

## **New Zealand Journal of Agricultural Research: A Bibliometric Study**

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### **Abstract**

*This study presents a bibliometric analysis of 329 research papers published between the period of ten years 2013 and 2022 in the 'New Zealand Journal of Agricultural Research'. The study observes the different parameters i.e. institution-wise and geographical-wise distribution of contributions, research productivity of literature, matrices of papers, highly viewed/cited articles and highly productive authors. Results indicate that out of 329 research papers the highest number of papers, 40 have been published in volume no. 58. Highest contributions have been made by universities with 154 papers. The contributions received in the journal are more from New Zealand than that of any other country. Majority of the contributions appeared under the subject Soil science, with 108 papers. Year 2014 appears with highly viewed articles. Year 2015 secures first place for highly cited articles and 2017 stands with highest altmetric. The work of author PR Kenyon has been widely viewed as well as highly cited in 2014. The article by TJ van der Weerden received highest almetric scores in 2017. G.R. Edwards is most productive author with 30 contributions.*

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**Keywords:** Bibliometrics, Agricultural research, Agricultural science, Metrics, Research productivity, Subject growth.

### **1. Introduction**

Bibliometrics is the discipline where quantitative methods were employed to probe scientific communication process by measuring and analyzing various aspects of written documents. It helps to monitor growth of literature and patterns of research. Bibliometrics is an emerging thrust area of research from different branches of human knowledge. It employs quantitative analysis to measure patterns of scientific publication and citation, typically focusing on journal papers. It is also used to measure scientific collaboration, assess interdisciplinary research and look for quality and excellence in research. There have been several bibliometric analyses of specific subject areas, such as XML (Zhao and Logan, 2002), computer supported collaborative work (Holsapple and Luo, 2003) and information science (Cai and Card, 2008). The very basic attribute of bibliometrics governing the relationships between information items and activities has thus made librarians and statisticians to conduct the bibliometric studies (Kumar, 2014).

## **2. Source Journal**

The New Zealand Journal of Agricultural Research plays an important role in disseminating topical information to researchers in universities, research institutes, and other centres concerned with animal or pastoral science. The journal publishes original research papers, review papers, short communications, book reviews, letters, and forum. All research articles in this journal have undergone rigorous peer review, based on initial editor screening and single-blind refereeing.

## **3. Review of Literature**

Pradhan and Kumar, et al. (2015) conducted a citation analysis of library and information science (LIS) scholarly publication in International LIS Journals and examine the authorship pattern, collaborative nature, research distribution, etc. The findings revealed that 84.13% literatures are contributed in the form of journal articles, more than half literatures are contributed by collaborative Indian authors, out of 41 journals having 353 LIS literatures, only seven journals cross more than 10 literatures each of which shows only few set of core journals where majority of LIS literatures are published, Delhi, found to be of central place has increased the growth of LIS research in India, having 24.08% publications.

Dhiman (2000) evaluated “Ethnobotany Journal” for authorship pattern, year-wise distribution of articles, institution and country-wise distribution and range of references cited. Hasbrouck et al. (2003) examined the scientific literature by analyzing citation patterns of specific journal articles to and by the American Journal of Epidemiology (AJE): 178,396 journal citations to and 126,478 citations by AJE were made from 1983 through 1999. They sorted citations based on the subject category of the referencing or referenced journal. Garg and Bebi (2014) conducted a citation study of a number of articles published in Annals of Library and Information Studies (ALIS) and DESIDOC Journal of Journal of Library and Information Technology (DJLIT) from the period 2010-2013 and found that the average number of articles published in DJLIT are more than the articles published in ALIS during the period of study, for this reason DJLIT is published six times in a year, while ALIS is published four times in a year.

Kalyane and Sen (1995) in their work on the Journal of Oilseeds Research observed that the authorship pattern in various fields as agriculture, anthropology, business and economics, medicine, etc show consistently increase in the number of two or more authored papers. Hussain and Fatima (2011) evaluated the Chinese Librarianship: an International Electronic Journal from 2006 to 2010 and found that publishing trend totally depends on the output of contributors, patterns of contributions and the quality of research.

## **4. Objectives**

The objective of the study is to address the following aspects of the bibliometric analysis.

1. To know year wise and volume wise and issue wise distribution of papers.
2. To know the paper contribution by institution type.
3. To know the paper contribution by country or region.
4. To know the literature growth/ research productivity of in Agricultural disciplines.
5. To know the matrices of papers published between 2013 and 2022.
6. To know the highly viewed/ cited articles.
7. To know the highly productive authors.

