



# Research landscape of marginal and small farmers in India from 1975 to 2024: A bibliometric analysis

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## Abstract

This paper attempted a bibliometric analysis of the literature on India's marginal and small farmers from 1975 to 2024, highlighted key terms, keyword co-occurrence, trending topics, research theme evolution, and future research directions for this critical group. Nearly ninety percent of India's agricultural households were marginal and small, playing a significant role in the country's agricultural framework. We used 309 research studies from the SCOPUS database for this purpose. The literature's primary keywords included climate change, food security, sustainability, farmers' income, contract farming, productivity, conservation agriculture, crop diversification, indebtedness, livelihood, institutional credit, farm size, farm income, employment, and integrated farming systems. Co-occurrence analysis indicated that researchers highly emphasized climate change, smallholder farmers, adaptation, and climate variability. Nonetheless, areas such as food security, and marginal and small farmers had adverse effects of climate change, and climate change mitigation strategies require further investigation to substantially improve the welfare of India's marginal & small farmers.

**Keywords:** Bibliometric analysis, Marginal and small farmers, PRISMA framework, SCOPUS database

## 1. Introduction

Worldwide, Indian agriculture holds an important place. It is the largest producer of milk, spices, and pulses. In 2017-2018 along with a share of 25 per cent in the global foodgrain production, India is also the world's largest foodgrain producer. Additionally, India holds the second position in producing vegetables, fruits, wheat, rice, tea, sugar, cotton, sugarcane, and farmed fish. In total world's foodgrain exports, India's shares rose from 3.38 per cent in 2010 to 7.79 per cent in 2022. Further more, India's area under wheat, rice, and cotton is the largest in the world. Domestically, the agricultural sector is the bedrock of India's economy, for its contribution to the country's GDP is 16 per cent and it provides livelihood security to around 46.1 per cent of its population. The sector is also vital in ensuring food security in the country, with a continuous rise in foodgrain production. The average food grain production in the country during 2015 and 2023 stood at 289 million tonnes, the same was 233 million tonnes during 2005 and 2014; and in the financial year 2023, only, total foodgrain production in the country touched a record level of 329.7 million tonnes (GoI, 2024-25).

Despite all these achievements, the Indian agricultural sector is faced with many challenges such as excessive and

unbalanced application of fertilizer and pesticides, falling productivity per unit of fertilizer, stubble burning, increasing extent of infertile land, depletion of groundwater levels, meagre average monthly income of agricultural households, a falling share of cultivation and simultaneous increase in the share of wages in the total agricultural households' income. The casualization of Indian agriculture has happened with the growth in the number of agricultural laborers and the reduction in the number of cultivators. Furthermore, this sector has become overcrowded with a high percentage of marginal and small farmers and less average land holding size. These have raised questions about the sustainability of agricultural practices in India.

Certain serious trends could exacerbate the already-mentioned problems in Indian agriculture. First, as per the 10<sup>th</sup> agricultural census in India (2015-16), while there has been an increase in the number of land holdings in India from 71 million in 1970-71 to 146 million in 2015-16, the average land holding size has come down from 2.3 hectares in 1970-71 to 1.08 hectares in 2015-16. Second, while marginal and small land holdings, i.e., less than 2 hectares, accounted for 70 per cent in 1970-71, it increased to 86 per cent in 2015-16. Third, marginal and small farmers had 21 per cent of total operational land in 1970-71, but it has gone up to 47.3 per cent in 2015-16. Fourth, the over crowdedness

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of Indian agriculture can be felt from the fact that the percentage of marginal and small agricultural households in India stood at 89.4 per cent (NSSO, 2018-19). While there were several valid reasons for the above trends such as increased population, fragmentation of landholdings within the family, and diversion of agricultural land for other sectors; if this trend continues then that time is not far when the entire agricultural sector becomes marginal and small making it unviable from the perspective of commercial agriculture.

