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Availability and use of electronic Databases by Scientists in Agric Research Institutes in North Central Nigeria

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INTRODUCTION

Information is an essential resource required by man regardless of the profession or the work he does. Information recording, and dissemination have gone through evolution since the ancient time from clay tablets to papyrus rolls to printed matter. Vladimir (2015) opined that “information is ranked higher than air, food, water and shelter”. He clarified further that although humans are proficient at processing information stored in memories such as CD ROM, USB storage devices, analogue information stored external to mind is not processed easily.

Today information is not only available in the electronic format but can also be accessed anywhere in the world through the online databases. Information is needed to further the frontiers of development through research in various aspects of human endeavour, particularly the most critical aspects of livelihood of man which are food, clothing, and housing. Food security is very important and that is why agricultural research is a matter of concern in any nation. To achieve food security, agricultural research becomes imperative in universities and research institutes.

Okere and Anaehobi (2014) in a study of agricultural research institutes revealed that “agricultural research institutions are established by the federal government of Nigeria to carry out in-depth research on various mandate crops in the field of agriculture and are placed under the supervision of the Federal Ministry of Agriculture”. Presently, agricultural research institutes are governed by a body called Agricultural Research Council of Nigeria (ARCN) which should make sure that these research institutes are funded adequately to carry out research in the field of agriculture and the general wellbeing of these research institutes. ARCN is also to ensure that these research institutes research on their various mandate crops by giving them research funds to do research and the research outputs made available to them (ARCN, 2011).

Scientists conduct research in the various research institutes and therefore require information resources that will enhance their research activities. Information resources are usually found in the library and perhaps the reason why libraries are usually established as soon as the research institutes are established. In this contemporary period however many information resources come

in both printed and electronic formats and also how online databases affected or influence agricultural research output of scientists.

Ani and Ahiauzu (2008) argued that “the emergence of electronic information resource has tremendously transformed information handling and management. This dramatic change includes the way this information is provided to its users, the accessibility to the resources and their utilisation”. Manda and Nawa (2008) revealed that the use of online databases has a positive influence on various research activities and milestones such as research proposal submission, research proposal funding, technical reports, theses and dissertations, research reports writing and journal article publishing. These have necessitated the need for offline or online databases which can be easily accessible and utilized so therefore there is need for availability of information resources.

Availability can also be described as a condition of being available, accessible or obtainable by the users. Availability of library facilities is ensuring their presence for immediate use. Edem and Egbe (2016) referred to availability of library information resources as the physical presence of information resources within the library. Such resources, according to the authors, include books (soft and hard copy), journals, dictionaries, dissertations, encyclopaedias, Internet facilities, audio visual materials and government documents. Availability of information resources implies ensuring that library- based information resources, published and unpublished materials, printed and non-printed ones, audio visual materials which may ordinarily not be immediately located in an institution are made available and ready for use. There is so much need for the availability of rightful information sources and resources. Availability of electronic resources is no longer a matter for debate; several efforts have been expended to make them available to researchers (Okiki, 2013). Okiki (2011) pointed out in his study that the National Universities Commission (NUC) in Nigeria subscribed to some international and national journals and made them available to researchers in Nigerian universities.

The advent of Information and Communication Technology (ICT) has changed the system of acquisition, storage, retrieval, preservation, and dissemination of information by librarians. The use of computers to access different varieties of resources has become more convenient than ever before with the emergence of different categories of electronic databases. The Internet has made it possible for libraries, organisations, and research institutes specially to have access to electronic

information resource (EIR) databases containing e-journals, books, seminars, and conference papers for users to use irrespective of their geographical location. EIR databases make it easier for scholars to have full access to information needed for their research work.

A database is an organised collection of information or data usually in computer readable form. Generally, they are made available for use by on-line or off-line search services. These search services have computers and software that facilitate retrospective search of one or more databases to locate information or references in answer to a specific query. Databases are mostly characterised by the kind of data they contain, that is text, numeric or statistical. Word-oriented databases contain word or text as the principal data, whereas numbers-oriented databases often referred to as databanks – contain numbers, symbols, series, graphs, and tables.

