

## Mapping the Research Landscape of Farmers' Wellbeing: A Comprehensive Bibliometric Analysis using Biblioshiny and VOSviewer

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### ABSTRACT

This study presents a comprehensive bibliometric analysis of the global research landscape on farmers' well-being using open-access articles extracted from Dimensions.ai. Employing Biblioshiny (R Bibliometrix package) and VOSviewer, the study analyses 484 scholarly articles to identify key contributors, research trends, thematic clusters, and collaborative networks. Results highlight that the majority of literature aligns with the Sustainable Development Goals (SDGs) with dominant research categories in Human Society and Agricultural Sciences. Conceptual structure analysis revealed core themes such as rural health, mental health, food security, and climate change, while citation analyses identified influential works and intellectual clusters within the domain. Social structure analysis mapped international collaborations, with Australia, the USA, and India as leading contributors. Emerging themes, including mental health and climate-smart adaptation, signal critical directions for future inquiry. The study underscores the interdisciplinary and evolving nature of farmers' well-being research and provides actionable insights for policymakers and stakeholders. By highlighting gaps and future research needs, particularly in underexplored yet pressing areas, this work contributes to shaping evidence-based policies and collaborative strategies for enhancing the well-being and resilience of farming communities worldwide. This bibliometric analysis reveals that farmer well-being research is gaining global recognition, with critical gaps in areas like mental health, food security, and rural healthcare that require urgent attention. These insights can guide policymakers and researchers to design targeted interventions, foster international collaborations, and promote sustainable livelihoods for farming communities.

**Keywords:** Agricultural research; Bibliometric analysis; Dimensions.ai; Farmer well-being; Scientific production

### 1. INTRODUCTION

Farming has been a longstanding practice on Earth since ancient times. Initially, it served as a means to fulfil the basic need of hunger. However, in modern times, farming is often viewed solely as an occupation, which is increasingly seen as one of the most stressful and uncertain professions worldwide<sup>1</sup>. Fewer people are now interested in pursuing farming practices, leading to a yearly decline in farmers. According to data(International Labour Organisation), the percentage of people working in agriculture has dropped from 44 % to 26 % between 1991 and 2020<sup>2</sup>. In the past ten years, there has been a significant focus on the concept of well-being within academic and policy circles. It has become an acknowledged objective of public policy in numerous countries, as well as supra-national organisations like the EC, OECD, and UN, which are allocating considerable resources towards conceptualising and measuring it<sup>3</sup>. The Doubling Farmers Income Committee (2017)<sup>4</sup> also

recommended changing the whole focus of agricultural scientific outreach services towards ensuring farmers' well-being on a sustainable basis by differentiating it from the previous welfare approach<sup>5</sup>. Farmer's well-being is associated with various research and scientific fields like occupational hazards<sup>6</sup>, farmer distress<sup>7</sup>, sustainable agriculture<sup>8</sup>, the impact of COVID-19<sup>9</sup>, mental health<sup>10</sup>, etc. Moreover, although many rural healthcare providers possess a limited understanding of agricultural work and are unable to appreciate the cultural background of farmers' lives and livelihoods<sup>11</sup>. Nevertheless, studies have consistently revealed significantly higher rates of suicide among farmers, approximately double the rate compared to other employed individuals<sup>12</sup>. One thing that makes farming unique is that farmers frequently use their farms as both their homes and places of work<sup>13</sup>. Farming is a way of life, leading to a blending of work, home, and family roles<sup>14</sup>.

The bibliometric analysis uncovers the crucial metrics concerning the different aspects of publication, representing classification and visualisation based on their impact, interest, citation frequency, and collaborative efforts

in the research field. It serves as a valuable tool for obtaining fresh insights into the specified field and can serve as a springboard for further scientific inquiry<sup>15</sup>. Bibliometric analysis is used for emerging trends to uncover the performance of papers and journals, patterns of collaboration, and to explore the specific domain of intellectual structure in the literature<sup>16-17</sup>. The enormous quantities of data used in bibliometric analysis tend to be objective in nature, even though its conclusions frequently rely on both objective (performance analysis) and subjective (thematic analysis) assessments established through appraised methods and techniques<sup>18</sup>. It involves applying quantitative techniques, such as citation analysis, to bibliometric data, which includes units of publication and citation<sup>19</sup>. Discussion on bibliometrics in 1950s<sup>20</sup> that the methodology is not a recent development. Beyond the initial idea of just recording scientific production or citation indexing, bibliometric methodologies are widely used in the scientific and professional communities<sup>21-22</sup>. Based on the information available, the Dimension database aims to give users access to a more transparent and all-encompassing data architecture, enabling them to investigate relationships between various types of research data. It has been seen as an alternative to WoS and Scopus and is supported by Digital Science & Research Solutions Inc<sup>23-24</sup>.