Therefore, it is essential to understand the salient features of marginal and small farmers like their productivity, profitability, opportunities, changing patterns and trends of sources of growth, and the challenges they face or could face in the future. Already marginal and small were facing many challenges like climate change and its variability due to erratic rainfall, long dry spells or droughts low production/ productivity, low household income, losses of livelihood, food insecurity, indebtedness, uncertainties, and poverty (Lopez-Ridaura et al., 2018; Datta & Behera, 2022). It was, therefore, a major challenge for researchers, planners, and policymakers to make agricultural practice in marginal and small landholdings more viable which could uplift the overall welfare level of marginal and small agrarian households. This had the potential to raise the level of rural and overall economic development in India. One way to tackle this challenge was to synthesize the findings of already published literature related to marginal and small-scale farmers in India by using the scientific method of bibliometric analysis. The study intended to bring out a bibliometric analysis of the existing literature on this vast and important stakeholder of Indian agriculture. In particular, the study attempted to layout valuable insight into the research domain of marginal and small farmers in India by identifying the research gaps and providing direction for future research. There are three important questions we seek to answer in this study. First, what are the primary keywords, trending topics, and their relationship in the domain of marginal and small-scale farmers in India? Second, what are the research themes and how have they evolved? And third, what could be the future research pathways for research on marginal and small-scale farmers in India?

## 2. Materials and Methods

As mentioned before, we used a bibliographic approach to synthesize the research on marginal and small-scale farmers in the agricultural sector in India. SCOPUS database, one of the most relevant and highly acclaimed databases was searched to collect the literature pertaining to marginal and small farmers in Indian agriculture. One of the limitations of our study, which included literature from the SCOPUS

database, was that it may lead to coverage bias, as it excluded grey literature, regional-language studies, and non-indexed local research. This may limit insights into India's marginal and small farmers.

The database's literature was searched on 20<sup>th</sup> June 2024 using the following advanced query search string. "TITLE-ABS-KEY ( 'smallholders' OR 'smallholder' OR 'small farmers' OR 'smallholdings' OR 'small households' OR 'small-farmers' OR 'marginal farmers' OR 'small and marginal farmers' OR 'small and marginal landholdings' OR 'agricultural households' OR 'landless farmers' OR 'landless households' AND 'India' ) AND PUBYEAR > 1971 AND PUBYEAR < 2025 AND ( LIMIT-TO ( SUBJAREA, 'SOCI' ) OR LIMIT-TO ( SUBJAREA, 'AGRI' ) OR LIMIT-TO ( SUBJAREA, 'ECON' ) OR LIMIT-TO ( SUBJAREA, 'ARTS' ) AND ( LIMIT-TO ( DOCTYPE, 'ar' ) ) AND ( LIMIT-TO ( LANGUAGE, 'English' ) ) AND ( LIMIT-TO ( AFFILCOUNTRY, 'India' ) ) AND ( LIMIT-TO ( SRCTYPE, 'j' ) ) )"

In the above string, all the possible synonyms of marginal and small farmers were used through keyword search and India was used so that we get the data in the Indian context to highlight the research issues of these farmers. Our initial search gave us 1987 documents. Then screening was performed using SCOPUS filters. The time used was 1975 to 2024 (June) as the database did not contain any literature before 1975. Then we limited the data by subject area: agricultural and biological sciences, social sciences, economics, finance, econometrics, arts, and humanities, which reduced the number of documents to 1517. Then we applied a limit document type to an article which further reduced the number of documents to 1196. Finally, after applying the language filter to English, country to India, and source type to journal, a total number of 861 documents were obtained. Following was the PRISMA framework of the inclusion-exclusion criteria for the selection of documents for this systematic study.

