A Bibliometric Analysis of Research Out-put of Agronomy Staff of Three Nigerian Universities

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Abstract

Purpose*: This study examined the Bibliometric analysis of research out-put of Agronomy staff of three Nigerian Universities.*

Design Methodology/Approach: *The study adopted a descriptive survey design and the data was collected using Google scholar to identify the frequency of researches conducted by staff of three universities in Nigeria, on those from agronomy departments. A structured questionnaire was also administered to the 74 academic staff from the universities.*

Findings*: Findings of this study indicated that the majority of publications were joint papers by two to three authors. For instance, publication on general agronomy revealed that out of the 15 publications, 13 were co-authored by two to three authors.*

Implication*: suggested solutions includes further studies to be done to focus on analyzing agricultural publications from the hard copies available in local journals, conference reports and research reports submitted to ministries of agriculture of states in the catchment areas of these universities, there is the need to develop a bibliometric/scientometric tool for meta-data analysis of research productivity among others.*

Originality/values: *The papers originality lies in the use of bibliometric analysis of research output of three Nigerian Universities, with particular emphasis on agronomy departments in the Faculty of Agriculture. Research is the backbone of any subject field, not just for its survival and sustenance, but also for the furtherance of education. Most of the research activities undertaken at any level and especially at tertiary institutions are aimed towards the welfare and betterment of society in general. Research in agriculture becomes necessary in view of the existing needs of combating hunger, malnutrition and food security among others.*

Key words: *Bibliometric, agronomy staff, research output, Nigeria.*

Paper type: *Empirical research*

Introduction

Universities in Nigeria function as focal points for academic research. Ezra (2010) has attributed this to the fact that research is made compulsory for both lecturers and students either by job description or prescribed academic programme. Moreover, there are specialized research institutes that also constitute another focal point for research activities in Nigeria. Some of these institutes were established after Nigeria's independence, and alongside academic institutions, these institutes turn out large research outputs relating to agriculture not only within the country but also within the African region. Examples of these research institutes are the International Institute of Tropical Agriculture (IITA), Ibadan; Institute of Agricultural Research (IAR), Samaru, Zaria; National Agricultural Extension Research Liaison Services (NAERLS), Zaria, and National Cereal Research Institute (NCRI), Badeggi. (Federal Ministry of Agriculture and Rural Development: Nigeria. 2012).

Statement of the Problem

In her effort to promote research in Nigerian universities, the Federal Government of Nigeria, established the Tertiary Education Trust Fund (TETFUND) and this agency has set aside the sum of N3 billion (the equivalent of $18,806,732.68 million) to universities in Nigeria on a yearly basis for staff development and research (Yakubu, 2012). Thus,

faculty members get grants for research and information generated. However, the big question is, are the staff utilizing the said funds for research and development and if so how and where? This study seeks to find out the how and where researchers do publish their work through the bibliometric analysis of their research output.

Literature Review

This study is based on information analysis of the research output of agronomy staff of three universities in Nigeria. Informatics is the quantitative study of information production, storage, retrieval, dissemination and utilization (DeBellis, 2009). The term informatics is a broad term comprising of all-metric studies related to information science, including bibliometrics (bibliographies, libraries) and Scientometrics (science).

Bibliometrics of the research output by staff of Bayero University Kano, Ahmadu Bello University, Zaria and Usmanu Danfodio University, Sokoto were identified and measured. Bibliometric analysis is the extraction of statistics of journal articles and research which are published online for people to refer to and cite (Fry, et. al., 2009). It is used to compare the prevalence of multiple fields of research and the relevance of a particular article can be determined through bibliometric analysis. In this study, publications of researches of the Universities from 2007-2012 were identified and measured through Goggle scholar. Onyancha (2008) observed that there are as many reasons for evaluating journals as there are different groups of people interested in information production, storage, dissemination and use. According to him, these varied interests have results in many papers being published about the performance of journals.

The introduction of Scopus and Google scholar as a search tools for research evaluation, informatics studies are likely to become more feasible in developing countries like Nigeria. This because Africa and more particularly Sub-Saharan Africa, lacks Science and technology data bases that can be used to conduct informatric studies (Onyancha, 2008). The Google Scholar is potentially a new tool for bibliometric citations. Therefore, it provides a new method of creating a potentially relevant articles on a given subject by identifying subsequent articles that cite a previously published articles (Kousha & Thelwall, 2005, Meho & Yang, 2007, Harzing & Van der Wal, 2008). Currently, there is an increase use of Google Scholar because of the apparent limited access to ISIS data bases. Despite the limitations associated with Google Scholar e.g. limited coverage of scholarly journals, the longer period it takes to update their services, double counting of citations, un-even coverage across disciplines and less comprehensive coverage of older publications, (Meho & Yang, 2007, Onyancha 2008, Harzing & Van der wel, 2008), this study used the Google Scholar search tools. This became apparent because the Google Scholar is a valuable alternative source of citations data, in particular in the social and information sciences.

