JSDC
Journal of Studies in Dynamics and Change (JSDC);
Vol-12, Issue-3, ISSN: 2348-7038
International Peer Reviewed Quarterly Journal
www.jsdconline.com

Understanding Farm Income Divergence in Rural Economy: A Bibliometric Mapping with Evidence on Livestock Sector Dynamics

Mehajabin Firdosh[1]

Sunil Kumar Kar[2]

ABSTRACT

This bibliometric study provides an overview of the global literature on the research topics of farm income divergence and the role of livestock as a moderator of income diversification, stabilization, and resilience. Bibliographic records from the Scopus and Web of Science databases were retrieved using an inclusive Boolean query and analysed using the bibliometrix R package (Biblioshiny). After merging, cleaning, and normalizing all the metadata, we present findings based on 1,825 unique publications through performance, collaboration, citation, and conceptual structure analysis. The study observes an upward trend since 1984, an accelerated growth since 2014, a reduction in unit cost, and an increase in efficiency that indicates a mature domain in its productive phase. Raw and citation-based outputs are highest for Agricultural Systems, followed by Sustainability, Agriculture, Ecosystems and Environment, and Food Policy, reflecting disciplinary versus policy focus. Author and institution analyses show concentrated collaboration explains most variance in productivity. For example, ZHANG Y. and WANG J. each wrote many articles but extensively co-author other authors, thus ranking lower in fractionalized output than total output. The leading institutions include the International Livestock Research Institute (ILRI) and Wageningen University. While the US and China have the enormous majority of national publications, other countries like the Netherlands, United Kingdom, and Australia are cited more frequently for a smaller overall contribution. In terms of conceptual mapping, poverty alleviation and sustainability and resilience are increasingly utilized for research on income from livestock. Highly cited works such as Barrett (2001), Haggblade (2010), and Zhou (2020) serve as intellectual anchors of the field. Overall, the findings demonstrate a mature, interdisciplinary, and progressively globalized knowledge domain shaped by collaborative networks and growing attention to equity and resilience in agricultural livelihoods.

Keywords: Bibliometrics, Livestock, Farm income, Divergence, Rural

JEL Classification Codes: O13, Q10, Q19, O43, R00

Author Details:

1. Mehajabin Firdosh is Research Scholar in the Department of A & A Economics, Utkal University, Bhubaneswar, Email: mehajabin95firdosh@gmail.com
2. Sunil Kumar Kar is Research Scholar in the Department of A & A Economics, Utkal University, Bhubaneswar, Email: karsunil60@gmail.com

Suggested Citation:
Firdosh, M. & Kar, S. K. (2025). Understanding Farm Income Divergence in Rural Economy: A Bibliometric Mapping with Evidence on Livestock Sector Dynamics, *Journal of Studies in Dynamics and Change (JSDC), 12*(3). 21-36.
DOI: www. https://doi.org/10.5281/zenodo.18613937
Published on: 01 July 2025

I. INTRODUCTION

Farmers' income fluctuation has emerged as a concern in agricultural and development research due to the inherently uncertain nature of farming activities. Agricultural incomes are highly sensitive to climatic shocks, yield variability, price volatility, and institutional constraints, often resulting in unstable and uneven income outcomes across farm households (OECD, 2018). In recent years, increasing exposure to climate change and market integration has further intensified income instability, contributing to persistent income divergence within the agricultural sector (Birthal et al., 2019). Income fluctuation frequently translates into farm income divergence, where disparities arise across farm size, farm types. While some farmers benefit from technological advancement and market access, others remain vulnerable to shocks and low productivity, reinforcing inequality and livelihood insecurity. These challenges have prompted experts to investigate ways to stabilize farm incomes and enhance resilience.

Among various strategies discussed in the literature, income diversification has gained significant attention. In this context, the livestock sector plays a critical role by providing relatively regular and continuous income streams compared to seasonal crop production. Livestock-based activities such as dairying, poultry, and small ruminant rearing are often highlighted as buffers against crop failure and price shocks, functioning as productive assets and informal insurance mechanisms (Delgado et al., 2001; Thornton et al., 2010). As a result, livestock is increasingly conceptualized as a moderating factor capable of reducing income fluctuation and mitigating farm income divergence.

Although the literature on farm income instability and livestock-based diversification has expanded rapidly, it remains fragmented across disciplines and methodological approaches. This fragmentation limits a comprehensive understanding of how research on income fluctuation and the livestock sector has evolved over time. Bibliometric analysis provides a systematic and quantitative approach to synthesizing this growing body of research by mapping publication trends, thematic structures, and intellectual networks (Aria & Cuccurullo, 2017; Donthu et al., 2021). Accordingly, this study employs bibliometric methods to examine the global research landscape on farm income fluctuation and the moderating role of the livestock sector.

II. METHODOLOGY

This study adopts a bibliometric research design to systematically analyse the literature on farm income divergence and the role of the livestock sector in income diversification, stabilization, and resilience. Bibliographic data were collected from the Scopus and Web of Science (WoS) databases using a comprehensive Boolean search applied to titles, abstracts, and author keywords. The search string combined two thematic blocks using the AND operator.

The first block included: "farm income divergence" OR "farm income disparity" OR "farm income inequality" OR "agricultural income inequality" OR "income inequality in agriculture" OR "inter-farm income variation" OR "inter-farm income disparity" OR "income gap among farmers" OR "rural income disparity" OR "rural income inequality" OR "income instability" OR "farm income variability" OR "farm income