### 2.1 PRISMA Framework

After the screening, retrieved data was assessed for eligibility, and SCOPUS data was manually refined by authors as per the article's relevance based on the title and abstract. In the manual process, 552 documents were excluded and 309 documents were identified as relevant for bibliometrics analysis. The 552 documents were excluded based on predefined eligibility criteria to ensure the relevance and quality of the bibliometric analysis. Studies were removed

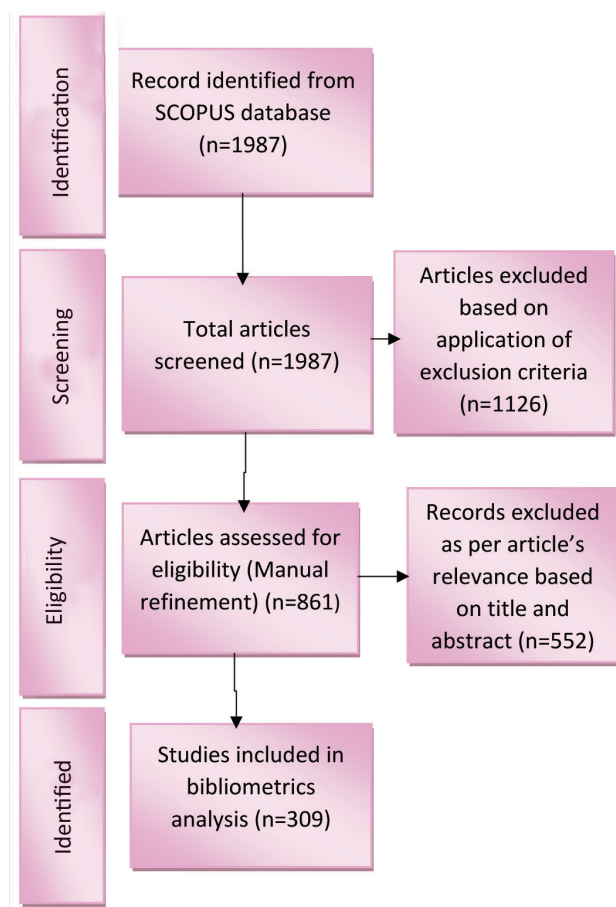


Figure 1. PRISMA Flow Chart

if they: (i) were unrelated to marginal and small farmers in India, (ii) focused on broader agricultural topics without specific reference to the target group, and (iii) were review papers, editorials, conference abstracts, or non-peer-reviewed sources. Biblioshiny, a tool within RStudio, an open-source software, was used for our quantitative analysis.”

### 3. RESULT AND DISCUSSION

Results of the bibliometric analysis of the literature on marginal and small farmers in India were discussed in this section under the broad headings of summary of the information about publications, keyword analysis, co-occurrence network, trend topics, and thematic evolution.

#### 3.1 Initial Information about selected documents:

A summary of the selected documents was given in Table 1. As can be seen, literature on marginal and small-scale farmers in India from 1975-2024 has been published in 135 different journals. These included 309 articles and 906 authors had written these articles, out of which only 56 were single-authored.

#### 3.2 Keyword Analysis

Word clouds of the author’s keywords provided a visual

Table 1. Summary of the selected data

Description	Results
Timeframe	1975:2024
Sources (Journals)	135
Documents (Article)	309
Annual Growth Rate (per cent)	5.95
Document Average age	8.77
Average citation (per doc)	13.35
DOCUMENT CONTENTS	
Keyword Plus	736
Author’s keywords	860
AUTHORS	
Authors	906
Authors of single authored docs	56
AUTHORS COLLABORATION	
Single authored docs	59
Co-Authors (per doc)	3.57
International co-authorships (per cent)	25.24

