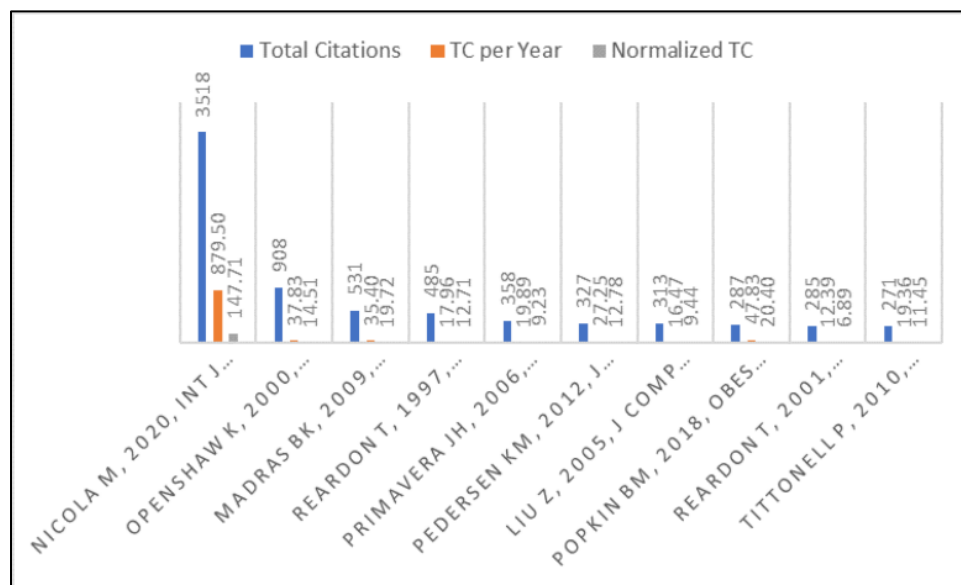|	
International co-authorships %	18.76
DOCUMENT TYPES	
article	2433
book	20
book chapter	194
conference paper	126
conference review	3
editorial	5
erratum	4
letter	3
note	3
review	122
short survey	3

Fig. 2. Top 10 Articles in Terms of Citations

Influential journals

As a bibliometric summary of academic journal publications, Figure 3 (a) displays a list of sources and the number of articles they contain. The sources are diverse and span different disciplines, including development studies, economics, labor, environment, and public health. The data suggests that "World Development,"
"PLOS ONE," and "Journal of Rural Development" are among the leading sources with higher numbers of articles, indicating their significant contribution to the field. This table helps assess the distribution of scholarly output across different journals, identifying prominent publishing venues, and understanding the diversity of research areas covered within the dataset.
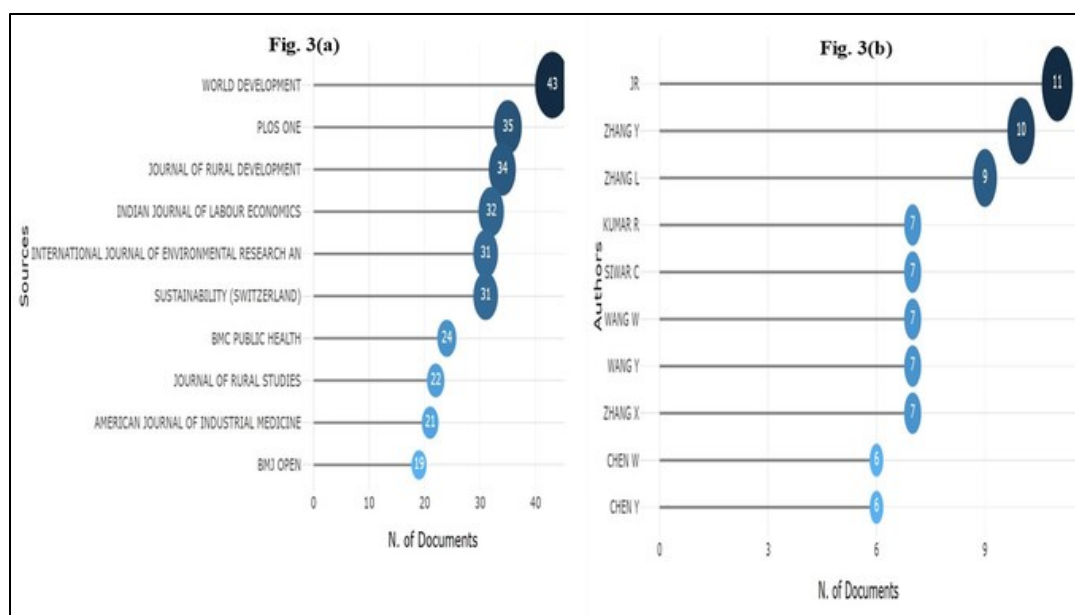
Fig. 3. (a) Top Ten Journals in terms of production of agribusiness issues, (b) Top Ten Authors in Agribusiness

Author's Outputs

The authorship statistics of scholarly articles are useful for bibliometric analysis, as shown in Figure 3 (b). Each row corresponds to an author and contains relevant information. Authors are ranked by their article counts, with "JR" having the highest count of 11 articles, followed by "ZHANG Y" with 10 articles.

