# Review Article
# Bibliometric Analysis on Rural Non-Farm Sector: Study on Scopus Database During 1990-2022


## ABSTRACT

The rural non-farm sector is increasingly playing an essential role in the development of rural areas around the world. Specifically, as agriculture in the region's contribution to the economy declines, the rural non-farm sector will need to increasingly become a significant provider of employment and income to many rural people. However, rural non-farm employment is not a substitute for employment in agriculture but rather an additional measure. Promoting the rural non-farm sector should be undertaken within the border context of rural development. Bibliometric analysis is a rare contribution to the field of Rural Non-Farm research. Therefore, a bibliometric analysis of the publications may provide a direction for future research and a detailed topic analysis. The global literature about Rural Non-Farm published between 1990 and 2022 was scanned from the Scopus database. The keywords used to get the relevant publications are given as "Rural" AND "Non-Farm" in the search criteria "Article Title, Abstract, Keyword". A total of 1135 papers were chosen for this study to conduct bibliometric analysis. VOSviewer is used to carry out the bibliometric analysis. VOSviewer software was used to create maps based on network data of scientific publications displaying relationships among researchers, countries, and scientific journals. Author keywords are used to explore the co-occurrence of different terms connected to rural non-farm research. Results reveal close and robust interconnections between the top authors, suggesting a solid research link. "Poverty", "Agriculture" "Rural Development", and "non-farm employment" are the keywords the authors most repeatedly use. "World Development" Journal has the highest number of citations (2607) with a total link strength of 172. The United States and India have the highest number of articles in the Rural Non-Farm Sector. This study on Rural Non-Farm would help future researchers gain significant insights into the current status of existing literature and assist in conducting a qualitative literature review.



Keywords: Rural Non-Farm, Scopus, Bibliometric Analysis, VOSviewer, Rural Development




## 1. INTRODUCTION

The importance of the RNFS in the rural Indian economy has been significant since the early 1970s. Nowadays, the rural non-farm sector has become an essential topic of discussion among researchers and policymakers. Many works of literature have been found concerning the nature, compositions, and determinants of the RNFS as a basis of income and employment generation. In most developing countries, most of the population lives in rural areas. This population continues to grow substantially; given limits to arable land, this growth in the rural labour force will not be productively absorbed in the agricultural sector. Either migration of urban areas or the development of non-farm employment in ruralareas must take up the slack (Lanjouw & Lanjouw, 2001). Policymakers have high expectations for the rural non-farm economy.

The development of rural non-agricultural employment has been considered an important strategy to solve the problems of poverty and regional disparity problems in most labour surplus and poverty-stricken countries. The rural non-farm sector has the potential to generate sizable employment opportunities in rural areas. Considering the growing labour force, reducing the average size of landholdings, declining employment elasticity in agriculture, and rising literacy rate, more workers have begun taking up jobs in the rural non-

agricultural sector to ease their subsistence. RNFS is vital for achieving our national objective of integrating rural development as it opens up either supplementary or alternative sources of income to rural farmers. The importance of the non-farm sector as a source of employment is well recognised in the development process. Rural non-farm activities are part of a diversified livelihood portfolio for most rural people in developing economies.

A comprehensive assessment of existing knowledge is a possible recognition of bibliometric analysis because only a few studies have been discovered through thorough literature surveys. So, the primary goal of this research is to do a bibliometric analysis that aids in examining the body of literature on rural non-farm. A bibliometric analysis that synthesises a vast amount of bibliometric data is diligently carried out to portray the status of cognitive structure and rising tendencies in rural non-farm areas. Literature evaluations on the rural non-farm sector have not been the focus of many studies. Consequently, the demand for bibliometric analysis allows for a comprehensive perspective of extant knowledge. To express the status of cognitive structure and emerging trends of Rural Non-Farm, the primary goal of this article is to conduct a bibliometric analysis that synthesises a large quantity of bibliometric data. The introduction and backdrop of the study are the main topics of the first section of the paper. The essay's second section covers the different databases for literature reviews, the selection criteria, and the analytic tool. The summary of the descriptive analysis, followed by the bibliometric analysis, conclusion, and areas for further investigation, are presented in the third section of the work.

## 2. THEORETICAL FRAMEWORK

Rural development thinking originated in the 1950s. The strength of the agricultural economy is critical to the growth of the non-farm sector. In other words, resolving poverty is difficult without agricultural expansion in rural regions (Ellis & Biggs, 2001). Rural areas are evolving, especially in terms of population, diversity, and growing ties to national and global economies; if there is a liberal entrance for the rural poor into the RNFS by reducing general development limitations, promoting urban-rural linkages, and allowing enterprise development, division or sub-sector interferences aid in helping the Rural Non-farm Sector's growth in rural regions (Ashley & Maxwell, 2001). The rural non-farm (RNF) sector plays a crucial role in contributing to economic growth by providing alternative livelihood opportunities for rural households, thereby reducing dependency on agriculture(Lawi et al., 2022). Studies have shown that the income generated from the RNF sector significantly impacts household consumption levels, with variables like education, access to credit, and training influencing households' decisions to engage in non-farm activities(Dufera et al., 2023). However, in regions like rural Gujarat, the non-farm sector has mainly flourished in urban or industrial areas, leading to a distress-led scenario in rural regions, highlighting the need for better sectoral and spatial linkages to strengthen rural non-farm employment and foster rurbanisation processes for sustainable economic development(Shah &Pattnaik, 2021). This shift towards promoting and supporting non-farm livelihood diversification reflects a structural transformation away from agriculture in certain developing countries, emphasizing the importance of enhancing the RNF sector for overall economic growth(Lawi et al., 2022).

A paper on rural livelihoods in Kenya, Uganda, Tanzania and Malawi investigates the micro-level circumstances of the rural poor using the sustainable livelihoods framework as a guide for the research methods implemented and making micro-macro links between the experience of rural poverty and the strategic policies designed to attack its causes and

reduce its incidence. All four countries considered in this document have Poverty Reduction Strategy Papers (PRSPs) or their equivalent. The article emphasises characteristics of rural poverty that are common throughout the region. At the macro level, approaches to poverty reduction are set out in the Poverty Reduction Strategy Papers or equivalent documents written between 1999 and 2001, and the question that must be asked is whether these documents formulate the problem of poverty reduction of poverty in a way that addresses the natural situation barriers rural citizens face in their efforts to build pathways out of poverty. At the micro level, the livelihoods framework is used to get a more accurate picture of the assets and activity patterns that characterise people experiencing poverty in particular and the institutional context that blocks or enables rural citizens to pursue livelihoods and safer lives over time.One study in Kiambu County, Kenya, identified various types of Rural Non-Farm Enterprises (RNFEs) supporting the agricultural sector and their impact on rural livelihoods (Mureithi et al., 2022). Another study in India analyzed the motivating factors and entry barriers for different categories of RNFS employment, highlighting education, access to credit, and social capital as key determinants (Drall& Mandal, 2020). Additionally, a study in India focused on the effects of non-farm activities on rural household incomes, emphasizing the importance of structural changes in the rural economy for income enhancement (Kapoor & Kapoor, 2021). These studies collectively contribute valuable insights into the dynamics, determinants, and impacts of the Rural Non-Farm Sector, offering policymakers essential information for developing strategies to support rural livelihoods and economic diversification.

While doing the existing literature survey, it is observed that very few studies have been carried out on rural non-farm with particular reference to bibliometric analysis. Bibliometric analysis is a rare contribution in rural non-farm research, hence the need for the study. This research aims to investigate the papers published in rural non-farm between 1990-2022 and provide a comprehensive analysis of the existing literature. An effort is made to answer the following research questions through this study. The following research questions have been framed: -

1. What is the pattern of Rural Non-Farm articles published between 1990-2022?
2. Which are the most prominent authors, and how many citations have they received?
3. Which are the top 10 countries contributing to Rural Non-Farm research?
4. Which are the top articles and their citations?