representation of frequently used keywords in the selected literature. Therefore, keyword analysis, given in Figure 2, revealed the frequently used words/terms/keywords and their frequency gave insight into prevalent themes and topics of the research issue. To conduct this analysis, we removed the terms India, marginal and small farmers (related synonyms), and agriculture so that the focus could directly come to the issues. Words such as climate change, food security, sustainability, farmers’ income, contract farming, productivity, conservation agriculture, crop diversification, indebtedness, livelihood, institutional credit, farm size, farm income, employment, and integrated farming system were the most frequently used keywords, indicating their significance in the reviewed literature. Climate change was the most commonly occurring keyword and marginal and small-scale farmers were most susceptible to the effects of climate change or variability. Low unpredictable rainfall with extreme dry spells reduced crop yield and ultimately affected the farmers’ income (Datta & Behera, 2022). Climate threat impacted the food production system in that it led to the loss of livelihood and food insecurity (Lopez-Ridaura et al., 2018). Another important keyword was crop diversification, which means shifting from low-value crops to high-value crops, it was a strategy to boost income and improve the livelihood of these farmers (Sharma et al., 2023; Shekhar et al., 2024). Declining trends in landholding size concentrate the focus on other keywords like farm size and farm productivity. To boost farmers’ income, contract farming and an integrated farming system were promoted by some studies (Kumar et al., 2023; Saroj & Paltasingh, 2024). The recent agricultural initiative focused on reducing rural indebtedness through institutional credit sources and positively affected farm consumption expenditure and income (Kumar et al., 2017; Shivaswamy et al., 2020).

Word clouds only gave a superficial view of the most frequently used terms. Therefore, for a more detailed view,



Figure 2. Word Cloud of Author's Keywords

keyword analysis results were given in Table 2 after categorization into different groups.

It was clear from the table that keywords on the issues of productivity, income, and diversification had the highest frequencies with 31.31 per cent. Yield, system productivity, and water productivity of marginal and small-scale farmers in India came out as the top priority of researchers. Besides, income and crop diversification as a means to boost the farm income of these groups of farmers also held significance in the research arena. The next prominent classification were gender, caste, poverty, employment, and irrigation. In this classification, issues such as maize cultivation, employment, COVID-19, caste, collective action, employment generation, gender, irrigation, poverty, and profitability have been the

top priority for researchers. The third significant classification was climate change, vulnerability, and sustainability. It came as no surprise that marginal and small-scale farmers were deeply affected and/or vulnerable groups due to climate change, a worldwide situation. Sustainability, in terms of adaptation and coping strategies used, of the farming practices of these groups of farmers becomes a key research issue. The finding that climate change, vulnerability, and sustainability were significant themes in the research on marginal and small-scale farmers underscores the urgent need for targeted policy interventions. Climate change disproportionately affected these farmers by reducing crop yields, exacerbating income inequality, and threatening food security (Datta & Behera, 2022). Therefore, policies should focus on climate-resilient agricultural practices, including the promotion of drought-resistant crop varieties, precision farming techniques, and sustainable water management strategies (Samanta, 2023). Additionally, government support for Farmer Producer Organizations (FPOs) can enhance collective resilience, providing smallholders with better access to credit, technology, and markets (Rout et al., 2023; Lalitha et al., 2024). Indebtedness, credit, information, marketing channels, and MSP were the next important classifications for the research on marginal and small-scale farmers in India, as these issues had a share of 14 per cent in

Table 2. Frequency distribution of Authors' keywords

Productivity, Income, and Diversification (1)			Gender, Caste, Poverty, Employment, and Irrigation (2)			Climate Change, Vulnerability, and Sustainability (3)		
Keywords	Frequency (f)	Per cent	Keywords	f	Per cent	Keywords	f	Per cent
Income	8	3.74	Maize	5	2.34	Climate change	10	4.67
Farmers	7	3.27	Employment	5	2.34	Sustainability	8	3.74
Crop diversification	10	4.67	Covid-19	4	1.87	Adaptation	4	1.87
Productivity	6	2.8	Propensity score matching	4	1.87	Adoption	4	1.87
Agricultural households	5	2.34	Caste	3	1.4	Zero tillage	4	1.87
Conservation agriculture	5	2.34	Collective action	3	1.4	Climate Variability	3	1.4
Farm Income	5	2.34	Cotton	3	1.4	Coping Strategies	3	1.4
Farm Size	5	2.34	Employment generation	3	1.4	Vulnerability	3	1.4
Farm Households	4	1.87	Gender	3	1.4	Total	39	18.22
Income Inequality	3	1.4	Irrigation	3	1.4			
System Productivity	3	1.4	Poverty	3	1.4			
Water Productivity	3	1.4	Profitability	3	1.4			
Yield	3	1.4	Tobit model	3	1.4			
Total	67	31.31	Total	45	21.03			
Indebtedness, Credit, Information, Marketing Channels & MSP (4)			Farming Systems (5)			Food Security and Livelihoods (6)		
Keywords	Frequency	Per cent	Keywords	Frequency	Per cent	Keywords	Frequency	Per cent
Indebtedness	5	2.34	Contract Farming	7	3.27	Food Security	8	3.74
Credit	4	1.87	Integrated farming system	4	1.87	Livelihood	5	2.34
Agricultural Credit	4	1.87	Farming systems	3	1.4	Rural Livelihoods	3	1.4
Institutional Credit	4	1.87	Organic farming	3	1.4	Total	16	7.48
Information	4	1.87	Total	17	7.94			
Credit Access	3	1.4						
Marketing Channels	3	1.4						
Minimum support price	3	1.4						
Total	30	14.02						



