

BIBLIOMETRIC REVIEW OF THE SCIENTIFIC PUBLICATIONS RELATED TO AGRICULTURAL FINANCE IN SOUTH ASIA

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Abstract: *This paper examines agricultural finance research publications indexed in the Scopus database up to 2023, covering countries representing the Indian subcontinent. The paper uses specific keywords related to agricultural finance and the names of countries representing the Indian subcontinent to identify the publications and employs bibliometric analysis. Tools such as Microsoft Excel for frequency analysis, VOSviewer and Biblioshiny for data visualization and Harzing's Publish or Perish for citation metrics and analysis were used. Scopus yielded 46 research publications on agricultural finance in South Asia from 1979 to 2023, suggesting a slow but consistent growth in scientific publications on agricultural finance in each decade, with India being the leading contributor. The Agricultural Finance Review recorded the most articles and citations related to the research domain. The results suggest a shift in the research clusters towards productivity and growth aspects, socioeconomic factors, and risk management function of agricultural finance including climate change adaptation. The study presents the findings of a bibliometric analysis, focusing on standard indicators such as publication growth, dominant research clusters in the selected region, collaboration, productive authors and countries, top institutions, primary journals, and high impact articles.*

Keywords: *Agricultural finance; South Asia; India, Pakistan; Sri Lanka*

Introduction

Availability of credit for agriculture, farm size, fertilizer usage, and labor input are factors that significantly influence farm productivity. Agricultural credit and size of farms are the key elements that play a pivotal role in enhancing productivity and technical efficiency for smallholder farmers (Chandio et al., 2019). Short-term loans have a greater influence on productivity compared to long-term loans (Chandio et al., 2018; Narayanan, 2016). Access to agricultural credit promotes the embracing of modern farming techniques and private sector investments in agriculture (Sidhu & Gill, 2006). Nevertheless, disadvantaged rural communities face numerous challenges in obtaining institutional credit, including high transaction costs, complicated procedures, lack of collateral, lack of lease agreements, bankers' reluctance to provide small loans due to perceived unprofitability, etc. (Bathla et al., 2019; Zulfiqar et al., 2021).

Several socioeconomic factors, including education, experience, total land tenure, monthly income, household size, perception of the risk of heavy rain fall, proximity to credit sources, and accessibility all exhibited a positive correlation with agricultural credit acceptance, especially in high-risk regions, necessitating the credit policies not only to address the specific challenges faced by farmers in such regions, but also need for the existing credit policies to be revised taking the protection of the interests of tenant farmers who lack collateral into account (E. Saqib et al., 2018; Mehedi et al., 2020; Saqib et al., 2016). While national credit policies have had some success in increasing the share of households with access to formal credit, their effectiveness is relatively weaker when considering the total amount of credit requested and received by borrowers (Hussain & Thapa, 2012).

Government-owned banks exhibit a lending pattern influenced by electoral cycles, with agricultural credit witnessing a notable increase during election years. The increment is particularly significant in highly competitive districts, while private banks do not demonstrate the same targeting behavior. Elections impact loan repayment, but the credit booms during election years do not substantially affect agricultural output (Cole, 2009). Consequently, government institutions are deemed less cost-effective for rural finance provision. To improve cost-effectiveness, strategies such as reducing loan defaults and focusing on smallholders in agriculture should be implemented (Khandker & Faruquee, 2003).

Agricultural income comprises around 60 percent of the total income for an average farm household. The majority of farmers turn to the credit market to secure funds for crops, labor expenses, and machinery rentals, while seeing potential savings of up to 25 percent when purchasing inputs for cash. Middlemen play a key role in the rural economy as by providing financial assistance and buying goods, with only a small portion of transactions conducted in cash. Repayment of borrowed money by farmers typically occurs after crop sales. By exploring alternative innovative and ethical solutions, alternative approaches to providing agricultural credit, such as Islamic finance modes, can offer promising avenues in this regard (Kaleem & Wajid, 2009).

Extensive research on agricultural finance has predominantly concentrated on sub-Saharan African countries (Sifa & Wiryono, 2022), while some attention given to certain countries in the Indian subcontinent. Notably, Pakistan (Ahmad & Afzal, 2019, 2022; Akram et al., 2008; Chaiya et al., 2023; Chandio et al., 2019; Chandio et al., 2018; Hussain & Thapa, 2016; Kaleem & Ahmad, 2016; Khandker & Faruquee, 2003; Saqib et al., 2016; Shahab E Saqib et al., 2018;

S. E. Saqib et al., 2018; Sher et al., 2021; Zulfiqar et al., 2021) and India (Bharti, 2018; Bhaskaran, 2017; Cole, 2009; Dey et al., 2023; Misra et al., 2016; Sangwan, 1986; Savitha & Kumar K, 2016; Shankar, 2022; Yadav & Rao, 2022, 2023) emerge as the frontrunners, contributing to a substantial body of high-quality literature in agricultural finance. However, the advancements in agricultural finance literature in other Indian subcontinent countries, such as Sri Lanka (Piyatissa, 1982; Wanasinghe, 1982), Nepal (Dhakal, 2019), and Afghanistan (Moahid et al., 2020), may have been overlooked, highlighting the need for a comprehensive assessment of recent research trends in this field using reputable literature databases.

Many bibliometric studies have examined global agricultural finance research (Table 1), but further investigation using bibliometric analysis of the Indian subcontinent is warranted. Bibliometric research is done in a research field to help authors find relevant papers, improve their literary contribution, and increase article visibility through more citations. Furthermore, journal editors, publishers and researchers must identify hot research topics and trends in South Asia's agricultural finance domain, which can be accomplished by tracing research history, analyzing relevant materials, identifying the gaps and evaluating the researchers and their work. Research articles written employing a bibliometric approach are more scientific, resulting in enhanced influence in their research field (Kasa & Nock, 2009; Pandey et al., 2018; Zhang, 2007).

Although a plenty of bibliometrics studies exist in the domain of microfinance with respect to some South Asian countries, we have not included them in our study for discussion. This decision arises from the broader aspects of these studies, encompassing both agricultural and non-agricultural finance. As a result, they may not directly address our research questions and objectives. Nevertheless, it is noteworthy that both sets of studies (i.e. agricultural and non-agricultural finance), reveal significant progress in agricultural finance research on an annual basis.

