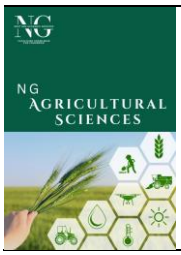

NG Agricultural Sciences

ISSN (Online): 3107-5053

Volume 1, Issue 4 (Oct-Dec), 2025, (50-59)

Review Article

Open Access

The Role of Social Media in Shaping Contemporary Research in Aquaculture and Agriculture: A Biblimetric Review

Sai Kumar Periginji, Peddi Naga Harsha Vardhan*, Vaishnavi Pulletikurthi, Sutej R. Kulkarni

Department of Agricultural Extension Education, M. S. Swaminathan School of Agriculture, Centurion University of Technology & Management, Odisha 761211, India

*Corresponding author email ID: peddi.harsha@cutm.ac.in

ARTICLE INFO

Article History:
Received: 03 October 2025
Revised: 14 December 2025
Accepted: 25 December 2025
Published: 30 December 2025

Keywords:
Agriculture
Bibiloshiny
Decision Making
Productivity
Social Media
VOSviewer

ABSTRACT

The intersection of social media and agriculture is making positive changes in the dynamic of agricultural practices, particularly in the increasing communication and collaboration between farmers, researchers and policymakers. This study goes deeper into how digital technologies such as artificial intelligence (AI), machine learning (ML) and robotics have been integrated with social media platform to foster innovation, precision farming and sustainability practices. The research methodology developed based on the bibliometric perspective to analyse scholarly publications from 2016 to 2025 to find out the key research trends, collaboration patterns and technological advancements in the field. With a data set of 3445 articles, the study employs various tools, like VOSviewer and Biblioshiny, to visualize the research output around the world, research theme trends and co-authorship networks. The findings show the growing importance of AI in agriculture, precision agriculture and sustainability in the field of research. However, there are still challenges in terms of providing equal access to information, especially in developing regions. The research has shown that social media plays a major role in enhancing decision-making processes and acceleration of technological adoption in agriculture. Furthermore, it underscores the increasing importance of cross-border partnerships and the need for international research collaboration to address new challenges in the field of agriculture.

1. INTRODUCTION

The integration of social media in agriculture has had dramatic changes in the way of communication and knowledge sharing between farmers, researchers, and policymakers (Priya et al., 2022). As digital technologies such as artificial intelligence (AI), machine learning (ML) and robotics have made changes in the agricultural practices, social media platforms have emerged as the critical centre of sharing information and collaborative efforts (Prusty et al., 2025). This intersection of social media and agriculture has made it possible for stakeholders to share knowledge, improve decision-making processes, and support innovation in precision farming and sustainable agricultural practices (Pulletikurthi et al., 2025; Vardhan et al., 2025).

The role of social media in agriculture is especially, in relation to exchange of real-time information like weather forecasts, crop management practices, pest control measures, and market trends (Mounika et al., 2025; Peddi et al., 2025). Farmers can also have access to timely updates, which can improve their productivity and decision-making capacity (Mounika et al., 2025). Additionally, researchers and

https://doi.org/10.66132/ngas010405

institutions have leveraged social media to collaborate on cross-border research projects to foster technological innovations in the agricultural sector (Periginji, 2025; Saha et al., 2025). The continuous digital transformation in agriculture such as the emergence of smart farming and decision-making based on data is being expedited with the use of social media as it becomes a platform for the dissemination of technological solutions and the creation of global collaborations (Yadav et al. 2023).

The growing role of social media in agriculture also comes as a challenge, including access to information in developing areas as well as the quality and reliability of information shared (Prusty et al., 2021). This research probes these challenges and aims to provide an in-depth analysis of the trends, thematic focus and collaborative patterns of the field, while a special attention is paid to the role of social media in the development of agricultural technologies (Pradhan et al., 2024). Through the application of a bibliometric analysis this paper investigates the research output of the world, which includes the identification of key technological innovations and the nature of the changing role of social media in agriculture between 2016 and 2025.

2. METHODOLOGY

In order to study the new intersection that has emerged between social media and agriculture, a bibliometric method was used to analyze scholarly publications in relation to this area. The data for this analysis was obtained from academic databases and comprise research articles published between 2016 and 2025. The main tools for the bibliometric analysis were VOSviewer and Biblioshiny, which offer powerful methods to visualize and understand the trends in publications, co-authorship networks, citation patterns and keyword associations (Periginji et al., 2025).

The total data set comprises of 3445 articles, where publications were found in the years 2016 to 2025. The document types that are covered in this dataset include a broad range of sources as well - 1474 records represent conference papers, book chapters, reviews, conference reviews, books and data papers. Notably, the analysis focuses on English language articles, which make up 1,352 publications in the dataset, securing that the research is based on the most widely accessible body of academic work (Kondo & Diwani, 2023).

The research design of this study adopts the approach of the bibliometric analysis to study the evolution of the academic research work at the interface of social media and the agriculture. This approach is selected because it is able to quantitatively and qualitatively analyse trends in publication, collaboration networks and thematic interests over a given period. The primary focus is to find out the impact of social media and other digital tools, including artificial intelligence (AI), machine learning (ML), and robotics on research in agriculture between 2016 and 2025. This study is structured to provide insights into the growing role of social media in practices in agriculture development by addressing important research themes, global patterns of collaboration and institutional impact in this emerging field.