all the keywords used. Farming systems, food security and livelihoods were the next important classifications that emerged from the frequency distribution of authors' keywords. Issues of marginal and small farmers, such as contract farming, integrated farming systems, and organic farming under the farming system classification; and issues such as food security and livelihoods have remained major focus points of researchers. To address food security concerns, policies should prioritize strengthening local food systems and promoting diversified farming, which has been shown to enhance resilience and stabilize incomes (Sharma et al., 2023; Shekhar et al., 2024). Expanding crop insurance schemes and improving access to institutional credit will also help mitigate the financial risks posed by climate-induced uncertainties (Yadav & Rao, 2022). Furthermore, targeted interventions, such as direct income support for small farmers and improved rural infrastructure (roads, storage, and irrigation), can help bridge the existing income gap and reduce rural poverty (Nawal et al., 2023).

### 3.3 Co-Occurrence Network

The Co-occurrence network gave important research themes of the selected literature. We used the 'Walktrap' clustering algorithm, a commonly used software in the case of bibliometric studies, and it was earlier used by Camarasa et al., 2019 and Saxena et al., 2023. This algorithm considered the citation pattern in the selected database and gave seven clusters, which were presented in figure 3 and table 2. The objectives of the analysis discussed in this section were to identify the pairs of authors' keywords that frequently occur together in literature and to highlight the conceptual structures and research topics from the selected research studies. More specifically, in Figure 3, the circle indicated the specific keyword, the stretch of the circle showed the frequency of occurrence of a particular word, and the node between the words showed its co-occurrence and association or relationship among the keywords. As can be seen, seven clusters were emerging from the analysis.

The first cluster showed a significant co-occurrence network among keywords like climate change, smallholder farmers, adaptation, and climate variability. Climate change was a phenomenon, so much so that the United Nations Intergovernmental Panel on Climate Change (IPCC), in 2021, termed it as 'code red for humanity'. Global warming, a clear indicator of climate change, was exacerbated as the heat/energy from the solar radiation falling on the surface of the

Earth was stopped from radiating back due to the increased extent of greenhouse gases (GHGs). Agriculture and food systems, as a result of their inherent dependence on climatic components like temperature, rainfall, humidity, etc., were impacted the worst by climate change. Some of the worst consequences of climate change on agriculture were happening in the form of reduced yield of crops and livestock, food and nutritional insecurity, and higher uncertainty in the food system. All these effects were happening in India and marginal and small-scale farmers were the worst-affected group in this. Therefore, the first cluster came as no surprise, as these issues occupy the highest priority in the literature on these groups of farmers. The second significant cluster contained keywords such as income, diversification, employment, and livelihood showed their close association in the literature. On the one hand, low farm income and the immense number of marginal and small farmers in Indian agriculture had attracted the attention of researchers to crop and/or agricultural diversification which was one of the ways to increase farm income. The casualization of Indian agriculture and the increasing share of agricultural wages in the total income of agricultural households had also brought into research focus an association between the terms mentioned in the second cluster. The third cluster brought into focus the association between farm size and productivity. This held a relevant position in the literature given the significance of the 'inverse farm size-productivity' relationship. The fourth cluster connected the nodes between food security and COVID-19 of marginal and small-scale farmers in India, given the situation they faced during the pandemic. There was a significant association between nodes such as agricultural credit and access to it in the literature as shown by cluster five. Cluster six gave us the association between farm income and agricultural households in the literature. It was to be underlined that in total income, there