The most stressful and uncertain professions, farming are experiencing declining participation and heightened mental health concerns, including a suicide rate. Amid this crisis, global and national policy frameworks, SDGs, particularly SDG 3 (Good Health and Well-being), SDG 2 (Zero Hunger), and SDG 8 (Decent Work and Economic Growth) have increasingly emphasised the importance of farmer wellbeing as a public policy priority. However, challenges persist due to limited awareness among rural healthcare providers of farming-specific stressors and cultural contexts. By leveraging databases like Dimensions, which offer a broader, more transparent research landscape, explore the intellectual structure of this domain and align future research more effectively with the SDG agenda, thus supporting sustainable agriculture and holistic rural development.

Recognising these challenges, several policy initiatives and interventions have been introduced globally and nationally. For example, India's National Commission on Farmers (2004–2006) emphasised the need for enhancing income security, mental health support, and social protection for farmers. The Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) scheme provides direct income support to small and marginal farmers. Similarly, the National Agricultural Market (eNAM) was introduced to improve market access and ensure better price realisation. In countries like Australia and Canada, mental health helplines, outreach programs, and resilience training tailored specifically for farmers have been implemented. The UK's Farming Help Partnership and Fit for Farming programs are notable for addressing stress and isolation among farmers through peer support and confidential counseling services.

The key rationale behind this study is to address the constraints of farmer well-being, considering stress, low participation, and peak rates of suicide, which are sometimes overlooked in agricultural and policy frameworks. This bibliometric analysis seeks to identify research trends, along with critical gaps, and its proper future research and interventions with global policy goals (SDGs) to promote sustainable agriculture and holistic rural development

## 1.1 Research Objectives

The primary objective of this study is to explore the global research landscape on farmers' well-being by analysing the distribution of scholarly articles across various research fields, countries, and periods. By employing bibliometric tools such as Biblioshiny and VOSviewer using data from Dimensions.ai, the study seeks to uncover key thematic areas, research clusters, and collaborative networks.

### 1.1.1 Identify Key Contributors to Perform Bibliometric Analysis

It pinpoints the leading countries, authors contributing to the scientific literature on farmers' well-being by using bibliometric tools Biblioshiny and VOSviewer to map research clusters, thematic areas and author collaboration networks

### 1.1.2 Inform Policy and Practice to Foster Global Collaboration

It provides data-driven insights to support evidence-based policies, strengthens agricultural extension efforts, and promotes global collaboration by highlighting partnerships that advance farmer well-being through shared knowledge and joint research.

## 2. LITERATURE REVIEW

The reviewed studies explored various factors influencing farmer wellbeing across different global contexts. Brown<sup>25</sup>, *et al.* investigated the role of regenerative agriculture in Australian farmers' wellbeing, prioritising landscape regeneration and enhanced farming self-efficacy, which boosted confidence and overall wellbeing. Similarly, Murage<sup>26</sup> *et al.* found that tree-based nature solutions in low and middle-income settings significantly improved agricultural yields, income, and self-reported well-being.

Jiang<sup>27</sup>, *et al.* examined public perceptions of pondscales in China, revealing that urban dwellers were more concerned about their loss and associated health impacts than rural residents. Similarly, Watts<sup>28</sup>, *et al.* analysed how climate change affected the well-being of subsistence farmers in homegarden agroforestry systems on Mt. Kilimanjaro. This underscored the need for climate-resilient interventions and policy support to mitigate vulnerability. In Morocco, Ahrabous<sup>29</sup>, *et al.* also similarly found that agrotourism positively impacted farmer wellbeing.

Budge and Shortall<sup>30</sup> analysed the gendered impact of COVID-19 on farm families, highlighting the importance of considering gender specific mental health and wellbeing in agricultural policies during crises. Rose<sup>31</sup>, *et al.* explored stressors affecting farmer wellbeing in Ireland, New Zealand, the UK, and the US, emphasising how social, economic, and environmental factors created uneven challenges for individuals. Collectively, these studies demonstrate that farmer wellbeing was shaped by ecological, economic, social, and policy-driven factors, requiring holistic and context-specific interventions.

Nuvey<sup>32</sup>, *et al.* found that livestock disease-related mortalities in Ghana significantly reduced ruminant farmers' wellbeing, especially in physical and psychological domains, with a 10 % mortality linked to a 0.8-point drop in wellbeing, highlighting the need for stronger veterinary services. Dølen<sup>33</sup>, *et al.* reported that over one-third of 265 Norwegian farmers had wellbeing scores suggesting risk of major depression, with women and full-time farmers faring worse. Financial insecurity and lack of appreciation were key barriers. Steen<sup>34</sup>, *et al.* showed that poor farmer wellbeing in Norway was associated with declining livestock welfare, underscoring human-animal interdependence in the One Welfare framework. Rice<sup>35</sup>, *et al.* identified health priorities like non-communicable diseases, alcohol use, and pollution in mining communities across Latin America, calling for tailored, data-driven interventions aligned with SDG3 and supported by the mining sector.