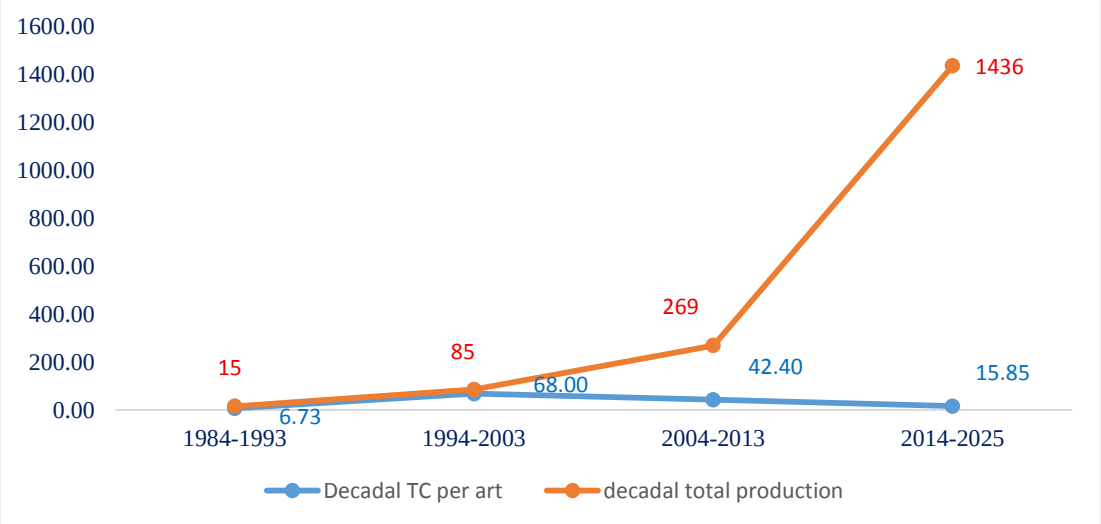
volatility" OR "farm income fluctuation" OR "regional farm income inequality" OR "agricultural income divergence" OR "farm household income inequality". The second block comprised using "AND" "livestock" OR "livestock sector" OR "animal husbandry" OR "dairy sector" OR "small ruminants" OR "backyard poultry" OR "livestock ownership" OR "livestock income diversification" OR "mixed crop-livestock systems" OR "mixed farming system" OR "livestock productivity" OR "livestock-based livelihoods" OR "livestock as a buffer" OR "moderating effect" OR "moderator variable" OR "interaction effect" OR "income diversification" OR "income stabilization" OR "resilience" OR "risk coping" OR "buffering effect" OR "income smoothing" OR "livestock diversification" OR "risk mitigation" OR "shock absorption" OR "crop-livestock integration" OR "integrated farming system" OR "vulnerability reduction".

Only English-language journal articles were retained. Records from both databases were exported in BibTex format, merged, and cleaned using the bibliometrix package through Biblioshiny (RStudio), with duplicates removed and metadata standardized. The final dataset consisted of 1,825 unique publications, which were analysed using descriptive, performance, collaboration, and conceptual structure bibliometric techniques to map publication trends, influential authors, institutions, and countries, citation impact, and thematic evolution in the literature. Following the bibliometric analysis, a systematic screening process was undertaken. Initially, 236 articles were identified through title screening, and after abstract screening, 204 articles were selected for the systematic review of the literature.

III. RESULTS

Figure-1 presents a bibliometric profile showing decadal changes in the number of publications and in the average total citations (TC) per article over the period 1984-2025.

Figure-1: Decadal Trends in Publications and Citations, 1984-2025



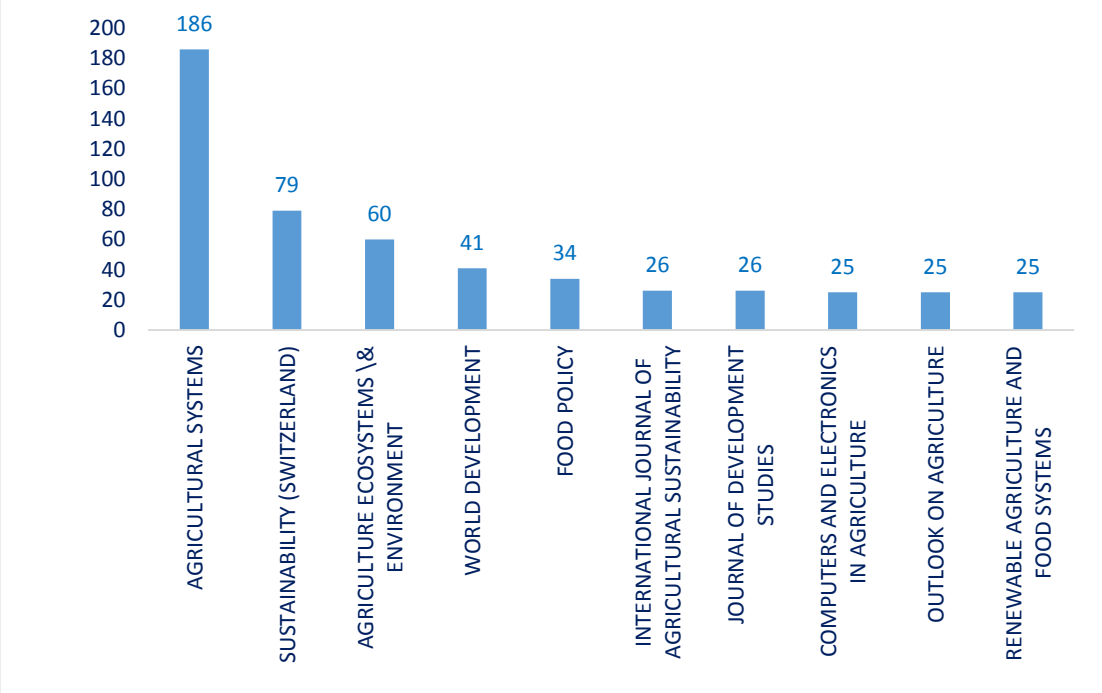
Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

Total output exhibits a constant ascending trend in the first 20 years and then a rapid growth rate in the last stage. Output grows from low levels in 1984-1993 and

1994-2003 to 269 units in 2004-2013 before jumping by over five times, reaching 1,436 units by end-2025. By contrast, TC per unit is non-linear. Unit costs rise in the beginning, reaching peak levels during 1994-2003, indicating potential adjustment or investment expenses. After that, TC content per unit reduces rapidly and falls to the lowest in the final decade. The simultaneous rise in production and decline in unit costs in the later period suggests significant productivity gains, economies of scale, and improved cost efficiency, indicating a transition from an expansion phase to efficiency-driven growth.

The most prolific source (Figure-2) "Agricultural Systems" has 186 publications, highlighting the core status of this journal in spreading out the research on agri-environment. This is also reflected in "Sustainability" (79 publications) and "Agriculture Ecosystem" (60 publications), which reflects the interdisciplinary character of the field, i.e., agricultural science vs. sustainability studies. The firm development and policy orientation of the literature is also demonstrated by journals such as World Development (41) and Food Policy (34). Overall, the distribution suggests a concentration of research within a few core journals, alongside a broader set of complementary sources, consistent with Bradford's Law of journal dispersion.