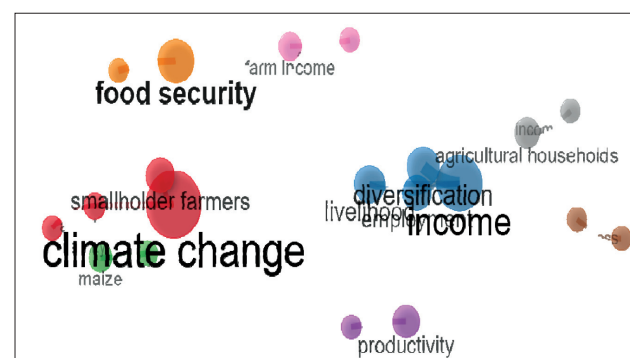


Figure 3. Co-Occurrence Network

Table 3: Clusters in the field of small and marginal farmers

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Climate change	Income	Productivity	Food security	Agricultural credit	Farm income	Agricultural households
Smallholder farmers	Diversification	Farm size	Covid-19	Credit access	Farm households	Income inequality
Adaptation	Employment					
Climate variability	Livelihood					

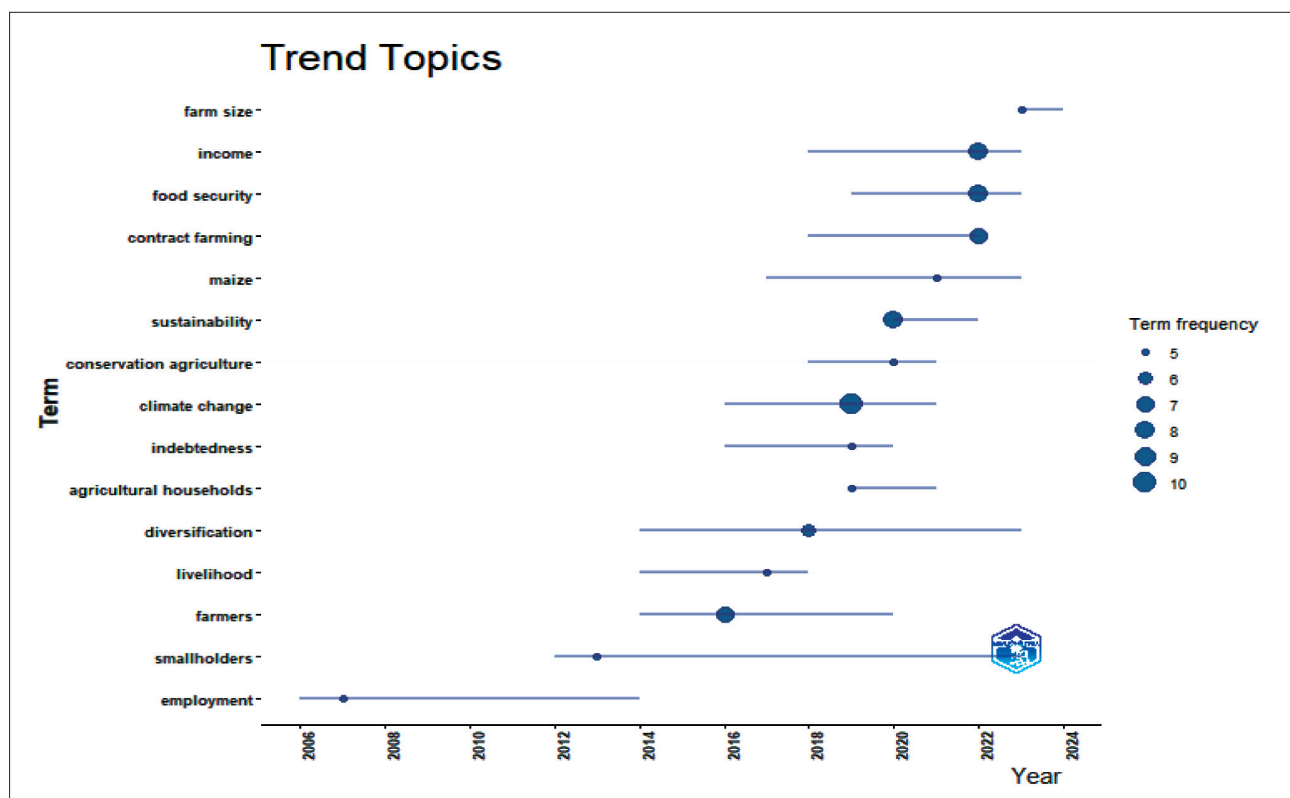


Figure 4. Trend topic chart

had been a decline in the share of income from the cultivation of agricultural households. The last cluster highlighted the association between inequality among agricultural households in the literature of marginal and small farmers in India.

### 3.4 Trend Topic Chart

Trend topic analysis gave the changing research trends, if any, within a particular field over a selected period. This analysis of our selected literature was presented in Figure 4. We had set the minimum level of word frequency at 5 and considered 3 words per year for this analysis. In the literature, it can be seen that ‘climate change’ appeared as the most commonly used term. Other terms such as ‘sustainability’, ‘income’, ‘food security’, ‘contract farming’, and ‘diversification’ were the focus point in the research on marginal and small-scale farmers in India. The usage of these terms in the research has become more particularly after 2016.