### 3. METHODOLOGY

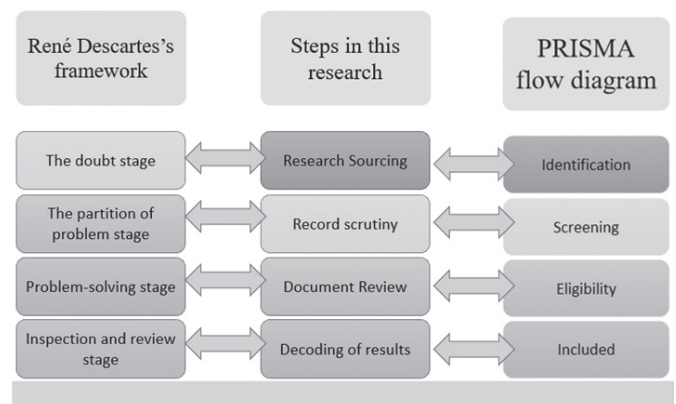
Bibliometric mapping has received significant attention since its inception<sup>36</sup>. Scholars have predominantly concentrated on refining methodologies Fig.1 for constructing bibliometric maps, examining influencing factors and evaluating various mapping techniques<sup>37-38</sup>. However, the graphical depiction of bibliometric data has received comparatively less scrutiny. Although some researchers have explored the challenges associated with graphical representation within bibliometrics<sup>38</sup>, this aspect remains relatively understudied compared to map construction. The analysis is based on the open-access research article retrieved from Dimension.ai. Unlike traditional databases such as Scopus or Web of Science, Dimensions allows for more inclusive and open access to both global and regional research, ensuring broader coverage of farmer wellbeing studies across diverse contexts. Moreover, its ability to filter by Sustainable Development Goals (SDGs), citation metrics, and publication types enhances the precision and depth of bibliometric investigations. The analysis was based solely on open-access research articles as they are freely available to all readers, allowing researchers, policymakers, and practitioners to verify, utilise, and build upon the results without subscription barriers.

The search string used for the extraction of the data set was “Farmers well-being”, limited to “Title and abstract” to ensure greater relevance and specificity in the retrieved documents, showing 828 documents. For a detailed investigation, the data set has been limited to publication

type in ‘Article’, extracting the final 484 documents. The dataset was narrowed from 828 to 484 documents by restricting the publication type to peer-reviewed research articles, thereby excluding conference papers, book chapters, editorials, and reports that may not follow the same level of scholarly rigour. This criterion was adopted to ensure that the analysis reflects high-quality, validated, and citable contributions to the field of farmer well-being, allowing for greater relevance, comparability, and replicability of the bibliometric mapping results. The analysis distributes the dataset under the Sustainable Development Goal (SDG). The dataset has a time span of 1943-2024, includes 317 Sources and 4241 Authors. 349 Author’s Keyword used in the analysis with 61 documents of single authors. The international Co-Authorship is showing 18.8 % indicating that less than one-fifth of the total publications on farmer well-being involved collaboration between authors from different countries.

The average citation per document is 12.51, which reflects the degree of academic influence and visibility of the published research. On average, each article in this dataset has been cited over 12 times, which suggests that farmer well-being is an emerging but impactful research area. Using the Bibliometrix package, the dataset was analysed under Conceptual Structure analysis, Multiple Correspondence Analysis (MCA), and thematic map; under Intellectual Structure analysis, considering citation analysis; and under Social Structure analysis, considering collaborating countries and trending topics. Every analysis performed in VOSviewer utilises the generated file using “Networking Visualisation.” A total of 484 documents were evaluated using the R package Bibliometrix(biblioshiny) to determine the association between the number of papers that represented it.

The detailed steps of a systematic examination of scholarly literature, leveraging advanced bibliometric techniques to analyse trends, patterns, and key themes within the field of farmers' wellbeing<sup>39</sup> Fig.2. Using R Biblioshiny and Dimension.AI, researchers conducted a rigorous analysis of the scholarly landscape surrounding farmers' well-being.



**Figure 1. Detailed steps of bibliometric analysis in the present research conforming to René Descartes's discourse framework and PRISMA flow diagram.**

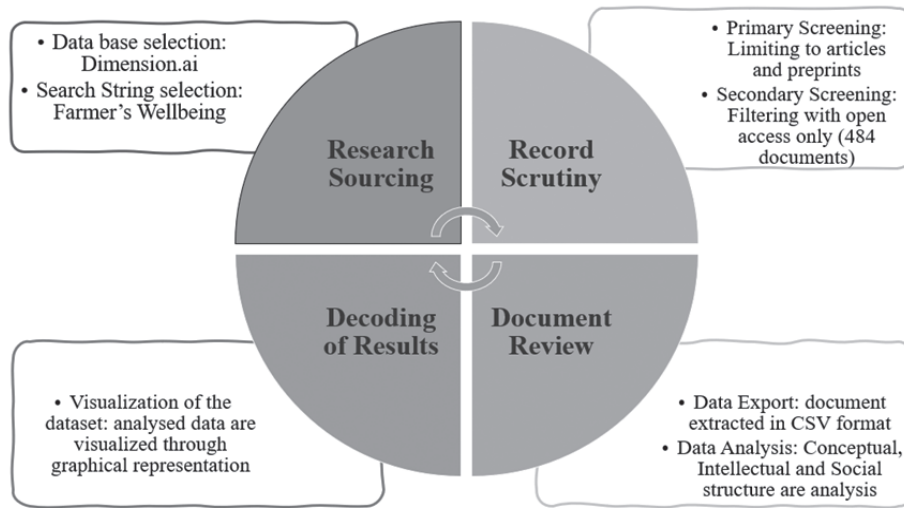


Figure 2. Detailed structure of the database retrieval to result analysis.