Table 1: Prior Research on Bibliometric Review of Agricultural Finance

Title and Author(s)	Domain/Search Strategy	Data Source & Scope	TDE	Bibliometric/Review Indicator
1 Bibliometric study on relationship of agricultural credit with farmer distress Pandey et al.(Pandey et al., 2018)	Farmer and suicide or distress Farmer suicide and agrarian distress	Scopus	317	- Research time frame: (1945-2016) - Bibliometric analysis: Number of articles published over the years. Top five keywords from research publications. Geographical locations of published papers. Top ten authors with highest contribution - Analyzed dimensions: Network analysis.

				Journal statistics: different sources of publications and top 10 source titles
				- Theoretical contributions
				- Managerial implications
2	The Bibliometric Analysis on The Worldwide Agricultural Financing Literature: The Mapping and Direction. Sifa & Wiryono(Sifa & Wiryono, 2022)	"agricultural credit" OR "agricultural financing" OR "agricultural funding"	Scopus 224	<ul style="list-style-type: none"> - Research time frame: (2012-2021) - Citation metrics: annual distribution of agricultural financing papers - The productive authors: most frequently authors in agricultural financing papers - The productive journals: most frequent journals in agricultural financing papers. - The productive countries: countries covered in agricultural financing studies. - The impactful articles - Top Frequent Author's Keywords: Mapping and direction
3	Bibliometric study on agriculture finance Zaharia, Ionescu, & Mihai(Zaharia, Ionescu, & Mihai, 2018)*	N/A	Scopus N/A	<ul style="list-style-type: none"> - Research time frame (1960-2016) - Evolution of research during 1960–2016-time frames - Dissemination of literature on agricultural finance by authors - Distribution of literature on agricultural finance by document type - Distribution of agriculture finance literature by language - Distribution of agriculture finance literature by field of study and regions. - Association maps of key- words in the subject area, determined from the titles and abstracts of the analyzed documents. - Highlighted results: Increase in agricultural finance publications worldwide, - BRIC countries have more publications than those from the USA.

- **Emphasized topics:** The role of governments in financing agriculture for development, sustainability, resource management, food safety and security.
- **Other issues:** Size of population, education, environmental management, policy formation, market relations, and agricultural credit.

*Full Text Not Accessible; TDE: Total Documents Extracted

This paper investigates the evolution of South Asian agricultural finance research publications. Thus, we investigate significant publication growth, examine the literary landscape and broader trends to identify the prevailing research themes in the domain. Additionally, this study addresses these key questions: Which research networks and collaborators are the best? What field contributions are notable? How did they influence agricultural finance research? What countries have driven this research and are there differences in their performance? What are top South Asian agricultural finance research institutions and their research concentrations? Given the publication landscape, which journals dominate this field?

To the best of our knowledge, this is the first attempt at bibliometric analysis and mapping using the Scopus database in the chosen topic. Thus, the main objective of the paper is to analyze the existing literature on agricultural finance research pertaining to South Asia to gain a better knowledge of worldwide research trends in agricultural finance related to South Asia. While selecting the data set, we did not set a filter for time in order to capture all research papers published in the field up to May 31, 2023, which is the time this research was conducted.

This study has several findings. We begin by introducing the significant aspects of agricultural finance research with respect to countries, institutions, authors, journals, articles, collaboration specifically pertaining to the Indian subcontinent. Next, we identify the most relevant areas of research: (1) The interconnection and linkage between typologies such as smallholders, access to credit, credit fungibility, food security, and Pakistan in the context of agricultural credit; (2) The grouping of agricultural finance, financial inclusion, and non-performing assets due to the significant challenges posed by the latter in achieving financial inclusion; (3) The utilization of disaster risk management strategies, diversification, and a probit model to guide agricultural financing; (4) The impact of social groups on the dynamics of agricultural finance in India and the development relevant policies or initiatives. Subsequently, we engage in examination of each theme by employing keyword and thematic analyses, including quadrant and network analysis methodologies. Ultimately, our analysis enables us to pinpoint potential avenues for future research on this topic.

The paper is organized chronologically, to ensure a coherent comprehension of the research. Section 2 provides a clear explanation of the research framework, including the data sources, compilation procedure, and extraction methods. Section 3 then presents the findings using descriptive analysis and visualization techniques. A comprehensive analysis of the findings is presented in Section 4 to offer valuable insights and interpretations. The conclusion

summarizes the practical implications, suggests possible research avenues, and acknowledges any limitations observed during the study in Section 5.

Research Framework

Sources of the Data and Search Techniques

The Scopus database was employed to conduct this bibliometric analysis as of 31st May 2023. Prior studies have demonstrated that the Scopus database is the most extensive collection of abstracts and citations for scientific research papers, making it particularly well-suited for bibliometric analysis. Similarly, the Scopus database was chosen for this study due to its emphasis on research studies spanning various disciplines, including life sciences, health sciences, physical sciences, and social sciences. As a result, it offers a more extensive range of relevant publications (Fahim & Mahadi, 2022).

To search the articles, we only opted for the titles of articles to search for, since the titles are the first impressions that readers look for (Annesley, 2010). The terms “agricultural finance together with some of its derivatives and alternatives”, with “names of countries in South Asia” solely and jointly, while applying Boolean operator AND between two sets of key terms were used to extract the relevant documents published in the field of agricultural finance research in South Asian countries (Table 2). The identified terms were expected to be contained in the titles of the articles. The titles stand for the respective topics, which correspond to research areas and their objective(s). We did not limit the search by publishing years to identify the latest trends, since our search results ultimately contained a very limited number of titles on the topic we searched for.