Corresponding Authors' Countries

A thorough overview of scholarly article production in various nations is shown in Figure 4, which is a useful tool for bibliometric analysis. The "SCP" (Single Country Publications) column represents the number of articles authors from the respective country solely author. The "MCP" (Multiple Country Publications) column counts articles co-authored by authors from multiple countries, demonstrating international collaboration. The "Freq" column denotes the proportion of articles authored by authors from the given country concerning the total articles in the dataset. Notably, the "MCP_Ratio" column presents the ratio of multiple country publications

to the total articles attributed to the respective country, revealing the extent of international collaborative efforts. For instance, the row corresponding to the USA indicates that out of the 359 articles, 71 are multiple-country publications, accounting for 19.8% of their total output.

Scientific production by countries

The summary of the region-wise distribution of scholarly articles is presented using Figure 5 which can introduce some bibliometric discipline insights. The top-producing countries are the USA, India, China, Australia, the UK, Canada, South Africa, Spain, Germany, and Brazil. This data allows for a quick assessment of the concentration of scholarly output within each region, with the USA having the highest count of 1884 articles, followed by India with 908 pieces and China with 807 papers. The table highlights the contributions of different regions to the scholarly literature, aiding in understanding research productivity and areas of focus across diverse geographical regions.
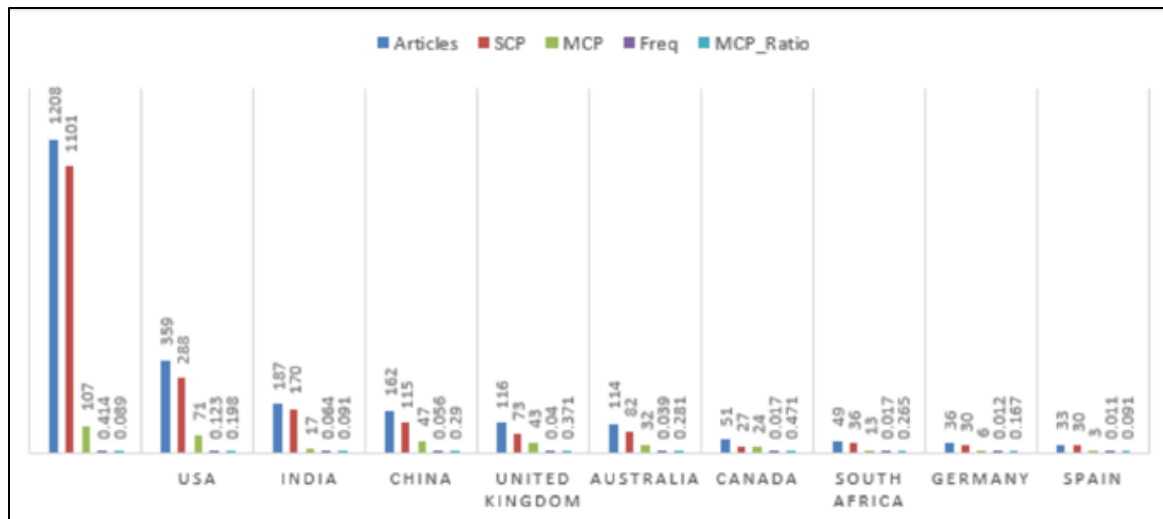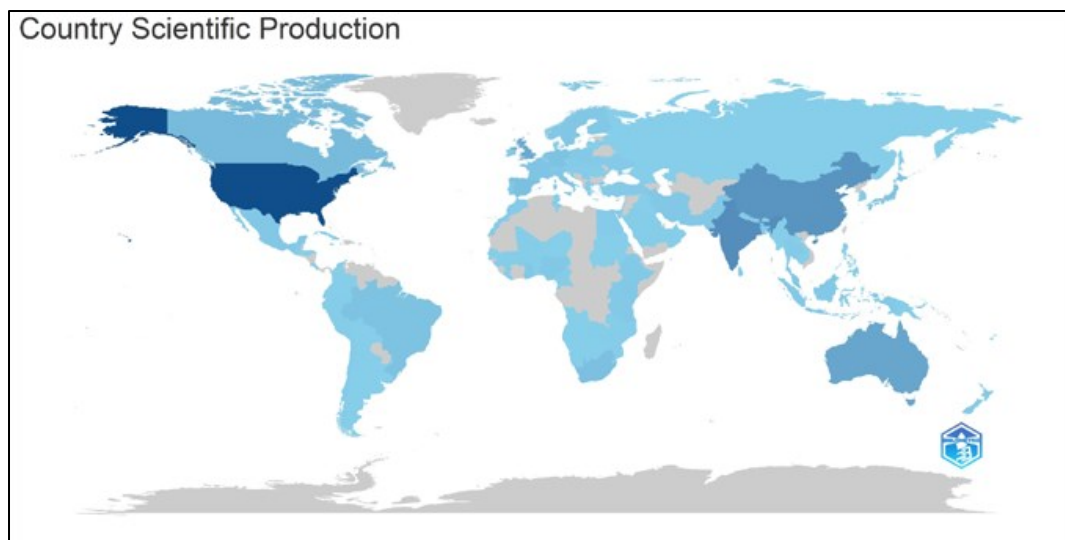
Fig. 4. Corresponding author's country