Online database is an aggregate or collection of bibliographic information kept in a computer or a central computer and retrospective search is made possible from a distant computer terminal using software. With the use of online databases, distance is no barrier, it also allows time-sharing as many users can search the record concurrently. Tijjani and Saka (2009) defined online databases as computer application that is delivered from the Internet that stored and organised data to make them accessible to users. They contain full text current and retrospective materials of electronic information resources such as journal articles, e-books, and digitized materials. Zinkhan (2004) defined electronic database as collections of organised information, data or citations stored in electronic format and searchable by the computer. The electronic information resources contain regularly updated files of digitised information (bibliographic records, abstracts, full-text documents, directory entries, images, statistics, etc.) related to a specific subject or field, consisting of records of uniform format organized for ease and speed of search and retrieval and managed with the aid of database management system (DBMS) software (Tanveer, 2012). There are different databases; some are general while others are subject based like the agricultural databases which are basically and specifically designed for agricultural sciences. Some of these are Access to Global Online Research in Agriculture (AGORA), The Essential Electronic Agriculture Library (TEEAL), Health Internetwork Access to Research Initiative (HINARI), Agricultural Online Access (AGRICOLA), Agricultural Database (AGRIS), and many others. Therefore, it is very important for researchers to use online databases to facilitate their research.

Scientists need various kinds of information resources for research and for self-development. To achieve these, the right information resources must be available for the right person at the right time in its appropriate format (Ogunjobi & Oyewusi, 2015). The mission of agricultural research has always been to improve agricultural practices for the purpose of feeding the ever-increasing global population. So, there is need for electronic recourses to help and keep agricultural scientists abreast of the available and current information in improving their productivity. Oladele (2010) opined that modern agricultural efforts must be supported by electronic resources which will, not only keep scientists abreast of the advances in their specialization but also provide exhaustive coverage of publications related to their work and those of their colleagues.

Statement of the Problem

Agricultural scientists require current and accurate information to make progress in their research, which is obtainable from their institute's libraries. The library meets these needs by using various possible approaches including the deployment of Information and Communication Technologies (ICT) to provide access to online resources which can be obtained through subscription or open access sources. The expectation is that research institute libraries should have subscription to various databases that can enhance agricultural research activities and improve the landscape of agricultural production in Nigeria. This raises some questions as to whether the institutes' libraries are providing enough electronic resources to meet their information needs or whether the scientists are not using the resources provided by the library. It is against this backdrop that this study investigates the availability and use of electronic resources by scientists for research in agricultural research institutes in north central Nigeria.

Aim of the Study.

The aim of this study was to investigate the availability and use of electronic databases for research by scientists in agricultural research institutes in North Central Nigeria.

Research questions:

1. What are the available electronic databases in agricultural research institutes' libraries in North Central Nigeria?
2. What is the adequacy of relevant resources in the available electronic databases for research in agricultural research institutes' libraries in North central Nigeria?
3. What is the degree of use of electronic databases for agricultural research by Scientists in agricultural research institutes in North central Nigeria?
4. What are the constraints in the use of electronic databases by scientists in agricultural research institutes' libraries in North Central Nigeria?

Hypothesis

The study was guided by one hypothesis, tested at a 0.05 level of significance.

H₀₁ There is no significant relationship between availability of electronic databases and their use by scientists in agricultural research institutes in North central Nigeria.

Literature Review

Review of Related Empirical Studies

Mtega *et al.* (2014) used survey method to examine the use of electronic resources among agricultural scientists and extension staff in Tanzania and found that the majority (96.3%) of the respondents had used electronic resources in their work. This corresponds to findings reported by Nkonoki (2013) indicating that 96% of the postgraduate students at Sokoine University of Agriculture Morogoro, Tanzania claimed to use e-resources in their research.

Sife and Bernard (2013) conducted a citation analysis of theses and dissertations at Sokoine University of Agriculture, showing an increase in level of usage of electronic resources by postgraduate students taking agricultural programmes. The increasing usage of e resources in Tanzania may also be explained by the limited acquisition of current print resources and may be further motivated by the easy discovery of free contents through search engines such as Google. In Tanzania, Sokoine National Agricultural Library – the largest agricultural library in the country has stopped subscribing to print journals over the past ten years. According to Omotayo (2010), the decreasing acquisition of print resources among libraries in most developing countries is partly due to dwindling funds for subscriptions. In such a circumstance, it is not surprising for scholars to depend on electronic resources and especially those which are freely accessible on the Internet, as the only choice to meet their scholarly information needs.

Salaam and Aderibigbe (2010) examined Awareness and Utilization of The Essential Electronic Agricultural Library by academic staff in University of Agriculture, Abeokuta, Nigeria. A survey was used for this study. The study revealed that 34.7% of the respondents used TEEAL when necessary. Reasons that most respondents had attributed for their usage of TEEAL resources include research and publication needs (73.4. %), references for their lectures (58.9%), and reading to be abreast of current trends in their various field of research (60.2%). One reason for not using TEEAL was that only 108 (57.75%) of the respondents were aware of the electronic resources. However, 34.2% of respondents claimed that they preferred the hardcopy of journals to electronic

format and that other demands on their time had prevented their exploration of electronic resources.