## 5. Methodology

The present study covers the articles published in “New Zealand Journal of Agricultural Research” between the years 2013 to 2022. The data have been downloaded from the journal website. The results were tabulated and analyzed to meet the objectives chosen for the study. A total of 329 articles were retrieved from 42 issues of 10 volumes of the journal covering the period of 2013-2022. The recorded data (in Microsoft Excel) have been calculated and presented in tabular form and analyzed.

## 6. Data Analysis and Interpretation

**Table 1: Year wise distribution of papers**

Year	Vol.	No. of Papers/ Articles	Percentage
2013	56	24	7.29
2014	57	28	8.51
2015	58	40	12.15
2016	59	34	10.33
2017	60	34	10.33
2018	61	34	10.33
2019	62	28	8.51
2020	63	37	11.24
2021	64	35	10.63
2022	65	35	10.63
<b>Total</b>		<b>329</b>	<b>100</b>

Table 1 show that the journal published 329 research papers during the period of study i.e. from 2013 to 2022. The journal on an average has published 33 research papers per year. The above table showed that the maximum numbers of papers were published in the year 2015 whereas the minimum in the year 2013.

**Table 2: Distribution of papers volume wise and issue wise**

Issue number	Volume Number									
	56	57	58	59	60	61	62	63	64	65
1 <sup>st</sup> Issue	6	5	8	8	7	9	7	10	9	5
2 <sup>nd</sup> Issue	7	7	10	8	9	8	8	8	8	9
3 <sup>rd</sup> Issue	5	8	10	9	9	8	6	14	11	
4 <sup>th</sup> Issue	6	8	12	9	9	9	7	5	7	12
5 <sup>th</sup> issue	-	-	-	-	-	-	-	-	-	
6 <sup>th</sup> issue	-	-	-	-	-	-	-	--	-	9
<b>Total</b>	<b>24</b>	<b>28</b>	<b>40</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>28</b>	<b>37</b>	<b>35</b>	<b>35</b>

The table 2 reveals distribution of articles (volume wise and issue wise). There are combined issues 2nd - 3rd and 4th - 5th in volumes 65. Among all volumes, volume 58 holds the first position with 40 papers. The lowest position occupied by volume 56 with 24 papers. In between the highest and lowest position volume 59, 60 and 61 stands with the same number of papers i.e. 35 and volume 57 and 62 with 28 articles.

**Table 3: Research paper contributions by Institution type**

<b>Year</b>	<b>Universities</b>	<b>Institute</b>	<b>Research Centre</b>	<b>Total</b>
2013	7	10	7	24
2014	16	3	9	28
2015	19	4	17	40
2016	13	4	17	34
2017	17	2	15	34
2018	14	10	10	34
2019	14	9	5	28
2020	24	7	6	37
2021	12	13	10	35
2022	18	8	9	35
<b>Total</b>	<b>154</b>	<b>70</b>	<b>105</b>	<b>329</b>
<b>%</b>	<b>46.80</b>	<b>21.27</b>	<b>31.91</b>	

The table 3 envisages the institution wise contributors. These sectors have been grouped into three distinct categories for the convenience of the study. Out of 329 journal articles, the highest contributions were from universities with 154 papers (46.80%), followed by research centres with 105 papers (31.91%), and institutes with 70 papers (21.27%).

**Table 4: Geographical distribution of papers**

<b>Country</b>	<b>No. of Contributions</b>	<b>Percentage</b>
Argentina	05	1.51
Australia	18	5.47
Brazil	7	2.12
Chile	3	0.91
China	2	0.60
Iran	4	1.21
Japan	1	0.30
Malaysia	1	0.30
Netherlands	2	0.60
New Zealand	271	82.37
People's Republic of China	4	1.21
Serbia	1	0.30
Switzerland	2	0.60
Turkey	1	0.30
Uruguay	7	2.12
<b>Total</b>	<b>329</b>	<b>100</b>

Table 4 shows the geographical distribution of research papers by country or region. Out of 329 contributions, 271 (82.37%) articles came from the New Zealand, followed by Australia with 18 (5.47%) articles. Rest of the countries have made contributions less than 3%.