This Google Scholar search tools enabled the researcher to study the frequency, trends and future directions of the research and publications by the staff from various departments for the period of five years**.** Subjects with good coverage are identified using the author's name, year of publication; output of research conducted and the frequency of the research are measured and analyzed. Such unforeseen challenges in the bibliometric analysis such as identifying the correct researcher, compiling accurate reference lists, researchers with no identifiable dissemination in the appropriate year (2007-2012), dissemination without citations and inability to locate an accessible copy of output were looked into. This is because bibliometric analysis is increasingly being used as a measure of research impact or research influence.

It analyses quantitative and qualitative data to describe publication patterns within a field of research (Fry, et. al., 200). The information obtained as a result of bibliometric analysis can be used to evaluate the influence/performance of a researcher and to provide a comparison between researchers. A number of studies have been undertaken in the area of bibliometrics. Most of the researches were undertaken at institutional level in order to ascertain the trend and growth of research output in those institutions. A study by Pandita, et al. (2014) discussed the research output of some selected Indian medical research institutions from 2007- 2011. The analysis mainly covered data retrieved from Web of sciences to assess the general publication trend of medical sciences in India. The study found out that articles published from 2007-2011 were 9,286 covering 89 subject areas.

Similarly, a study by Gohain (2014) on citation analysis of PhD theses submitted to the Department of Chemical Sciences in India revealed that out of 10983 citations made, journals were the most preferred sources of information used by the researchers in the field of chemical sciences, accounting for 78.83%. The findings further revealed that out of the total number of 8658 journal citations, 39.89% were by more than three authors, followed by two authors with 22.28%.

Tella & Olabooye (2014) studied the bibliometric analysis of African Journal of Library Archive and Information Science. The study was for a period of 12 years, from 2000-2012. The results of the study revealed that a total of 218 articles were published in the 12 year period with 21 (9.63%) articles being the highest total in the year 2012. The study also revealed that the majority of the articles, i.e., 126 (57.8%) were published by a single author. The study also showed

that the majority of the articles were theoretical papers, while others were empirical papers.

Pendlebury (2011) observed that, experts reviewing the work of their colleagues should rightly be the basis of research evaluation. The approach to making such decision is through bibliometric analysis. Furthermore, Meho & Yang (2007) writing on the impact of Data sources on Citation counts and ranking of LIS faculty: Web of science Vs. Scopus and Google scholar, studied the work of 25 library and information science faculty members. The study revealed that overall, more than 10,000 citing and purportedly citing documents were examined. Further, the results using GS stands out in its coverage of conference proceedings as well as international, non-English language journal.

A study by Harzing & Van der Wal (2008) on an alternative metric to measure journal impact in Economics and Business, using Google scholar H-index for journals. The procedure used is by calculation using publish or perish software programme that retrieves and analyses academic citation using Google scholar. Articles published between 2001 and 2005 were reviewed using the JIF and ranked by citation. This paper therefore studied the bibliometric analysis of research output of three Nigerian Universities, with particular emphasis on agronomy departments in the Faculty of Agriculture.

Methodology

Data collection for this research involves using Google scholar to identify the frequency of researches conducted by staff of three universities in Nigeria, especially those from agronomy departments. A structured questionnaire was also administered to the 74 academic staff from the universities. The database uploaded the search results from 2007-2012. Data on the type of researches conducted and the sources of information of the staff were obtained from the questionnaire.

Data Analysis

The areas on which staff research are provided is in the table below.

Table 1: Areas of research by the Universities

ABU	BUK	UDUS
Irrigated crop in the dry land.	Organic local and sustainable farming.	Crop breeding.
Irrigation system design and operational research.	Ground nut breeding.	Crop science.
Cultural weed management.	Horticulture.	General agronomy.
Integrated weed management.	Cereal crops.	Cultural and chemical weed management.
Physiology.	General agronomy.	Traditional vegetable farming.
Plant stress.		
Ecology.		
Grains yields and seedlings.		
Fertilizer and manure application.		

Although this study is confined to the 3 universities in North Western Nigeria, the aim is to show the overall bibliometric trends of research publications in the field of irrigation farming. Publications undertaken within the period mentioned were retrieved through the google scholar database, but this does not mean that it is all the research publications that this staff had in the period under review. It is possible that other additional information was deposited somewhere, to which the database does not have access. This is therefore one of limitations of this study. The data gathered and retrieved through the database was analysed using descriptive statistic.