#### 4. RESULTS AND DISCUSSION

This section presents a qualitative analysis of the dataset. All the documents are distributed among the SDGs Fig. 3 according to their importance. It clearly shows that the majority(138) of papers on farmers' well-being are related to the second sustainable goal(Zero Hunger), followed by 104papers related to the third SDG(Good Health and Well Being). SDG 2 emphasises the role of farmers in achieving food security, improving nutrition, and promoting sustainable agriculture areas directly influenced by farmers' physical and economic well-being. Without healthy and supported farmers, food production systems become vulnerable, posing a threat to global efforts to end hunger. Meanwhile, SDG 3 focuses on ensuring healthy lives and promoting well-being for all, which includes addressing the physical, mental, and emotional health challenges that farmers face due to occupational stress, isolation, financial pressures, and exposure to environmental risks. By linking research on

farmers' well-being with these goals, the studies highlight how improving the livelihoods and health of farmers is not only a moral imperative but also a strategic priority for achieving broader global development outcomes.

Beyond these, contributions to SDG 8 (Decent Work and Economic Growth) are evident in studies focused on farmer incomes, market reforms, and agricultural policies, which align with the goal of creating secure livelihoods and inclusive economic opportunities for small and marginal farmers. Several studies also connect to SDG 13 (Climate Action), where research on adaptive technologies, sustainable resource management, and resilience-building highlights how farmer well-being is closely tied to climate sustainability. By linking farmer well-being to SDG 2, SDG 3, SDG 8, and SDG 13, the analysis underscores that supporting farmers is not only a moral obligation but also a strategic priority for advancing food security, health, economic growth, and climate resilience in line with the global sustainable development agenda.

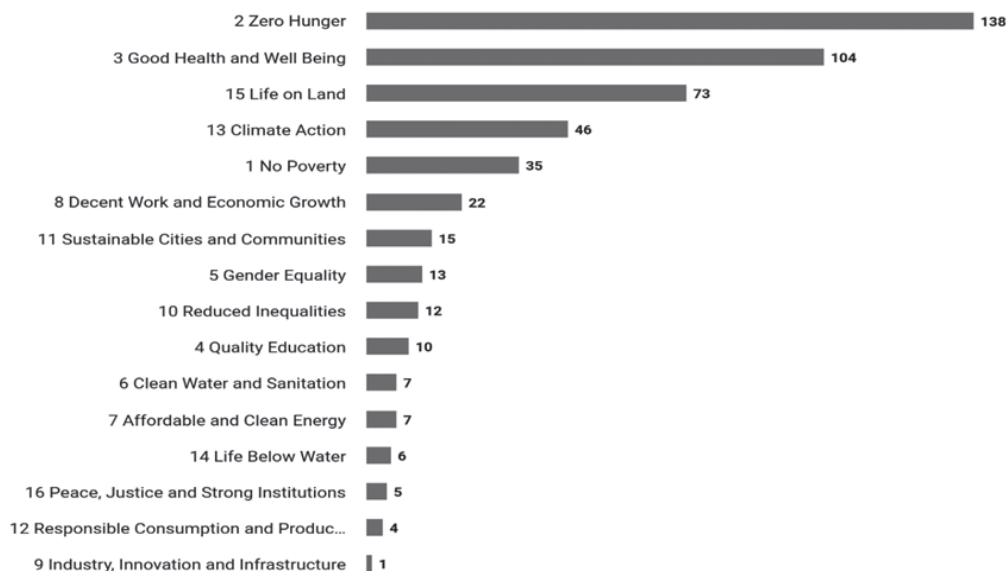


Figure 3. Distribution of research papers according to SDG.

**4.1 Conceptual Structure Analysis**

A conceptual map Fig. 4 based on the authors' keywords is plotted using two dimensions: density (y-axis) and centrality (x-axis). Density indicates the level of theme development, with higher positions representing denser keyword clusters and stronger internal associations. Centrality measures a theme's significance by its interactions with other clusters; themes on the right side have higher centrality and play pivotal roles in network connections. This visualisation helps identify well-developed areas and key focal points in farm well-being research. "The map shows four quadrants: (a) Motor themes (high-density and centrality), (b) Basic themes (low-density and high-centrality), (c) Niche themes (high-density and low-centrality), and (d) Emerging/declining themes (low-density and centrality)"<sup>40</sup>.

