

USE OF BIBLIOMETRIC ANALYSIS FOR INSIGHTS INTO A JOURNAL: SPECIAL REFERENCE TO “INTERNATIONAL JOURNAL OF AGRICULTURAL SUSTAINABILITY”

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ABSTRACT

Bibliometrics analysis is in trend nowadays as many researchers from various fields are using that frequently. Bibliometrics analysis is a helpful research tool as it helps authors deal with a vast amount of data in the easiest way possible. Bibliometrics analysis is mainly a tool to map a particular research area by assessing the bibliographic data. It also helps to describe various characteristics of the large volume of bibliographic data obtained about a specific field, domain, Journal, etc. Here to understand the use of bibliometrics analysis in analysing the performance of a Journal, the authors decided to write this review. For that, the authors have selected “International Journal of agricultural sustainability,” a leading journal in the agriculture research domain that is cross-disciplinary and peer-reviewed. The Journal focuses on awareness and implementation of sustainability in agricultural & food practices globally. Founded by Jules pretty in 2003, known as IJAS, the Journal is famous among researchers. The Journal has seen immense growth in the past two decades. The authors have conducted this bibliometrics analysis to analyse the development of the IJAS Journal. The data was extracted from Elsevier’s Scopus in June 2022 and studied with the help of descriptive and bibliometrics analysis. The findings suggest that bibliometrics analysis can help researchers get insights into this Journal. It also shows that The International Journal of agricultural sustainability has much potential to grow.

Keywords: *Bibliometrics Analysis, Agricultural Sustainability, IJAS, Citation Analysis.*

Introduction

Bibliometric analysis has gotten its due recognition in the last few years as more and more researchers are using it to fulfill their various research objectives. Alan Pritchard is the originator of bibliometrics analysis. He coined this term in 1969 in his article "statistical bibliography or bibliometrics," which was published in the journal "Journal of Documentation" (PRITCHARD, 1969). The bibliometrics tool is popular among researchers for many reasons, such as simplifying large volumes of data for easy understanding, finding emerging research trends in specific subject domains, determining the intellectual depth of existing literature on different subjects or journals, etc. (Donthu, Kumar, Mukherjee, et al., 2021). In the research community, the impact of the Journal, author, organization, or country can be

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analysed with the help of the number of publications and citations. In this review, the authors use bibliometrics analysis to investigate the contribution of a journal in the research domain. For that, the authors have selected the "International journal of agricultural sustainability (IJAS)." The authors examined the performance of the Journal from its very beginning. Before going into the analysis and interpretation, the authors have presented a brief description of the selected Journal.

International Journal of International Sustainability

The International Journal of Agricultural Sustainability (IJAS) will be 20 years old in 2022. The Journal was defined as "The International Journal of agricultural sustainability, a cross-disciplinary, peer-reviewed journal dedicated to advancing our understanding of sustainability in agricultural and food systems." (Pretty et al., 2003).

Along with Jules Pretty as chief editor, an esteemed group of international scientists like Dr. Jacqueline Ashby, Prof Andrew Ball, Prof. James Morrison, and Prof. Norman Uphoff acted as associate editors for the Journal's first issue in 2003. These scientists have come up with expertise from different disciplines and geographic contexts. Their collaboration indicates the width of boundaries drawn by the Journal since the beginning regarding the quality of research they want to present in their Journal. Jules Pretty is a professor of environment and society at the University of Essex, UK (citizensalliancepei, 2017), and is among the top 1% of prestigious scientists worldwide who are most cited in their research domain.

Taylor and Francis From the United Kingdom is the publisher of the Journal. As per Scopus, the cite score of the Journal is 5, and the source-normalized impact per paper (SNIP) (Mukherjee et al., 2021) is 1.525. The Journal's impact factor is presented by Scopus and web of science, which are 3.25 and 2.905, respectively. The H-index of the Journal is 43 per google scholar.

Bibliometrics analysis can help authors get insights into a research domain. Citation analysis is the essential analysis authors employ while doing a bibliometrics review as it shows how much matter that research work. "In addition to this, understanding how scholar collaborates in any scientific field can help understand that specific field." (Donthu, Kumar, Pandey, et al., 2021). The author used bibliometrics analysis to understand the trends in the publishing pattern of IJAS and the Journal's performance in the past decades. For that, there are some research questions (R.Q.) formulated by the authors they had answered. These R.Q. are as follows:

RQ1. What is the pattern of articles and citations published in IJAS?

RQ2. What is the pattern of collaboration between different authors publishing in IJAS?

Objectives of the Research

The objective of This Review is as follows:

- To determine the use of bibliometrics analysis in analyzing the contribution of the IJAS in the Agricultural Research Domain.
- To understand the pattern of the publications in IJAS.
- To recognize the pattern of collaboration among authors publishing in IJAS.

Research Methodology

The authors have adopted bibliometric analysis. This study contains a citation analysis, co-authorship, bibliographic coupling, and co-occurrence network analysis.

Data Collection

The authors have considered Elsevier's Scopus for data collection. The Elsevier group launched Scopus in 2004 as an abstract and citation database available in 40 languages for users. All journals covered in the Scopus database are high quality and measured on four types of numerical quality for each title: H-Index, Cite score, SJR (SCImago Journal Rank), and SNIP (Source Normalised impact per paper) (wikipedia, 2022).

After that, the authors searched in Scopus with the source name "International Journal of agricultural sustainability" in June 2022. The Sample analyzed in the review contains documents published from January- 2003 to June-2022.