Figure-2: The Most Relevant Sources Contributing to the Literature under Review, Measured by the Number of Publications

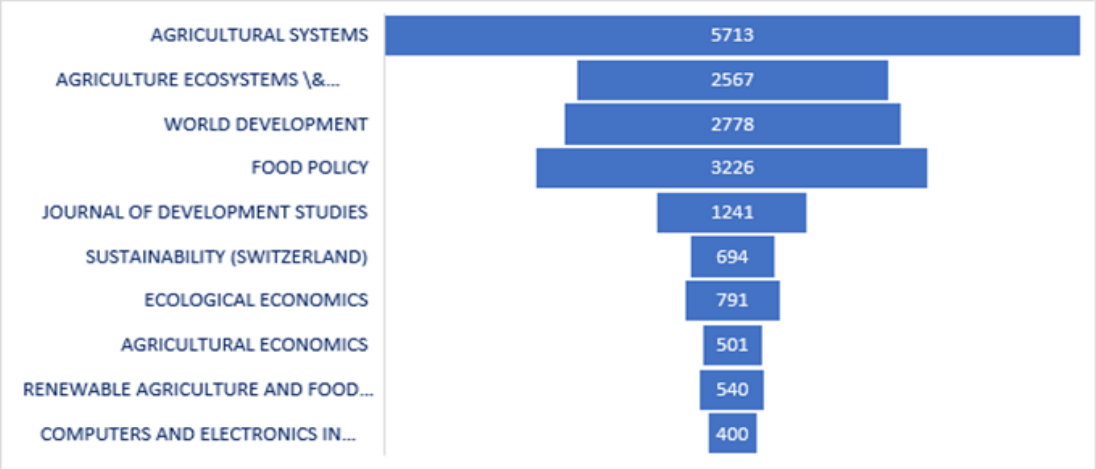


Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

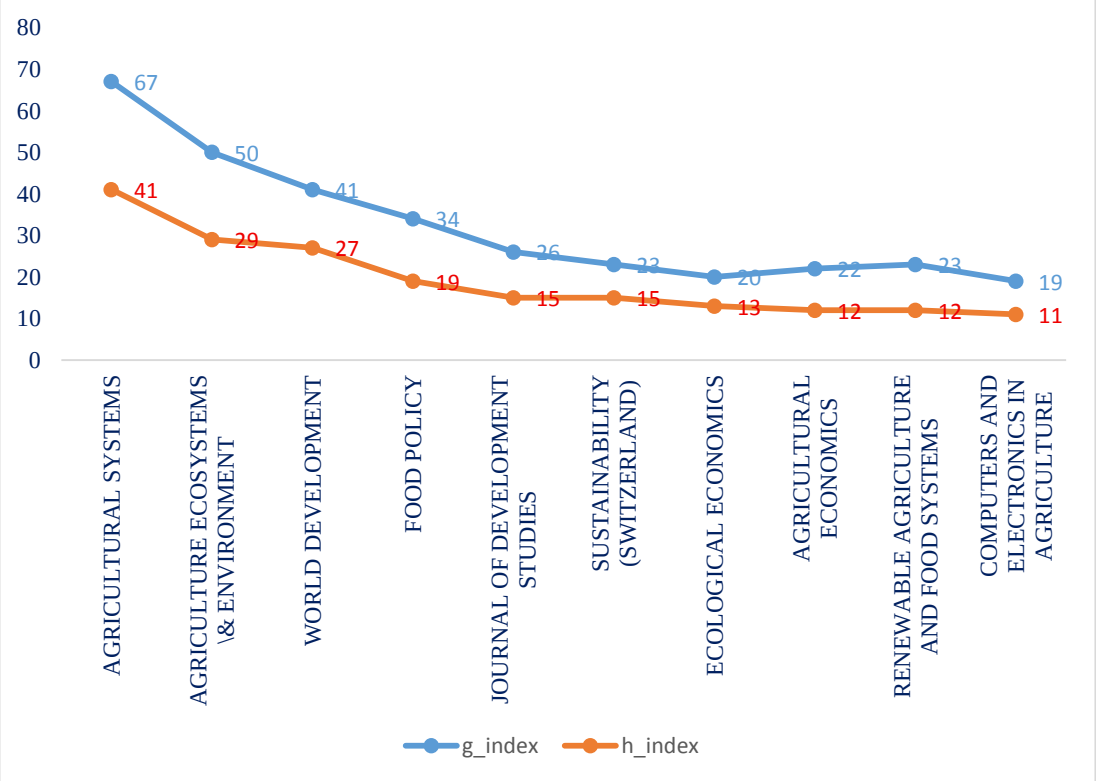
The two panels in Figure-3 together analyse the impact of top journals by TC, h- & g-index.

Figure-3: Sources Local Impact

Panel (a)



Panel (b)



Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

Agricultural Systems leads prominently for TC (5,713), h-index (41), and g-index (67), evidencing volume-based and enduring citation impact. Food Policy and World Development show good citation per publication rates with high TC values, but not remarkable h- and g-index despite significant influence among scholars. By

contrast, the journals “Sustainability” and “Ecological Economics” indicate moderate TC but significantly lower h- and g-index, reflecting a citation profile distributed more evenly. It is noteworthy that “Agriculture Ecosystems & Environment” has a high TC (2,567) with good index values, which indicates the depth and duration of impact. We can argue here that comparing the results demonstrates that at all times number of citations and the quality of citations do not go together, and this reflects on need for the combined use of different bibliometric indicators to measure journal impact fully.

The two panels in Figure-4 together provide a nuanced understanding of author-level research performance by jointly examining publication volume and collaboration intensity. The first graph underscores the significant discrepancies between total vs. fractionalized number of articles, which shows that raw publication counts heavily overestimate individual scholarly contribution under a high level of collaboration. For example, there are large quantities of total documents for researchers such as ZHANG Y, WANG J, and LI Y, but their fractionalized results indeed fall down greatly in them. This contrast is a consequence of their extensive participation in multi-authored studies with one's intellectual contribution spread over numerous collaborators.