Acheampong and Dzandu (2015) investigated the information-seeking behaviours of crops research scientists in Ghana using the Council for Scientific and Industrial Research Crops Research Institute (CSIR-CRI), Kumasi, Ghana. The case study method was used to carry out the research. Questionnaire made up of both close-ended and open-ended questions and interview schedule were the main instruments used for collecting data for the study. The study revealed that 83.6% of the scientists used other libraries like CSIR-Forestry Research Institute of Ghana (CSIR-FORIG), and Kwame Nkrumah University of Science and Technology (KNUST) which were about one (1) kilometre and five (5) kilometres respectively away from where CSIR-CRI is situated. This therefore implied that scientists at CSIR-CRI did not depend solely on the resources available at the Information Centre/Library. The finding also revealed that majority of the respondents, (64.4%) indicated that although they acquired the needed information through both informal and formal channels; however, given the choice, they preferred the formal to the informal. Attending scientific conferences and meetings were very beneficial. Respondents observed that not only did they gain knowledge from listening to presentations and discussions but also helped develop social contacts and relationships among scientists. In addition, scientific meetings provided the major platform for the acquisition of informal information through discussions with colleagues encountered at such gatherings.

DharMangi, (2015) examined managing e-resources in higher education by agricultural scientists and veterinarians in Jammu and Kashmir (SKUAST of Kashmir and SKUAST of Jammu, India). The findings of the study revealed that the majority 91% of the agricultural scientists and 89% of the Veterinarians were aware about the available databases and they also used these for their different purposes. On the constraints to media resources utilization in agricultural research institutes, the study revealed that poor funding of research institutes (86.8%), irregular electricity supply (81.4%), inadequate media resources (71.3%), infrastructure breakdown (64.4%), poor maintenance of media resources (57.2%) and obsolete equipment (57.2%) were the major constraints to the use of media resources in agricultural research institutes. Others were inadequate access to media resources (54.8%), inadequacy of trained media specialists (46.1%), unfavourable organizational policies (44.0%), poor management (48.5%) and lack of knowledge in the use of some of the existing media resources (28.1%).

A good number of empirical studies on the use of agricultural online databases are available but none of these studies has precisely examined the availability and use of electronic databases by scientists in agricultural research institutes in North Central Nigeria. This study will fill the gap in the literature.

Research methodology

The descriptive survey research design was adopted for the study. The population of the study comprised all the 430 agricultural scientists in the four (4) research institutes in North Central Nigeria as of March 2017. These are National Cereal Research Institute Badeggi, Niger State; National Institute for Freshwater Fisheries Research, New Bussa, Niger State; Nigerian Stored Products Research Institutes Ilorin, Kwara State; and National Veterinary Research Institutes, Jos, Plateau State. The study adopted the total population of the study. The data collection instruments that were used to conduct this study were a closed ended structured questionnaire and an observation checklist. Descriptive statistics such as frequency counts, simple percentages, means, and standard deviations were used to analyse demographic data and data generated from the answers to the research questions, also descriptive statistics was used to test the null hypotheses.

RESULTS AND DISCUSSION

Response Rate

A total of four hundred and thirty (430) copies of the questionnaire were administered to the agricultural scientists in the four (4) research institutes studied in North Central Nigeria, out of which three hundred and sixty-seven (367) copies were filled and returned representing 86% response rate.

The breakdown of the response rate is shown in Table1.

Table1 Response Rate

S/No	Agricultural Institute	Research	No of Administered Questionnaire	No of Returned Questionnaire	Percentages (%) Of Questionnaire Returned
1	National Cereals Research Institute, Badeggi, Niger State		94	81	19

2	National Institute for Freshwater Fisheries Research, New Bussa, Niger State	81	74	17
3	Nigerian Stored Products Research Institute Ilorin, Kwara State	122	93	22
4	National Veterinary Research Institute Vom, Plateau State	133	119	28
Total		430	367	86

From Table1 it is revealed that the number of the questionnaire retrieved from National Cereal Research Institute (NCRI), Badeggi Niger State was 81 (19%) from National Institute for Freshwater Fisheries Research New Bussa, Niger State 74 (17%) from Nigerian Stored Products Research Institute Ilorin, Kwara State 93 (22%) and from National Veterinary Research Institute Vom, Plateau State 119 (28%).

Demographic Information of the Respondents

Table.2: Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	265	72.2
Female	102	27.8
Total	367	100.0

Table2 shows that 265 respondents representing 72.2% of the total were males and 102 respondents representing 27.8% of the total were females.