Data Statistics**Table 1: Data statistics of the International Journal of Agricultural Sustainability**

Descriptions	Results
Main Keyword	"International Journal of Agricultural Sustainability"
Period of analysis	From 2003 till June 2022
Database	Elsevier's Scopus
Types of Documents	Articles, Editorials, Commentary letters, Proceedings papers, and Book Reviews
Total No. of Publications (T.P.)	602
No. of Authors	2050
Average Authors per article	3.4
Total No. of Citations (T.C.)	11429
Average Citations per paper (A.C.)	18.98
Total No. of cited references (T.R.)	29493
Average references per paper	48.99
No. of keyword	2902
No. of Authors' keywords	1904
No. of Index Keywords	1309

Table 1 demonstrates the essential nature of the literature published in IJAS.

Data Analysis and Visualization

Data were analyzed with the help of VOSviewer. VOS stands for visualization for similarities. "VOSviewer is a program developed for constructing and viewing bibliographic maps." And "the program is freely available to the bibliometrics research community" (van Eck & Waltman, 2010). In VOSviewer, users can construct different Maps based on citation, co-citation, co-authorship, bibliographic coupling, co-occurrence, etc.

The data were also analysed with the help of descriptive analysis.

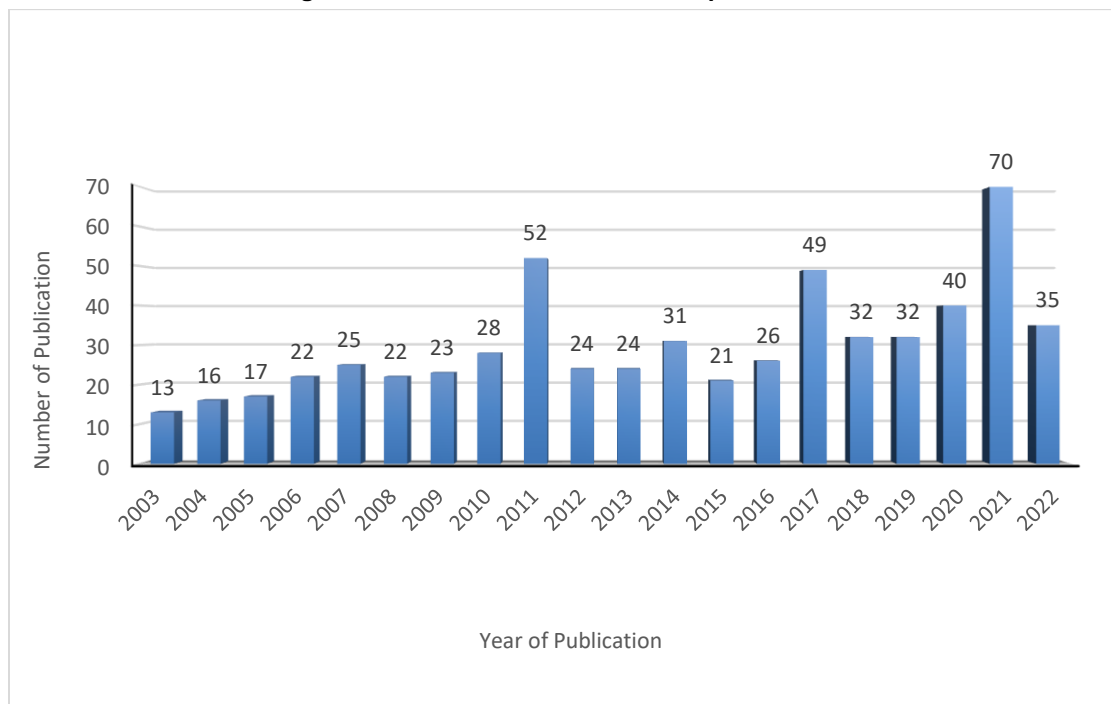
Descriptive analysis Results**Figure 1: Year Wise Distribution of Papers in IJAS**

Figure 1 presents the year-wise distributions of the papers published in IJAS. The number of published articles rises with the increasing number of issues. 2021 has seen a peak in the number of articles published in IJAS, totalling 70. 2011 has the second-highest no. of articles published in IJAS with 52 articles. In 2011, the Journal published a special issue named "Integrated assessment of agricultural sustainability: exploring the use of models in stakeholder processes," containing seven papers and an editorial. The articles for this issue were developed from the oral presentations at a seminar on the theme "Stakeholders involvement in designing, use, and evaluation of integrated assessments models" at "The international conference on Integrated assessment and of agriculture and sustainable development," which was held on 10-12 march 2009 in Egmond Ann Zee, Netherlands (Herrmann et al., 2011). The citation analysis of the documents published in IJAS is equally vital in understanding their relevance in the research domain.