Four clusters formed in the first quadrant relate mainly to rural health services, occupational exposure, agriculture, and food supply, representing foundational aspects of farm well-being research with strong internal associations. Under emerging/declining themes, conservation of natural resources and the environment emerged with increasing centrality and density, indicating growing importance. Public health, animal welfare, and similar areas were identified as niche themes, characterised by

high development but decreasing relevance within the broader research landscape of farm well-being<sup>41</sup>.

Two larger clusters were identified and visualised in Fig. 5. "Mental health, economic wellbeing, food security, climate change, with farmers' wellbeing" were the major research words having interconnection. A large number of research studies are being conducted on topics in the middle cluster of topics. Research on sustainable development and ecosystem services is an overlapping research area. This cluster likely represents core areas of inquiry that attract widespread attention and investment from researchers, policymakers, and practitioners<sup>42</sup>. It shows in Multiple Correspondence Analysis.

The identification of mental health, economic wellbeing, food security, and climate change as central clusters suggests areas where intersectoral policies are needed. For example, rural development schemes could include both economic incentives (credit access, cooperatives) and health services (mobile clinics, stress counseling). Along with emerging/declining themes like conservation and environment indicates that policymakers should anticipate future priorities and invest early in resource management strategies that protect both natural ecosystems and farmer well-being.

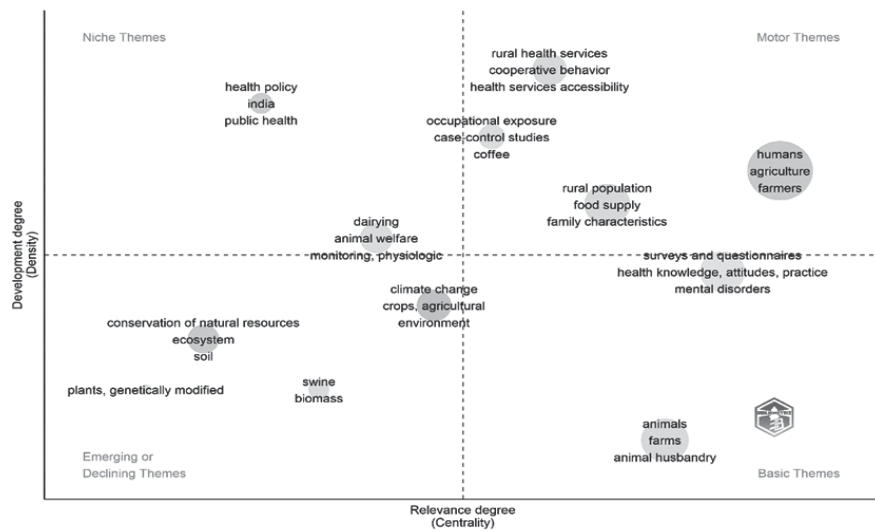


Figure 4. Conceptual map using authors' keywords in a thematic area.

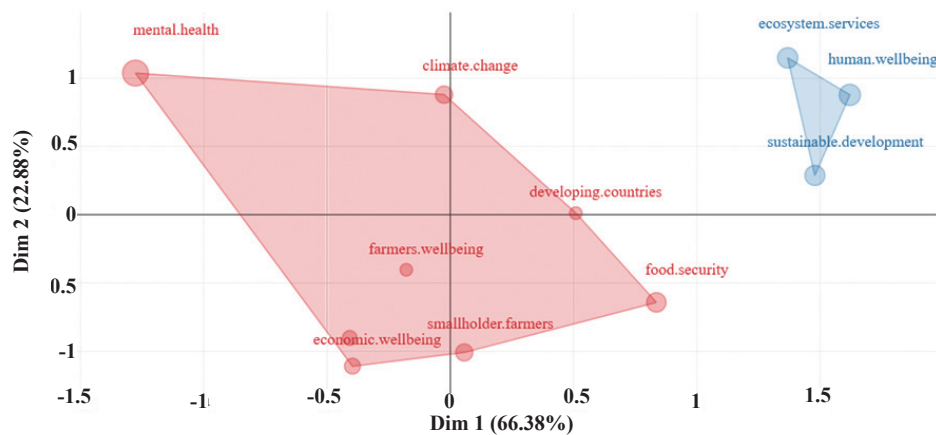


Figure 5. Multiple correspondence analysis (MCA).

### 4.2 Intellectual Structure Analysis

The study utilised citation analysis to unravel the intellectual structure. It is the process of analysing citation rates to determine the significance of authors, research papers, or publications. This approach is effective in identifying influential studies within the field. However, a limitation of citation analysis is that newly published works may have lower cumulative citation rates compared to older publications, which are more likely to accrue higher citation counts<sup>43</sup>. The study identified and visualised eight thematic clusters, as illustrated in Fig. 6, with a default threshold value of 5 for the number of citations in VOSviewer. Among these clusters, the largest one, highlighted in red and green, emerged as the most prominent and representative, containing a substantial volume of research literature.