Table3: Distribution of Respondents by Age

Age	Frequency	Percentage
20-30 Years	73	19.8
31-40 years	107	29.3
41-50 years	130	35.4
51-60 years	57	15.5
Total	367	100.0

Table3 shows that majority of the respondents age between 41-50 years numbering 120 (35.4%) were the highest, followed by age 31-40 years numbering 107 (29.3%) respondents, followed by age less than 31years which represents 73 (19.8%) and finally 57 (15.5) were between 51- 60 years.

Table4: Distribution of Respondents by Years of Working Experience

Years of Working Experience	Frequency	Percentage
1-5	148	40.3
6-10	102	27.8
11-15	38	10.4
16- 20	53	14.4
21-25	19	5.2
26 -30	7	1.9
Total	367	100.0

Table4 indicates that majority of the respondents, 148(40.3%) had 1-5 years of working experience. This was followed by 102 (27.8%) of respondents with 6-10 years working experience, 53(14.4%) of the respondents had 16-20years working experience. Then 38(10.4%) had 11-15 years working experience, 19(5.2%) respondents had 21-25 of years working experience and finally 7(1.9%) respondents had a working experience of between 26 – 30years.

Presentation and Analysis of Results

Table5: Available Electronic Databases in Agricultural Research Institutes

S/No	Types of Databases	NCRI			NIFFR			NSPRI			NVRI		
		A	NA	D	A	NA	D	A	NA	D	A	NA	D
1	ACCESS Digital Library	74	7	A	48	26	A	73	20	A	78	41	A
2	AGORA	62	19	A	56	18	A	83	10	A	89	30	A
3	AGRICOLA	72	9	A	59	15	A	34	59	NA	97	22	A
4	AGRIS	67	14	A	63	11	A	19	74	NA	85	34	A
5	ASFA	13	68	NA	69	5	A	18	75	NA	31	88	NA
6	EBSCOHOST	39	42	NA	18	56	NA	28	65	NA	38	81	NA
7	OARE	58	23	A	21	53	NA	76	17	A	92	27	A
8	Medline	21	60	NA	32	42	NA	32	61	NA	43	76	NA
9	Pro-quest	48	33	NA	46	28	A	27	66	NA	76	43	A
10	Science Direct	65	16	NA	48	26	A	81	12	A	94	25	A
11	PubMed	16	65	NA	38	36	A	31	62	NA	88	31	A
12	TEEAL	71	10	A	26	48	NA	78	15	A	103	16	A

13	E-brary	25	56	NA	64	10	A	65	28	NA	39	80	NA
14	E-granary	17	64	NA	17	57	NA	39	54	A	56	63	NA

Key: A = Available NA = Not Available D = Decision

In Table 5, the respondents at the National Cereal Research Institute Badeggi, Niger State indicated that ACCESS Digital Library, AGORA, AGRICOLA, AGRIS, OARE and TEEAL were available in their research institutes. Respondents from National Institute for Freshwater Fisheries Research, New Bussa, Niger State revealed that ACCESS Digital Library, AGORA, AGRICOLA, AGRIS, ASFA, Pro-quest, Science Direct, PubMed and E-brary were available in their research institute. Respondents from Nigerian Stored Products Research Institute Ilorin, Kwara State showed that ACCESS Digital Library, AGORA, OARE, Science Direct, TEEAL and E-granary were available in their research institute. And the respondents from National Veterinary Research Institute Vom, Plateau State indicated that ACCESS Digital Library, AGORA, AGRICOLA, AGRIS, OARE, Pro-quest, Science Direct, PubMed and TEEAL are available in their research institute. The National Cereals Research Institute Badeggi, Niger State did not have ASFA, EBSCOHOST, Medline, Pro-quest, Science Direct, PubMed, E-brary and E-granary in their institute. Response from National Freshwater Fisheries Research New Bussa Niger State also showed that OARE, Medline, TEEAL, E-brary and E-granary were not available in their Institute. Nigerian Stored Products Research Institute showed in the findings that AGRICOLA, AGRIS, ASFA, EBSCOHost, Medline, Pro-quest, PudMed and E-brary were not available. The respondents from National Veterinary Research Institute Jos, Plateau State indicated that ASFA, EBSCOHost, Medline, E-brary and E-grenary were not available in the institute.