In this regard, the year-wise citation analysis of IJAS is presented below:

Figure 2: Year-wise Citations of IJAS

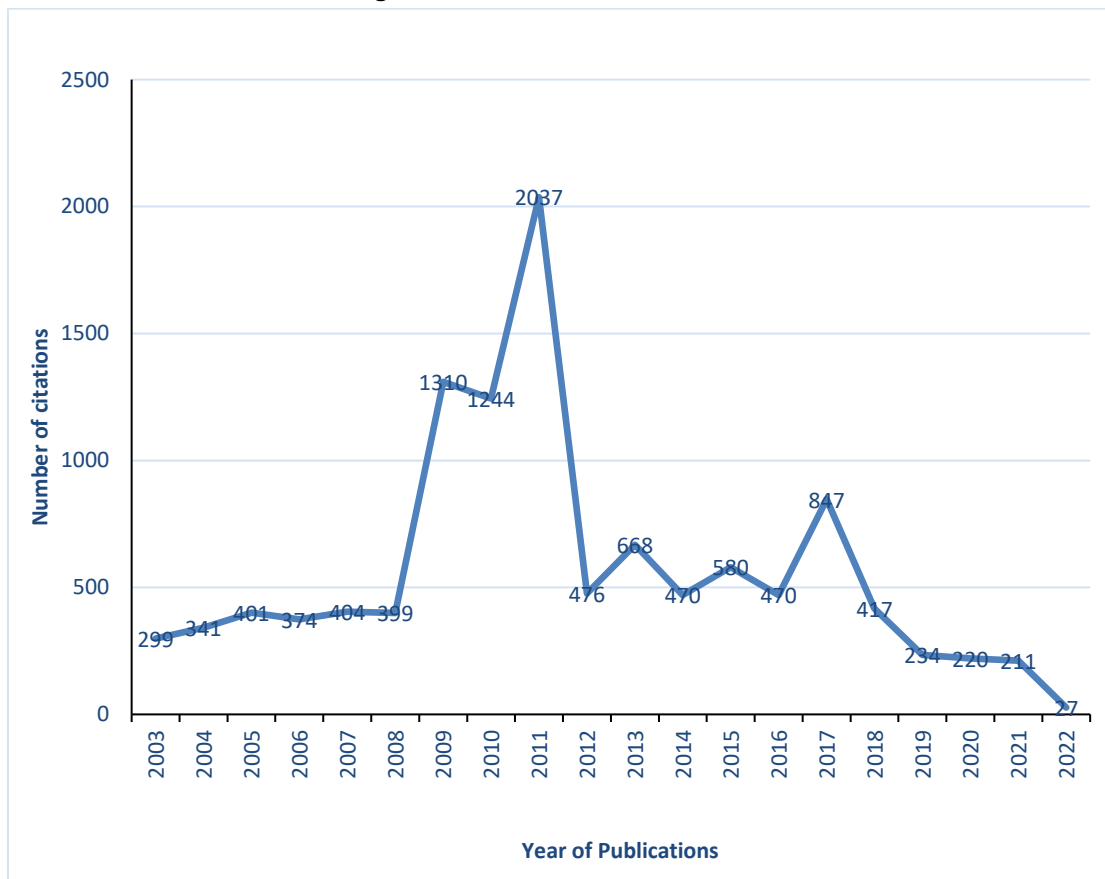


Figure 2 demonstrates the number of citations received by the papers. No citations to past articles are more critical when researchers' interest is growing. Total citations in 2011 are almost double the citations received on articles over most other years, so it is not only a turning point in the context of no. of papers but also the no. of citations. Citations are the criteria all follow in assessing the quality of the paper; more citations mean more researchers find articles helpful to include in their future research. The increase in citations shows that the study published by IJAS is high-quality and moving in the right direction.

The expansion of the research literature of a journal doesn't only assess based on the years only. The researchers also determined the research area's evolution based on the geographical locations.

In this respect, a Graph has been drawn below:

Figure 3: Countries-wise Contribution of Papers in IJAS

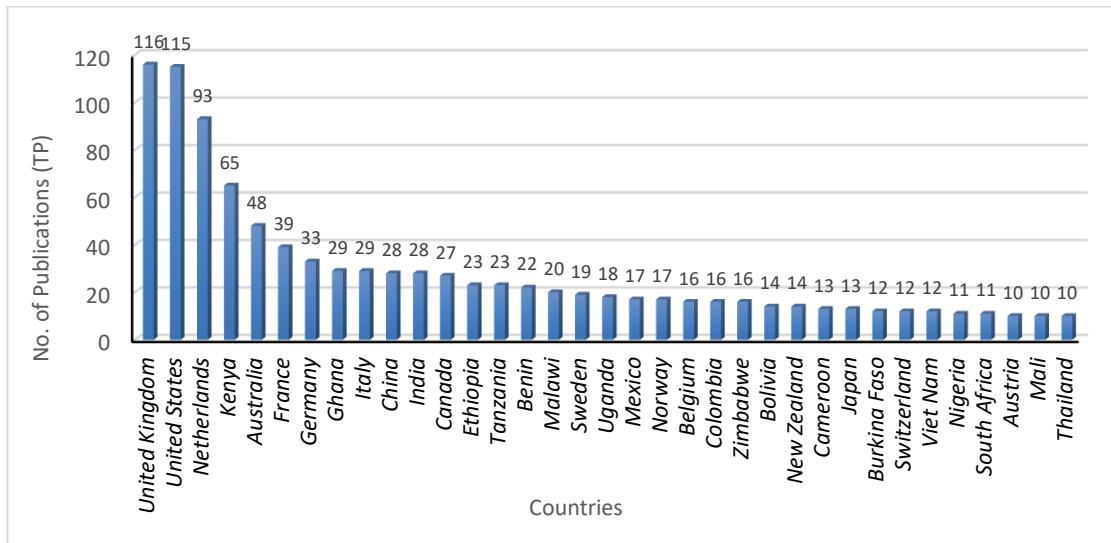


Figure 3 demonstrates the contributions of different countries in the publications of the IJAS. Although 100 countries in the sample data publish their research with IJAS, only 35 meet the threshold criteria of ten or more than ten articles Published in IJAS. U.K. has published 116 documents IJAS, which is the maximum, followed by the USA, which published 115 papers, and the Netherlands, which has published 93 articles.