Table 2: Data Collection Criteria

Search terms	(“agricultur* financ*” OR “agricultur* credit” OR “agricultur* investment*” OR “agricultur* lend*” OR “farm credit” OR “farm financ*”) AND (“South Asia” OR “India” OR “Srilanka” OR “Pakistan” OR “Nepal” OR “Afghanistan” OR “Bhutan” OR “Bangladesh” OR “Maldives” OR “SAARC” OR “Indian Subcontinent”)
Development Date	All available Periods (i.e., 1979 – 2023)
Database	Scopus
Subject Area	Journals categorized in: Social Sciences, Econometrics and Finance, Economics, Business, Management and Accounting, Agricultural and Biological Sciences, Environmental Science, Earth and Planetary Sciences, Engineering, Computer Science, Arts and Humanities, Energy, Material Science, Mathematics

Data Extraction

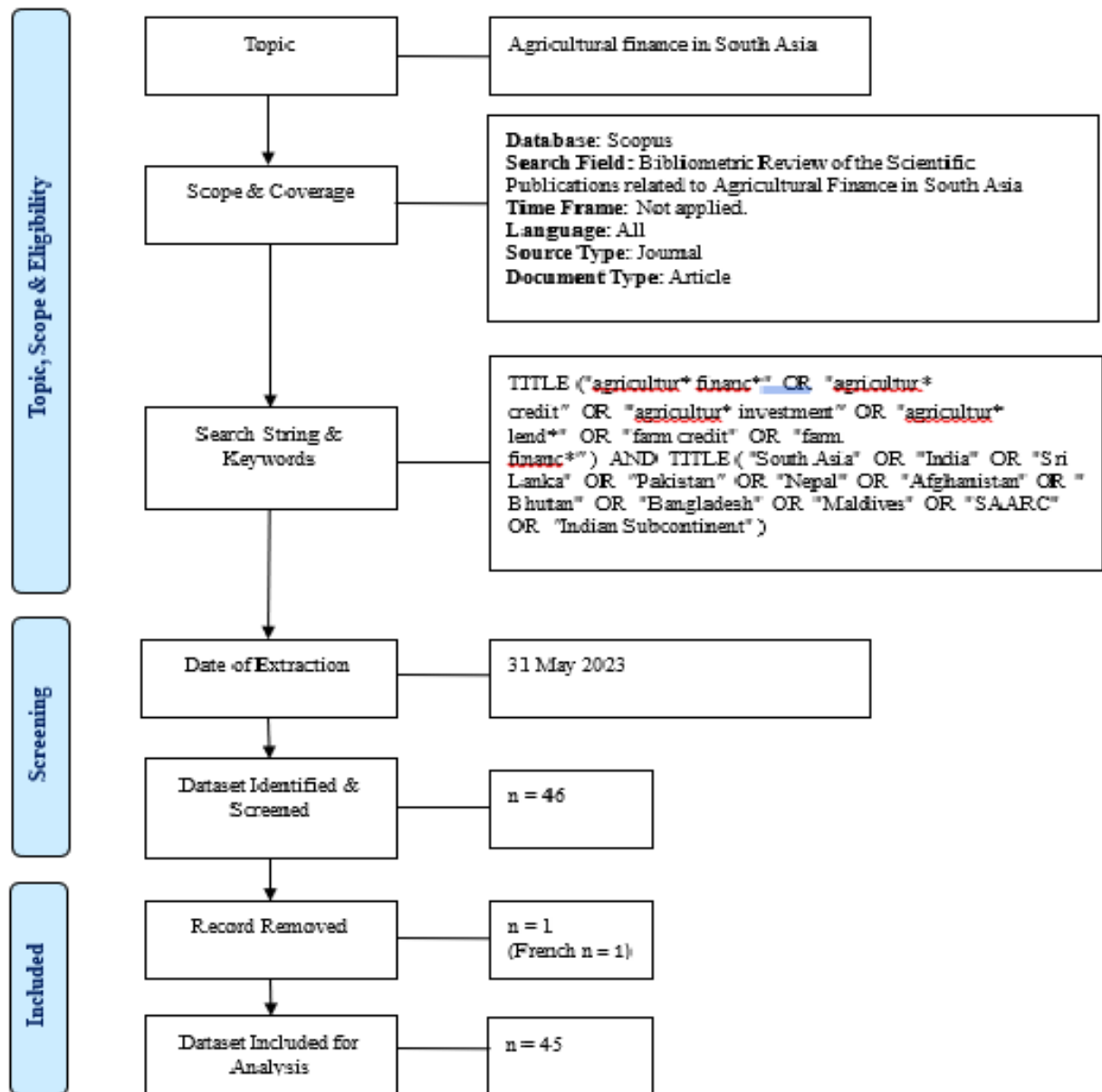


Figure 1: Search strategy-flow diagram and sample selection following the PRISMA Protocol.

One article published in French was excluded from the final sample. For bibliometric analysis of the documents, we utilized several tools. (i) Microsoft Excel office 365 was employed to determine publication frequency and proportion, and to generate informative graphs and charts; (ii) VOSviewer (version 1.6.19) and Biblioshiny was utilized for visualizing bibliometric networks; and (iii) Harzing's "Publish or Perish" (8.0) was used to calculate citation metrics. Our search approach is outlined in Figure 1.

Results

Descriptive Statistics

The dataset encompasses the timespan from 1979 to 2023, comprising 45 documents sourced from 32 distinct publications. The documents exhibit an average age of 12.4 years and garner an average of 18.04 citations a piece, translating to an average annual citation rate of 1.96 per document. A total of 1679 references are cited across the dataset.

The document collection comprises three distinct types: articles, book chapters, and reviews. The distribution of document types is as follows: 40 articles, 2 book chapters, and 3 reviews. Notably, author-assigned keywords across the sample totaled 117. With regard to authorial contributions, the dataset features 89 distinct authors, collectively responsible for authoring 45 documents. This translates to an average of 1.2 documents authored per individual. Further analysis reveals that 13 documents are single authored, while 32 documents are multi-authored by 76 authors. This distribution yields a collaboration index of 2.38, signifying a substantial degree of collaboration within the field.