Data was analysed using descriptive statistics of tables and percentages only. Belowis the staff distribution per universities under study: Ahmadu Bello University, Zaria (ABU) has 22 academic staff from agronomy department, Bayero University; Kano (BUK) has 11 academic staff, while Usmanu Danfodio University, Sokoto (UDUS) has 14 academic staff (ABU, Staff Handbook, 2012, BUK Staff Handbook, 2012, and UDUS Staff Handbook, 2012).

Table 2 below shows the distribution of the total number of researches conducted per each university per year (2007-2011). The highest number of research was from Ahmadu Bello University (ABU) with 31 publications representing 43.0%, followed by Bayero University, Kano (BUK) with 23 publications, representing 32% and then Usmanu Danfodio University, Sokoto (UDUS) with 18 publications, representing 25%. This suggests that ABU, Zaria has the largest publications on irrigation online more than BUK and UDUS. This could be a result of the experienced and high number of staff found at ABU. According to the available records, ABU Zaria has the highest number of academic staff.

Table 2: Distribution by year per university

S/N	Purpose for using Agricultural Information	Highly seek	Rarely seek	Not seek
1	Preparing for Lectures	0%		0
2	Dissertation work	5%		
3	Paper presentation	20%		
4	Examination	0		
5	Research and publication	35%		

If we take the distribution across the universities in the year under review, we could observe that the total publications per year for all universities are as follows: 2007 was 13 publications representing 18.0%. 2008 posted a significant improvement of 16, representing 22.2%, while in 2009, total publications reduced to 13 again, representing 18.0%. This indicated a major setback in the trend of publication online because of the inconsistency in publishing researches conducted.

Table 3: Research Publications by Subject

Years	**ABU**	**BUK**	**UDUS**	**Total publications**	**%**
2007	05	04	04	13	18.0%
2008	07	05	04	16	22.2
2009	05	05	03	13	18.0%
2010	06	04	04	14	19.4%
2011	08	05	03	16	22.2%
Total	31	23	18	72	100%

From the table above, it could be observed that general agronomy was the area that the staff widely conducted research on with 15 publications representing 20.8%. General agronomy deals with among others, hybrid seedlings, horticulture and weed control. General agronomy was followed by fertilizer application with 11, representing 15.2%.

Table 4 Purpose for using Agricultural Information

Year	Irrigation water management	Sustainable farming	General agronomy	Weed management	Fertilizer application	Grain yield/ seedling	Others	Total
2007	2	3	3	2	1	1	1	13
2008	1	1	3	2	3	4	2	16
2009	3	2	3	0	2	1	2	13
2010	2	1	2	2	2	2	2	14
2011	2	2	4	3	3	1	1	16
Total	10	9	15	9	11	9	9	72

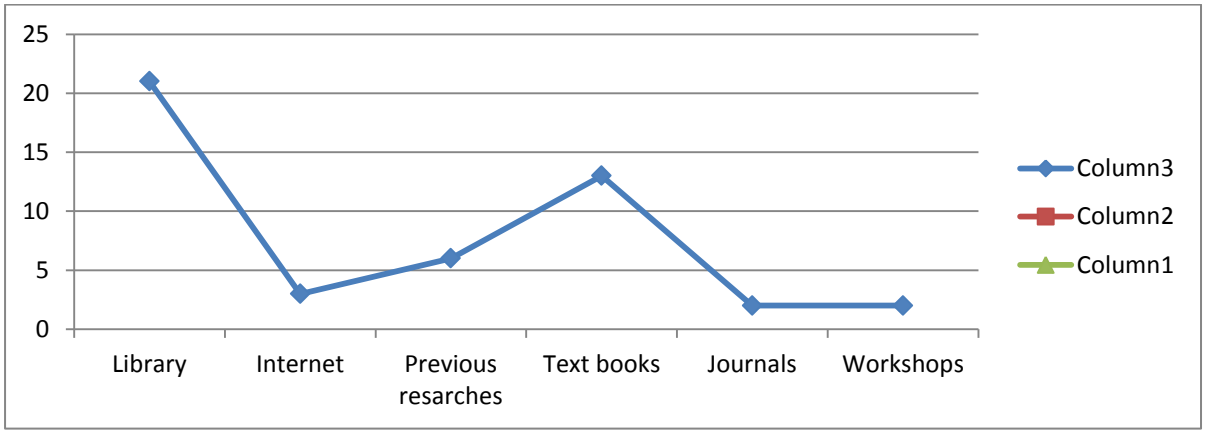
Sources of information

This refers to the channels or medium with which the academic staff from these universities obtained their information to enable them conduct their research. There are many sources of information which were categorized under: print material (books, journals, magazines, leaflets, pamphlets, proceedings and research reports), non-books: multimedia and ICT tools. Others are oral sources and field experiences/sources. The preference of the academics to certain retrieval devices for information, teaching and for research was studied. The essence of knowing these sources was to establish the relationship between what the irrigation farmers preferred in this study.