The citations revied by articles from a particular country show the articles' quality and importance, which makes the citation analysis of different countries equally vital.

A graph of country-wise citations has been presented below:

Figure 4: Country-wise Distributions of Citation in IJAS

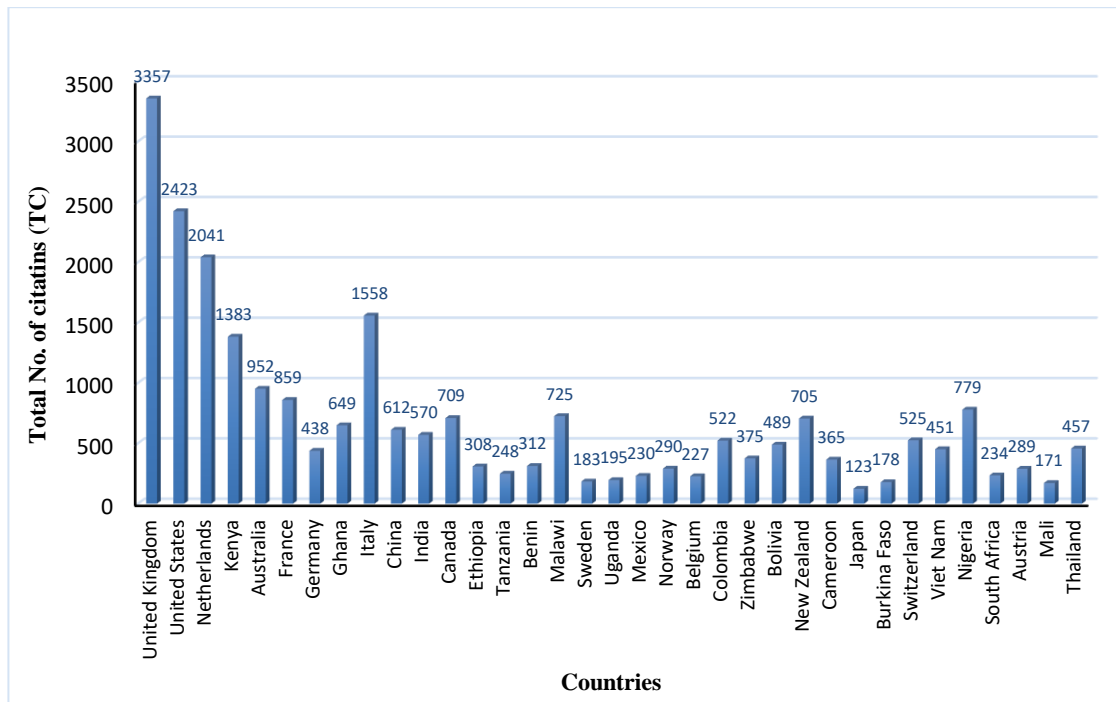


Figure 4 presents the top countries in the number of citations they received for their articles Published in IJAS. The U.K. gets 3357 citations, the maximum number of citations on their publications in IJAS, followed by the USA with 2423 citations. The Netherlands occupies the 3rd rank in the number of citations it received on its articles. These citations make literature from the U.K. have the most important place in IJAS.

Bibliometrics Analysis Results

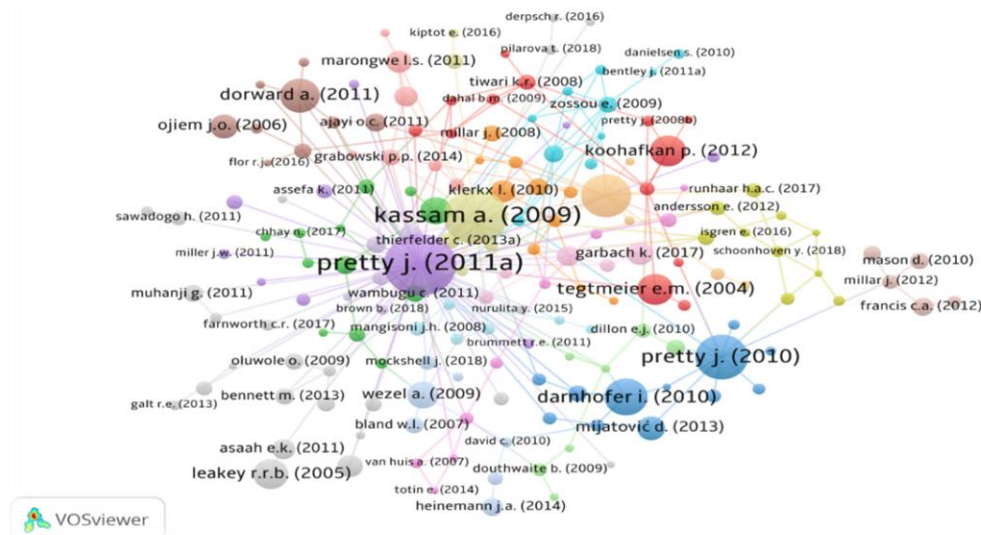
Bibliometrics analysis contains techniques like citation, co-authorship, co-citation, bibliographic coupling, and co-occurrence network analyses. These methods are used for different purposes and depend on the study's needs. Here authors have applied citation analysis, co-authorship analysis, bibliographic coupling, and network analysis to analyze trends in the research literature Published by IJAS in the past twenty years.