## 3. METHODOLOGY

Different literature review methods exist, such as systematic literature review, meta-analysis, and bibliometric analysis. The bibliometric analysis method is used in this study to analyse the data. This study collects data from the Scopus database by inputting the keywords. For searching articles on rural non-farm, combinations of two keywords such as "Rural" and "Non-Farm" were used. Then, the data collected were saved in CSV format in an Excel sheet, and the papers were extracted using the inclusion and exclusion criteria (Kumar & Yadav, 2022).

This study uses VOSviewer software since it can potentially exhibit sizeable bibliometric maps simply and understandably. The software also provides built-in features like zooming and adjusting the size of the maps. The descriptive analysis gives out year-wise publication trends of the articles, the top contributing journals and the top contributing authors. All the graphs and tables for the analysis were done with the help of the data saved in the Excel sheet in CSV format. The second step shows bibliometric analysis, including citation

analysis, bibliometric coupling, and analysis of clusters formed. VOSviewer software was used along with the data in an Excel sheet to get the visualisation done for bibliometric analysis (Kumar & Yadav, 2022).

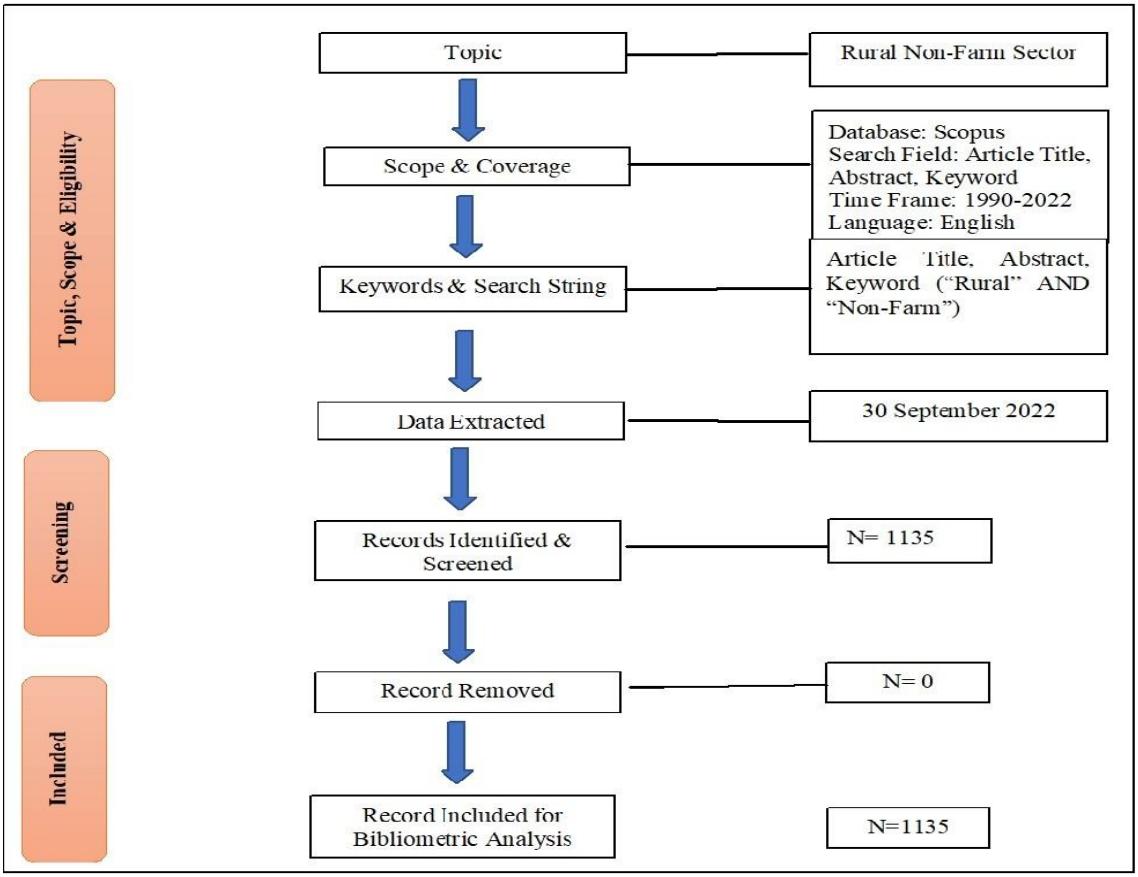
### 3.1. Search Strategy and Data Collection

Based on the aim and scope of this study, a search strategy was adopted to identify relevant literature concerning the core topic, i.e., Rural Non-Farm. The search strategy included a widely used reputable online database, Scopus, for data collection with keywords ("Rural" AND "Non-Farm") in the article search field of "Article Title, Abstract, Keyword".

### 3.2. Data Screening

From the Scopus database, use the search field of "Article Title, Abstract, Keyword" by using the keywords "Rural" AND "Non-Farm" for a period from 1990 to 2022. The language selected for the article selection was "English". The data was extracted on 30th September 2022. The records were exported in CSV format in an Excel sheet. Out of the 1249 articles after giving the keyword, after the inclusion and exclusion criteria used for selecting articles, 1135 records were finally included for the bibliometric analysis.

**Figure 1:** Flow diagram of the search in the Scopus database




***Source: Author***

### 3.3. Software Used

The ease of access to free and open-source software makes it appropriate to conduct the bibliometric analysis. Bibliometric software, VOSviewer, was used with the data in an Excel sheet to get the visualisations done for bibliometric analysis. It also includes citation analysis, bibliometric coupling, co-authorship networks, etc.

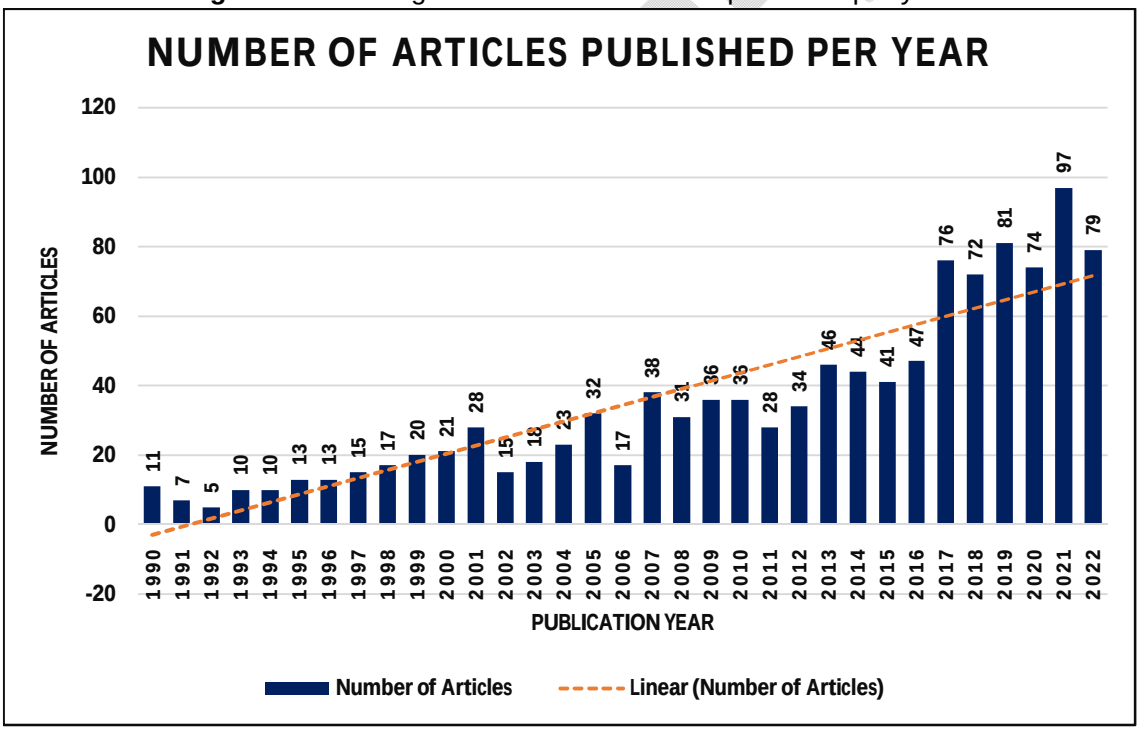
## 4. RESULTS

### 4.1. DESCRIPTIVE ANALYSIS

#### 4.1.1. Year-wise publication trend

The wise chart exhibits the yearly records published from 1990 to 2022. Figure 2 indicates that though there is an increasing rate of papers being published, most of the documents will be published in 2021. The chart suggests a fluctuating trend, which shows that the number of articles published has increased. A massive volume of articles was published from 2017 to 2022, which shows the importance of this area, and therefore, there is a lot more to be explored.