### 3.5 Thematic Evolution

Thematic evolution in bibliometric analysis brought out numerous interconnections and intensive relationships over the years and also demonstrated the historical development of research issues. The author’s keywords were used to conduct this analysis. Parameters were set for the number of words at 5000, 10 minimum cluster frequency (per thousand docs), inclusion index weighted by word occurrences,

number of levels (for each cluster) at 2, and clustering algorithm at Walktrap. The results were given in Figure 5. As can be seen, there were two distinct periods, i.e., an earlier period from 1975–2015 and the recent period from 2016–2024, during which different themes had been the focus point of research.

Themes such as adoption (of new technology), caste, small farmers, employment, and food security were the main research themes from 1975 to 2015. Some of the studies in this period stated that there was a wide scope to improve the production and crop productivity of marginal and small-scale farmers by enhancing the knowledge and adoption of new technology. These studies also found that the adoption of new technologies and their prices are directly related. Further, differences in the level of adoption of new technologies were present among marginal, small, and large farmers. (Choudhary et al., 2014; Raghu et al., 2015).

The second time slice, from 2016 to 2024, gave the emergence and evolution of new concepts/themes namely food security, contract farming, income, and climate change. The major change that we can see in this time segment was that food security had come out as an emerging theme, and the focus was not only concentrated on small farmers, but marginal farmers also. Some studies had computed the economic impact of climate change or variability on the farmers’ income and agricultural production and found that