Table 3: Descriptive Statistics of the Sample

Description	Results
General Information	
Timespan	1979:2023
Sources (Journals, Books, etc)	32
Documents	45
Average years from publication	12.4
Average citations per documents	18.04
Average citations per year per doc	1.96
References	1679
Document Types	
Article	40
Book chapter	2
Review	3
Document Contents	
Keywords Plus (ID)	106
Author's Keywords (DE)	117
Authors	
Authors	89
Author Appearances	107
Authors of single-authored documents	13
Authors of multi-authored documents	76
Authors Collaboration	
Single-authored documents	13
Documents per Author	0.506
Authors per Document	1.98
Co-Authors per Documents	2.38
Collaboration Index	2.38

Documents Analysis

We identified 45 documents from the Scopus database in total, covering all sorts of documents: an original article, or a review article or a book chapter. All the documents we accessed were in English. Original articles accounted for 88.9 percent (40) of all published materials, followed by review articles (3, 6.7%) and book chapters (2, 4.4%). All of the retrieved publications garnered 819 citations in total, with an average of 1.96 citations annually and 18.04 citations per article. Figure 2 demonstrates the growth of agricultural finance in South Asia publications over time.

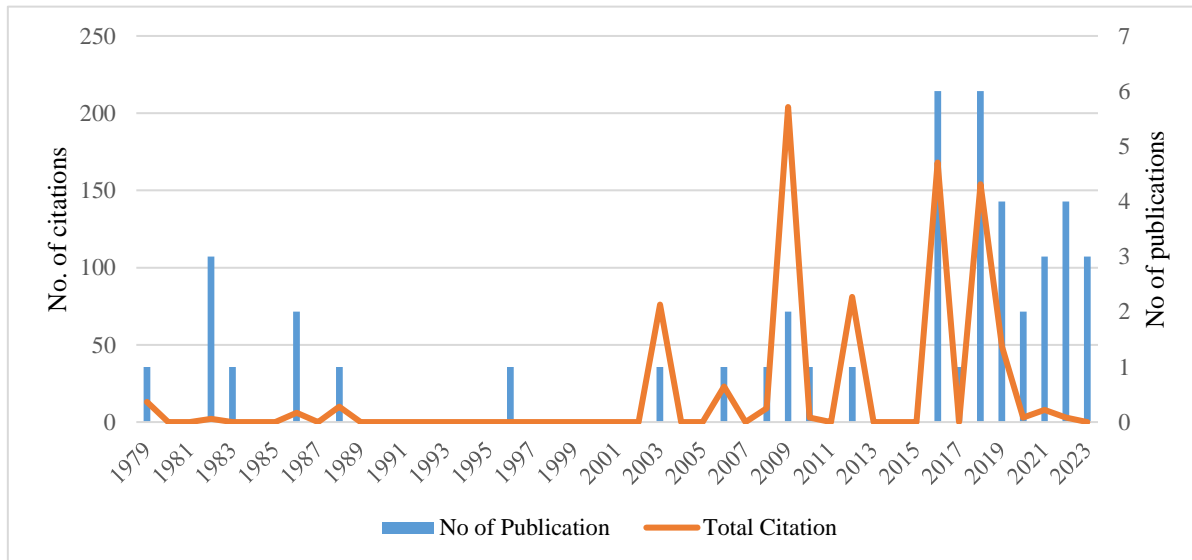


Figure 2: Growth of Publication

Examining the documents by the publication year helps the reader to perceive the shape of growth and recognition of the research topics over time (Gutiérrez-Salcedo et al., 2018). The highest output was observed in 2016 and 2018, with 6 documents per year, the lowest productivity for many years with only one publication, or without any publication. The study period evidenced a growth in the number of documents, albeit with some long-haul pause between 1988 and 1996 and declining trend from 2019 onwards (Figure 2). Table 4 shows the number of citations received by the articles published within a specific year in the dataset. The citation matrix per year for retrieved articles, which is calculated by dividing the number of citations by the number of publications annually, is given in Table 4. The year 2009 recorded the highest number of citations for published documents (102 citations/publication), while the lowest number of citations for documents was found in 1982 (0.67 citations per publication). However, the publications from 1983, 1996, 2017 and 2023 were not cited.

Table 4: Number of Publications and Citation Matrix per Year

Year	TP	NCP	TC	C/P	C/CP
2023	3	0	0	0.00	0.00
2022	4	2	3	0.75	1.50
2021	3	3	8	2.67	2.67
2020	2	2	3	1.50	1.50
2019	4	3	51	12.75	17.00
2018	6	6	154	25.67	25.67

2017	1	0	0	0.00	0.00
2016	6	6	169	28.17	28.17
2012	1	1	81	81.00	81.00
2010	1	2	7	3.50	3.50
2009	2	2	204	102.00	102.00
2008	1	1	9	9.00	9.00
2006	1	1	23	23.00	23.00
2003	1	1	76	76.00	76.00
1996	1	0	0	0.00	0.00
1988	1	1	10	10.00	10.00
1986	2	1	6	3.00	6.00
1983	1	0	0	0.00	0.00
1982	3	2	2	0.67	1.00
1979	1	1	13	13.00	13.00

Notes: TP: Total number of publications; NCP: Number of cited publications; TC: Total citations; C/P: Average citations per publication; C/CP: Average citations per cited publication

The ten most cited articles in agricultural finance research in South Asia are given in Table 5. The most cited article: “Fixing market failures or fixing elections? Agricultural credit in India” by Cole (2009), which was published in 2009 in American Economic Journal: Applied Economics has received 183 citations in total with the highest annual citations (12.20 citations/year), next to the article “Factors determining subsistence farmers' access to agricultural credit in flood-prone areas of Pakistan” by (S. E. Saqib et al., 2016). When Cole investigated the political capture of government institutions, in which banks were part of it, there was little empirical studies of the economic and political implications of such capture, particularly in India. Thus, Cole filled the gap and brought many insightful findings, such as a 5-10% increase of agricultural lending in government banking during electoral years and election-imminent districts, which did not increase in non-electoral years and private bank lending, in addition to the impact of the election on loan defaults and the lack of relationship between the election year credit boom and the agricultural output. Consequently, the average citations (12.20 cited per year) Cole received reflect a huge impact on the agricultural finance literature that place him as the most popular author in our selected sample according to the definition given by Ding and Cronin (2011).