(TITLE-ABS-KEY(Social Media) AND TITLE-ABS-KEY(Agriculture) OR TITLE-ABS-KEY(Fishery) OR TITLE-ABS-KEY(Aquaculture) OR TITLE-ABS-KEY (Inland Aquaculture)) AND (LIMIT-TO(DOCTYPE,"ar")) AND (LIMIT-TO(LANGUAGE, "English")) AND PUBYEAR > 2016 AND PUBYEAR < 2025.

The data for this bibliometric study were collected from two major academic databases, Scopus, which is known for their complete and quality academic content. These databases were particularly selected since of the extensive coverage of peer reviewed journals, conference proceedings and academic books. The search was limited to publications within the years 2016 to 2025 as this was to ensure the analysis reflects on recent trends and developments in the field. The research received a lot of attention to articles that were related to the integration of social media in the agriculture sector, including the applications of precision farming, the use of AI, sustainability and technological innovations. The search process brought up a total of 20167 publications from 3445 articles, including a subset of 1474 conference papers, book chapters, reviews and data papers, which were included in the final dataset. Only publications in English were considered since they represent the highest part of available, internationally diffused research in this area (Suman et al., 2025).

The process of cleaning and preparing data was essential in ensuring that the dataset was accurate and consistent. The initial dataset contained some inconsistencies such as duplicate entries, missing or incomplete information about authors and documents that did not match the specific criteria. These issues were addressed by removing any duplicates and irrelevant types of documents such as non-peer-reviewed articles, blog posts, and other non-scholarly publications. In addition, documents were filtered by language to include only documents written in

English as English is the dominant academic language of this field. Author names have been standardized to ensure consistency of attribution and only relevant document types have been retained, for example journal articles, conference papers and book chapters. This resulted in a better and more complete dataset that can be used for in-depth bibliometric analysis. 3445 articles satisfied the inclusion criteria for all.

For the analysis of the bibliometric data, two main tools were used: - VOSviewer and Biblioshiny VOSviewer was used for its capability to visualize and analyze bibliometric networks in particular keyword co-occurrence and author co-authorship networks and country-based collaboration. VOSviewer is particularly helpful in developing visual findings from research themes and identifying clusters of related keywords and in exploring the relationships between different entities in the research. On the other hand, Biblioshiny which is an extension of the Bibliometrix, R package was used for deeper statistical analysis such as citation analysis, bibliometric coupling and study of collaboration networks at the level of institution and countries. These tools provided complementary information about the publication trends, research impacts and global collaboration patterns in the field of social media and agriculture.

Visualization played an important role on the presentation of this bibliometric analysis results, figures from (1 to 7). The visual outputs created using VOSviewer and Biblioshiny helped to simplify complicated relationships within the data to allow for more clear lessons of the research landscape. The following types of visualization were made: keyword co-occurrence maps, co-authorship networks, country collaboration maps, citation networks, and plot of three fields. Keyword co-occurrence maps were used to identify the main themes and emerging trends in the research and co-authorship networks were used to identify the collaborative efforts of authors and institutions. Country collaboration maps were used to illustrate distribution of research output across the world as well as collaboration on a cross-border basis. Citation networks showed the most influential authors and institutions in the field while three-field plots linked authors, keywords and publication sources to reveal the links between prolific researchers and their research outputs. These visualizations played an important role in the interpretation of the bibliometric data and display of the results in an accessible and comprehensible form.

The method of data analysis has taken into consideration the methods of descriptive and network analysis in order to provide the holistic knowledge of the research trends. The first process we used was publication trends over the years to determine the overall increase in research output between 2016 and 2025, which show the growth in interest on the intersection of social media and agriculture. Descriptive statistics was used to analyse the distribution of document types and language characteristics, in particular the proportion of English language publications and representation of different type of documents, for example journal articles and conference papers. In addition to this, network analysis techniques were used to investigate the co-occurrence of keywords, author collaboration and institutional partnership. The keyword co-occurrence analysis helped to identify the most researched topics, for example, AI in agriculture and in sustainability. Co-authorship and bibliometric coupling network were produced to analyse the intensity of global collaborations between researchers, institutions and countries. Finally, the analysis of citations was conducted, in order to determine the impact of the publications, identifying the most influential works, authors and organizations in the field. This comprehensive approach allowed for an in-depth exploration of the bibliometric data and provided valuable insights into the changing research landscape at the intersection of social media and agriculture.

3. RESULTS

The bibliometric analysis of research publications was performed to analyse the global research trends, collaboration network and thematic research in the chosen field. The results shows the growth of research domain which reflects the growing interest in the area of integration of advanced technology such as artificial intelligence, robotics and precision agriculture. Wide scholarly participation was also indicated by a total of 108 countries, 8481 author keywords and 1891 organizations identified. The analysis highlights the fact that a few developed countries are responsible for the majority of publication output and international collaboration while developing countries are emerging contributors. The co-authorship and co-occurrence networks show close relationships between research institutions and countries, which reflect multidisciplinary and collaborative development.

The author keyword analysis showed eight major clusters of keywords, focusing on keywords such as precision agriculture, machine learning, AI, remote sensing, and sustainability, suggesting a clear focus on technological innovation and resource management. The bibliometric coupling of countries and organizations indicated significant relationships, which may indicate that research communities have a common base of references and academic influences.

Institutions from technologically advanced countries had higher citation and co-authorship frequencies, which confirmed their influence and leadership in the field. Overall, the results show that scientific production in this field is both extensive and dynamic, with growing collaboration networks and a growing thematic diversity.