The Figure below explains the sources of information from the respondents. In the study, 2 respondents, representing 4.3%, indicated that their sources of information were journals. Journals are collections of articles written by academics in institutions of learning or a body with the aim of making people aware of the type of investigation carried out. Also, 21 respondents, representing 44.7%, indicated their source of information to be the library. In addition, 3 respondents, representing 6.5%, indicated that their sources of information were ICT facilities especially the Internet. This implies that they relied on the Internet to search for the information to perform their duties effectively. Chisita (2010), Bolarin and Ayandale (2011), and Bello and Obinna (2012) assert

that most of the academic staff members from universities conduct their studies using the Internet. This could be that the Internet provides up-to-date and timely information. Furthermore, 13 respondents, representing 27.7%, indicated that their sources of information were textbooks. This shows that they preferred to use written documents, particularly textbooks on agricultural education for their research. Another 6 respondents, representing 12.8%, indicated that their sources of information were previous researches conducted. The other respondents, 2, representing 4.3%, stated that their sources of information were workshops and conference proceedings. The result of this study was in line with Aina (1995), Oladele (1999), Mokotjo & Kalusopa (2010), Lwoga, Stilwell & Ngulube (2011) and Bello & Obinna, (2012). Their studies maintained that the sources of information for agricultural researchers revolve around print materials, mass media, oral source and ICT.

Figure 1: **Sources of information Chart**



From the findings of this study, it is clear that the majority of publications were joint papers by two to three authors. For instance, publication on general agronomy revealed that out of the 15 publications, 13 were co-authored by two to three authors. This implied that 87.0% publications were co-authored and the remaining 13% were singly authored. This finding differed with Tella and Olabooye's (2014) findings that 57.8% of the articles were published by single authors and majorities were theoretical papers. The findings from the quantitative data revealed that the majority of the publications were empirical papers.

The trend of publications for another area of specialization was similar, except that of irrigation water management, which largely has single authorship with over 8 publications, representing 80%. The frequency of the publications from the result of this study indicated that publications were not frequent. These could be observed from the tables above where the results showed a forward and backward development. The results also show that most of the publications on agriculture and especially irrigation farming were locally based. A preliminary study conducted by the researcher revealed that the trends in research in irrigation farming are such that more publications are in locally based journals and reports. A study by Solomon, et al., (2013) corroborated the present study. In their study, it was revealed that 65% of the researches conducted in agriculture were mostly found in locally available journals, in which 280 of the articles were produced locally while 80 were published internationally. This implied that most of the researches conducted could only be obtained through local journals and that was why this study could not find enough research publications through google scholar.

Conclusion

This study is meant to analyse the bibliometric status of research output of agronomy staff of three universities in Nigeria, covering a period of five years (2007-2011). It demonstrated that the publishing trend usually depends on the output and the quality of the research. In this study, it is pertinent to say that most of the researches conducted were on general agronomy and irrigation water management, which as a result helped the very growth of the discipline. From the analysed data, we can observe that there is no positive growth of publications online when compared with other fields of study, i.e., library and information studies, sciences and medicine. This implied that 87.0% publications were co-authored and the remaining 13% were singly authored. This finding

differed with Tella & Olabooye's (2014) whose finding indicated that 57.8% of the articles were published by single authors and majorities were theoretical papers. The findings from the quantitative data revealed that the majority of the publications were empirical papers.

Limitations

The limitation to this study is having access to publications in journals and conference proceedings dealing with irrigation farming. It is hope that other researchers in agricultural literature will carry out similar studies in irrigation or general agriculture across the country. That majority of the publications were contributed by multiple authors as identified by this study.

Implication of the study findings

It is recommended that further studies should be done to focus on analyzing agricultural publications from the hard copies available in local journals, conference reports and research reports submitted to ministries of agriculture of states in the catchment areas of these universities.

It is further recommended that staff from these universities should publish their research findings in both reputable local and internationally peer-reviewed journal. By publishing in peer-review journals, researchers would be cited more by other researchers interested in the field and the more their universities become recognized through world university ranking.
It is further recommended that there is the need to develop a bibliometric/scientometric tool for meta-data analysis of research productivity.

There is also the need to collaborate with external partners to increase access and impact. Finally, there is the need to digitized profiles of authors and updates of researchers to show case researches conducted and grants performances on institution repositories.

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