Citation Analysis

Citation analysis becomes the base for predicting the impact of a particular article, author, Journal, etc. (Donthu, Kumar, Mukherjee, et al., 2021). Everyone evaluates the quality of a specific research document based on its citations. Here Citation analysis helped the authors recognize the most cited papers of the IJAS, the most profound authors of IJAS.

More citations mean more matter to the research work. So, the citation analysis of the most-cited document has been presented in Figure 5:

Figure 5: Most Cited Articles of IJAS



Note: - Threshold Criteria: Minimum Ten Citations per document.

Figure 5 presents the most cited articles in the International Journal of agricultural sustainability. Scientific mapping of the documents is based on the minimum ten citations per article threshold. Two hundred ninety-four articles meet the threshold criteria, of which 173 are connected in the scientific mapping.

To gain more insight into IJAS's literature, Table 4 for the Top-ten most-cited articles is presented below:

Table 2: Top-Twenty Most-cited Articles in IJAS

R	Document Title	Authors Full Name	T.C.
1	"Sustainable intensification in African agriculture" (Pretty et al., 2011)	"Jules Pretty, Camilla Toulmin & Stella Williams" (Pretty et al., 2011)	613
2	"The spread of Conservation Agriculture: justification, sustainability, and uptake" (Kassam et al., 2009)	"Amir Kassam, Theodor Friedrich, Francis Shaxson & Jules Pretty" (Kassam et al., 2009)	491

3	"The top 100 questions of importance to the future of global agriculture" (Pretty et al., 2010)	"Jules Pretty, William J. Sutherland, Jacqueline Ashby, Jill Auburn, David Baulcombe, Michael Bell, Jeffrey Bentley, Sam Bickersteth, Katrina Brown, Jacob Burke, Hugh Campbell, Kevin Chen, Eve Crowley, Ian Crute, Dirk Dobbelaere, Gareth Edwards-Jones, Fernando Funes-Monzote, H. Charles J. Godfray, Michel Griffon, Phreak Gypmantisiri, Lawrence Haddad, SiosuaHalavatau, Hans Herren, Mark Holderness, Anne-Marie Izac, Monty Jones, ParvizKoochafkan, Rattan Lal, Timothy Lang, Jeffrey McNeely, Alexander Mueller, Nicholas Nisbett, Andrew Noble, Prabhu Pingali, Yvonne Pinto, Rudy Rabbinge, N. H. Ravindranath, Agnes Rola, Niels Röling, Colin Sage, William Settle, J. M. Sha, Luo Shiming, Tony Simons, Pete Smith, Kenneth Strzepeck, Harry Swaine, Eugene Terry, Thomas P. Tomich, Camilla Toulmin, Eduardo Trigo, Stephen Twomlow, Jan Kees Vis, Jeremy Wilson & Sarah Pilgrim" (Pretty et al., 2010)	321
4	"The role of knowledge, attitudes, and perceptions in the uptake of agricultural and agroforestry innovations among smallholder farmers in sub-Saharan Africa" (Meijer et al., 2015)	"Seline S. Meijer, Delia Catacutan, Oluyede C. Ajayi, Gudeta W. Sileshi & Maarten Nieuwenhuis" (Meijer et al., 2015)	300
5	"Assessing a farm's sustainability: insights from resilience thinking" (Darnhofer et al., 2010)	"IkaDarnhofer, John Fairweather & Henrik Moller" (Darnhofer et al., 2010)	224
6	"The carbon footprints of food crop production" (Hillier et al., 2009)	"Jonathan Hillier, Cathy Hawes, Geoff Squire, Alex Hilton, Stuart Wale & Pete Smith" (Hillier et al., 2009)	192
7	"The Malawi agricultural input subsidy programme: 2005/06 to 2008/09" (Dorward & Chirwa, 2011)	"Andrew Dorward& Ephraim Chirwa" (Dorward & Chirwa, 2011)	184
8	"External Costs of Agricultural Production in the United States" (Tegtmeier & Duffy, 2004)	"Erin M. Tegtmeier& Michael D. Duffy" (Tegtmeier & Duffy, 2004)	158
9	"Green Agriculture: foundations for biodiverse, resilient, and productive agricultural systems" (Koochafkan et al., 2012)	"ParvizKoochafkan, Miguel A. Altieri & Eric Holt Gimenez" (Koochafkan et al., 2012)	154
10	"Agroforestry Tree Products (AFTPs): Targeting Poverty Reduction and Enhanced Livelihoods" (Leakey et al., 2005)	"Roger R.B. Leakey, Zac Tchoundjeu, Kate Schreckenberg, Sheona E. Shackleton & Charlie M. Shackleton" (Leakey et al., 2005)	145