Table 5: Top 10 Highly Cited Articles in Agricultural Finance Research in South Asia

NO	Documents	Title	Year	Cits	C/Y	NTC
1.	Cole (2009), Am Econ J Appl Econ	“Fixing market failures or fixing elections? Agricultural credit in India”	2009	183	12.20	1.79
2.	S. E. Saqib et al. (2016), Int J Disaster Risk Reduct	“Factors influencing farmers' adoption of agricultural credit as a risk management strategy: The case of Pakistan”	2016	84	10.50	3.00
3.	Hussain and Thapa (2012), Food Secur	“Smallholders' access to agricultural credit in Pakistan”	2012	81	6.75	1.00

4.	Khandker and Faruqee (2003), Agric Econ	“The impact of farm credit in Pakistan”	2003	76	3.62	1.00
5.	Shahab E Saqib et al. (2018), Kasetsart J Soc Sci	“Factors determining subsistence farmers' access to agricultural credit in flood-prone areas of Pakistan”	2018	66	11.00	2.57
6.	Chandio et al. (2018), Agric Financ Rev	“Effects of agricultural credit on wheat productivity of small farms in Sindh, Pakistan: Are short-term loans better?”	2018	53	8.83	2.06
7.	Narayanan (2016), Agric Econ	“The productivity of agricultural credit in India”	2016	49	6.13	1.75
8.	Chandio et al. (2019), J Saudi Soc Agric Sci	“The Nexus of Agricultural Credit, Farm Size and Technical Efficiency in Sindh, Pakistan: A Stochastic Production Frontier Approach”	2019	44	8.80	3.59
9.	Sidhu and Gill (2006), Indian J Agric Econ	“Agricultural credit and indebtedness in India: Some issues”	2006	23	1.28	1.00
10.	Kaleem and Rana (2009), Br Food J	“Application of Islamic banking instrument (Bai Salam) for agriculture financing in Pakistan”	2009	21	1.40	0.21

Notes: C/Y: Citation Per Year; NTC: Normalized Total Citations.

Authorship Analysis

A total of 13 (28.9%) articles were published by single authors, while the rest of the documents (32; 71.1%) were published by multi-authors (Table 6) representing the collaborative research pattern between the researchers of agricultural finance.

Table 6: No of Authors per Document

Author Count	No of Publications	Percentage
1	13	28.89%
2	17	37.78%
3	4	8.89%
4	7	15.56%
5	4	8.89%
	45	100.00%

Our dataset reveals that 89 authors published research on agricultural finance in South Asia during the period 1979 to 2023 as presented in Table 7. Kaleem, A. and Saqib, S.E. were the most productive authors in our dataset, each publishing 3 articles and receiving 26 and 96 citations respectively, whereas Cole, S. took the first place by total citations receiving 183 citations with one publication only. This shows that most publishing authors need not be highly cited.

Table 7: The 10 Most Influential Authors

Author	TP	TC	Author	TC	TP
1 Kaleem A.	3	26	Cole S.	183	1
2 Saqib S.E.	3	96	Ali U.	150	2
3 Afzal M.	2	2	Hussain A.	101	2
4 Ahmad D.	2	2	Thapa G.B.	101	2
5 Ahmad M.M.	2	96	Chandio A.A.	97	2
6 Ahmad S.	2	5	Jiang Y.	97	2
7 Ali U.	2	150	Saqib S.E.	96	3
8 Bharti N.	2	16	Ahmad M.M.	96	2
9 Chandio A.A.	2	97	Panezai S.	96	2
10 Hussain A.	2	101	Kuwornu J.K.M.	78	2

Notes: TP = total number of publications; TC = total citations

Sources Analysis

Table 8 provides the top ten journals on agricultural finance research in South Asia. Agricultural Finance Review and Indian Journal of Agricultural Economics published the most articles, 5 each Followed by the International Journal of Social Economics with 3 articles. On the other hand, American Economic Journal: Applied Economics emerged as the most impactful sources with 183 citations. International Journal of Disaster Risk Reduction was ranked second with 84 citations followed by Food Security with 81 citations as presented in table 8.

Table 8: To 10 Journals on Agricultural Finance on South Asia

Source	TP	TC	Source	TC
1 Agricultural Finance Review	5	73	American Economic Journal: Applied Economics	183
2 Indian Journal of Agricultural Economics	5	39	International Journal of Disaster Risk Reduction	84
3 International Journal of Social Economics	3	14	Food Security	81
4 Environmental Science and Pollution Research	2	4	Agricultural Economics	76
5 European Journal of Development Research	2	23	Agricultural Finance Review	73
6 Savings And Development	2	0	Kasetsart Journal of Social Sciences	66
7 Agricultural Administration	1	1	Agricultural Economics (UK)	49

8	Agricultural Economics	1	76	Journal Of the Saudi Society of Agricultural Sciences	44
9	Agricultural Economics (UK)	1	49	Indian Journal of Agricultural Economics	39
10	American Economic Journal: Applied Economics	1	183	European Journal of Development Research	23

Notes: TP: Total number of publications; TC: Total citations

Network Analysis

The institutions with the most publications and the highest impact are given in Table 9. A total of 81 organizations worldwide contributed to the production of research papers in this field. The most productive institution was the Asian Institute of Technology Thailand located in Thailand with five publications and 425 citations. Notable is the dominance of Indian and Pakistani institutions among the top ten most influential institutions with four Indian institutions and three Pakistanis institutions and one Afghan institution all coming from the Indian subcontinent. Citation-wise, Asian Institute of Technology Thailand retained the first place as the most cited organization with 425 citations followed by Harvard Business school and University of Balochistan with 183 and 150 citations respectively.