**Table 5: Subject Growth of literature in Agricultural Research**

Subject	Number of Publications	Percentage
Agricultural /Veterinary communication and extension	9	2.73
Agrometeorology	11	3.34
Agricultural environment factors/ecosystems	7	2.12
Forage Science	11	3.34
Genetics and Plant Breeding	15	4.55
Plant Pathology	16	4.86
Pastures agronomy	31	9.42
Soil Science	108	32.82
Animal Genetics and breeding	25	7.59
Agricultural biodiversity	2	0.60
Weed science and weed management	12	3.64
Dairy farming	31	9.42
Animal nutrition	21	6.38
Veterinary physiology	9	2.73
Agriculture Biotechnology	4	1.21
Plant physiology and anatomy	1	0.30
Veterinary pathology	6	1.82
Livestock management	4	1.21
Entomology	1	0.30
Animal biochemistry	4	1.21
Irrigation and water management	1	0.30
<b>Total</b>	<b>329</b>	<b>100</b>

Table 5 shows the growth of literature in Agriculture Research by subject area. The literature on agriculture research is categorized in twenty-one subject areas. It is observed that among the total of 329 publications in various subject areas, majority of the contributions appeared under Soil science, with 108 (32.82%) papers, followed by Pasture Agronomy and Dairy farming both with 31 papers, Animal Genetics and Breeding with 25 papers, Animal Nutrition with 21 papers, Plant Pathology with 16 papers, Genetics and Plant Breeding with 15 papers, Weed Science and Management with 12 papers and Forage Science and Agro Meteorology with 11 articles. Other subjects have less than 10 articles.

**Table 6: Matrices of Research papers (2013-2022)**

Year	Matrices (Crossref, web of science, Scopus)		
	Total Viewed	Total Cited	Total Altmetric
2013	29506	797	11
2014	40251	1191	22
2015	40217	1249	8
2016	34029	857	31
2017	27077	851	2301
2018	15960	387	21
2019	22628	524	42

2020	21708	847	33
2021	16709	480	37
2022	13857	263	15

Table 6 shows the Matrices of total articles published between 2013 and 2022. The analysis is based on the data that has been collected between 08 April 2023 to 10 April 2023. Among these ten years, 2014 appears with highly viewed articles i.e. 40251. 2015 secures first place for highly cited articles i.e. 1249 and 2017 stands with highest altmetric i.e. 2301. Altmetrics stands for "alternative metrics." The "alternative" part references traditional measurements of academic success such as citation counts, journal prestige (impact factor), and author H-index. Altmetric is a system that tracks the attention that research outputs such as scholarly articles and data sets receive online.

**Table 7: Highly viewed/ cited/ altmetric paper (year wise)**

<b>Vol. &amp; Year</b>	<b>Viewed/ Cited/ Altmetric</b>	<b>Title</b>	<b>Author</b>
<b>56 (2013)</b>	Highly Viewed 4166	Nitrate and phosphorus leaching in New Zealand: a national perspective	JR Dymond
	Highly Cited 154	Using near-continuous measurements of N <sub>2</sub> O emission from urine-affected soil to guide manual gas sampling regimes	TJ van der Weerden
	Highly Altmetrics 06	Assessment, modelling and management of land use and water quality in the upper Taieri River catchment	RW McDowell
<b>57 (2014)</b>	Highly Viewed 15794	Review of sheep body condition score in relation to production characteristics	PR Kenyon
	Highly Cited 451	Review of sheep body condition score in relation to production characteristics	PR Kenyon
	Highly Altmetrics 6	Changes in pH, bicarbonate-extractable-P, carbon & nitrogen in soils under pasture over 7 to 27 years	RL Parfitt
<b>58 (2015)</b>	Highly Viewed 2681	Influence of demographic factors on the use of farm management tools by New Zealand farmers	RA Corner-Thomas
	Highly Cited 98	Effects of body condition score and nutrition in lactation on twin-bearing ewe and lamb performance to weaning	RA Corner-Thomas
	Highly Altmetrics 3	Epichloëuncinata infection and loline content afford Festulolium grasses protection from black beetle (Heteronychus arator)	GM Barker
<b>59 (2016)</b>	Highly Viewed 3530	Dairy and beef breed effects on beef yield, beef quality and profitability: a review	MD Bown
	Highly Cited 113	Potential for forage diet manipulation in New Zealand pasture ecosystems to mitigate ruminant urine derived N <sub>2</sub> O emissions: a review	CA Gardiner
	Highly Altmetrics 8	Potential for forage diet manipulation in New Zealand pasture ecosystems to mitigate ruminant urine derived N <sub>2</sub> O emissions: a review	CA Gardiner
<b>60 (2017)</b>	Highly Viewed 3209	A review of soil carbon change in New Zealand's grazed grasslands	Louis A. Schipper