Figure 1 depicts the network of co-authorship relationships between countries in the world that have contributed to research in the chosen domain. A total of 108 countries were identified out of which 56 countries achieved the collaboration threshold i.e. countries with at least one internationally co-authored publication. Each node represents a country and the size of the node reflects the number of publications coming from each country, while the connecting lines (links) represent collaborative strength. The United States, China, and India stand out as the largest and most interconnected nodes, indicating their primacy in terms of research output and the intensity of their collaboration. European countries are a dense secondary cluster that shows close academic cooperation. The visual pattern shows a high degree of globalization in scientific production which is still concentrated in developed regions, while developing nations are emerging participants in the collaborative network. This figure therefore illustrates the role of international partnerships in knowledge creation and diffusion in technology-based agricultural research. network. This figure thus indicates the role of international partnerships in knowledge creation and diffusion in technology-based agricultural research.

The co-occurrence map of author-supplied keywords from the bibliographic information is shown in Figure 2. In all, 8,481 keywords were identified, of which 562 met the frequency criteria at least five times throughout the database. The network groups together the keywords that appear together frequently to form thematic groups referring to the intellectual structure of the field. Prominent terms are artificial intelligence, machine learning, precision agriculture, robotics, automation and sustainability. The size of each node represents keyword frequency, while color-coded clusters represent different sub-themes -- such as technological innovation, smart farming systems and environmental management. The close association between these keywords implies that the research arena has moved to the incorporation of advanced digital technologies in the agricultural sector. This figure shows the evolution of the research priorities and the multidisciplinary nature of the field.

The figure 3 is a visualization of relationships between indexed keywords assigned by scientific databases such as Scopus or Web of Science. Out of the 5487 indexed keywords, 66 satisfied the inclusion criteria with at least twenty occurrences. The resulting map identifies the conceptual connections between terms that occur together in several papers. Central clusters usually contain keywords such as precision agriculture, IoT, remote sensing, crop monitoring, and data analytics. The high level of interconnection between agricultural sciences and computing technologies is indicated by the density of the network surrounding these terms. The figure shows that the research on artificial intelligence in agriculture is growing in new directions such as decision-support systems, environmental sensing and sustainable resource management. So it can be seen in Figure 3 that the meeting of many scientific disciplines in the field.

The institutional citation network is depicted in Figure 4 and shows the organizations that have created the most influential and cited research. A total of 1,891 organizations were detected and 52 were at the threshold for citations. Each node represents an organization, and the size of the node corresponds to the sum of citations received by that organization; the thickness of the lines indicates the inter-organizational citation linkages. Well-known universities and research institutes of the technologically advanced nations dominate the visualization, and form the central cluster. These include agricultural universities, AI research centers, and national laboratories providing contributions to digital and precision agriculture. The figure shows that research impact is focused in a small number of high-performing institutions, highlighting inequalities in research visibility and resource allocation across the world.

The Figure 5 depicts the degree of similarity among the research orientation of various organizations, as evidenced by the extent of their share of reference patterns. When two institutions tend to cite the same papers, those institutions are said to be "coupled." Of the 1,891 organizations analyzed, 52 were included in the minimum citation-link analysis. The map reveals that universities with robust engineering and agricultural programs cluster together, indicating overlapping interests in the areas of AI and robotics and sustainable farming technologies. High coupling strength between institutions represents intellectual alignment and possible collaboration channels. The figure shows that leading organizations often have a common base of underlying literature, leading to the diffusion of ideas across disciplines.

Figure 6 shows country level bibliometric coupling, which highlights how countries are linked according to shared citation behaviour. Out of the

countries that participated in the process, a total of 56 countries cleared the threshold for inclusion from 108 countries that participated. Countries located near each other in the map have similar reference patterns and frequently work on similar topics. The visualization shows that groups of countries, for instance, in Europe and Asia have strong intellectual connections because they have joint projects or research initiatives in the region. The United States, China, India and European countries form the core, which is both high productivity and similarity in cited literature. This pattern highlights the fact that research agendas are inter-connected around the globe but nevertheless subject to the influence of geographic and economic alliances.

The final figure, the three-field plot, bridges three very important dimensions of the bibliometric landscape -- authors, keywords and publication sources (journals). The left column lists prolific authors, the middle lists frequently used keywords and the right lists the journals in which those authors most frequently publish. The width of the connecting lines is related to the strength of the relationship between the fields. This visualization highlights very well which authors are focusing on specific themes and where they are distributing their research. For example, prominent players on the topic of precision agriculture or AI for farming could regularly publish in journals like Computers and Electronics in Agriculture or with the journal publication platform, the Open Access journal, Access. The figure serves not only to indicate the concentration of research in some publication venues but also the dominance of some authors in establishing thematic orientation.