Table 9: To 10 Influential Institutions

	Affiliation	P	TC	Affiliation	TC
1	Asian Institute of Technology, Thailand	8	425	Asian Institute of Technology, Thailand	425
2	Indian Institute of Technology Kharagpur	3	0	Finance Unit, Harvard Business School, USA	183
3	National Bank for Agriculture and Rural Development	3	6	University of Balochistan, Pakistan	150
4	Utkal University	2	0	Sichuan Agricultural University Chengdu, China	141
5	Sichuan Agricultural University	2	99	Higher Education Department, Khyber Pakhtunkhwa, Pakistan	84
6	University of Balochistan	2	150	World Bank, Washington Dc, USA	76
7	University of Management and Technology	2	5	Higher Education Department, Pakistan	66
8	COMSATS Institute of Information Technology	2	5	Punjab Agricultural University, India	66
9	Symbiosis Institute of International Business	2	16	Indira Gandhi Institute of Development Research, India	49
10	Ministry of Agriculture	1	1	Lahore School of Economics, Pakistan	42

Notes: TP: Total number of publications; NCP: Number of cited publications; TC: Total citations; C/P: Average citations per publication; C/CP: Average citations per cited publication

Researchers from 16 different countries contributed to the publication of the retrieved documents. Table 10 shows the top ten countries with the most publications and citations. Starting with publications, India was the top country in terms of publications, with 15 documents (33.33%). Pakistan was second, with 11 (24.44%) while Thailand was third, with 6 documents (13.33%). These results are in line with our findings of the most influential institutions. In terms of the most cited countries, Thailand topped the list with 427 citations from 10 publications. The United States and Pakistan accumulated 274 and 192 citations respectively in the second and third place respectively of most cited countries.

Table 10: Top 10 Countries Contributed to the Publication

Rank	Country	TP	Country	TC
1.	India	15	Thailand	427
2.	Pakistan	11	United States	274
3.	Thailand	10	Pakistan	192
4.	China	5	India	125
5.	United States	5	China	105
6.	Bangladesh	2	Nepal	22
7.	Nepal	2	Bangladesh	9
8.	Belgium	1	Belgium	4
9.	Czech Republic	1	Czech Republic	4
10.	Germany	1	Germany	4

Notes: TP: Total publications TC: Total citations

Content Analysis

Keyword Analysis

The VOSviewer application was used to map author keywords that have a minimum two occurrences which revealed terms such as agricultural credit and Pakistan as the most occurred keywords with 14 and 13 appearances respectively. The 10 most occurred authors keywords are presented in Table 11.

Table 11: Table 11. Most Occurred Author Keywords

Words	Occurrences
1 Agricultural credit	14
2 Pakistan	13
3 Access to credit	4
4 Probit model	4
5 Agriculture	3
6 Food security	3
7 Smallholders	3
8 Agriculture finance	2
9 Catastrophic risk	2
10 Credit fungibility	2

These keywords were clustered into four groups based on the similarity of the research field as shown in figure 3. Publications on similar topics in agricultural finance are denoted by circles of the same color. Each circle represents a different subfield of agricultural finance research. Particularly, the red cluster (cluster no. 1, 6 items) includes keywords such as smallholders, access to credit, credit fungibility, food security, agricultural credit and Pakistan. These terms are associated with the topic of “agricultural credit”. Green cluster (cluster no. 2, 4 items) covers the subfields of agricultural finance such as financial inclusion, and non-performing assets, since non-performing assets can pose significant challenges to financial inclusion in agricultural finance practices. In the blue cluster (cluster no. 3, 3 items), research publications discuss the topics of diversification associated with “catastrophic risk” which are usually analyzed through probit model. Finally, India and social groups were the two keywords appeared in the yellow cluster (cluster no. 4, 2), since the social groups play a crucial role in the process of agricultural finance in India.

Thematic Analysis

The thematic analysis illustrates the occurrence of prevailing research themes in the literature of agricultural finance in South Asia on the basis of the centrality and density dimensions in figure 4. The γ -axis represents centrality, which indicates the thematic relevance of a certain topic while the theme development or density is indicated by the κ -axis reflecting the evolution of a theme within the research field. The top right quadrant represents motor themes specifically for significant and well-developed clusters. Niche themes, on the other hand, are developed clusters that are less significant and are positioned in the upper left quadrant. On the bottom right are located the basic themes denoting underdeveloped clusters with significant importance. Underdeveloped themes with no significant value are known as emerging themes positioned at the lower left quadrant.



Figure 3: Author Keywords in Network Visualization Map

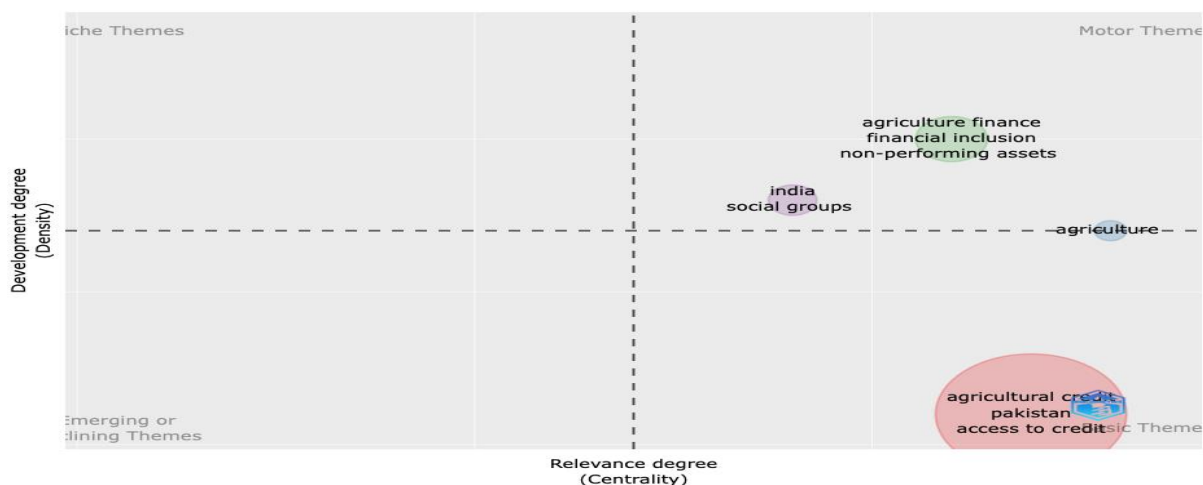


Figure 4: Density and Centrality of Agricultural Finance Publications

The green cluster comprising of three keywords (agricultural finance, financial inclusion, and non-performing assets) are designated to the top right quadrant of figure 4 as developed themes with significance importance. India and social groups of the purple cluster follow a similar interpretation as a motor theme. Terms such as agricultural credit, access to credit and Pakistan which formulate the red cluster manifest the relevance of an under-developed dense theme. Accordingly, the three terms have a substantial importance in the literature of agricultural finance despite being underdeveloped. Finally, the location of the blue cluster implies the importance of agricultural research publications which are equally splitted into developed and underdeveloped research themes.