**Figure 2:** Flow diagram of the No of articles published per year




***Source: Author***

#### 4.1.2. Top Contributing Journals

Table 1 represents the top contributing journals in Rural Non-Farm with the highest count of documents. Out of 1135 articles selected for the analysis, the most documents were published in the "Indian Journal of Labour Economics" with 48 documents. "World Development" journal and "Food Policy" Journal have 35 and 29 documents each per source from 1990 to 2022.

**Table 1:** Top contributing journals

| Source | Count of Documents |
|---|---|
| Indian Journal of Labour Economics | 48 |
| World Development | 35 |
| Food Policy | 29 |
| Journal of Rural Development | 25 |
| Indian Journal of Agricultural Economics | 23 |
| Economic and Political Weekly | 22 |
| Journal of Rural Studies | 20 |
| Sustainability (Switzerland) | 15 |
| Journal of Development Studies | 14 |
| Agrekon | 14 |
| Pakistan Development Review | 11 |
| Land use policy | 11 |
| Quarterly Journal of International Agriculture | 10 |
| Journal of International Development | 10 |
| European Journal of Development Research | 10 |

***Source: Author***

Table 2 represents the top contributing journals in Rural Non-Farm with the most citations. Out of 1135 articles selected for the analysis, "World Development" Journal have 35 articles with the highest number of citations of 2607. Food policy has 2327 citations and 29 articles.

**Table 2:** Top contributing journals with the highest citation

| Source | Count of Documents | No of Citations |
|---|---|---|
| World Development | 35 | 2607 |
| Food Policy | 29 | 2327 |
| Journal of Rural Studies | 20 | 732 |
| Agricultural Systems | 8 | 604 |
| Ecological Economics | 7 | 603 |
| Journal of Development Studies | 14 | 569 |
| Clinical and Experimental Allergy | 3 | 528 |
| Journal of Development Economics | 5 | 477 |
| Development Policy Review | 8 | 375 |
| Economic and Political Weekly | 22 | 325 |
| Journal of Agricultural Economics | 8 | 310 |
| Land use policy | 11 | 284 |
| Agricultural Economics | 3 | 271 |
| American Journal of Agricultural Economics | 6 | 237 |
| Landscape and Urban Planning | 2 | 223 |

***Source: Author***

### 4.1.3. Top contributing authors

Table 3 represents the top contributing authors in Rural Non-Farm with the highest number of citations and published articles. Thomas A. Reardon (Reardon t.) has the highest number of citations of 1185 in Rural Non-Farm, with seven documents in this area. (Rigg j.) and T.S.Jayne (Jayne t. s.) has 747 and 656 citations with a count of 6 documents each.

**Table 3:** Top contributing Authors with the highest citation

| Author | Count of Documents | Citations |
|---|---|---|
| Reardon t. | 7 | 1185 |
| Rigg j. | 6 | 747 |
| Jayne t. s. | 6 | 656 |
| Lanjouw p. | 4 | 550 |
| Ravallion m. | 4 | 543 |
| Datt g. | 2 | 454 |
| Barrett c. b. | 6 | 395 |
| Stamoulis k. | 3 | 388 |
| Haggblade s. | 3 | 384 |
| Headey d. d. | 2 | 361 |
| Deininger k. | 6 | 343 |
| Chamberlin j. | 5 | 338 |
| Abdulai a. | 2 | 311 |
| Vedeld p. | 2 | 310 |
| Davis p. | 4 | 308 |
| Hazell p. | 1 | 306 |
| Zezza a. | 3 | 305 |

***Source: Author***

### 4.2. BIBLIOMETRIC ANALYSIS (BIBLIOMETRIC MAPPING WITH VOSVIEWER)

Bibliometric analysis is a quantifiable method for assessing and observing the present position of research in a specific field of academic concerns (Garfield et al., 1964; Small, 1973; Dzikowski, 2018). This analysis gets a competitive edge compared to other means since, when compared with bibliometric analysis, conventional techniques depend on the personalised choice of literary texts and organise the analysis on some pre-decided criterion, thereby not catering to developmental features of research (Kajikawa et al., 2007). Bibliometric analysis is done to discover the highly cited paper in a particular research field (Kumar & Yadav, 2022). The papers are chosen from the Scopus database, and several methods are used to discover citations and the number of documents published. Citation is attained by citation analysis in VOSviewer. Table 4 shows the top 15 countries with the most Rural Non-Farm papers published. In Table 4, the presentation of publication is limited to the top 15 countries who have published their articles with a citation score of 200 or more are classified:-

**Table 4:** Top contributing Countries with the highest no of documents

| Sl No | Country | No of Documents | Citations | Total link strength |
|---|---|---|---|---|
| 1 | United States | 240 | 8461 | 660 |
| 2 | India | 237 | 1502 | 279 |
| 3 | United Kingdom | 97 | 3900 | 270 |
| 4 | Germany | 67 | 1095 | 180 |
| 5 | Ethiopia | 49 | 808 | 172 |
| 6 | China | 85 | 1222 | 140 |
| 7 | Ghana | 25 | 459 | 135 |
| 8 | Italy | 22 | 884 | 133 |
| 9 | Kenya | 26 | 1271 | 133 |
| 10 | Netherlands | 32 | 1171 | 120 |
| 11 | Australia | 43 | 843 | 116 |
| 12 | South Africa | 54 | 588 | 112 |

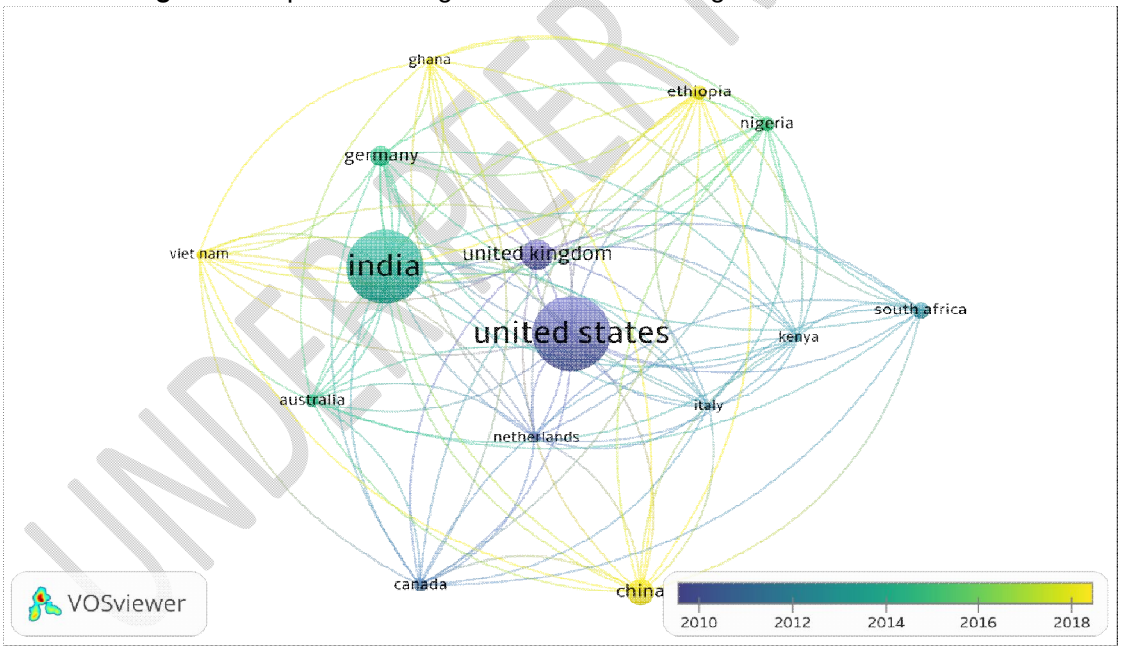
| | | | | |
|---|---|---|---|---|
| 13 | Nigeria | 48 | 228 | 79 |
| 14 | Canada | 43 | 503 | 79 |
| 15 | Vietnam | 24 | 251 | 74 |