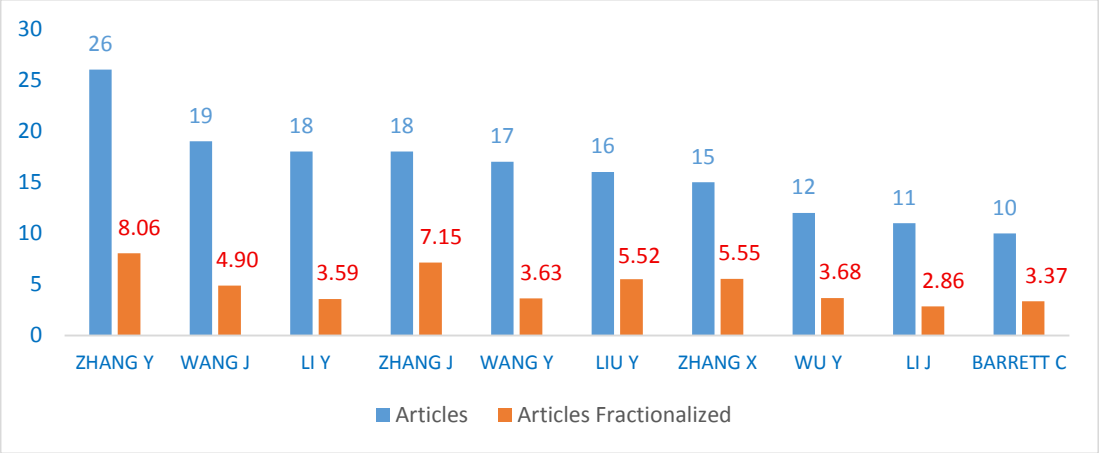
Further investigation shows that ZHANG Y itself has the largest fall with fractionalized output, indicating a tendency to large and collaborative teams. LI Y and WANG Y also display relatively lower fractionalized contributions with respect to the total publications. This trend suggests that high productivity by these authors is more due to collaborative research activity than concentrated authorship.

The second graph reinforces this interpretation by explicitly capturing collaboration intensity through average co-authors per paper. Authors with the highest collaboration intensity, notably LI Y and WANG Y, also show the widest gaps between total and fractionalized outputs in the first graph. This alignment confirms a systematic relationship between team size and individual contribution metrics. In contrast, authors such as ZHANG J and ZHANG X display lower average numbers of co-authors, which corresponds with relatively higher fractionalized contributions per article, indicating stronger individual or small-team dominance in research production.

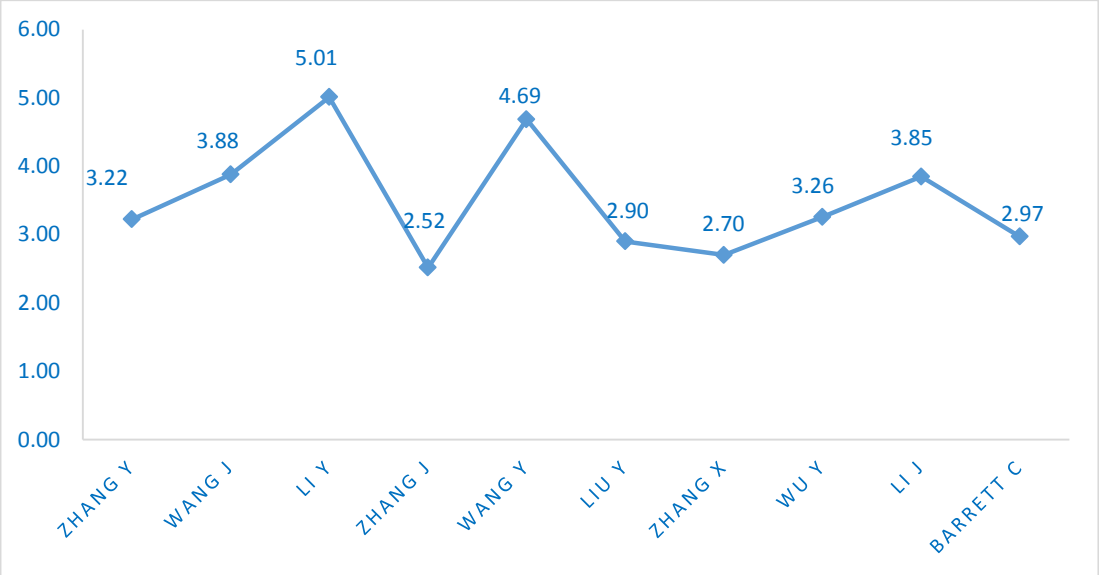
Notably, BARRETT C and LI J demonstrate a different productivity profile. Although their total publication counts are lower, their fractionalized outputs are comparatively efficient, suggesting a higher degree of intellectual ownership per paper. Their moderate collaboration intensity further supports the inference that these authors balance collaboration with substantive individual contribution. This pattern is often characteristic of senior or specialized researchers whose work is less reliant on large research teams.

Figure-4: Top 10 Relevant Authors

Panel (a)



Panel (b)

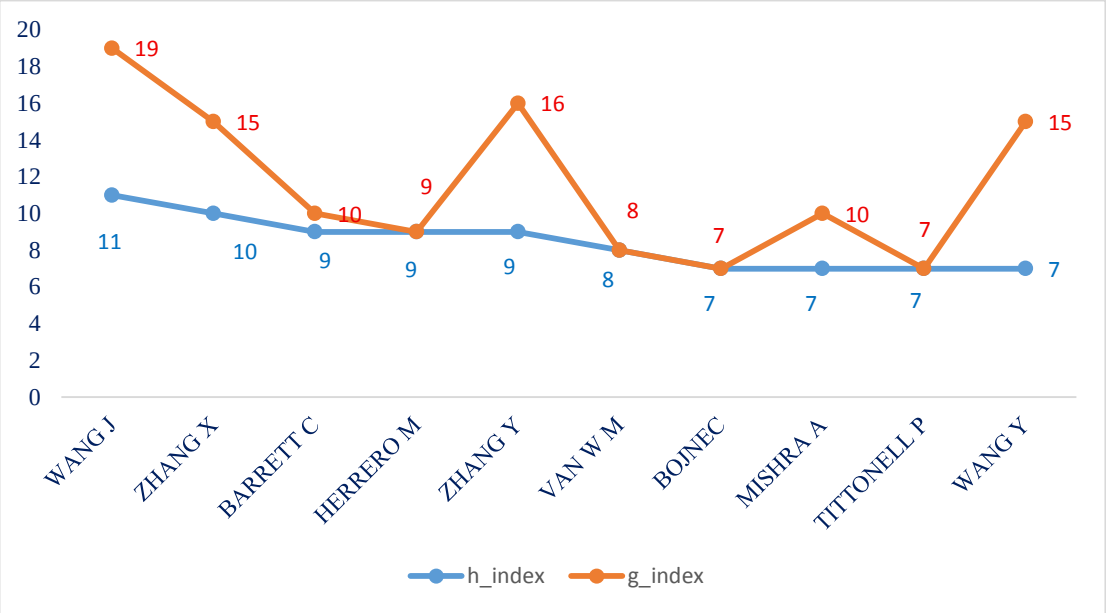


Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

Figure-5 presents a comparative assessment of the h-index and g-index for selected authors, offering complementary insights into both the consistency and intensity of their scholarly impact. While the h-index captures sustained citation performance across publications, the g-index gives greater weight to highly cited works. Together, these indicators allow for a more refined interpretation of academic influence beyond publication counts alone.