Fig. 5. Country-specific Scientific Production in Agribusiness

Most cited countries

Academic articles are bibliometrically analyzed in Figure 6 according to their citation impact in various nations. The authors cited the USA, United Kingdom, Australia, China, Netherlands, India, Canada, Germany, Denmark, and Sweden. The "TC" column represents the total citations received by articles from each country within the analyzed dataset. The "Average Article Citations" column indicates the average number of sources articles from each country have garnered. The United Kingdom stands out with a relatively high average of 55.40 citations per article, while India has a lower standard of 5.30 citations per article

Country Collaboration

The analysis of the scholarly articles in terms of international collaboration as depicted in Figure 7 is immensely useful for bibliometric analysis. For instance, there were five collaborations between Australia and Canada, indicating joint research efforts. Similarly, there were three collaborations between Australia, Denmark, and Australia and Germany. It helps identify countries that often collaborate, revealing the global nature of

research and fostering an understanding of   collaborative networks in the academic world.
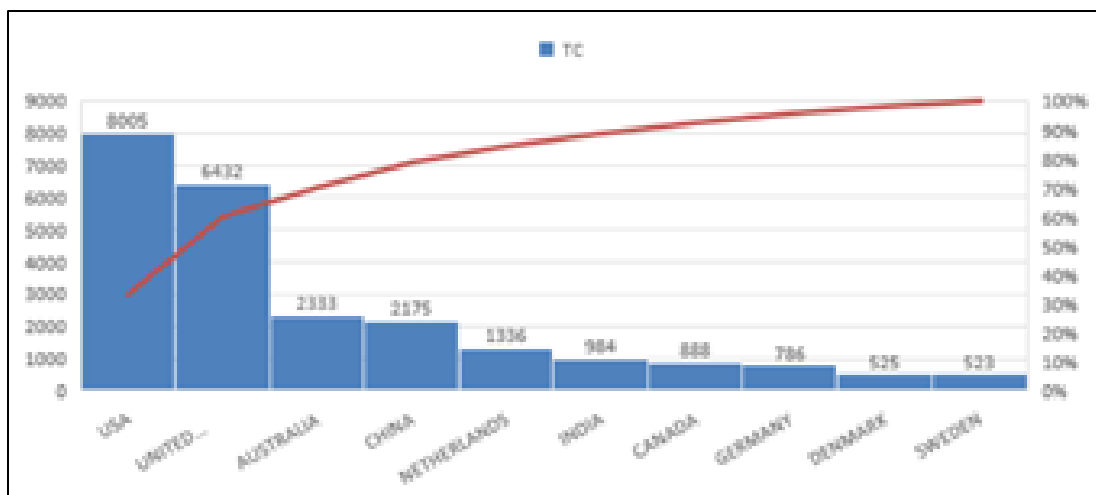