***Source: VOSviewer***

Table 4 presents the highest number of articles contributed by countries. Out of 1135 articles, with a minimum 20 number of documents from a country with a citation score of 200 or more, of the 100 countries researched in the area or Rural Non-Farm Sector, 16 meet the thresholds. Out of these, only 15 countries were selected for the analysis. Table 4 shows that the United States is leading with 8461 citations and is the highest in contributing 240 articles. India has the second highest with 237 articles and citations of 1502. The top fifteen countries with highest number of articles in the area of Rural Non-Farm includes United States (240), India (237), United Kingdom (97), Germany (67), Ethiopia (49), China (85), Ghana (25), Italy (22), Kenya (26), Netherlands (32), Australia (43), South Africa (54), Nigeria (48), Canada (43), and Vietnam (24).

The bibliometric representation of the top contributing countries with the highest number of articles is depicted in Figure 3. Co-citation is done with the help of VOSviewer by selecting "Citation" as the type of analysis by taking "Countries" as the "unit of analysis". Out of 1135 articles, with a minimum 20 number of documents from a country with a citation score of 200 or more, of the 100 countries researched in the area or Rural Non-Farm Sector, 16 meet the thresholds.

**Figure 3:** Top contributing Countries with the highest no of documents




***Source: VOSviewer***

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represented in the figure is connected with the other item. The figure shows the overlay visualisation of the top 15 countries with the most published articles.

There are altogether three clusters formed. The first cluster comprises eight countries (Australia, Germany, Ghana, India, Netherlands, United Kingdom, and the United States), the second cluster shall consist of 5 countries (Ethiopia, Italy, Kenya, Nigeria, and South Africa), and the third cluster comprises of 2 countries (Canada, China). United States have the highest total link strength of 660 with the highest number of articles of 240. India has a total link strength of 279 with a number of total articles of 237, and the United Kingdom has a total ink strength of 270 with a total of 97 articles.

### 4.3. Citation Analysis

The fundamental belief of citation analysis is that authors mention the work connected to their field of study. As a result, the citation is regarded as a standard of impact (Van Raan, 2003; Dzikowski, 2018). The goodwill of a paper can be associated with the number of citations a paper obtains. An article's acceptance and importance relate to the number of quotations a paper gets (Ding and Cronin, 2011). Table 5 and Figure 4 represent the list of highly cited documents in the Rural Non-Farm Sector. The cut-off limit for citations was 102; out of 1135 documents, 43 only met the threshold. Out of each of the 43 papers, the top 15 with the most prominent links and citations were analysed. Out of the top 15 papers included are: -

**Table 5:** Highly cited document

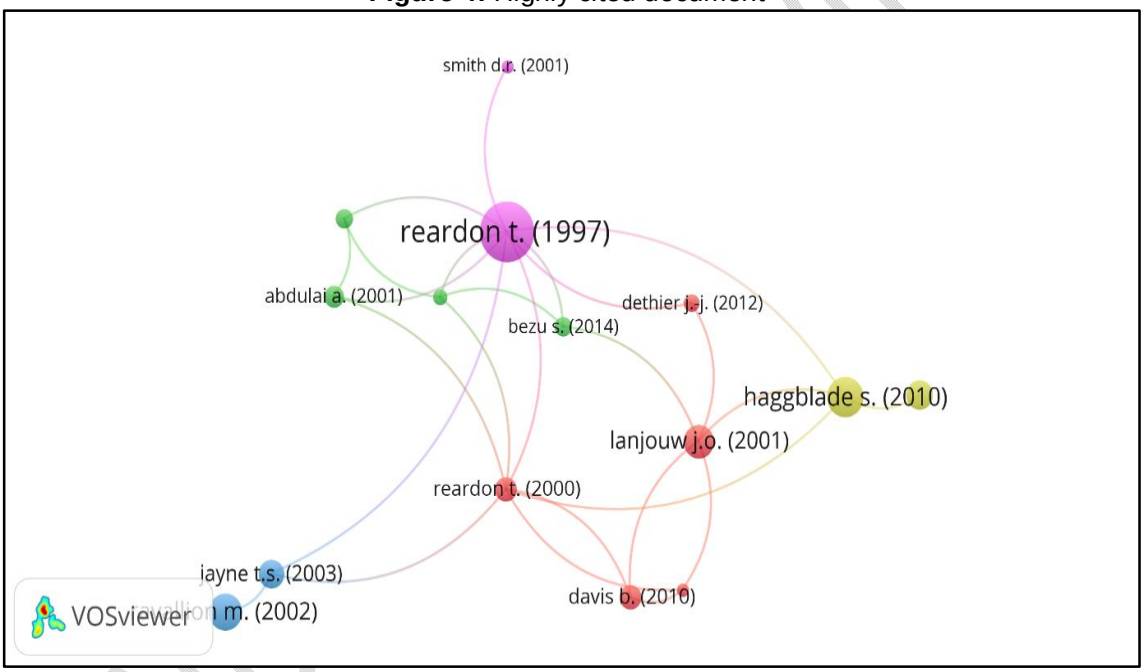
| Sl No | Title | Author | Citations | Link |
|---|---|---|---|---|
| 1. | Using evidence of household income diversification to inform the study of the rural nonfarm labour market in Africa | Reardon t. (1997) | 462 | 9 |
| 2. | Effects of Non-Farm Employment on Rural Income Inequality in Developing Countries: An Investment Perspective | Reardon t. (2000) | 186 | 7 |
| 3. | The rural non-farm sector: issues and evidence from developing countries | Lanjouw j. o. (2001) | 254 | 5 |
| 4. | Non-farm income, household welfare and sustainable land management in a less-favoured area in the Ethiopian Highlands | Holden s. (2004) | 126 | 4 |
| 5. | The rural non-farm economy: prospects for growth and poverty reduction | Haggblade s. (2010) | 306 | 4 |
| 6. | Are African households (not) leaving agriculture? Patterns of household's income sources in rural sub-Saharan Africa | Davis b. (2017) | 103 | 3 |
| 7. | Non-farm work and food security among farm households in Northern Ghana | Owusu v. (2011) | 146 | 3 |
| 8. | Smallholder income and land distribution in Africa: implications for poverty reduction strategies | Jayne t. s. (2003) | 220 | 3 |
| 9. | Determinants of income diversification amongst rural households in Southern Mali | Abdulai a. (2001) | 165 | 3 |
| 10. | Are rural youth in Ethiopia abandoning agriculture? | Bezu s. (2001) | 148 | 3 |
| 11. | A cross-country comparison of rural income generating activities | Davis b. (2010) | 186 | 3 |
| 12. | Agriculture and Development: A brief review of the literature | Dethier j. j. (2012) | 134 | 2 |
| 13. | Livelihood diversification in Uganda: patterns and | Smith d. r. | 102 | 1 |

| | | | | |
|---|---|---|---|---|
| | determinants of change across two rural districts | (2001) | | |
| 14. | Why has economic growth been more pro-poor in some states of India than others? | Ravallion m. (2002) | 283 | 1 |
| 15. | Rural livelihoods and poverty reduction strategies in four African countries. | Ellis f. (2004) | 223 | 1 |

***Source: VOSviewer***

From Figure 4, it is clear that the article titled "Using Evidence of Household Income Diversification to Inform the Study of the rural nonfarm labour market in Africa", Reardon t. (1997) received the maximum number of citations of 462, with the maximum number of link strength of 9, followed by the article "Effects of Non-Farm Employment on Rural Income Inequality in Developing Countries: An Investment Perspective", Reardon t. (2000) with a citation of 186, with the second highest link strength of 7 and "The rural non-farm sector: issues and evidence from developing countries", Lanjouw j. o. (2001) with a total citation of 254 and the third-highest link strength of 5.