The results indicate that WANG J stands out with the highest g-index (19) alongside a strong h-index (11), reflecting both consistent productivity and the presence of highly cited publications. This suggests a well-balanced research profile in which regular scholarly output is reinforced by influential contributions. Similarly, ZHANG X demonstrates a relatively strong citation presence, with a g-index of 15 and an h-index of 10, indicating steady citation accumulation supported by a few impactful works.

Figure-5: Comparative Analysis of h-index and g-index - Citation Impact and Scholarly Influence among Leading Authors



Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

A contrasting pattern emerges for ZHANG Y, whose g-index (16) is substantially higher than the h-index (9). This divergence implies that while the author may not have uniformly cited publications, a smaller subset of papers has attracted exceptionally high citations. Such a profile is characteristic of scholars who produce landmark or field-defining studies that disproportionately shape academic discourse. A similar interpretation applies to WANG Y, whose g-index of 15 significantly exceeds an h-index of 7, reinforcing the role of citation concentration in defining scholarly influence.

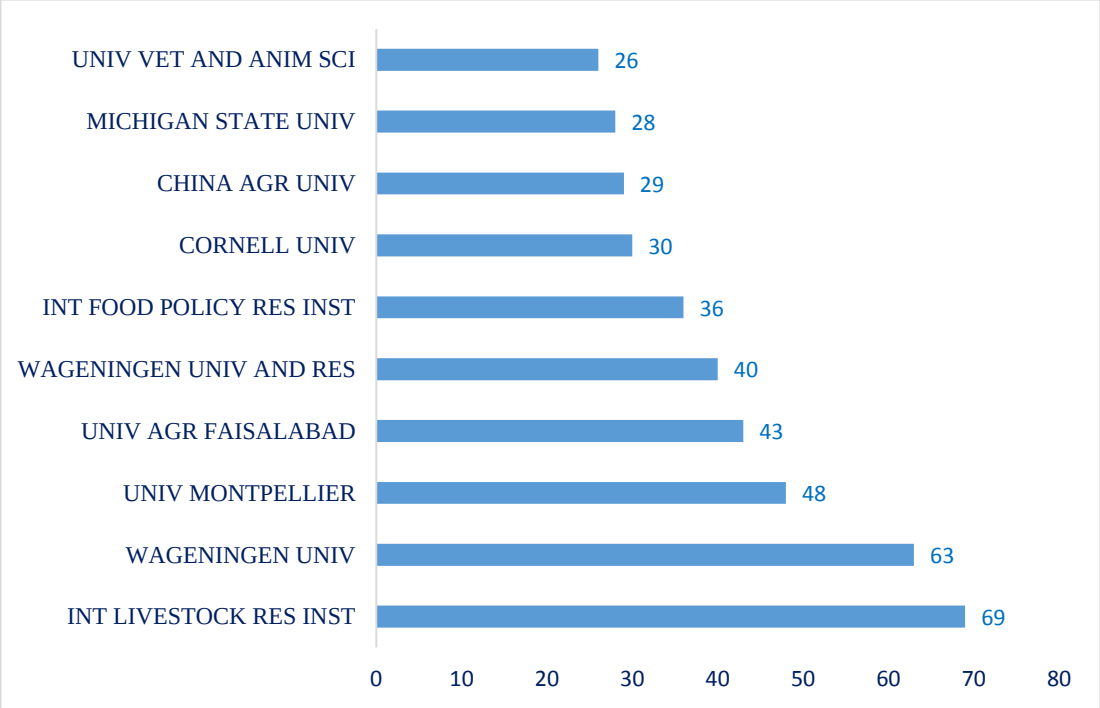
In contrast, authors such as BARRETT C and HERRERO M exhibit closely aligned h-index and g-index values, suggesting a more even distribution of citations across their publications. This pattern reflects sustained and consistent academic influence rather than reliance on a few highly cited papers. Such profiles are often associated with mature research agendas and stable engagement with core themes in the literature.

Lower index values observed for VAN W M, BOJNEC, MISHRA A, and TITTONELL P indicate moderate citation impact, with minimal divergence between h-index and g-index. This alignment suggests limited citation concentration and a relatively uniform citation structure across publications. While these authors may not dominate citation metrics, their steady performance indicates meaningful participation within their respective research communities.

In Figure-6, at the upper end of the spectrum, the International Livestock Research Institute (ILRI) emerges as the most prolific contributor, with the highest number of publications. This dominance underscores ILRI's central role in advancing research

within the domain, likely reflecting its strong thematic focus, extensive international collaborations, and mandate-driven research agenda. Closely following is Wageningen University, which also demonstrates a remarkably high publication output. The strong performance of Wageningen further reinforces its reputation as a global hub for agricultural and food systems research, supported by robust research infrastructure and sustained funding.

Figure-6: Institutional Contribution to Research Output - A Comparative Analysis of Affiliations and Article Production



Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

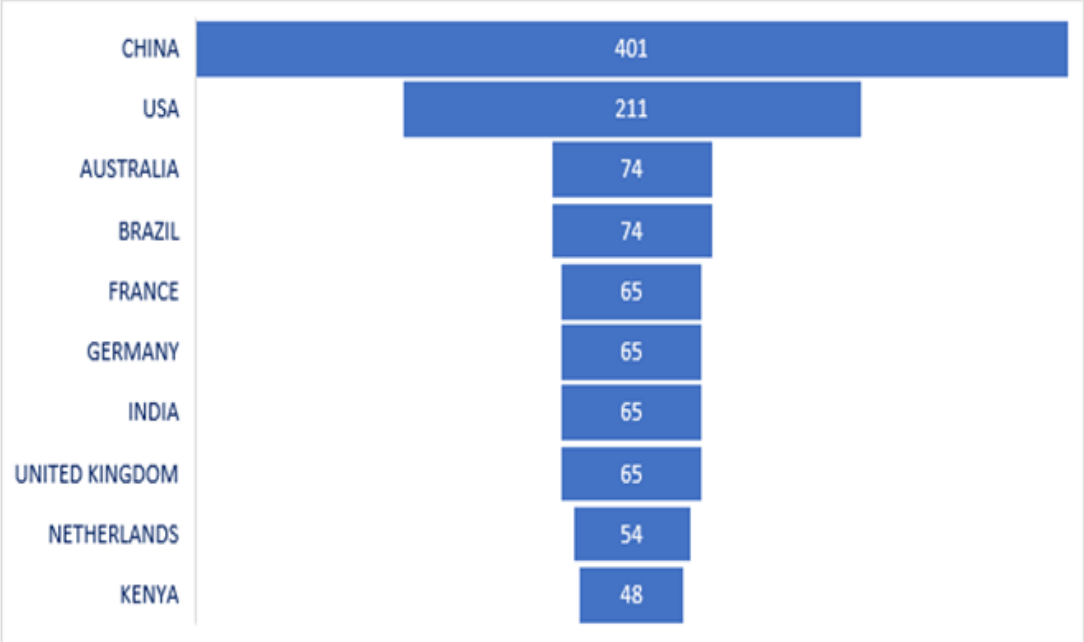
A second tier of institutions, including Université de Montpellier, University of Agriculture Faisalabad, and Wageningen University and Research, also show substantial research contributions. Their relatively high publication counts indicate consistent engagement in the field and suggest the presence of active research clusters. These institutions often function as regional or thematic leaders, contributing significantly to knowledge generation while also participating in broader international research networks.