Note: R-Rank, TC- Total citations, Y- Year

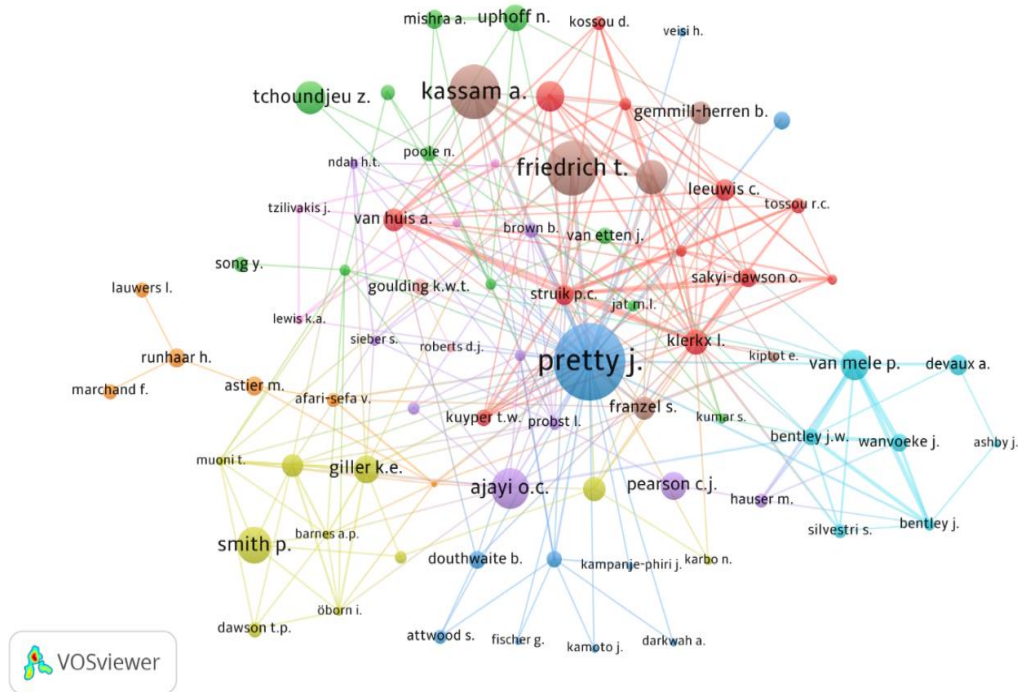
Table 2 details the topten most cited papers published in IJAS. After data analysis, it was found that out of 602 publications, only 36 have more than 50 citations. Every document contains a new aspect for making agricultural and food systems more sustainable than before globally.

The top-cited paper published in IJAS in 2011 discusses the 40 sustainable intensification projects employed in 20 African countries where agriculture didn't perform well in the past century on a large scale(Pretty et al., 2011). This research explains sustainable agricultural intensification as producing more output from a given land without harming our environment. It concluded that if African

countries give some importance to agriculture economically and politically, agriculture can grow there without breaking the environment even slightly (Pretty et al., 2011). The second most cited paper discusses conservation agriculture's rapid spread since the 1980s (Kassam et al., 2009).

The authors have analyzed the most profound authors of IJAS by citation analysis. In that respect, Figure 6 has been presented below:

Figure 6: Most profound Authors in IJAS



Note: Threshold criteria: Minimum three documents per author.

Figure 6 demonstrates the citation analysis of authors who published their research in IJAS. Out of 2050, only 83 authors meet the threshold criteria of having a minimum of three documents and five citations, but only 77 are connected in the scientific mapping. So, only related items are present in figure six.

Based on this analysis, a table of top-ten authors of IJAS has been presented below:

Table 3: Most Profound Authors in IJAS

R	Author	Affiliation	Country	D	C	AC	A-HI	A-HI in IJAS	I-10 I
1	Jules Pretty	University Of Essex	UK	12	1564	130.3	101	9	262
2	Aliya Kassam	University Of Calgary	Canada	5	651	130.2	22	5	36
3	Tobias Friedrich	University Of Hawaii	USA	4	619	154.8	21	4	34
4	Pete Smith	University Of Aberdeen	U.K.	8	611	76.37	142	6	489
5	Oluyede Clifford Ajayi	"The Eu-Acp Technical Centre for Agricultural and Rural Cooperation (Cta)" (Meijer et al., 2015)	Netherlands	3	359	119.7	39	3	92

6	Christian Thierfelder	CGIAR: Consultative Group for International Agricultural Research	México	6	253	42.2	45	5	83
7	Zac Tchoundjeu	CGIAR: Consultative Group for International Agricultural Research	Cameroon	3	226	75.3	41	3	105
8	Niels Röling	Wageningen University	Netherlands	6	206	34.3	NA	6	NA
9	Paul Van Mele	Agro-Insight	Belgium	9	193	21.4	31	8	64
10	Norman Uphoff	Cornell University	United States	8	192	24	51	4	N.A.

Note: R- Rank, D- documents, C- Citations, A.C.- Average Citations, A-HI- authors H-Index, A-HI in IJAS- authors H index in IJAS.

Table 3 demonstrates the top twenty most influential authors of IJAS based on total citations. Google Scholar calculates the h-index and I-10 index of the authors based on the paper published and citations on those papers every year (Google scholar). Here A-HI and I-10 index data have been collected from google scholar, and A-HI in IJAS has been calculated with the help of biblioshiny.