	Highly Cited 121	Milk production and urinary nitrogen excretion of dairy cows grazing plantain in early and late lactation	Lisa A. Box
	Highly Almetrics 2260	Nitrous oxide emissions from cattle urine deposited onto soil supporting a winter forage kale crop	T. J. van der Weerden
<b>61 (2018)</b>	Highly Viewed 1152	Growth and carcass trait association with variation in the somatostatin receptor 1 (SSTR1) gene in New Zealand Romney sheep	Fangfang Zhao
	Highly Cited 44	Potential inhibition of urine patch nitrous oxide emissions by <i>Plantagolanceolata</i> and its metabolite aucubin	Camilla A. Gardiner
	Highly Almetrics 9	Liberating soil data for profitable agriculture and catchment health in the Corangamite region, Australia	Peter G. Dahlhaus
<b>62 (2019)</b>	Highly Viewed 7297	Triplet lambs and their dams – a review of current knowledge and management systems	P. R. Kenyon,
	Highly Cited 98	Nitrate leaching losses are lower from ryegrass/white clover forages containing plantain than from ryegrass/white clover forages under different irrigation	Anna J. Carlton
	Highly Almetrics 26	Quantifying the economic cost of invertebrate pests to New Zealand's pastoral industry	Colin M. Ferguson
<b>63 (2020)</b>	Highly Viewed 5696	Can alternative forages substantially reduce N leaching? findings from a review and associated modelling	Racheal H. Bryant
	Highly Cited 209	A review of plant options for mitigating nitrous oxide emissions from pasture-based systems	Cecile A. M. de Klein
	Highly Almetrics 23	Can the presence of plantain ( <i>Plantagolanceolata</i> L.) improve nitrogen cycling of dairy grassland systems on peat soils?	Jeroen Pijlman
<b>64 (2021)</b>	Highly Viewed 2678	Quantifying contaminant losses to water from pastoral land uses in New Zealand III. What could be achieved by 2035?	Richard W. McDowell
	Highly Cited 41	Quantifying contaminant losses to water from pastoral landuses in New Zealand II. The effects of some farm mitigation actions over the past two decades	Ross Monaghan
	Highly Almetrics 16	Effect of feeding time on urinary and faecal nitrogen excretion patterns in sheep	Beverley C. Thomson
<b>65 (2022)</b>	Highly Viewed 2492	Ergot alkaloids in New Zealand pastures and their impact	John R. Caradus
	Highly Cited 36	Ergot alkaloids in New Zealand pastures and their impact	John R. Caradus
	Highly Almetrics 6	Elevating soil pH does not reduce N <sub>2</sub> O emissions from urine deposited onto pastoral soils	Tony J. van der Weerden

Table 7 lists specific papers with the author's name and title that has received the most views, citations, and metrics in chronological order from 2013 to 2022. Among all these papers, PR Kenyon work has been widely viewed (15,794) as well as highly cited (451) in 2014. The article by TJ van der Weerden received highest almetric scores (2260) in 2017.

**Table 8: Special Issues**

Year	Volume	Issues	Articles
2022	65	4-5	Trends in plant sciences. Guest Editor: Jim Moir
2022	65	2-3	Animal science to meet today's challenges. Editor: Nicola Schreurs
2021	64	3	Land use and water quality. Guest Editor: Richard McDowell
2021	64	1	Recent advances in grazed pasture based dairy science. Editor: Timothy Clough
2020	63	3	Advances in plant sciences. Guest Editor: Jim Moir
2020	63	1	Role of plants in reducing nitrogen losses. Guest Editors: Racheal Bryant and Timothy Clough
2018	61	3	Soil, a Balancing Act Down Under: Selected papers from the combined NZSSS / ASSS conference, Queenstown, New Zealand. Guest Editors: Seth Laurenson, Jim Moir and Tony van der Weerden
2018	61	2	Implications of grass-clover interactions in dairy pastures for forage value indexing systems. Guest editors: Mike Dodd, Cory Matthew and Errol Thom
2014	57	4	Regional responses to dicyandiamide (DCD) in New Zealand

Table 8 shows the details of issues carrying specific topics published from 2013 to 2022. There are not any special issues published in 2013, 2015, 2016, 2017 and 2019. In the above table, except 2014 each year has been published two special issues covering different topics of agriculture research.