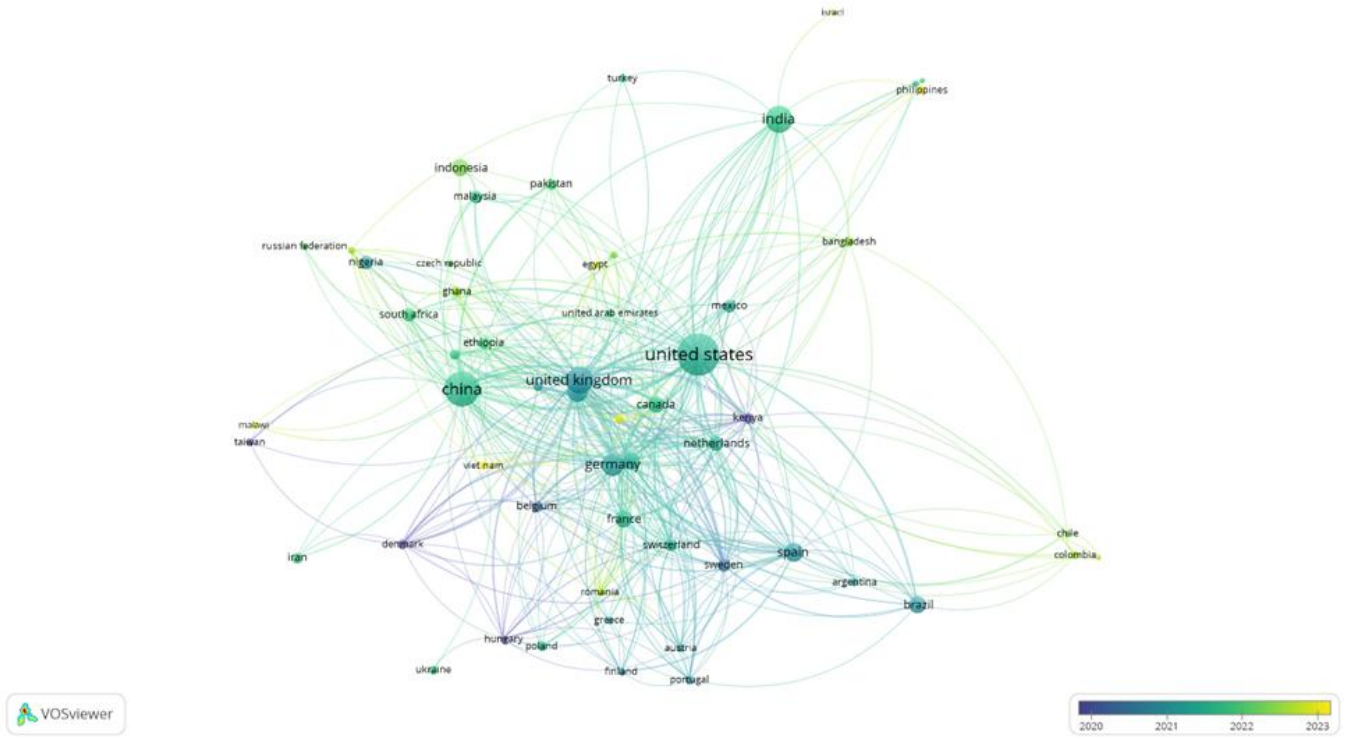

Figure 1. Co-authorship country

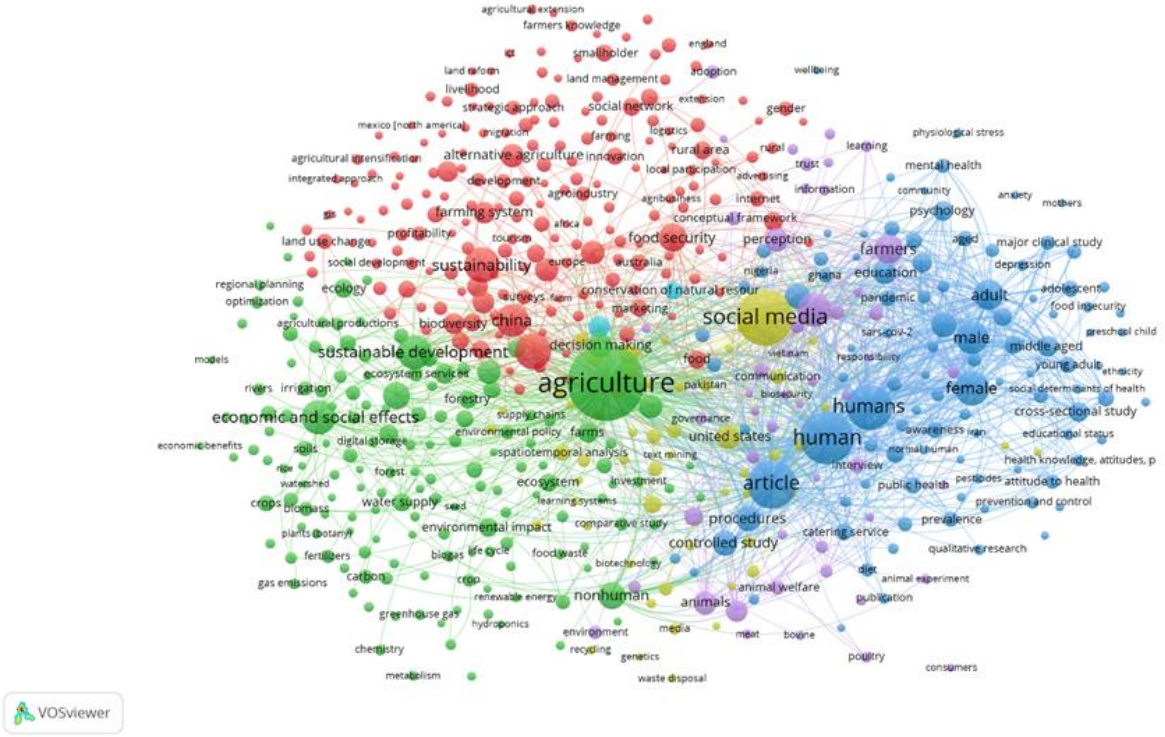

Figure 2. Author All keyword

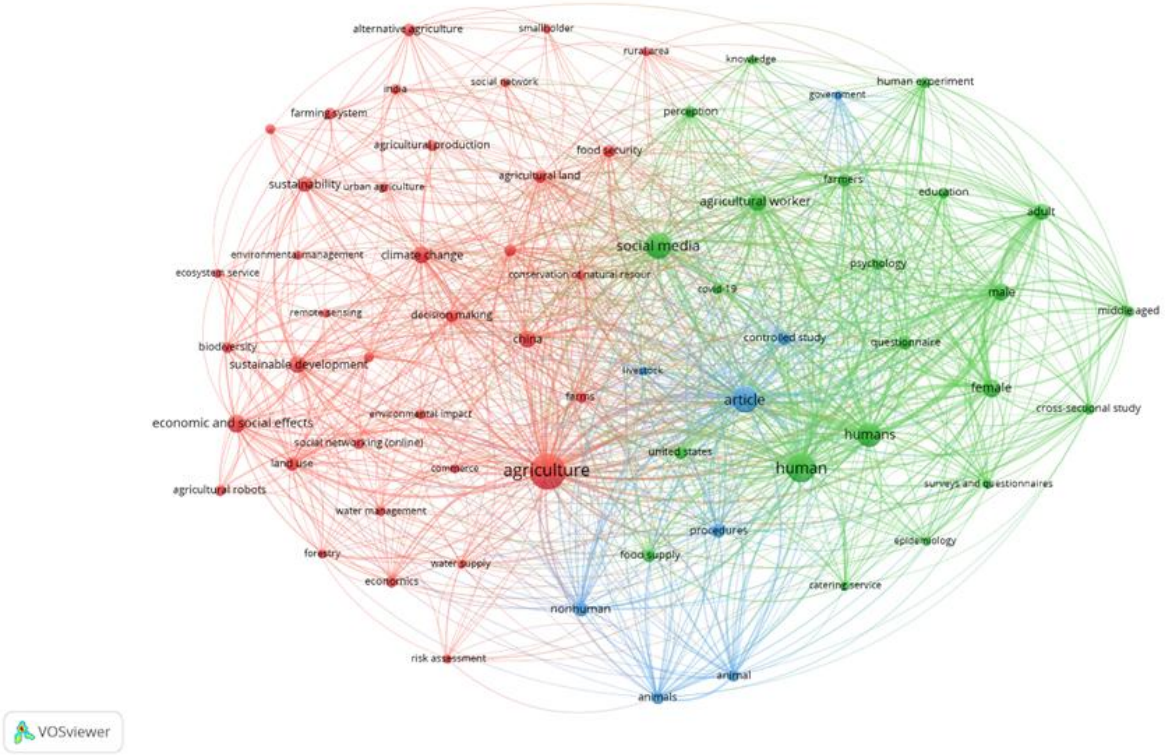

Figure 3. Co-occurrence index keyword

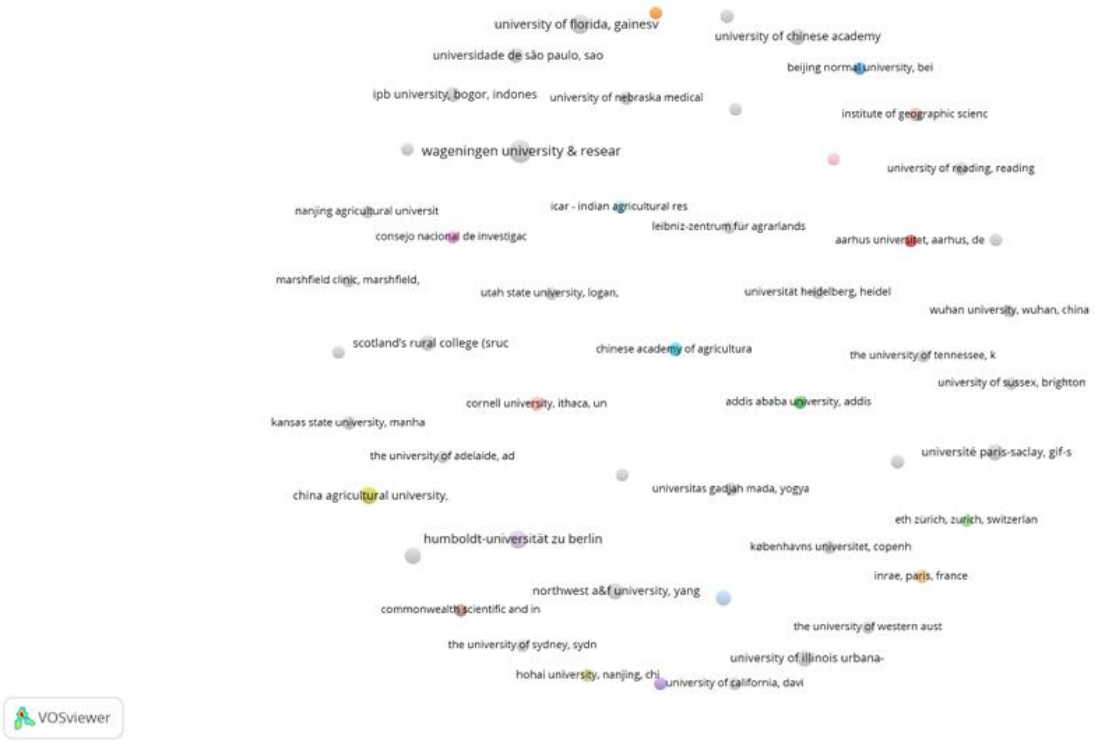

Figure 4. citation organisation

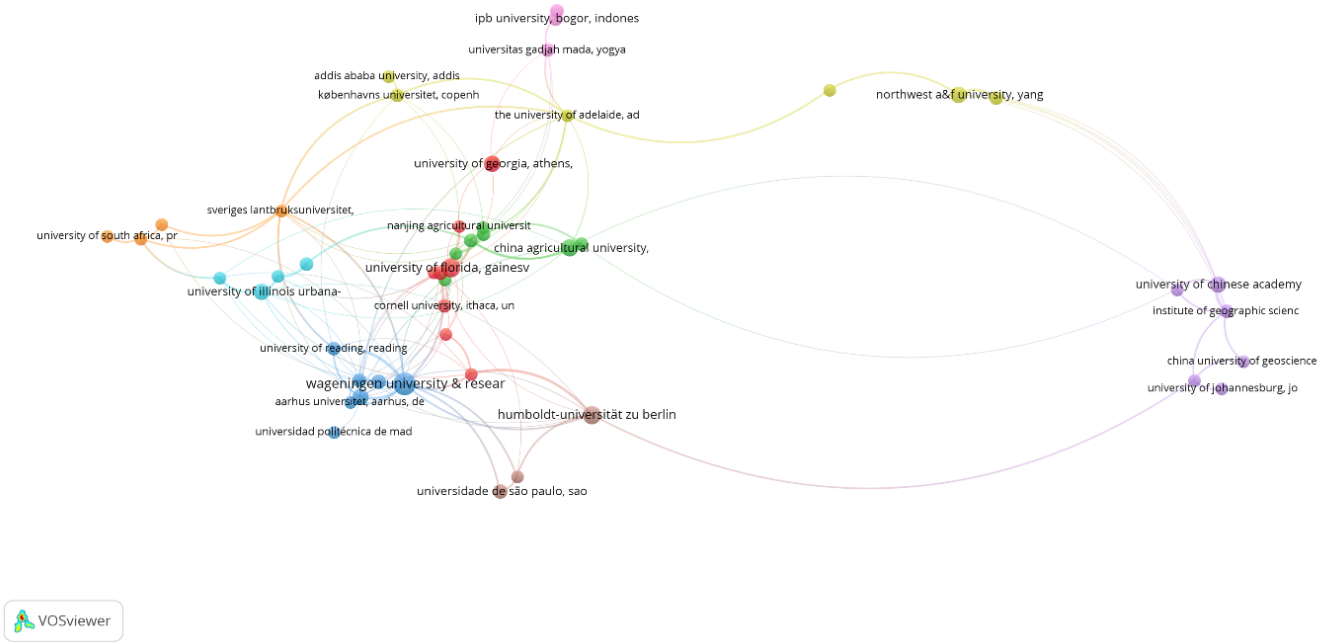

Figure 5. Bibliometric coupling organization

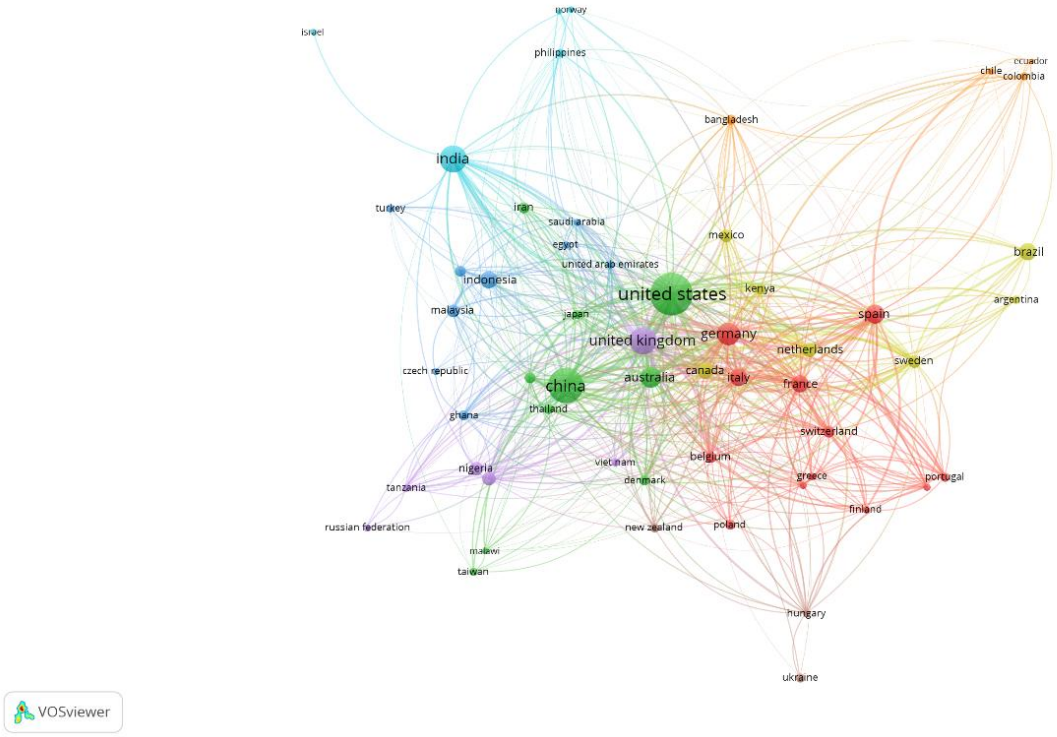

Figure 6. Bibliometric Coupling country

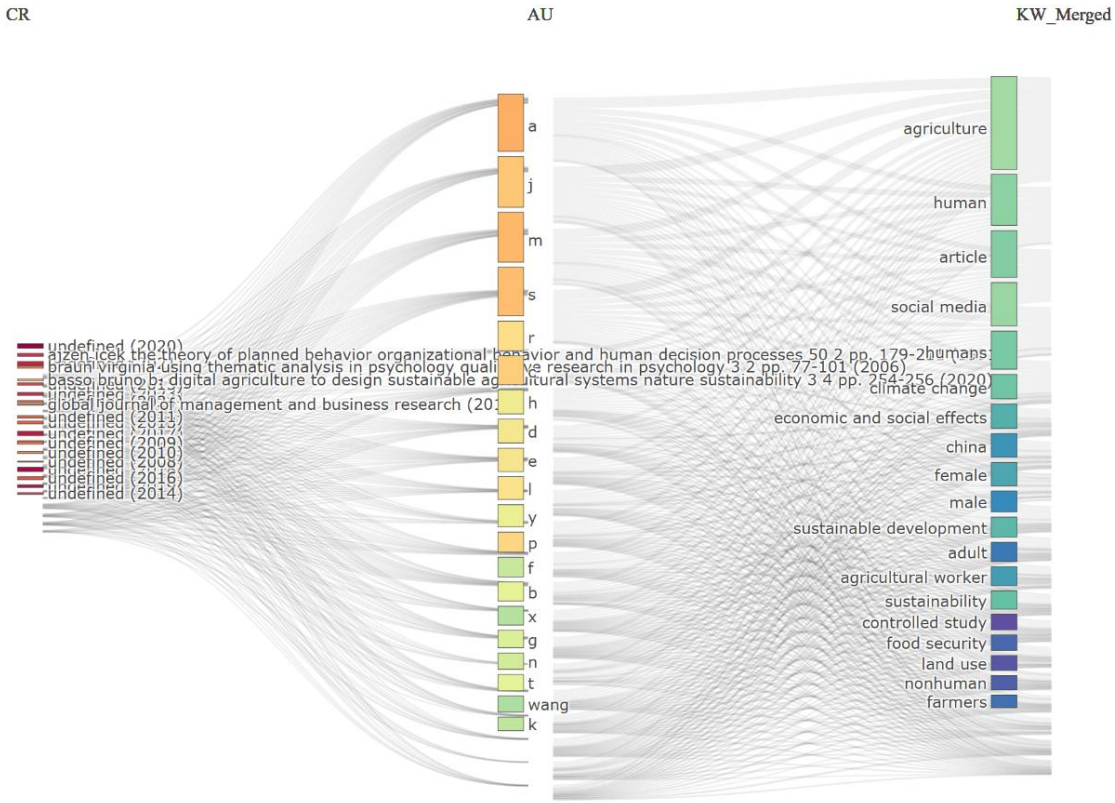

Figure 7. Three-field plot

4. DISCUSSION

The results underline the key importance of global cooperation and multidisciplinary research in defining the evolution of technology-driven agriculture. The co-authorship (country) network (Figure 1) shows that developed countries such as USA, China and India are situated at the central nodes of collaboration that demonstrate their high research output and leadership in the field. The occurrence of developing countries in smaller clusters is an indication of an increasing but still limited involvement and points to opportunities for wider international engagement.