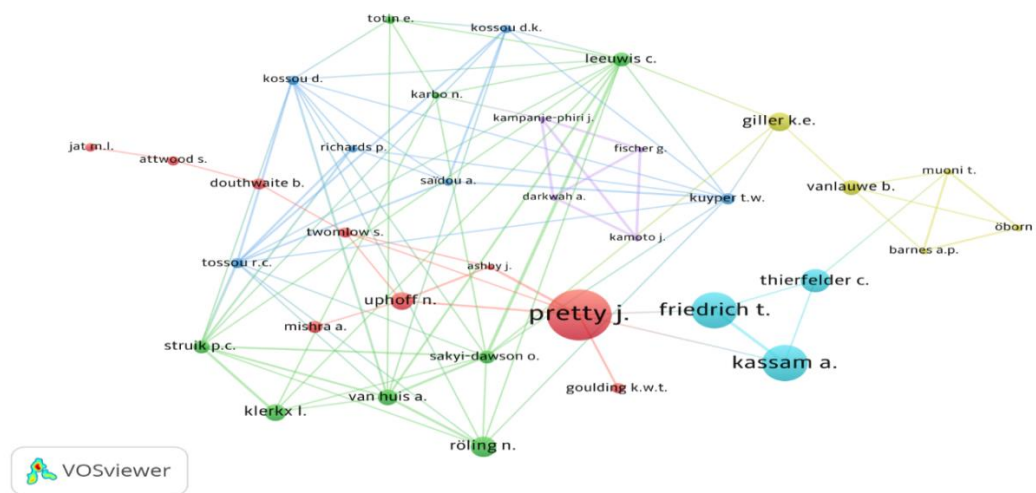
Jules Pretty from the University of Essex (U.K.), founder and chief editor of IJAS, is the most profound author, having the maximum number of publications with twelve documents and 1564 citations on his papers. He has 130.3 average citations on his papers. His H-index is also 101, which is too good in the research community. Aliya Kassam, University of Calgary (Canada), secures 2nd by publishing only Five articles and has 651 citations on them. Tobias Friedrich from the University of Hawaii(USA) is the third most profound author of IJAS. Even after publishing only four articles and having 610 citations on those documents, he has 154.8 Average citations, which is the maximum.

Co-Authorship Analysis

Co-authorship analysis helps authors understand the associations between authors of a particular research field (Donthu, Kumar, Mukherjee, et al., 2021). Different authors associate with other authors on various projects. This association can be between authors from the same field, organization, and country or different fields, organizations, and countries. Co-authorized investigations examine the changing cooperation between authors and the impact of that change.

Here, the analysis of authors published with IJAS has been presented in Figure 8 based on authors' associations.

Figure 7: Co-authorship Analysis of Authors of IJAS



Note: - threshold criteria: Minimum ten citations per article.

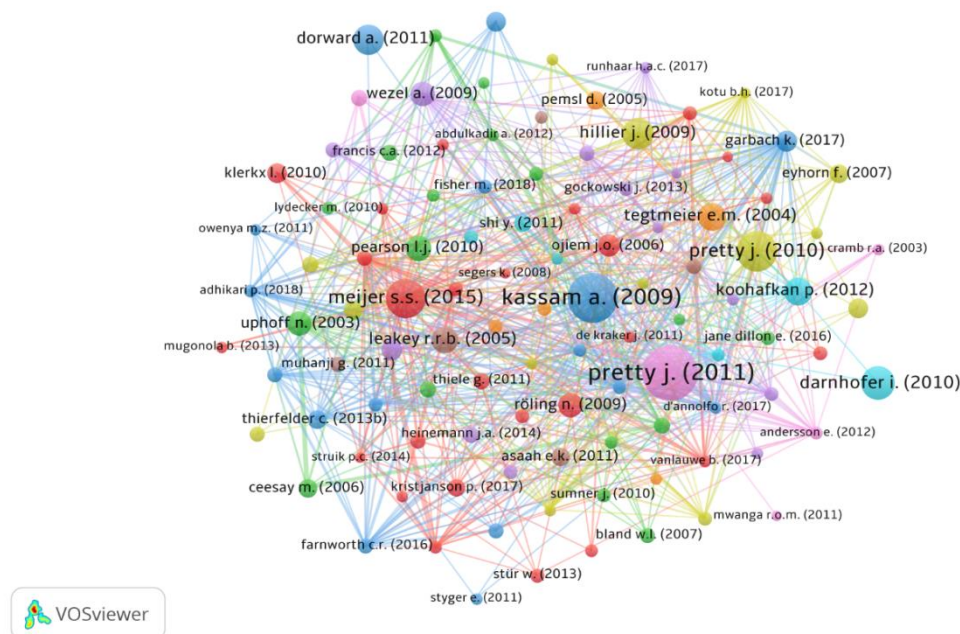
Figure 8 shows the co-authorship analysis of authors published in IJAS since its beginning. Of 2050 authors, 85 meet the threshold criteria of having ten citations per article and published three or more articles in IJAS, but only 35 are connected in scientific mapping. So here, the figure represents only those 35 documents co-authored by three or more associated authors. Different authors have different numbers of citations, but many authors co-authored various articles in IJAS.

Bibliographic Coupling

"Bibliographic coupling is a technique for science mapping that operates on the assumption that two publications sharing common references are also similar in their content." (Donthu, Kumar, Mukherjee, et al., 2021). Here the authors have examined the research domain of IJAS based on the bibliographic coupling of articles published in IJAS over the years.

This analysis can help one understand the relevance of the research published in IJAS, and Figure 9 is below presented the same:

Figure 9: Bibliographic Coupling of the Articles of IJAS



Note: - Threshold criteria: minimum twenty-five citations per article.