Discussion

Bibliometric analysis is of paramount importance for examining literary trends and the state of knowledge in various subject areas through the use of different analytical techniques (Echchakoui, 2020). To date, only a small number of bibliometric studies investigating research on agricultural finance have been published. In our search, we found that Bhavna Pandey and her colleagues (Pandey et al., 2018) and Zaharia, A. and her colleagues (Zaharia et al., 2018) initially conducted a bibliometric study of agricultural finance research in 2018. Along the same lines, we found another analysis, focusing on research from 2012-2021, conducted by Eka Nurhalimatus Sifa and her colleague in 2022 (Sifa & Wiryono, 2022). We focused on agricultural finance research in South Asia in this study to uncover predominant (dominant) research trends, authorship collaboration and productivity, publication growth, country wise and institution wise productivity, and impactful articles and journals.

Previous research data suggested that agricultural finance research has shown an impressive upward trend, reflected in the year-on-year publications from 1995, albeit with a modest beginning from 1945, and steady growth from 2009 and beyond 2017. Our results reveal several years with no publications, particularly notable in the period between 1989 and 2002, during which only one publication emerged in 1996. The peak number of articles published in a single year was six, observed in both 2016 and 2018. The dynamics of research activity in periods, such as periods of limited activity, noteworthy peaks, and long gaps of inactivity, highlight the need to address the underlying factors shaping these trends. Such exploration is

crucial for paving the way and providing the stakeholders with insights into the potential areas for future exploration.

Moving to the citation analysis, which focuses on the aggregate citations a document accumulated since its production, shows that recent publications are less likely to be top-cited or have a higher average citations per publication (three articles published in 2023 have received no citations) than older publications (2009 and 2016). Unlike new publications, old articles accumulate more citations over time. The most cited year found in our data set was 2009 as shown in Figure 2. Although 2009 is the most cited year in the data set and warrants further exploration into its significance, the accumulation of citations over times suggests a trend in which the impact of research increases over time and older publications remain influential. However, new metrics such as normalized citations indicate the need to capture the true impact of publications by eliminating the limitations of traditional citations and considering the truly influential factors such as the current publication year. A case in point, the most impactful document in our list based on normalized citations was “The nexus of agricultural credit, farm size and technical efficiency in Sindh, Pakistan: A stochastic production frontier approach” (3.59) despite its later publication in 2019 whereas the most cited article of our sample “Fixing market failures or fixing elections? Agricultural credit in India” which was published in 2009 received a normalized total citation of only 1.79.

Kaleem, A. and Saqib, E. were the most productive authors, contributing each with three publications followed by 14 authors with two publications each. Interestingly, none of these authors topped the list of the most cited authors of our dataset. The results presented in table 7 reveal Cole S. as the most cited authors with 183 citations from one article published by American Economic Journal: Applied Economics. In the second place was Ali U who accumulated 150 citations from two publications whereas Hussain A and Thapa G. B shared the third place with 101 citations each from two publications. This illustrates that publication volume does not necessarily correlate with higher citation rates, as there is a clear difference between productivity (quantity) and citation impact (quality). Certain authors can achieve more impact with fewer works, which is possible due to the significance of the particular publications. Therefore, by understanding the reasons for variations in citation, and the place of publication as a possible influencing factor, one could gain insights into the factors that contribute to the author’s impact.

Keyword analysis of our results reveals that agricultural finance, financial inclusion, and non-performing assets emerge as pivotal themes with profound significance. This imply a central role of these themes in the discourse. Therefore it may be relevant for stakeholders to address the key challenges and opportunities pertaining to these issues. India and social groups exhibit a parallel pattern in this context, which highlight the need to emphasize these issues and initiate relevant interventions at both national and societal levels. Noteworthy terms like agricultural credit, access to credit, and Pakistan hold substantial importance in the agricultural finance literature, despite their relative underdevelopment. This underdevelopment in meaning could suggest the vitality of these terms for integration into future research agendas, policy discussions, and further investigations.

Through thematic analysis, four distinct research clusters were discerned. The first cluster included smallholders, access to credit, credit fungibility, food security, agricultural credit, and Pakistan, all linked to the overarching theme of "agricultural credit." These terms are

interconnected and have a common thematic relevance, thus they are researched together in research narratives. The second cluster encompasses agricultural finance, financial inclusion, and non-performing assets, grouping them together due to substantial challenges posed by the latter in achieving financial inclusion. This addresses certain challenging issues and constraints like financial inclusion and non-performing assets, that trigger the attention of scholars and policymakers. The third cluster delves into the diversification related to "catastrophic risk" through a probit model, which can guide agriculture finance risk management strategies. Lastly, India and social groups form a separate cluster, underlining the critical role that social groups play in the dynamics of agricultural finance in India. This emphasizes the need to consider social aspects and group dynamics while developing agricultural financing policies or initiatives. These clusters provide academics and policymakers with information to leverage and prioritize research areas, address significant challenges, and design programs that consider different factors of agricultural finance. The proliferation of four clusters indicates the development of specialized and focused themes, necessitating that researchers focus on certain features in order to conduct a deeper and more comprehensive study.

However, in prior studies, such as the study by Sifa and Wiryo (2022), the authors presented the primary focus of the ten most cited articles. It revolved around two central themes: the critical role of access to agricultural credit in climate adaptation, and the impact of socio-economic factors on access to finance, suggesting the influential aspect and considerable attention of these two topics in the literature, which could guide stakeholders to focus on these critical issues in the field of agricultural finance. Furthermore, their study identified an additional set of four key themes from the remaining highly cited papers. These encompassed the influence of credit on the technical output of farmers, the determinants of and motivation for participation in financial services, credit as a risk management strategy, and the role of credit in fostering both agricultural productivity and overall agricultural growth. This diversity of themes suggests the dynamics of agricultural finance and its role in different aspects of agricultural development, such as interaction of credit with various aspects of agriculture, the design of financial inclusion programs, and risk management strategies.