**Figure 4:** Highly cited document

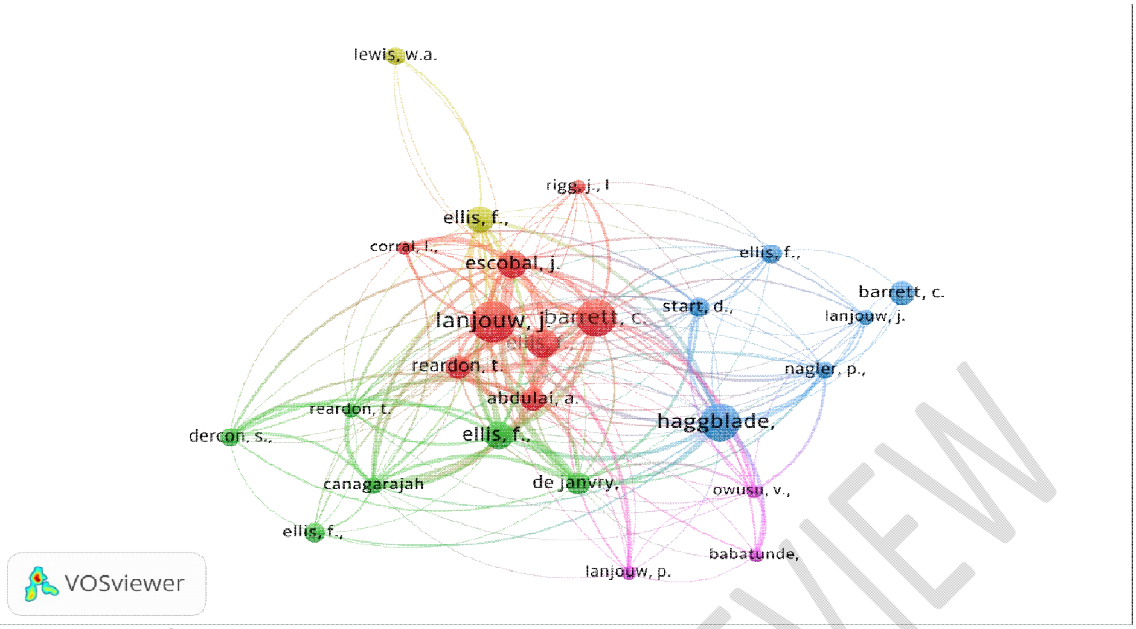



***Source: VOSviewer***

### 4.4. Co-Citation Analysis

The following sets of papers that are jointly cited in the source articles are implied by co-citation analysis. When two articles are referenced together, they almost all have the same topic. With the aid of VOSviewer, co-citation is accomplished by choosing "cited reference" and "cited authors" as the unit of analysis. The minimum number of citations is determined as the criteria. (Kumar & Yadav, 2022).

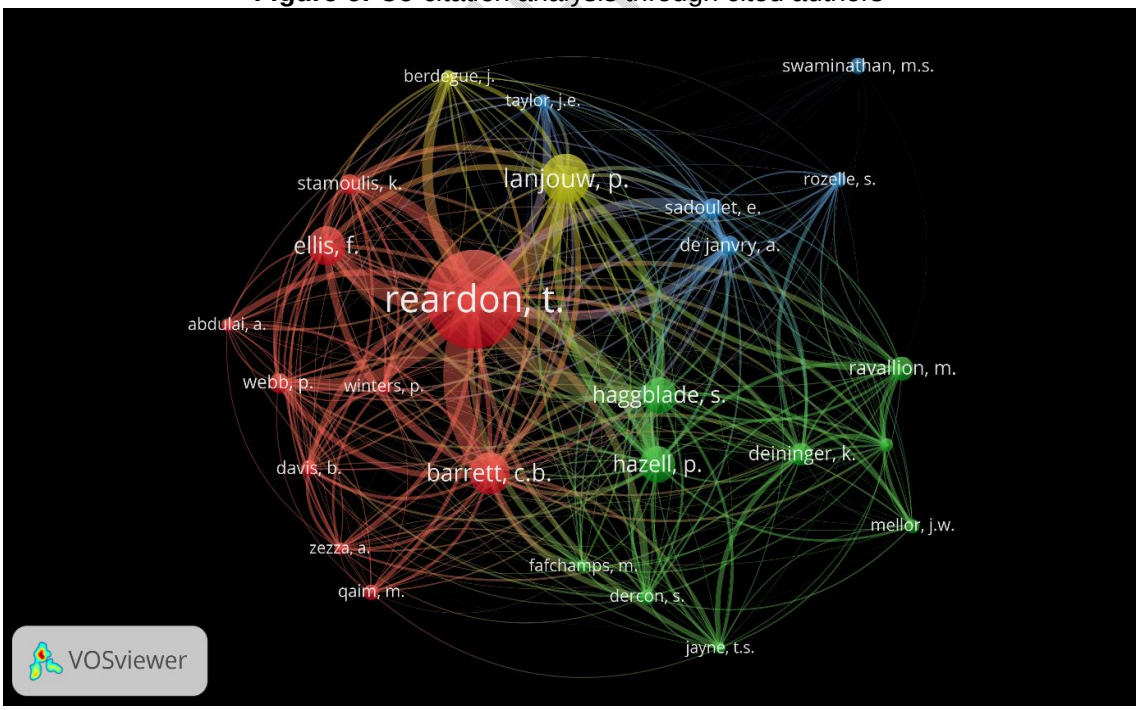
**Figure 5:** Co-citation analysis through cited reference




***Source: VOSviewer***

In Figure 5, the co-citation analysis of cited references was done using the full counting method. The minimum number of citations of a cited reference was given as 10. Of the 42677 cited references, 25 meet the threshold. Thus, 25 cited references were selected for the bibliometric analysis.

**Figure 6:** Co-citation analysis through cited authors




***Source: VOSviewer***

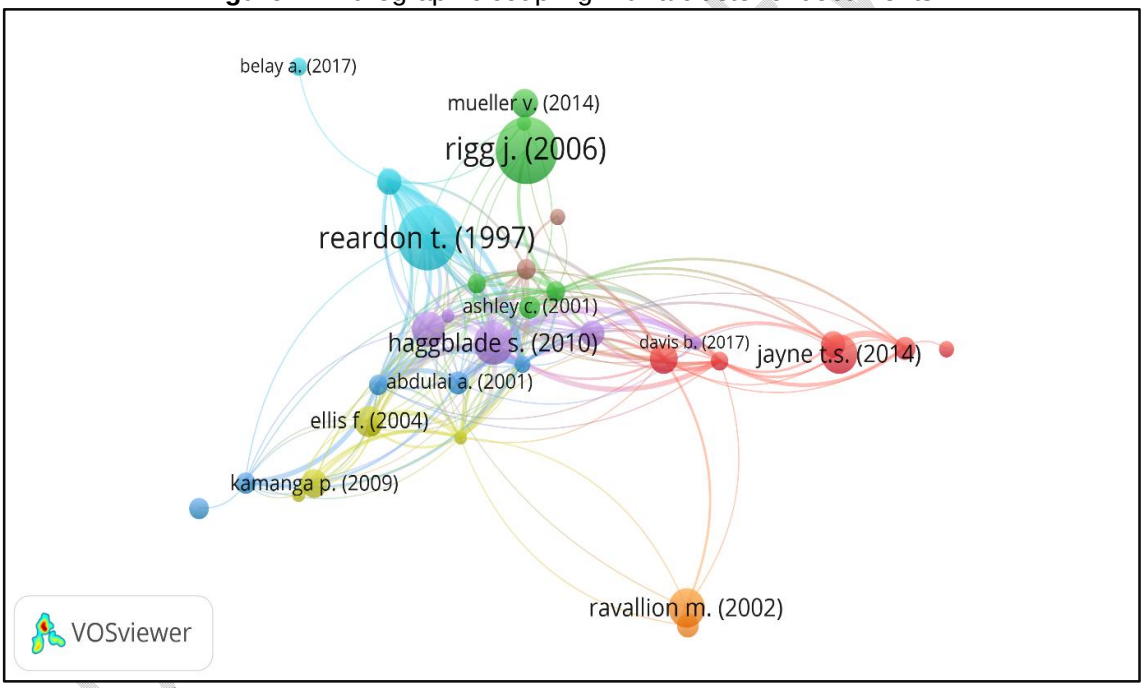
In Figure 6, the co-citation analysis of cited authors was done using the full counting method. The minimum number of citations of an author was 100, which means 26 authors have a minimum citation of 100. Of the 39076 authors, 26 authors meet the threshold. Twenty-six

authors were selected for the bibliometric analysis. The study portrayed the map of 26 authors with four clusters by co-citation analysis of authors. As the figure shows, Reardon t. has received the highest number of citations of 811 with the highest total link strength of 11081, followed by Barrett, c.b., with 346 citations and Lanjouw, p. with 408 citations.