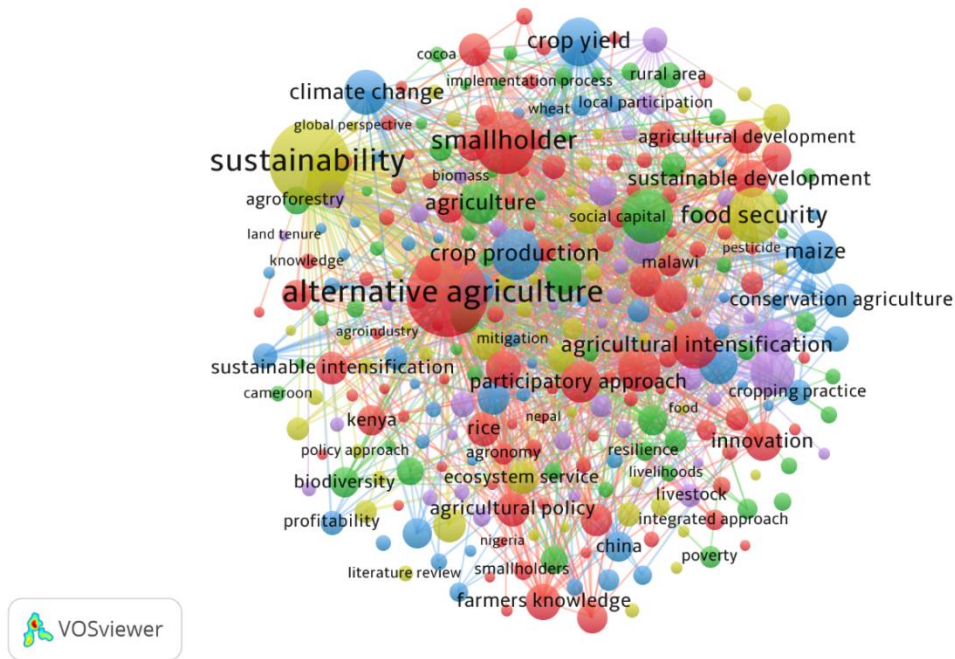
Figure 10 demonstrates the bibliographic coupling analysis of the articles published in IJAS. Of 602 publications titles, only 118 meet the threshold criteria of having a minimum of twenty-five citations per article; out of 118, 107 documents are connected in the scientific mapping, so here, the analysis for only 107 papers is presented in this study. The bibliographic coupling of documents explains past research's relevance as new researchers use some papers as a reference in their publications. IJAS is one of the world's leading peer-reviewed journals, which provides various themes to researchers all over the globe for research in new dimensions.

Co-occurrence Analysis (Keyword Analysis)

Co-occurrence analysis, also known as co-word analysis, helped authors detect the critical themes that have evolved in IJAS since the beginning. Co-occurrence analysis, also known as co-word analysis, helped authors see the essential keywords researchers use while researching different dimensions of agricultural sustainability. This analysis determines the trends in the research papers published in IJAS.

The most frequently used keywords influence upcoming researchers who want to print with IJAS, and new trends can be seen in the publication pattern of IJAS. A figure showing all of the above-discussed things is present below:

Figure 8: Keyword Analysis of IJAS



Note: - Threshold criteria- Minimum five occurrences of a keyword.

Figure 12 demonstrates the most frequent keywords the researchers picked up in the articles published with IJAS in the past two decades. To know the depth of the literature in the research domain of agricultural sustainability, the authors have employed the all-keyword analysis instead of the only author keyword analysis. By applying threshold criteria, the authors have analyzed that out of 2902 keywords, only 294 keywords meet the threshold of having a minimum of 5 occurrences as a keyword. "Alternate agriculture" is the most frequent keyword, with a maximum occurrence of 132 times. "Sustainability" comes in the second spot with an event of 131 times, reflecting the importance of sustainability in the agri-practices followed by the farmers globally, followed by "Smallholder" with 81 occurrences.

Table 4 for the top Ten keywords is presented below.

Table 4: Most- Occurred keywords of IJAS

S.No.	Keyword	Occurrences	Cluster	TLS
1	Alternative Agriculture	132	6	1208
2	Sustainability	131	4	1109
3	Smallholder	81	1	811
4	Food Security	67	4	584
5	Farming System	64	2	607
6	Crop Production	57	3	590
7	Crop Yield	52	3	538
8	Agricultural Intensification	50	6	513
9	Agroecology	48	5	401
10	Climate Change	47	3	412

Table 4 presents the most recurring keywords of documents published in IJAS. These words can be found, giving researchers the maximum idea of which direction to move. So here, 'Alternative Agriculture' is the most occurring keyword in the existing literature having 132 occurrences, followed by 'Sustainability' with 131 events. 'smallholder' has 81 affairs and occupies the third place in the most occurring keyword list. All other keywords are related to the different practices that researchers can adopt who want to research for sustainable growth of agriculture, like alternative agriculture, conservation agriculture, green agriculture, etc.

Conclusion

The performance analysis and scientific mapping of documents show that IJAS has been a remarkable Journal in the last two decades, publishing about the impact of sustainable practices on agricultural and food systems of the world. With the help of rising year-wise and countries-wise distribution of papers and citations in IJAS, authors have answered RQ1 presented in the study and fulfilled objectives 1 and 2.

More and more authors from different countries want to publish with IJAS, which has led to various collaborations among these authors. Co-authorship analysis and Bibliographic coupling helped the authors answer RQ2 and determine objective 3 of this review study to understand that pattern.

More and more research is going on different dimensions of sustainable practices worldwide in agricultural and food systems, and IJAS is publishing literature in those emerging areas. In the past decade, conservation agriculture, alternative agriculture, and various aspects of agricultural sustainability have highlighted the research published in IJAS. Multiple articles such as those (Kassam et al., 2009)(Marongwe et al., 2011)(Thierfelder et al., 2013) talk about conservation agriculture which emerged as a theme of research in IJAS.

Based on the above analysis, the authors can conclude that bibliometrics analysis provides the depth of literature published in a journal such as IJAS. The past decade has seen remarkable growth in the use of bibliometrics analysis for analyzing different research domains, and still, there are much more researcher can do in this context.

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