In contrast, institutions such as the International Food Policy Research Institute (IFPRI) and Cornell University occupy a middle position in the distribution. While their publication counts are lower than the top-performing institutions, they nonetheless reflect strong and steady scholarly engagement. For IFPRI, this output aligns with its policy-oriented research focus, where impact may be driven more by policy relevance and citation influence than sheer publication volume. Similarly, Cornell's contribution reflects selective but high-quality research participation within the field.

At the lower end of the distribution, China Agricultural University, Michigan State University, and the University of Veterinary and Animal Sciences exhibit comparatively fewer publications. This does not necessarily indicate weaker research capacity but may reflect narrower thematic specialization, differences in publication strategies, or the dispersion of research output across multiple disciplines and outlets not fully captured within the dataset.

Figure-7 shows a geographical distribution of corresponding authors. In general, the distribution of corresponding author's across countries reflects a (very) concentrated but increasingly diversified global research leadership situation. Although China and the United States lead by a significant margin in absolute values, involvement of multiple countries demonstrates increasing levels of international participation and diffusion of coordinating functions. Read alongside studies at institutional and author level, these results emphasise the close relationship between national research capacity, the strength of institutions and global collaboration in contemporary knowledge production.

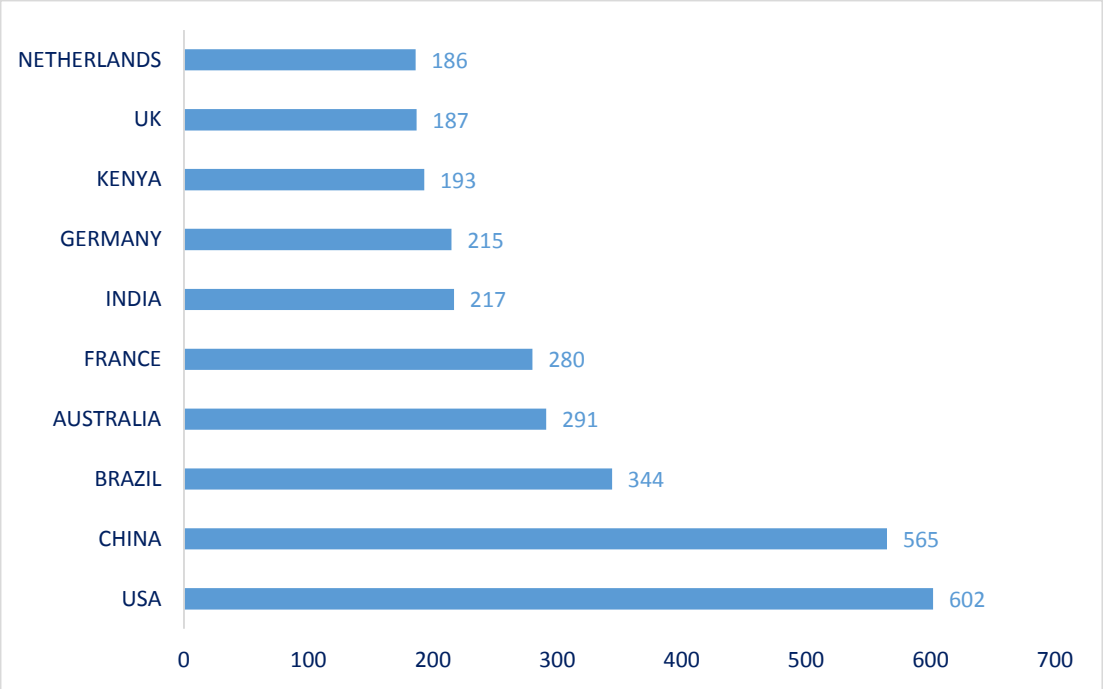
Figure-7: Geographical Distribution of Corresponding Authors - A Country-Level Analysis of Research Leadership



Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

Figure-8 presents a comparative overview of scientific production across countries, measured by the total number of publications. The distribution reveals a clear stratification in global research output, with a small number of countries accounting for a disproportionately large share of scientific production, while several others contribute more modestly.

Figure-8: Country-Level Scientific Production: Patterns of Global Research Output



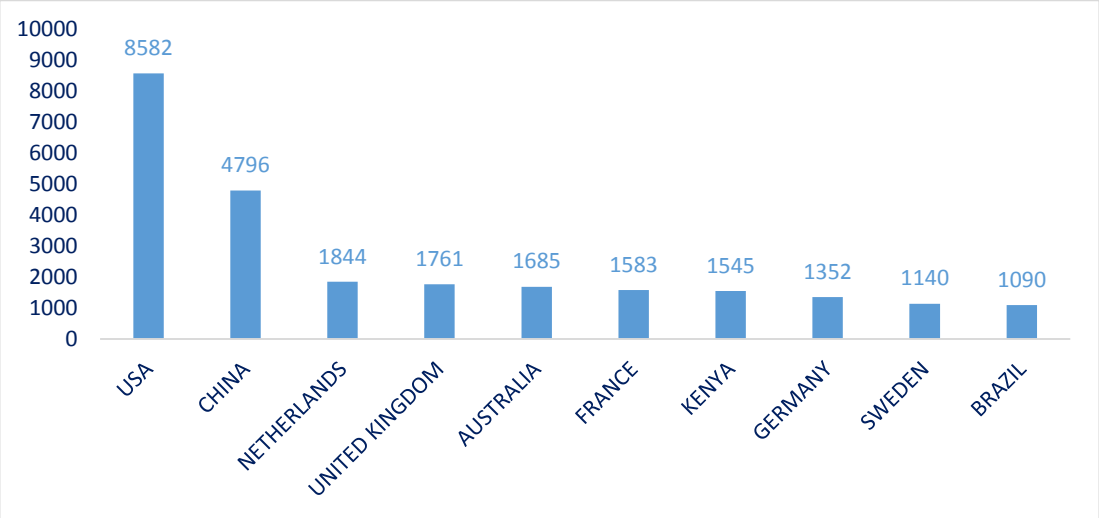
Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

The combined analysis of country-wise scientific production and corresponding authorship highlights a concentrated yet uneven global research structure. The United States and China dominate total publication output, reflecting their large and well-funded research systems. However, China's substantially higher share of corresponding authors indicates a stronger leadership role in coordinating research, whereas the United States exhibits more distributed authorship despite higher output. Countries such as Brazil, Australia, and France function as important secondary contributors, while European nations like the UK, Germany, and the Netherlands show relatively lower publication volumes but maintain influence through collaboration and specialization. Emerging economies, notably India and Kenya, demonstrate growing participation and leadership, suggesting a gradual diversification of global research coordination beyond traditional centers.