The number of times a publication has been mentioned by other publications in the repository displays the total number of citations that are issued annually Fig.7. It is visible that publications related to farmers' well-being increased after the COVID-19 pandemic<sup>9</sup>.

Since newer studies may have fewer citations, governments should ensure continuous literature scanning

through collaborations with universities so that cutting-edge evidence such as post-COVID stress interventions that informs real-time policy updates.

### 4.3 Social Structure Analysis

The analysis of author collaboration and country involvement was conducted to gain insights into the scholarly impact and network dynamics within the research community. This approach allowed for the exploration of author networks and collaborations, as well as the identification of authors' production over time.

The distribution of corresponding authors' countries reveals significant insights into the geographical landscape of research contributions Fig. 8. Notably, Australia emerges as the foremost contributor, exhibiting both single-country and multiple-country publications, indicating its prominent role. Following closely are the USA and India, underscoring their substantial contributions to the scholarly discourse on the topic. This analysis focuses on the global reach and collaborative effort of research, highlighting key countries that drive advancements and knowledge dissemination in the field of interest.

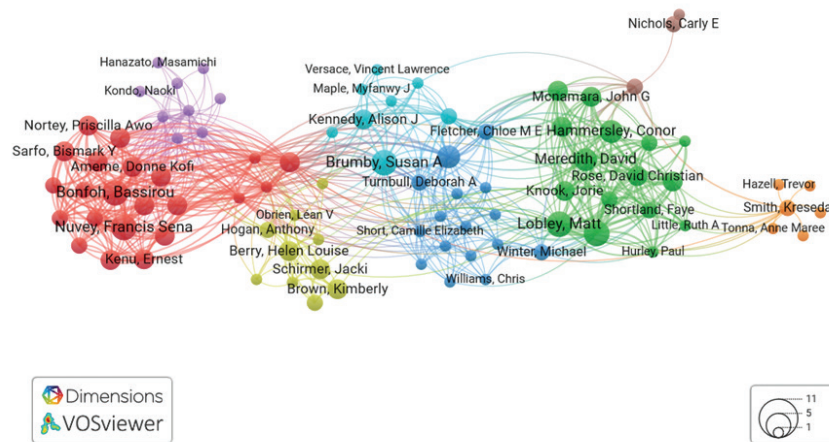


Figure 6. Citation analysis of documents.

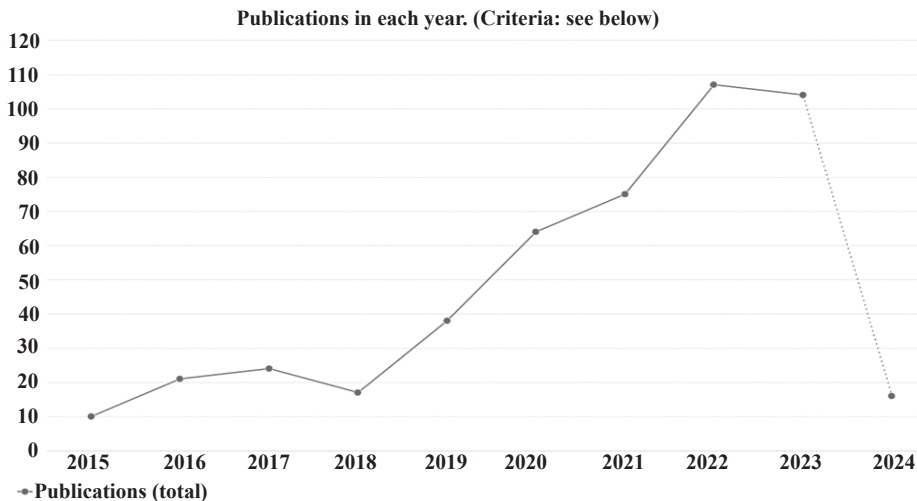


Figure 7. Publication per year (last 10 years).

Fig. 9 sheds light on evolving areas of research focus on farmers' well-being in the last 15 years. Key themes such as food supply, agriculture, and mental health signify critical aspects of farmer well-being that are garnering increasing attention and scrutiny. It highlights how livelihood insecurity and psychological stress impact farmers' overall well-being. Climate change, market volatility, and resource scarcity have placed additional pressures on farmers, prompting greater research into how these factors affect their livelihoods and well-being. The attention to mental health arises from mounting evidence that farmers face higher levels of psychological stress, depression, and suicide risk compared to other professions. Additionally, the inclusion of middle-aged men and women underscores a growing recognition of demographic considerations

in understanding the unique challenges and needs of farmers, indicating a demographic shift in understanding how age and gender influence vulnerability and coping strategies. Moreover, the emphasis on health knowledge, attitudes, and practices reflects a holistic approach to addressing farmer well-being, recognising the importance of physical, mental and emotional well-being beyond just income and productivity. The utilisation of cross-sectional studies employing surveys and questionnaires signifies a methodological shift towards more comprehensive and empirical investigations into farmer wellbeing, facilitating a deeper understanding of the factors influencing farmers' quality of life. This approach enables researchers to assess multiple well-being dimensions in diverse contexts, identify key stressors, and inform targeted interventions.