Fig. 6. Top Ten Countries in Citations: total citation vs. average citation
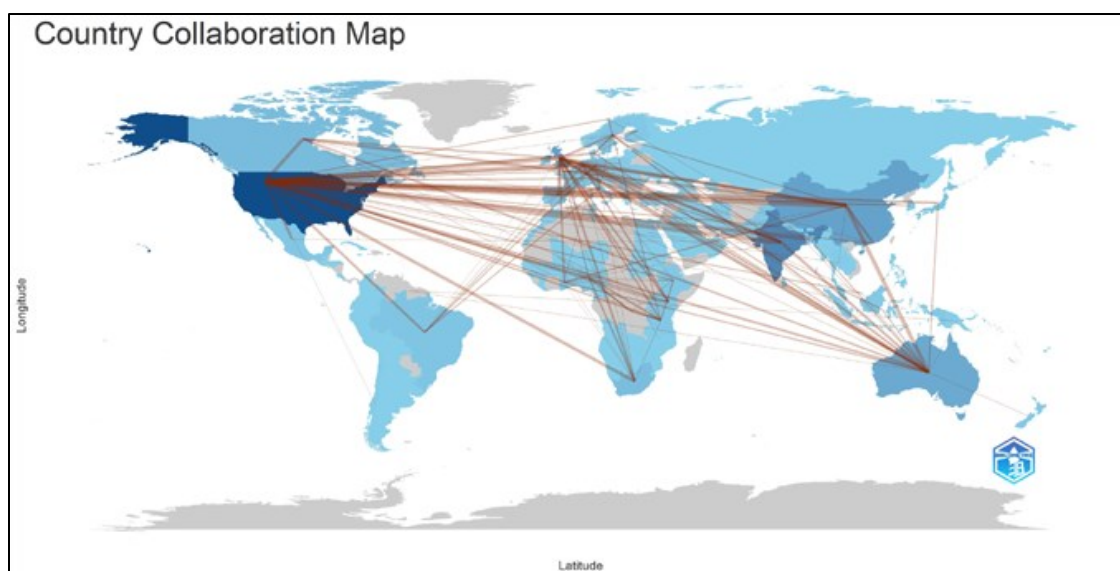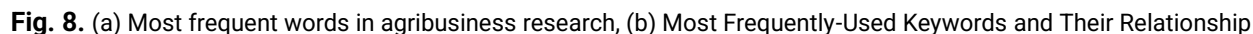

Fig. 7. Inter-country Collaboration in Research

Network analysis and trend word analysis

Co-Occurrence Network

As a basis for bibliometric analysis, Figure 8 (a) presents a snapshot of frequently occurring terms in scholarly articles. The "Words" column lists various key terms, including "female," "male," "adult," "employment," "human," "article," "humans," "middle-aged," "rural population," and "aged."

Notably, terms like "female," "male," and "adult" indicate a focus on gender and age-related discussions, while "employment" signifies attention to labor-related matters. The "rural population" appearance suggests an interest in rural demographic studies. Such analysis can assist researchers in understanding the thematic landscape of the field, identifying dominant topics, and providing a foundation for further investigation and literature review.

Fig. 8. (a) Most frequent words in agribusiness research, (b) Most Frequently-Used Keywords and Their Relationship

Most Frequently-Used Keywords and Their Relationship

The provided Figure 8 (b) offers a bibliometric analysis of frequently used keywords within scholarly articles, presenting key terms and associated metrics for research. The "keyword" column lists various terms that hold significance in the analyzed academic literature, such as "human," "article," "employment," "female," "humans," "adult," "male," "rural area," and "rural population. This table assists researchers in identifying the predominant themes and topics within the field, as indicated by the high occurrence of terms like "employment," "rural area," and "rural population." This analysis aids in understanding the focal points of research, the trends shaping scholarly discourse, and the network of ideas within the analyzed corpus.

Changes In Keywords' Frequency of Use over Time

A bibliometric examination of the frequency of particular keywords in academic publications over time is demonstrated in Figure 9. Each row represents a year, and the columns correspond to keywords that are frequently mentioned in the articles. The keywords include "FEMALE," "MALE," "ADULT," "EMPLOYMENT," "HUMAN," "ARTICLE," "HUMANS," "MIDDLE AGED," "RURAL POPULATION," and "AGED." The numerical values in each cell indicate the frequency of occurrences

of the respective keyword within articles published in that year. The table depicts trends in using these keywords over time, allowing for the observation of patterns and changes in focus within the scholarly literature. For instance, there seems to be an increasing trend in the occurrences of keywords like "FEMALE," "MALE," "ADULT," and "EMPLOYMENT" from 2000 to 2023. This table is valuable for tracking the evolution of research themes and topics in the field over the years, shedding light on the shifting emphases and interests within the scholarly discourse.