In terms of geographical focus, according to the study of Sifa and Wiryo (2022), the ten most cited articles mainly covered sub-Saharan African countries, namely, Ghana as the most studied country with five articles, followed by Pakistan with two articles, India and Bangladesh each with one article and an article with a global perspective. This means that agricultural finance research has placed a considerable emphasis on this region. This historical backdrop may affect the existing knowledge base and research goals in the topic. Since our study covers the southern Asia region, we found that only Pakistan and India from the Indian subcontinent accounted for 70% and 30%, respectively, of ten most cited articles, emphasizing their significance in the discourse. However, regional dynamics and research objectives might be better understood by identifying the elements that contribute to these concentrations with variation. Looking at the entire group of the extracted articles, we found that India was covered by the majority of articles with 20 articles, followed by Pakistan with 18 articles, Bangladesh with three articles, Sri Lanka with two articles, Nepal and Afghanistan each with one article. While discrepancies in article coverage among these nations may point to unanswered questions or neglected areas of study, they also present promising avenues for further investigation into these nations' agricultural finance systems, which could improve our knowledge of the field as a whole.

Previous bibliometric studies, specifically of that Sifa and Wiryo (2022), showed that publications on “agricultural finance” came mainly from the academic bodies in the USA. However, our results revealed an insignificant influence of USA publications with regards to agricultural finance research pertaining to South Asia. The participation of regional research institutions and researchers largely accounts for the potential region-specific character of the research themes and the influence of local factors on research production, which is why the contribution of US research institutions within the South Asian agricultural finance context is limited. India and Pakistan emerged as the top two publishing countries of agricultural finance research publication in South Asia. As a result of this preponderance, it is reasonable to assume that scholars in these nations are shifting their publication patterns to prioritize local viewpoints and circumstances. Researchers and academic institutions in South Asia may thus be able to take advantage of new opportunities for international cooperation in agricultural finance.

For South Asian agricultural finance research, some hypotheses can be put forward that agricultural finance research related to productivity and growth, the influence of socio-economic factors on access to finance, as well as the role of agricultural finance in risk management strategies, especially in climate change adaptation, may become more important in the future years than the other clusters that have previously dominated agricultural finance research in the South Asian region, as the content analysis of the high impactful articles reveals. These predictions, if proved, have ramifications for policy, practice, and ongoing academic research, perhaps leading to a more diverse and dynamic study environment in the subject.

Conclusion

Our study analyzed South Asian agricultural finance research output, revealing an average document age of 12.4 years, 819 citations, and 1.96 annual average citation rates. The dataset included 1,679 references consisting of articles (89%), reviews (7%), and book chapters (4%). The study found 117 author-assigned keywords and 89 distinct authors, with an average of 1.2 documents per author. Although 13 documents were single authored, 32 were multi-authored with 76 authors and a 2.38 collaboration index, demonstrating the breadth and academic collaboration in South Asian agricultural finance research.

The analysis of publication and citation trends in the topic reveals a complex track of scholarly contributions. There has been an overall increase in publishing, with a pause between 1988 and 1996. However, publication rates have been dropping since 2019, and citation rates vary greatly by year. Cole (2009), a prominent author in the study, by investigating the political capture of government institutions, including banks, in India, he filled the gap and brought many insightful findings. Thus, his article earned 183 total citations and an extraordinary annual citation rate of 12.20, placing him as the most popular author in the study. However, some articles earned no citations, demonstrating the changing effect of research throughout time. Peaks and troughs in both publishing and citation rates show the dynamic nature of the scholarly discourse in the area, which shapes agricultural finance research.

Between 1979 and 2023, 89 authors contributed to our topic on collaborative efforts prevailed, with multi-author collaborations accounting for 71% of articles and individuals authoring 29%. Kaleem, A. and Saqib, S.E. were productive authors, each with three publications. However, their total citations did not always correlate with the number of publications produced. Relatively, Saqib, S.E. earned more citations, while Cole, S’s dominance in total citations

despite having only one publication demonstrates that prolific publication does not always translate into high citation impact. This emphasizes the complex relationship between author productivity and citation counts and the various methods in which scholarly contributions are recognized and valued within the academic community.

Academic journals Agricultural Finance Review and Indian Journal of Agricultural Economics emerged as prominent platforms, each publishing five papers, followed by the International Journal of Social Economics with three publications, while the American Economic Journal: Applied Economics has 183 citations demonstrating its significance in the field. The International Journal of Disaster Risk Reduction and Food Security have also had a significant impact, placing second and third in terms of citations.

The research institutions in this field exhibit diverse collaboration with 81 active contributing organizations. The Asian Institute of Technology Thailand is the most productive, with five publications and 425 citations. Indian and Pakistani institutions dominate the top ten most influential organizations. The Asian Institute of Technology Thailand has a lasting impact, followed by Harvard Business School and the University of Balochistan. These findings show global collaboration and scholarly excellence, providing insights for future collaborations. The study of publication and citation patterns in the field highlights the global scope of research contributions. India is the leading contributor, accounting for 33.33% of the publication, followed by Pakistan (24.44%) and Thailand (13.33%). Thailand leads in citation impact, with 427 citations from 10 publications. The United States and Pakistan follow closely behind, with 274 and 192 citations respectively, confirming their status as significant contributors to the research topic.

Our analysis of keywords revealed key themes and research clusters, with agricultural credit and Pakistan being the most prevalent keywords. Access to credit, probit model, agriculture, food security, smallholders, agriculture finance, catastrophic risk, and credit fungibility are other key topics. Four research clusters were identified: agricultural credit, financial inclusion, risk management, and Indian social groups. These findings provide a roadmap for understanding and navigating the complex landscape of agricultural finance research, possibly informing directions for further research, policy, and strategic interventions.

This bibliometric study has certain limitations that should be taken into account. First, our dataset is limited to Scopus publications, which is a small portion of the worldwide literature in this research domain, as the literature in the subject is thought to be much larger than the data included in the study. Second, the inclusion criteria were based on titles, potentially excluding some articles without the associated phrase. Third, the number of citations used in the impact assessment may not be an accurate reflection of the quality of each research.

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