The author keyword network (Figure 2) identifies major research themes showing that the core topic of current studies are artificial intelligence, machine learning, precision agriculture and sustainability. These keywords often co-occur to reveal interdisciplinary connections related to agricultural sciences, engineering, and environmental management. Similarly, the co-occurrence of indexed keywords (Figure 3) supports these findings, in which technological innovation, smart farming, and resource efficiency are important topics in recent academic discourse (Paudel et al., 2024).

The citation by organization network (Figure 4) shows that institutions from advanced economies have the greatest research impact as measured by the frequency of citations and network centrality. In contrast, smaller or new institutions from developing regions are located on the periphery which indicates uneven distribution of research visibility. The bibliometric coupling of organizations (Figure 5) shows similarities in the research bases of institutions that are linked, and thus similar reference bases and topic interests. This coupling is the strongest among research universities with an agricultural technology and AI-based solution (Zhang et al., 2025).

The bibliometric coupling country map (Figure 6) gives more insight into how nations share academic references and work together towards common research goals. Countries that are close together in the visualization have potentially similar interests, and there may be opportunities for future collaboration programs. Lastly, the three-field plot (Figure 7), which links between authors, keywords, and journals and indicates the most productive researchers, their favorite keywords, and the leading journal publishers. This visualisation shows the predominance of some authors and journals that influence the direction of scientific inquiry in the field (Hove et al., 2024).

5. CONCLUSIONS

It can be concluded from the study is that social media has become a crucial tool in the digital transformation of agriculture, enabling real-time information exchange and collaboration among research communities around the globe. Despite the remarkable increase in the volume of research output and thematic diversity, disparities in access to technology and research visibility are significant barriers, particularly in developing nations. The bibliometric analysis reflects the dominance of developed countries in contributing to the field and shows emerging participation from the global South. Technological innovations, especially artificial intelligence (AI), precision agriculture, and farming practices such as sustainability, are key themes that are leading agricultural research. The changing role of social media in this area has the potential to influence future developments, promoting interdisciplinary approaches and equitable access to agricultural knowledge. Collaborative efforts, both regionally and globally, will be critical to higher innovation and overcome critical challenges in global agriculture.

Conflicts of Interest: The authors declare no conflicts of interest.

Funding: This research received no external funding.

Acknowledgment: The authors gratefully acknowledge the support of CUTM, Odisha for providing the necessary facilities and resources that enabled the successful completion of this work.

Author Contributions: Conceptualisation, P.N.H.V.; methodology, P.N.H.V.; validation, S.K.P.; formal analysis, P.N.H.V.; investigation, V.P.; resources, S.R.K.; data curation, S.R.K. and V.P.; writing—original draft preparation, S.K.P.; writing—review and editing, P.N.H.V. and S.K.P.; visualisation, P.N.H.V.; supervision, P.N.H.V.; All authors have read and agreed to the published version of the manuscript.