### 4.5. Bibliographic Coupling (Data Clustering)

The software VOSviewer is used for data clustering. The database's Scopus file is chosen, and the option to "Create a map based on bibliographic data" is selected. Documents are the unit of analysis for constructing clusters in the "bibliographic coupling" style of analysis. Bibliographic connection shows that there is a chance that two works are handling the same theme. The many clusters obtained from VOSviewer through bibliographic coupling are represented in Figure 7. Clustering is a valuable method for finding different facets of themes in current literature since clusters pool articles based on how closely related research subjects are. The circle size represents the total number of citations a paper has. Different hues represent various clusters. The extent of the circles constitutes the number of citations an article obtained (Kumar & Yadav, 2022).

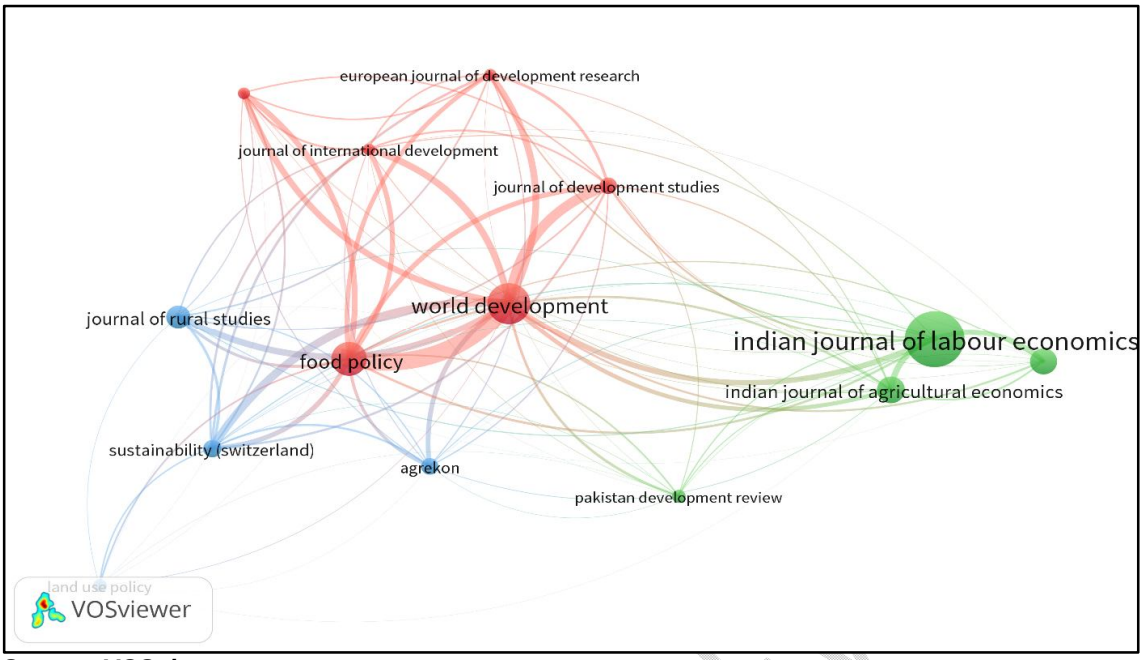
**Figure 7:** Bibliographic coupling with a cluster of documents




***Source: VOSviewer***

When two works cite the same third work in their bibliographies, this is known as bibliographic coupling. It is a sign that there is a chance the two works deal with the same subject matter. If two documents cite one or more other documents, they are said to be bibliographically connected. Figure 5 denotes the clusters of documents through bibliometric coupling. The minimum number of citations of the documents was set as 100. Out of the 1135 articles on Rural Non-Farm, 44 meet the threshold.

**Figure 8:** Bibliographic coupling with a cluster of documents




***Source: VOSviewer***

Figure 8 shows the cluster of documents' sources. The minimum number of documents in a source is 10, while the minimum number of citations in a source is 50. There are 14 journals in total, organised into various clusters. The first cluster, which is coloured red, has six journals in it. Four journals are shown in the second cluster, which is shown in green, and four journals are shown in the third and final cluster, which is shown in blue. These clusters are formed based on how similar the papers published are.

**Table 6:** Cluster of sources of documents with the highest citation of Documents

| Clusters | Journals | No. of Documents | Links | Total Link Strength |
|---|---|---|---|---|
| **Cluster 1 (Red)** | European Journal of Development Research | 10 | 12 | 553 |
| | Food Policy | 29 | 13 | 1233 |
| | Journal of Development Studies | 14 | 13 | 669 |
| | Journal of International Development | 10 | 13 | 527 |
| | Quarterly Journal of International Agriculture | 10 | 13 | 486 |
| | World Development | 35 | 13 | 1744 |
| **Cluster 2 (Green)** | Economic and Political Weekly | 22 | 12 | 263 |
| | Indian Journal of Agricultural Economics | 23 | 13 | 447 |
| | Indian Journal of Labour Economics | 48 | 12 | 600 |
| | Pakistan Development Review | 11 | 13 | 213 |
| **Cluster 3 (Blue)** | Agrekon | 14 | 13 | 378 |
| | Journal of Rural Studies | 20 | 13 | 463 |
| | Land Use Policy | 11 | 10 | 103 |
| | Sustainability (Switzerland) | 15 | 13 | 655 |

***Source: VOSviewer***

Table 6 shows the sources with the highest number of documents. It is the tabular representation of Figure 8. A total of fourteen journals have been divided into three clusters.

Cluster 1 has six sources, out of which "World Development" have the most significant number of articles of 35 and the most prominent link strength of 1744 among the others in Cluster 1. "Indian Journal of Labour Economics" has the highest number of documents of 48 with the total link strength of 600 in the second cluster. "Journal of Rural Studies" have a maximum of 20 documents with a link strength of 463.