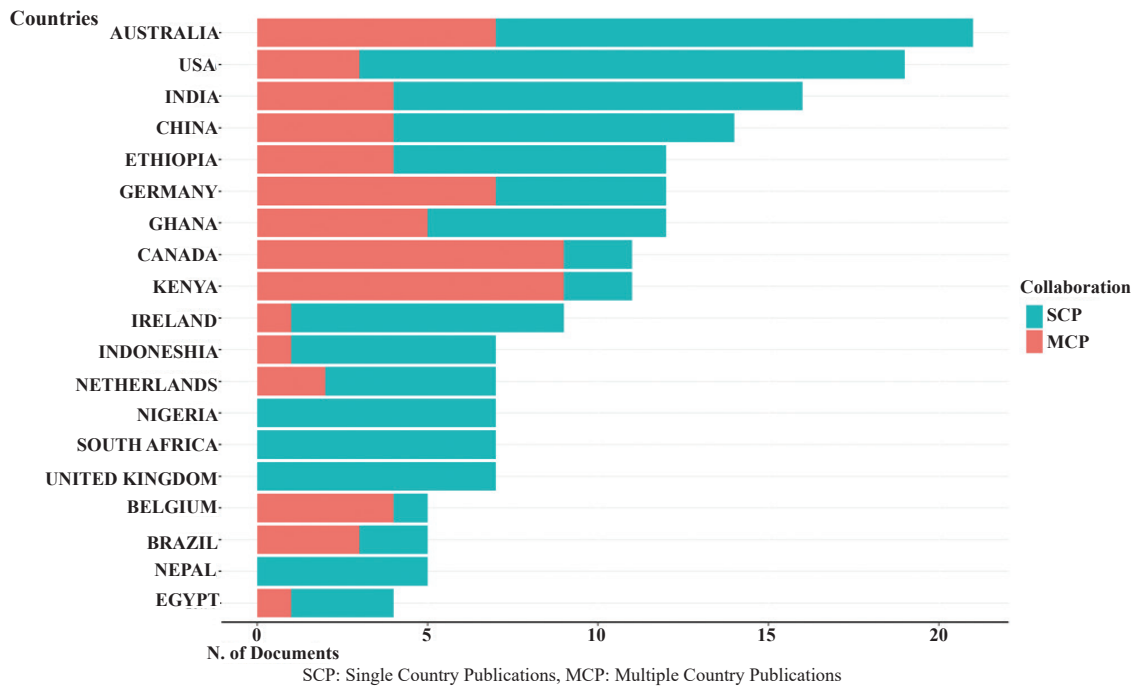


Figure 8. Corresponding author's countries.

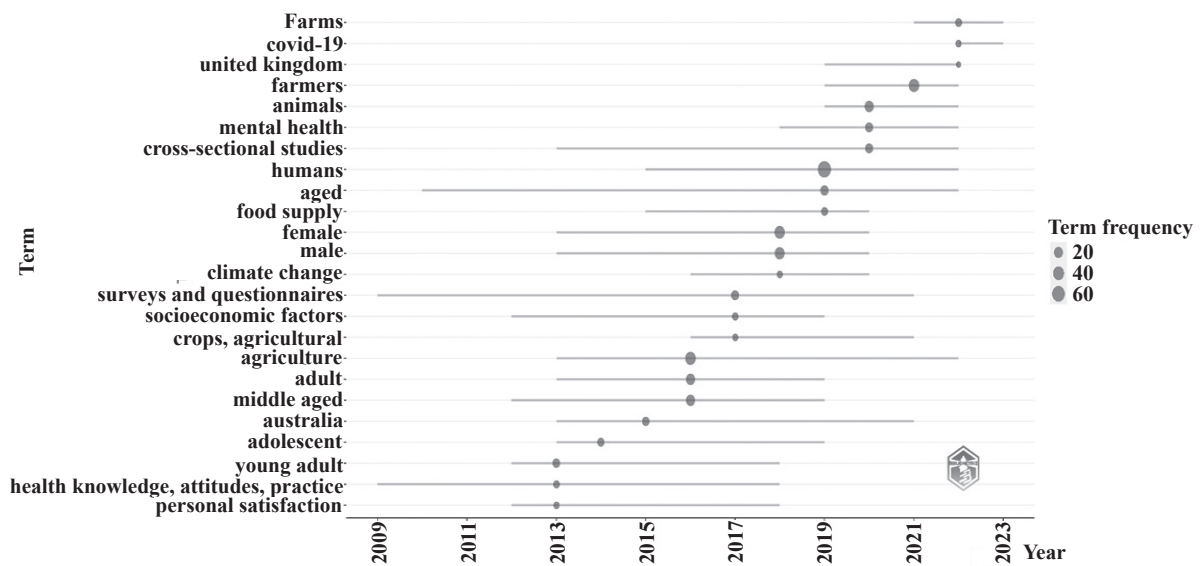


Figure 9. Trending topics.