In Figure-9 the total citation (TC) distribution across countries reveals a highly skewed pattern of research impact. The United States overwhelmingly dominates with the highest citation count, indicating not only high publication volume but also strong global influence and visibility of its research outputs. China, despite being one of the largest producers of scientific publications, records substantially fewer total citations than the United States, suggesting that its rapidly expanding output has not yet translated proportionately into citation impact. A second group of countries including the Netherlands, United Kingdom, Australia, and France achieves moderate citation counts, reflecting comparatively smaller publication volumes but higher citation efficiency and research quality. Notably, Kenya demonstrates a relatively strong citation presence despite lower overall output, highlighting the impact of specialized and policy-relevant research. Countries such

as Germany, Sweden, and Brazil record lower total citations, indicating more limited global visibility within the dataset. Overall, the results underscore a clear distinction between research volume and research impact, emphasizing that citation dominance is more closely associated with established research systems and high-impact scholarship than with publication counts alone.

Figure-9: Country-wise Distribution of Total Citations - Global Patterns of Research Impact



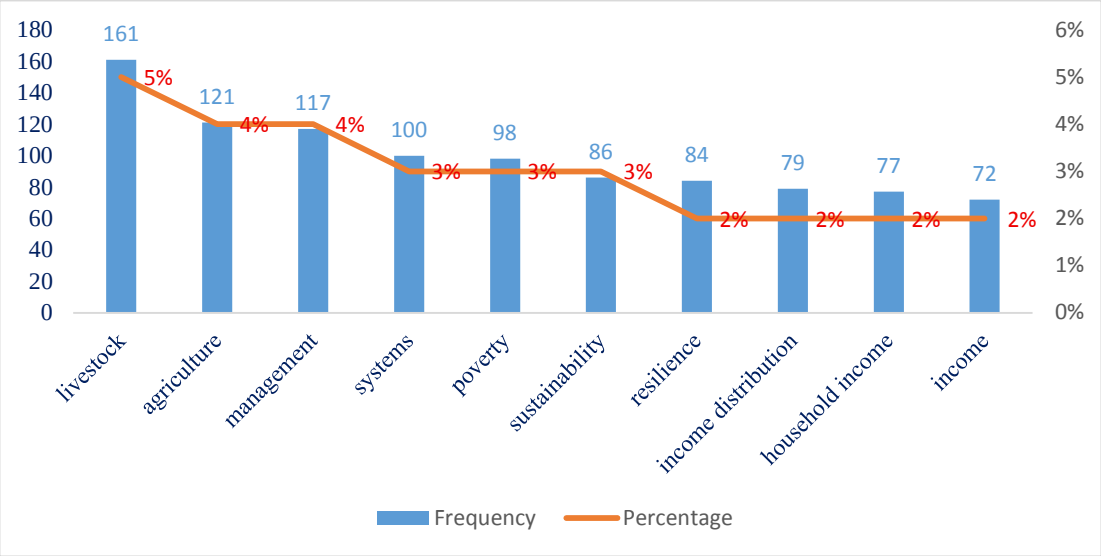
Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

Figure-10 illustrates the frequency and relative prominence of key trend topics within the literature, revealing clear patterns in thematic emphasis. Livestock emerges as the most dominant topic, indicating a strong research focus on animal-based production systems and their associated economic, environmental, and livelihood dimensions. This is followed by agriculture and management, highlighting the centrality of production practices, resource governance, and institutional arrangements in shaping research agendas.

Mid-ranking topics such as systems, poverty, and sustainability reflect a growing interdisciplinary orientation, where agricultural research is increasingly framed within broader socio-economic and environmental systems. The comparable frequencies of these terms suggest an integrated approach that links production outcomes with welfare, development, and long-term viability concerns. The presence of poverty as a recurrent theme underscores the policy relevance of the literature, particularly in relation to rural livelihoods and inclusive growth.

Lower-frequency yet still significant topics, such as resilience, income distribution, household income, and income, indicate a shift toward outcome-oriented research that examines distributional impacts and vulnerability. Although these themes appear less frequently, their consistent presence suggests an emerging emphasis on equity, income dynamics, and adaptive capacity in response to economic and environmental shocks.

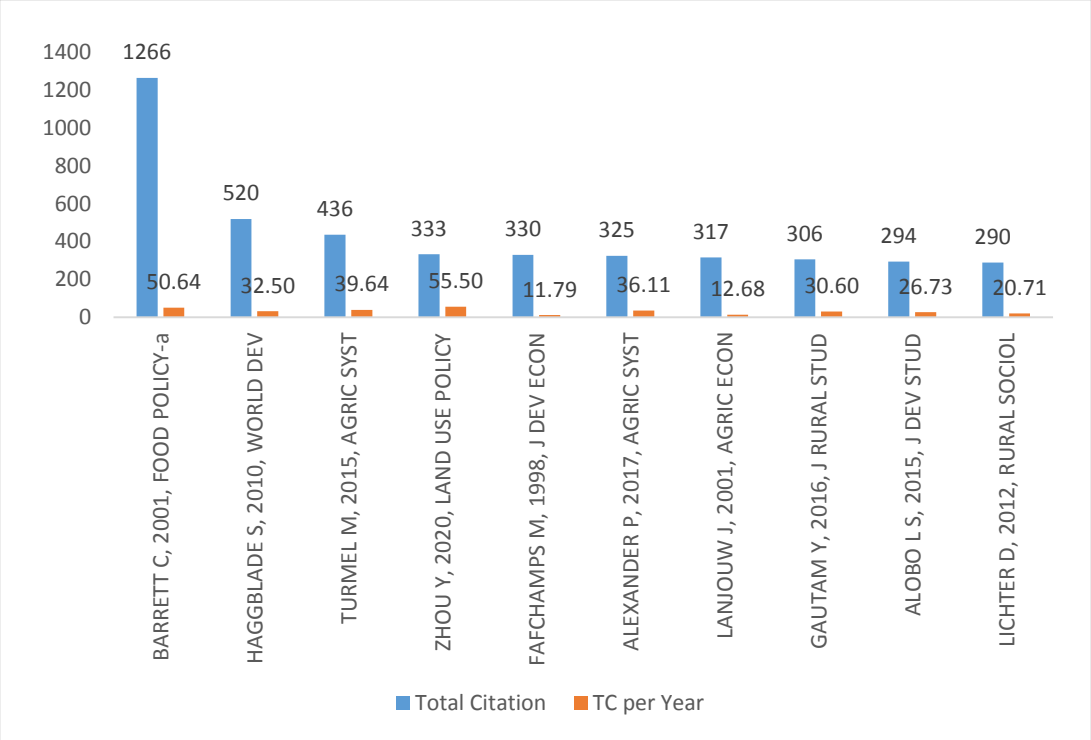
Figure-10: Trend Topic Word Frequency: Thematic Focus and Research Priorities



Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

In Figure-11, the bibliometric profile of the most globally cited documents reveals a highly concentrated citation landscape dominated by a small set of foundational works. Barrett (2001, Food Policy) clearly emerges as the pivotal contribution, amassing 1,266 citations and standing far above all other documents in terms of global recognition. A second tier of influential studies including Haggblade (2010, World Development), Turmel (2015, Agricultural Systems), Zhou (2020, Land Use Policy), Fafchamps (1998, Journal of Development Economics) and Alexander (2017, Agricultural Economics) each attracts between roughly 290 and 520 citations, indicating their status as key reference points in debates on food policy, rural development and agrarian change. Notably, some more recent articles such as Zhou (2020) and Alexander (2017) combine substantial total citations with very high average citations per year, suggesting that they are emerging "hot papers" whose influence is still rapidly expanding, whereas older works like Lanjouw (2001) and Lichter (2012) exhibit more moderate annual citation rates consistent with mature, classic references.

Figure-11: Top 10 Globally Cited Articles



Source: Authors' computation based on Scopus and Web of Science data using R-Studio and Biblioshiny

IV. CONCLUSION

The bibliometric evidence underscores a dynamic and rapidly expanding research landscape at the intersection of farm income divergence and livestock-based livelihood strategies. Scholarly output has not only intensified but also diversified, reflecting wider engagement with sustainability, policy, and welfare dimensions. The dominance of Agricultural Systems and the strong performance of development-oriented journals reveal deep disciplinary integration, while concentration in leading institutions such as ILRI and Wageningen University points to robust research ecosystems driving global collaboration. Although China and the United States lead in publication counts, citation influence remains concentrated in established research systems with high-impact scholarship. The thematic structure indicates a transition from production- to resilience-oriented inquiry, linking livestock with income stability, risk mitigation, and vulnerability reduction. The results provide a valuable bibliometric baseline to understand evolving research directions, highlighting the need for greater cross-regional collaboration, deeper exploration of equity outcomes, and more policy-focused integration between livestock research and income divergence studies. Collectively, the findings contribute to mapping the intellectual structure and future trajectory of this important domain in agricultural and rural development research.

V. REFERENCES

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. Journal of Informetrics, 11(4), 959–975.

https://doi.org/10.1016/j.joi.2017.08.007

Barrett, C. B., Reardon, T., & Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa. Food Policy, 26(4), 315–331.

https://doi.org/10.1016/S0306-9192(01)00014-8

Birthal, P. S., Chand, R., Joshi, P. K., & Saxena, R. (2019). Doubling farmers' income: Sources, drivers, and policy implications. Agricultural Economics Research Review, 32(1), 1–14.

https://doi.org/10.5958/0974-0279.2019.00001.7

Birthal, P. S., & Joshi, P. K. (2007). Diversification in Indian agriculture towards high-value crops. Agricultural Economics, 37(1), 81–93.

https://doi.org/10.1111/j.1574-0862.2007.00238.x

Delgado, C. L., Rosegrant, M. W., Steinfeld, H., Ehui, S., & Courbois, C. (2001). Livestock to 2020: The next food revolution. International Food Policy Research Institute.

Dercon, S. (2002). Income risk, coping strategies, and safety nets. World Bank Research Observer, 17(2), 141–166.

https://doi.org/10.1093/wbro/17.2.141

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. Journal of Business Research, 133, 285–296.

https://doi.org/10.1016/j.jbusres.2021.04.070

Ellis, F. (2000). Rural livelihoods and diversity in developing countries. Oxford University Press.

Haggblade, S., Hazell, P., & Reardon, T. (2010). The rural nonfarm economy: Prospects for growth and poverty reduction. World Development, 38(10), 1429–1441.

https://doi.org/10.1016/j.worlddev.2009.06.008

Herrero, M., Havlík, P., Valin, H., et al. (2013). Biomass use, production, feed efficiencies, and greenhouse gas emissions from global livestock systems. Proceedings of the National Academy of Sciences, 110(52), 20888–20893.

https://doi.org/10.1073/pnas.1308149110

OECD. (2018). Income risk management in agriculture. OECD Publishing.

https://doi.org/10.1787/9789264303161

Reardon, T., Berdegué, J., Barrett, C. B., & Stamoulis, K. (2007). Household income diversification into rural nonfarm activities. World Development, 35(5), 753–779.

https://doi.org/10.1016/j.worlddev.2006.10.018

Ryschawy, J., Choisis, N., Choisis, J. P., Gibon, A., & Hubert, B. (2012). Mixed crop-livestock systems: An economic and environmentally friendly way of farming? Animal, 6(10), 1722–1730.

https://doi.org/10.1017/S1751731112000675

Scoones, I. (1998). Sustainable rural livelihoods: A framework for analysis (IDS Working Paper No. 72). Institute of Development Studies.

Thornton, P. K., Herrero, M., Freeman, H. A., et al. (2010). Livestock production: Recent trends, future prospects. Philosophical Transactions of the Royal Society B: Biological Sciences, 365(1554), 2853–2867.

https://doi.org/10.1098/rstb.2010.0134

Thornton, P. K., van de Steeg, J., Notenbaert, A., & Herrero, M. (2009). The impacts of climate change on livestock and livestock systems in developing countries. Agricultural Systems, 101(3), 113–127.

https://doi.org/10.1016/j.agsy.2009.05.002

World Bank. (2020). Agriculture and food global practice: Income resilience and rural livelihoods. World Bank.