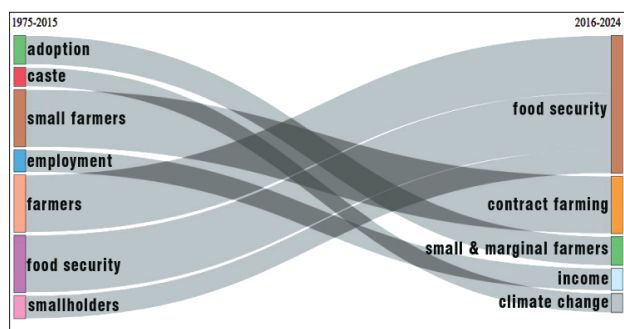


Figure 5. Thematic Evolution

it led to livelihood vulnerability specifically among marginal and small farmers (Datta & Behera, 2022). Other findings revealed that climate change was one of the many drivers that led to farmers' suicide (Rothler et al., 2024). One study recognized the interrelation between climate change and food security (Lopez-ridaura et al., 2018). A few studies also highlighted the mitigation strategies adopted by these farmers for climate change (Das et al., 2016). The association between farm size and productivity was analyzed by Saini et al., 2023. Farmer producer organizations (FPOs), as shown in the literature, were an effective mechanism for increasing the efficiency of marginal and small farmers (Lalitha et al., 2024; Das et al., 2024). Some papers have thrown light on the effect of institutional agricultural credit on crop productivity (Yadav & Rao, 2022). Several studies highlighted the declining trend of landholding size and stated that it constitutes a major challenge to the profitability and sustainability of the farming system as a whole; therefore, they advocated for the development of strategies and techniques to enhance income and generate employment for marginal and small farmers (Behera, 2019). Few papers suggested that access to roads can double farmers' income (Nawal et al., 2023). The direct inter relationship between agricultural diversification and farm income for the marginal and small farm categories has been well established in the literature. Further more, the economic performance of diversified households was superior to that of non-diversified households (Sharma et al., 2023; Shekhar et al., 2024). Income generation and addressing income inequality in the agrarian sector of India (Chakravorty et al., 2019) are two important themes in this period. The effect of contract farming on the profitability of smallholder farmers (Kumar et al., 2023; Saroj & Paltasingh, 2024) has been addressed throughout the literature in this period.

### 3.6 Future Research Pathway

Future research on India's marginal and small farmers can be explored through several key themes. One critical area is the impact of climate change on farm income, crop productivity, food security, and overall livelihood security. Studies should examine how climate variability affects food production systems and increases food insecurity among

small farmers, while also assessing mitigation strategies adopted by smallholders, including the role of new technologies such as hybrid seeds in enhancing productivity, particularly in the context of climate change (Raghu et al., 2015; Das et al., 2016; Datta & Behera, 2022; Samanta, 2023). Another important research avenue is the relationship between farm size, agricultural production, and productivity, with particular focus on how Farmer Producer Organizations (FPOs) influence price stability, poverty alleviation, and sustainable agricultural practices (Rout et al., 2023; Saini et al., 2023; Lalitha et al., 2024; Das et al., 2024). Additionally, future studies should investigate access to institutional credit and infrastructure, such as roads and irrigation, and their role in improving crop productivity and farmer incomes (Yadav & Rao, 2022; Nawal et al., 2023). Crop diversification and its impact on agricultural income and income inequality among farming households also warrant further exploration (Sharma et al., 2023; Shekhar et al., 2024). Finally, contract farming and Integrated Farming Systems present significant potential for enhancing profitability among small and marginal farmers, making them an essential area for future research (Kumar et al., 2023; Saroj & Paltasingh, 2024).

## 5. Conclusion

The study attempted to analyse the literature on various issues of marginal and small-scale farmers in India using bibliometric analysis. The results revealed that 'climate change', 'food security', 'sustainability', 'farmers' income', 'contract farming', 'productivity', 'conservation agriculture', 'crop diversification', 'indebtedness', 'livelihood', 'institutional credit', 'farm size', 'farm income', 'employment', and 'integrated farming system' are most frequently used keywords by the researchers. Among these, keywords, namely, 'productivity', 'income', and 'diversification' had the highest frequency of occurrences. The co-occurrence network analysis revealed that the issue of 'climate change, smallholder farmers, adaptation, and climate variability' was given the highest emphasis in the literature. The thematic progression in recent times (2016-2024) has placed the highest emphasis on food security, contract farming, income, and climate change. In the earlier times (during 1975-2015), research emphasis was on issues like employment, caste, food security, and adoption of new technology. It is important to underline that, in the entire time period, food security and climate change issues have remained important in so far as marginal and small farmers in India are concerned. Our study states some important future pathways for research for these categories of farmers in India and it includes themes like climate change, productivity, income, food security, and livelihood security, farm size, agricultural production, and productivity,

institutional credit and production; and access to other infrastructures, crop diversification, diversified agriculture and farm income; and income inequality, Contract farming and IFS.

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