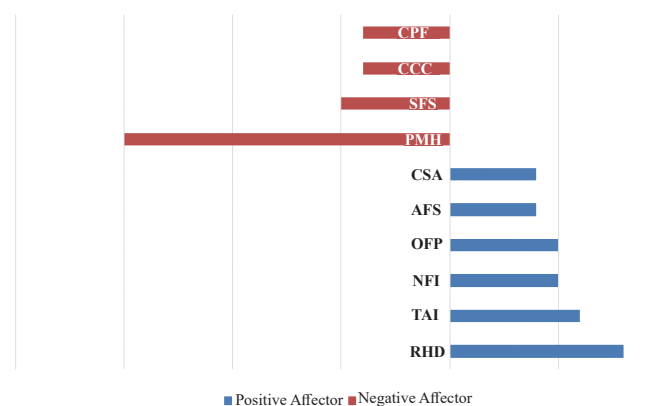
International policy bodies (FAO, WHO, UNDP) can leverage by creating global knowledge-sharing platforms where research insights are transferred into research output.

#### 4.4 Affecting Factors of Farmers' Well-being Worldwide

To shed some light on the contributors to farmers' Well-being 10 most frequently occurring Trigrams were identified using text mining by utilising the tidytext package. The visualisation Fig.10 shows the analysis of abstracts, providing important insight into the positive and negative factors which the researchers and policymakers need to focus on to ensure evidence-based improvement intervention<sup>44-45</sup>.

The findings generated through this analysis contribute to the advancement of knowledge in the field, informing future research directions, policy formulation, and interventions enhancing the farmers' well-being worldwide<sup>46</sup>. Bibliometric analysis serves as a valuable tool for uncovering the intellectual structure and conceptual framework of research within a given field. By systematically analysing publication trends, citation patterns, and collaboration networks, bibliometric analysis offers insights into the evolution and development of specific topics over time. This analytical approach facilitates a deeper understanding of the advancements made within a field, provides crucial information for journal editors to make informed decisions and evaluations regarding manuscript submissions and editorial policies<sup>47</sup>. Topics like mental health and food security networks, identified through thematic analysis, require greater attention and investigation. Conducting research in these emerging areas can provide deeper insights into crucial aspects of farmer well-being, contributing to a more comprehensive understanding of the challenges and opportunities within the field<sup>48</sup>.

Future research on farmers' well-being should prioritise interdisciplinary and context-specific approaches that



**Figure 10.** Frequently used trigrams of farmers' well-being from the published article from 1943 to 2024 (CPF: Commodity Price Fluctuations, CCC: Changing Climatic Conditions, SFS: Smallholder Farming Systems, PMH: Poor Mental Health, CSA: Climate Smart Adaptation, AFS: Achieving Food Security, OFP: Organic Food Products, NFI: Net Farm Income, TAI: Traditional Agricultural Industries, RHD: Rural Household Development).

integrate health sciences, agricultural economics, and environmental studies. Comparative studies across regions and farming systems could uncover how socio-cultural, gender, and generational factors shape vulnerabilities and coping strategies. Moreover, research should explore the effectiveness of policy interventions, such as crop insurance, mental health outreach, or digital agricultural platforms, in enhancing farmer well-being in diverse contexts.

#### 5. CONCLUSION

The bibliometric analysis conducted in this study has provided valuable insights into the research landscape surrounding farmers' well-being. The findings underscore the urgent need for increased attention and research focus on emerging topics such as mental health and food security networks within farmer wellbeing. Addressing these critical areas can provide invaluable insights into the holistic well-being of farmers and inform targeted interventions and policies aimed at improving their quality of life.

Furthermore, identifying key research clusters and thematic areas through bibliometric mapping facilitates a deeper understanding of the intellectual structure and conceptual framework of farmer wellbeing research, guiding future research directions and fostering interdisciplinary collaboration. Additionally, the visualisation of country contributions highlights the global reach and collaborative nature of research efforts in this field, emphasising the importance of international partnerships and knowledge exchange for advancing farmer well-being. Overall, this analysis extends beyond academia, informing policymakers, practitioners, and stakeholders about the pressing issues facing farming communities and the potential avenues for promoting their health, resilience, and sustainable livelihoods. Building on the findings, for a country like India, where small and marginal farmers form the majority, the major policy outcome of this study is the need to integrate farmer well-being into the core of agricultural policies. The policymakers and government organisations can implement some practical solutions like investing in rural mental health services, strengthening food security networks, promoting climate adaptive technologies, revitalisation of traditional agricultural industry to increase the net income of farmers, enhancing agricultural education and awareness, and increasing funding for farmer wellbeing research. Conversely, the research community needs to place greater emphasis on addressing key motor themes such as rural healthcare services, farmer cooperation, and the food supply situation, while also drawing lessons from the experiences of researchers in developed countries.

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