### 4.6. Co-Occurrence Analysis

Co-occurrence analysis examines the phrases commonly arising in the chosen articles (Su & Lee, 2010). A co-occurrence map is created from the VOSviewer files to get the highly occurring keywords that occurred the maximum number of times in the documents. From the VOSviewer, 'Create a map based on bibliographic data' is selected. Afterwards, 'Read data from bibliographic database files' was selected (Kumar & Yadav, 2022). The Scopus database extracted with 1135 articles has been uploaded for analysis. The most occurred 'authors keyword' has been selected for analysis. Minimum number of occurrences of a keyword was set as 5. Of the total of 2135 keywords, 100 meet the threshold. The top 15 used keywords are set as follows: -

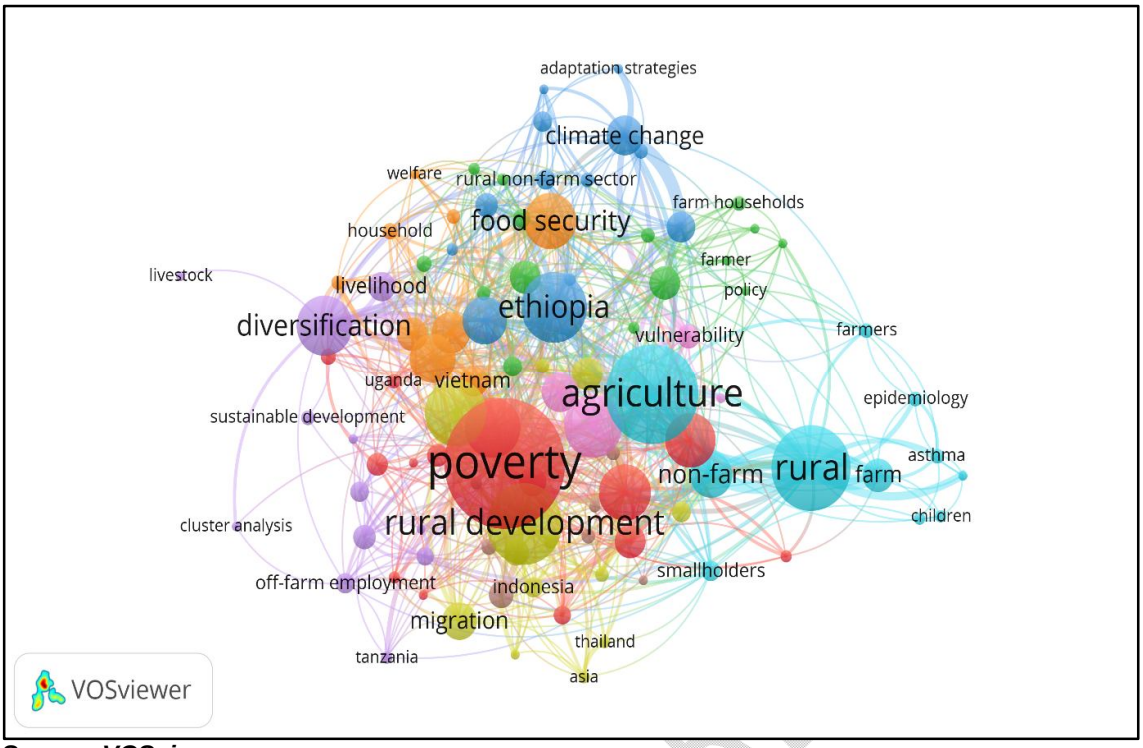
**Table 7:** Co-occurrence of most used Authors keyword

| Sl No | Keyword | Occurrence | Total link Strength |
|---|---|---|---|
| 1 | Poverty | 62 | 124 |
| 2 | Agriculture | 48 | 92 |
| 3 | Rural | 41 | 81 |
| 4 | Rural Development | 39 | 56 |
| 5 | Ethiopia | 34 | 73 |
| 6 | Non-Farm Employment | 32 | 44 |
| 7 | Livelihoods | 30 | 57 |
| 8 | Diversification | 29 | 58 |
| 9 | China | 29 | 27 |
| 10 | Gender | 27 | 57 |
| 11 | Food Security | 27 | 48 |
| 12 | India | 26 | 34 |
| 13 | Income Diversification | 24 | 45 |
| 14 | Livelihood Diversification | 23 | 33 |
| 15 | Non-Farm | 22 | 50 |

***Source: VOSviewer***

Table 7 represents the most used 15 keywords out of the 100 keywords. Out of the documents which had been chosen for the analysis, the keyword 'Poverty' has occurred 62 times, 'Agriculture' has happened 48 times, 'Rural' has occurred 41 times, Rural (41), Rural Development (39), Ethiopia (34), Non-Farm Employment (32), Livelihoods (30), Diversification(29), China (29), Gender (27), Food Security (27), India (26), Income Diversification (24), Livelihood Diversification (23) and Non-Farm (22).

**Figure 9:** Co-occurrence of most used Authors Keyword




***Source: VOSviewer***

Figure 9 shows the network visualisation of the most occurred author's keyword from among the total documents. A total of 100 Keywords has been categorised into 9 clusters, of which Cluster 1 includes 15 keywords, cluster 2 consists of 15 keywords, cluster 3 contains 13 keywords, cluster 4 includes 13 keywords, cluster 5 includes 12 keywords, cluster 6 includes 11 keywords, cluster 7 consists of nine keywords, cluster 8 contains eight keywords and cluster 9 includes four keywords. 'Poverty' is the most used keyword, with an occurrence of 62 and a total link strength of 124.

### 4.7. Co-Authorship Analysis

In Co-authorship analysis, the nodes represent the authors or nations associated when they share the article's authorship. The extent of co-authorship can be denoted by the number of different co-authors an author has in a given period. To create a co-authorship map from the VOSviewer, select 'generate a map based on bibliographic data'. Choose 'read data from bibliographic database file'. Select the required Scopus file. Choose the kind of analysis as 'Co-authorship' and 'Countries' as a unit of analysis under the 'full counting' method. Then, choose the required threshold and the number of authors (Kumar & Yadav, 2022). Of the 100 countries, 36 countries meet the threshold when the count of documents of a country is given as five, and the minimum number of citations of a country is given as 50. The clusters are displayed after that.

**Figure 10:** Density Visualisation of Co-authorship and Country Analysis


***Source: VOSviewer***

Figure 10 depicts the density visualisation of the co-authorship with countries. Cluster 1 (Red) includes nine countries: India, Kenya, Malawi, Nigeria, Norway, South Africa, Tanzania, Uganda and the United Kingdom. Cluster 2 (Green) includes China, Indonesia, Italy, Japan, Mexico, Pakistan, the Philippines and the United States. Cluster 3 (Blue) comprises six countries, including Belgium, Denmark, Ethiopia, Ghana, Sweden, and Vietnam, and Cluster 4 (Pink) includes six countries, including Austria, Finland, France, Germany, Netherlands, and Switzerland. Cluster 5 (Violet) comprises five countries: Australia, Bangladesh, Canada, New Zealand and South Korea. Cluster 6 (Brown) includes Thailand.

## 5. DISCUSSION

With the help of Bibliometric analysis, the author could understand the core research articles, authors, and the relationship between the co-authors and the countries. Utilising mathematical and statistical methods, it is possible to quantify the connections between and effects of publications in the field of rural non-farm. A bibliometric analysis was used to analyse the results of each research topic.

1. RQ(1) addresses the pattern of articles published between 1990-2022 in the field of Rural Non-Farm Sector. It can be easily inferred from the findings that there is an increasing rate of papers being published, and most papers will be published in 2021. A massive volume of articles was published from 2017 to 2022, which shows this area's importance; therefore, there is a lot more to be explored.
2. RQ(2) indicates the most prominent authors and the number of citations they have received. Thomas A. Reardon (Reardon t.) has the highest number of citations of 1185 in Rural Non-Farm, with seven documents in this area. (Rigg J.) and T.S. Jayne (Jayne t. s.) have 747 and 656 citations with a count of 6 documents each.
3. RQ(3) highlights that the United States is leading with 8461 citations and is the highest in contributing 240 articles. India has the second highest with 237 articles and citations of 1502. The top fifteen countries with highest number of articles in the area of Rural Non-Farm includes United States (240), India (237), United Kingdom (97), Germany

(67), Ethiopia (49), China (85), Ghana (25), Italy (22), Kenya (26), Netherlands (32), Australia (43), South Africa (54), Nigeria (48), Canada (43), and Vietnam (24).

4. RQ(4) addresses the top articles and their citations in the field of the Rural Non-Farm Sector. In the article "Using Evidence of Household Income Diversification to Inform the Study of the rural nonfarm labour market in Africa", Reardon t. (1997) received the maximum number of citations of 462, with the maximum number of link strength of 9, followed by the article "Effects of Non-Farm Employment on Rural Income Inequality in Developing Countries: An Investment Perspective", Reardon t. (2000) with a citation of 186, with the second highest link strength of 7 and "The rural non-farm sector: issues and evidence from developing countries", Lanjouw j. o. (2001) with a total citation of 254 and the third-highest link strength of 5.