**Table 9: Ranking of authors**

S. N.	Rank	Author	No. of paper
1.	1	G.R. Edwards	30
2.	2	K.C.Cameron	26
3.	3	H.J.Di	22
4.	3	N. Lopez-Villalobos	22
5.	4	R.E.Hickson	17
6.	5	Tim J. Clough	16
7.	6	P.R.Kenyon	15
8.	7	D.J.Moot	14
9.	8	S.T.Morris	13
10.	8	Richard W. McDowell	13
11.	9	F.M.Kelliher	12
12.	10	David F.Chapman	11



13.	11	D. E. Dalley	10
14.	11	J.M. de Ruiter	10
15.	11	B.J.Malcolm	10
16.	11	R.A. Corner-Thomas	10
17.	11	S.R. Davis	10
18.	12	J.R.Cursh	09
19.	12	R.M. Monaghan	09
20.	13	J.L.Burke	08
21.	13	D.J.Wilson	08
22.	13	Alison J. Popay	08
23.	13	H. Ghanizadeh	08
24.	13	H.T.Blair	08
25.	13	K.C. Harrington	08
26.	13	G.W.Bourdot	08
27.	13	C.W. Gray	08
28.	13	S. Laurenson	08
29.	13	T.J.van der Weerden	08
30.	14	A.L. Ridler	07
31.	14	E. Chakwizira	07
32.	14	G.P. Cosgrove	07
33.	14	Julia M. Lee	07
34.	14	L. Rossi	07
35.	14	D.R.Stevens	07
36.	14	N.L.Bell	07
37.	15	D.J.Garrick	06
38.	15	F Lembeye	06
39.	15	G.A. Hurrell	06
40.	15	P.J.Back	06
41.	15	N.W. Sneddon	06
42.	15	Long Cheng	06
43.	15	Racheal H. Bryant	06
44.	15	Sam Carrick	06
45.	16	Alasdair D.L. Noble	05
46.	16	A.D. Mackay	05
47.	16	C.A.Cameron	05
48.	16	J.L.Moir	05
49.	16	Johan J. Drewry	05
50.	16	D. J. Saville	05
51.	16	G.M. Rennie	05
52.	16	I. Rugoho	05
53.	16	Paul R. Johnstone	05
54.	16	K. N. Tozer	05
55.	16	L. M. Cranstone	05

Table 9 shows the ranking of authors on the basis of their contribution in the journal. The authors, who have contributed five or more than five papers, are included in the analysis. It is found that G.R. Edwards got first rank with 30 publications, followed by K.C. Cameron with 26 publications. H.J. Di and N. Lopez-Villalobos both secure third rank with 22 publications.

## 7. Findings of the study

After the analysis of the data, the following important findings can be listed.

1. The maximum numbers of papers were published in the year 2015, whereas the minimum in the year 2013.
2. In the distribution of articles volume 58 holds the first position with 40 papers.
3. According to the institution wise contributors, highest contributions were from universities with 154 papers (46.80%).
4. Out of 329 contributions, 271 (82.37%) articles came from the New Zealand, followed by Australia with 18 (5.47%) articles.
5. In the growth of literature in Agriculture Research by subject area, majority of the contributions appeared under Soil science, with 108 (32.82%) papers.
6. Among all papers, the author PR Kenyon work has been widely viewed (15,794) as well as highly cited (451) in 2014.
7. Among the ranking of authors on the basis of their contribution in the journal, it was found that G.R. Edwards got first rank with 30 publications, followed by K.C. Cameron with 26 publications. H.J. Di and N. Lopez-Villalobos both secure third rank with 22 publications.

## 8. Conclusions

Bibliometric techniques are being used for a variety of purposes like determination of various scientific indicators, evaluation of scientific output etc. The popularity in the adaptation of bibliometric techniques in various disciplines stimulated stupendous growth of literature on bibliometrics and its related areas. The journal has published 329 papers during the period of study. The journal on an average has published 33 research papers per year. Highest 40 articles have been published in volume no. 58 and lowest 24 papers published in volume no. 56. Out of 329 research papers, the highest contributions were made from universities with 154 (46.80%) papers. As observed geographical distribution of papers, New Zealand has top the list of contributors with 271 (82.37%) papers. Majority of the contributions appeared under the subject Soil science, with 108 (32.82%) papers. During these ten years, 2014 appears with highly viewed articles i.e 40251. 2015 secures first place for highly cited articles i.e. 1249 and 2017 stands with highest altmetric i.e. 2301. The work of PR Kenyon has been widely viewed (15,794) as well as highly cited (451) in 2014. The article by TJ van der Weerden received highest almetric scores (2260) in 2017. G.R. Edwards is most productive author with 30 contributions.

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