Fig. 9. Top keywords and their uses over time

Trending Topics

As a window into research trends across time, Figure 10 presents a bibliometric study of frequently recurring items and their distribution over years. The "item" column lists various terms and phrases, including "article," "india," "education," "employment," "adolescent," "self-employment," "social support," "social status," and

more, which are often encountered in scholarly articles. Figure 10 enables the observation of trends and shifts in
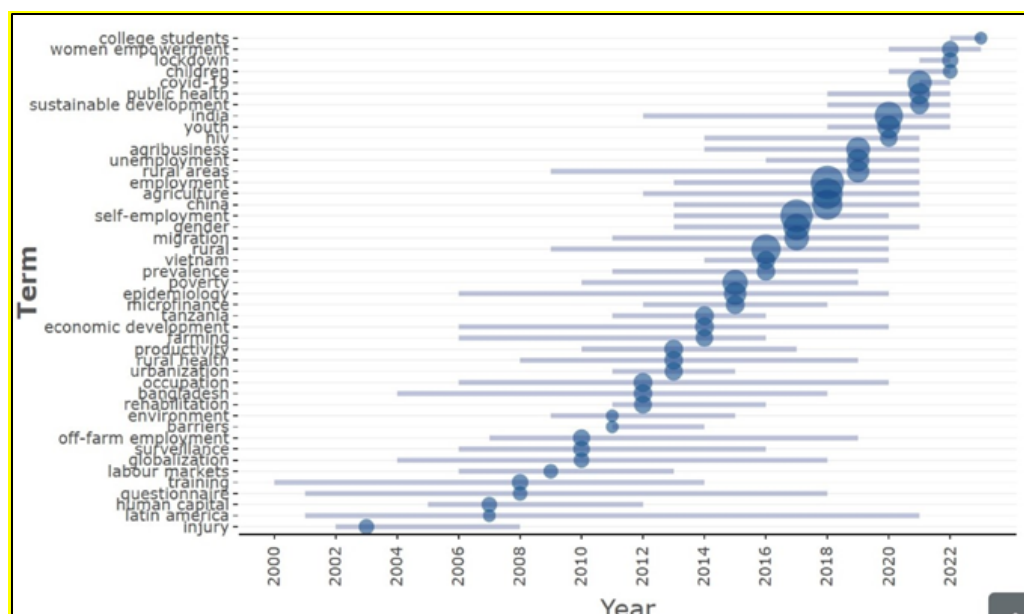

Fig. 10. Trend topics over time and their frequencies over time

research interests within the academic literature. For example, terms like "COVID-19," "pandemic," and "coronavirus disease 2019" gained prominence in 2021 and 2022, reflecting the impact of global events on research topics. Additionally, the figure can guide researchers in understanding the evolution of key concepts and themes within the field over the years, serving as a valuable resource for literature analysis and trend identification.

Conclusion

This study provides a broad analysis of the current state of research on agribusiness, rural entrepreneurship, self-employment, and such major areas by revealing the emerging topics and the trajectory of research evolution. Additionally, combining the bibliometric analysis with the literature review part suggests that leading journals, such as World Development, PLOS One, Journal of Rural Development and the Indian Journal of Labor Economics play important roles in these domains. Between countries, the study outlines the predominance of the USA, India, and China, suggesting that these nations lead much of the academic activity in agribusiness. Top researchers (JR, Zhang Y, Kumar R) are noted as first among equals.

The examination shows that agri-marketing, management, and its tools have become a trendy research area along with the inclusion of modern technologies such as artificial intelligence in this field, top of the line following the proceedings of this study, these trends point to the development of science and ideas of many researchers. Implications such as these suggest the importance of researchers and policy makers alike accounting for these changing dynamics when considering future research agendas and policy solutions. Policymakers can then create policies for agribusiness and rural entrepreneurship that facilitate sustainable development and economic growth by aligning policies with these trends.

Insights gleaned from this study will guide us in devising research and programmatic directions that keep pace with the rapidly evolving world of agribusiness and the farming sector in the rural areas. With the rise of technology, particularly in the field of artificial intelligence and strategic management, playing a crucial role in shaping the future landscape of these domains, it becomes

imperative for both researchers and policymakers to pave the way towards innovation by keeping sustainable practice at the forefront of agriculture and rural entrepreneurship policy-making. Staying in touch with such new developments will allow policymakers to stipulated interventions that concert those real challenges within the sector, and thus, can actively work toward unlocking potential economic growth and rural poverty alleviation.

Authors' contributions

Conceptualization, AKMKP and MSK; Methodology, MSU and AKMKP; Investigation, MSK and AKMKP; Data collection and analysis, MSK, MM and AKMKP; Draft preparation, MSK, AKMKP and MM; Review and editing, MSU and MM. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interests.

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