## 6. SCOPE FOR FUTURE RESEARCH

Rural Non-Farm has been considered an essential aspect of rural development. It acts as an alternative solution to poverty, unemployment and underemployment. The rural non-farm sector plays a crucial role in contributing to economic growth by diversifying income sources for rural households, promoting overall economic development, and providing employment opportunities (Diao et al., 2018;Khandker, 2016;Chowdhury, 2017). In countries like Bangladesh and Tanzania, the expansion of the rural non-farm sector has been facilitated by access to microcredit, which has helped relax constraints and promote activities in this sector (Khandker, 2016; Chowdhury, 2017). Additionally, better infrastructure and community factors have been identified as important determinants of rural non-farm participation, while skill development and market promotion are essential for sustaining increased productivity and expanding production in this sector (Khandker, 2016; Chowdhury, 2017). The growth of the rural non-farm sector not only provides alternative income sources but also contributes to overall economic growth by creating employment opportunities and diversifying economic activities beyond agriculture (Diao et al., 2018; Chowdhury, 2017).As a result, there are many opportunities for research in this area, enabling the researcher to examine all the facets and dimensions of rural non-farm. Very few studies have been carried out on rural non-farms with particular reference to bibliometric analysis and systematic literature reviews, which have widened the scope.

## 7. CONCLUSION

The rural non-farm (RNF) sector plays a crucial role in sustaining the livelihoods of rural households by providing alternative sources of income and employment opportunities, especially in regions facing challenges in the agricultural sector(Alabi et al., 2022; Dufera et al., 2023). Historically, rural households have heavily relied on farming, but the emergence of non-farm activities has diversified income sources and improved household consumption levels (Dufera et al., 2023;Lawi et al., 2022). Studies indicate that the RNF sector has become increasingly significant, with a growing number of rural households engaging in non-farm enterprises, highlighting a shift towards non-agricultural activities for income generation(Alabi et al., 2022;Lawi et al., 2022). This transition underscores the importance of promoting and supporting the RNF sector to enhance rural livelihoods and foster economic development in rural areas, ultimately contributing to overall sustainable growth and poverty reduction.

This study's main objective was to evaluate the many studies on rural non-farm conducted by various authors and their contributions to the field. This bibliometric analysis presents a comprehensive outline of the studies done in rural non-farm from 1990 to 2022. The study's findings specify that the field of rural non-farm is on the rise, and various authors are working together to present their studies in this area with a drastic increase. Additionally, this paper has emphasised the topmost contributing countries to the area of Rural Non-Farm, the top contributing authors with their citation counts, and the clusters of documents

and authors with the aid of bibliometric analysis. This article provides valuable information and considers the approaches for bibliometric data and outcomes. The findings of this study would be very beneficial to the researchers since they would lay the groundwork for future literature reviews and offer an in-depth analysis of the field.

## Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

### REFERENCES


Alabi, D. L., Famakinwa, M., &Afolami, M. B. (2022). Nexus of non-farm enterprises and rural households' livelihood: evidence from Nigeria. Apstract, *Applied Studies in Agribusiness and Commerce/Apstract*, 16(1). https://doi.org/10.19041/apstract/2022/1/8

Ashley, C., & Maxwell, S. (2001). Rethinking Rural Development. *Development Policy Review,* 19(4), 395–425. https://doi.org/10.1111/1467-7679.00141

Chowdhury, S. (2017). Microfinance and rural non-farm employment in developing countries. *IZA World of Labor*. https://doi.org/10.15185/izawol.350

Diao, X., Magalhaes, E., &Mcmillan, M. (2018). Understanding the Role of Rural Non-Farm Enterprises in Africa's Economic Transformation: Evidence from Tanzania. *Journal of Development Studies*, 54(5), 833–855. https://doi.org/10.1080/00220388.2018.1430766

Ding, Y. and Cronin, B. (2011). Popular and/or Prestigious? Measures of Scholarly Esteem. *Information Processing and Management,* 47, 80-96. https://doi.org/10.1016/j.ipm.2010.01.002

Drall, A., & Mandal, S. K. (2020). Determinants of various modes of rural non-farm sector (RNFS) employment in SAT (semi-arid tropics) and Eastern regions of India: an empirical analysis. *Indian Economic Review*, 55(2), 253–282. https://doi.org/10.1007/s41775-020-00092-4

Dufera, W., Bedemo, A., & Kebede, T. (2023). Does non-farm employment increase rural households' consumption: Empirical evidence from West Ethiopia*? Research Square (Research Square). https://doi.org/10.21203/rs.3.rs-2623830/v1*

Dzikowski, P. (2018). A Bibliometric analysis of Born Global Firms. *Journal of Business Research*, 85, 281-294. https://doi.org/10.1016/j.jbusres.2017.12.054

Ellis, F., & Biggs, S. (2001). Evolving Themes in Rural Development 1950s-2000s. *Development Policy Review*, 19(4), 437–448. https://doi.org/10.1111/1467-7679.00143

Garfield, E., Sher, I.H. and Torpie, R.J. (1964). The Use of Citation Data in Writing the History of Science. *Institute for Scientific Information, Philadelphia, PA.*https://doi.org/10.21236/ad0466578

Kapoor, S., & Kapoor, S. (2021). Effectiveness of non-farm diversification on rural household income – evidence and policy implications from India. *International Journal of Development Issues*, 21(1), 1–23. https://doi.org/10.1108/ijdi-03-2021-0065

Kajikawa, Y., Ohno, J., Takeda, Y., Matsushima, K. and Komiyama, H. (2007). Creating an Academic Landscape of Sustainability Science: An Analysis of The Citation Network, *Sustainability Science,* 2(2), 221-231. https://doi.org/10.1007/s11625-007-0027-8

Khandker, S. R. (2016). Role of Targeted Credit in Rural Non-farm Growth. *Bangladesh Development Studies*, 24, 181–193. https://ideas.repec.org/a/ris/badest/0365.html

Kumar, N. K., & Yadav, A. S. (2022). A Systematic Literature Review and Bibliometric Analysis on Mobile Payments. Vision: *The Journal of Business Perspective.*

Lanjouw, P., Quizon, J., & Sparrow, R. (2001). Non-agricultural earnings in peri-urban areas of Tanzania: Evidence from household survey data. *Food Policy*, 26(4), 385–403. https://doi.org/10.1016/S0306-9192(01)00010-0

Lawi, M. B., Adeniyi, O. R., &Omolehin, R. (2022). NON-FARM LIVELIHOOD DIVERSIFICATION AND SUB-SAHARAN AFRICA'S RURAL STRUCTURAL TRANSFORMATION: *A REVIEW. Fudma Journal of Sciences*, 6(4), 95–100. https://doi.org/10.33003/fjs-2022-0604-1018

Mureithi, A. M., White, R., & Wesonga, P. S. (2022). Rural Non-Farm Enterprises Supporting the Agricultural Sector and their Relative Success in Kiambu County, Kenya. *Journal of Agriculture*, 6(1), 34–51. https://doi.org/10.53819/81018102t2077

Shah, A., &Pattnaik, I. (2021). Pattern and dynamics of the rural non-farm economy: a case study of Gujarat. *Journal of Social and Economic Development*, 23(S1), 48–70. https://doi.org/10.1007/s40847-020-00132-y

Small, H. (1973). Co-Citation in The Scientific Literature: A New Measure of The Relationship Between Two Documents, *Journal of the American Society for Information Science*, 24(4), 265- 269. https://doi.org/10.1002/asi.4630240406

Su, H.N. and Lee, P.C. (2010). Mapping Knowledge Structure by Keyword Co-Occurrence: A First Look at Journal Papers in Technology *Foresight. Scientometrics*, 85(1), 65-79. https://doi.org/10.1007/s11192-010-0259-8

Van Raan, A. (2003). The Use of Bibliometric analysis in Research Performance Assessment and Monitoring of Interdisciplinary Scientific Developments, *TATuP-Zeitschrift€urTechnikfolgenabsch€atzung in Theorie und Praxis,* 12(1), 20-29. https://doi.org/10.14512/tatup.12.1.20