REFERENCES

Hove, D., Olugbara, O., & Singh, A. (2024). Bibliometric analysis of recent trends in machine learning for online credit card fraud detection. *Journal of Scientometric Research, 13*(1), 43–57. https://doi.org/10.5530/jscires.13.1.43

Kondo, T. S., & Diwani, S. A. (2023). Artificial intelligence in Africa: A bibliometric analysis from 2013 to 2022. *Discover Artificial Intelligence, 3*(1), Article 34. https://doi.org/10.1007/s44156-023-00034-1

Kumar, R. (2025). Bibliometric analysis: Comprehensive insights into tools, techniques, applications, and solutions for research excellence. *Spectrum of Engineering and Management Sciences, 3*(1), 45–62. https://doi.org/10.5281/zenodo.3607461

Mounika, T., Hath, T. K., Sahoo, S. K., & Debnath, M. K. (2025). Comparative morphometric measurements of different developmental stages of *Callosobruchus chinensis* in five different pulses. *Journal of Entomological Research, 49*(1), 64–67. https://doi.org/10.5958/0974-0347.2025.00010.9

Mounika, T., Hath, T. K., Sahoo, S. K., Gupta, D. S., & Debnath, M. K. (2025). Oviposition behaviour of pulse beetle (*Callosobruchus chinensis* L.) on different stored pulses. *Legume Research*, 1–6. https://doi.org/10.18805/LR-5516

Paudel, B., Riaz, S., Teng, S. W., Kolluri, R. R., & Sandhu, H. (2024). The digital future of farming: A bibliometric analysis of big data in smart farming research. *Cleaner and Circular Bioeconomy*, Article 100132. https://doi.org/10.1016/j.cleanc.2024.100132

Peddi, N. H. V., Badavath, A., Naik, A., & Kalpana, K. (2025). Sustainable agriculture practices for a resilient future: A review. *Environment Conservation Journal, 26*(2), 692–700. https://doi.org/10.36953/ECJ.30692981

Periginji, S. (2025). Transformative power of social media in agriculture. *NG Agriculture Insights, 1*(1), 17–21. https://doi.org/10.5281/zenodo.4530127

Periginji, S. K., Pulletikurthi, V., Kulkarni, S. R., Pradhan, S. K., & Sujohn, M. (2025). Agriculture and the utilisation of information and communication technology: A bibliometric review. *NG Agricultural Sciences, 1*(3), 33–45. https://doi.org/10.5281/zenodo.17748653

Pradhan, S. K., Prusty, A. K., Priyadarshi, D., Badavath, A., Nayak, S., & Munda, S. C. (2024). Impact of disruptive technologies on transforming Indian agriculture. *International Journal of Agricultural Extension and Social Development, 7*(5), 34–41. https://doi.org/10.12345/ijaesd.1241

Priya, P., Jain, G., Juyal, R., Kumari, P., & Paliwal, R. (2022). Growing success: Employing social media marketing in agriculture. *Journal of Survey in Fisheries Sciences, 8*(3), 359–366. https://doi.org/10.5005/journal.survey.2022.08942

Prusty, A. K., Mohapatra, B. P., Rout, S., Senapati, R., & Padhy, C. (2021). Social media: Boon to agriculture. *PLANTA, 2*, 245–250. https://doi.org/10.53227/planta.2021.1248

Prusty, A. K., Saha, P., Das, N., & Suman, S. (2025). Implementation and adoption of smart technologies in agri-allied sectors. *Plant Science Today, 11*, Article 3467. https://doi.org/10.36953/pst.3467

Pulletikurthi, V., Vijay, M. S., & Periginji, S. K. (2025). Climate-resilient agriculture: Paving the path to a sustainable future in India. *NG Agriculture Insights, 1*(3), 7–11. https://doi.org/10.5281/zenodo.17015781

Saha, P., Kulkarni, S. R., & Periginji, S. K. (2025). Accessing education in India: Challenges faced by rural children. *NG Agricultural Sciences, 1*(2), 29–34. https://doi.org/10.5281/zenodo.15305118

Suman, S., Prusty, A. K., Deb, A., Kumari, A., & Reddy, G. S. (2025). Global research trends in family farming: A bibliometric insight. *Indian Journal of Extension Education, 61*(1), 25–31. https://doi.org/10.20346/ijee.61.1.7

Vardhan, P. N. H., Badavath, A., Naik, A., & Kalpana, K. (2025). Sustainable agriculture practices for a resilient future: A review. *Environment Conservation Journal, 26*(2), 692–700. https://doi.org/10.36953/ECJ.30692981

Xu, J., Li, Y., Zhang, M., & Zhang, S. (2024). Sustainable agriculture in the digital era: Past, present, and future trends by bibliometric analysis. *Heliyon, 10*(14), Article e12594. https://doi.org/10.1016/j.heliyon.2024.e12594

Yadav, J., Yadav, A., Misra, M., Rana, N. P., & Zhou, J. (2023). Role of social media in technology adoption for sustainable agriculture practices: Evidence from Twitter analytics. *Communications of the Association for Information Systems, 52*(1), 833–851. https://doi.org/10.17705/1CAIS.52249

Zhang, R., Wu, X., Li, J., Zhao, P., Zhang, Q., Zhang, D., & Yang, L. (2025). A bibliometric review of deep learning in crop monitoring: Trends, challenges, and future perspectives. *Frontiers in Artificial Intelligence, 8*, Article 1636898. https://doi.org/10.3389/frai.2025.1636898