Table6: Adequacy of Relevant Resources in the Electronic Databases for Scientists

Electronic Databases	VA	A	NA	VIA	N	F_x	\bar{X}	Std
ACCESS Digital Library	79	144	103	41	367	995	2.71	0.21
AGORA	78	116	107	66	367	940	2.56	0.06
AGRICOLA	163	162	23	19	367	1203	3.28	0.78
AGRIS	156	148	31	32	367	1162	3.17	0.67
ASFA	158	168	15	26	367	1192	3.25	0.75
EBSCOHost	27	36	146	158	367	666	1.81	0.69
OARE	26	47	114	180	367	653	1.78	0.72
Medline	43	37	68	219	367	638	1.74	0.76
Pro-quest	48	58	112	149	367	739	2.01	0.49
Science Direct	27	32	117	191	367	629	1.71	0.79
PubMed	36	214	73	44	367	976	2.66	0.16
TEEAL	55	187	85	40	367	991	2.70	0.20
E-brary	36	56	74	201	367	661	1.80	0.70
E-grenary	37	68	132	130	367	746	2.03	0.47
Weighted Mean							2.37	0.13

Key: VA =Very Adequate A = Adequate NA =Not Adequate VIA = Very Inadequate

Table 4.6 reveals that seven items had high mean score which were above the 2.5 benchmark on a four-point scale indicating the adequacy of relevant resources in the electronic databases for scientists. These items included item 1: Access Digital Library ($X = 2.71$, $SD=0.21$); item 2: AGORA ($X = 3.28$, $SD = 0.78$); item3: AGRICOLA ($X = 3.28$, $SD = 0.78$); item 4: AGRIS ($X = 3.17$, $SD = 0.67$); item 5: ASFA ($X = 3.25$, $SD= 0.75$), item 11: - PubMed ($X = 2.66$, $SD = 0.16$) and Item 12: TEEAL ($X = 2.70$, $SD = 0.20$). While item 6: EBSCOHOST ($X = 1.81$, $SD = 0.69$), Item 7: OARE ($X = 1.78$, $SD = 0.72$), Item 8: Medline ($X = 1.74$, $SD = 0.76$), Item 9: Pro-quest ($X = 2.01$, $SD = 0.49$), Item 10: Science Direct ($X = 1.71$, $SD = 0.79$), Item 13: E-Library ($X = 1.80$, $SD = 0.70$) and Item 14 E-grenary ($X = 2.03$, $SD = 0.47$) had mean scores below the 2.50.

Table7: Degree of Use of Electronic Databases for Research by Scientists in Agricultural Research Institutes

S/No	Databases	VR	R	NR	NVR	N	F _x	\bar{X}	Std
1	ACCESS Digital Library	59	150	97	61	367	941	2.56	0.06
2	AGORA	104	85	109	69	367	958	2.61	0.11
3	AGRICOLA	143	152	23	49	367	1123	3.06	0.56
4	AGRIS	47	202	46	72	367	958	2.61	0.11
5	ASFA	188	128	34	17	367	1221	3.33	0.83
6	EBSCOHOST	15	43	103	206	367	601	1.64	0.86
7	OARE	24	50	74	219	367	613	1.67	0.83
8	Medline	27	49	113	187	376	668	1.78	0.72
9	Pro-quest	34	53	134	146	367	709	1.89	0.61
10	Science Direct	14	27	134	192	367	597	1.59	0.91
11	PubMed	88	187	56	36	367	1061	2.89	0.39
12	TEEAL	93	134	65	75	367	979	2.60	0.10
13	E-brary	87	68	98	114	367	862	2.29	0.21
14	E-granary	16	145	49	157	367	754	2.01	0.49
Weighted Mean								2.32	0.18

Key: VR =Very Regularly, R = Regularly, NR = Not Regularly, NVR = Not Very Regularly

Result of Table7 indicated that out of fourteen items provided for respondents to indicate the degree of use, seven of the items had high mean scores which were above the 2.50 criterion mean. These items included Item 1: ACCESS Digital Library (X=2.56, SD = 0.06) Item 2: AGORA, (X=2.61, SD = 0.11), Item 3: AGRICOLA (X=3.06, SD = 0.56), Item 4: AGRIS (X=2.61, SD = 0.11), Item 5: ASFA (X=3.33, SD = 0.83), Item 11: PubMed (X= 2.89, SD = 0.39) and Item 12: TEEAL (X=2.60, SD = 0.10). The other seven items which were Item 6: EBSCOHOST (X= 1.64, SD = 0.86) Item 7: OARE (X=1.67, SD= 0.83), Item 8: Medline (X=1.78, SD= 0.72), Item 9: Pro-quest (X=1.89, SD= 0.61), Item 10: Science Direct (X=1.59, SD= 0.91), Item 13: E-Library

(\bar{X} =2.29, SD = 0.21) and Item 14: E-granary (\bar{X} =2.01, SD = 0.49) produced low mean scores below the criterion mean of 2.50. The mean scores indicated that these electronic databases had a low degree of use in the agricultural research institutes in North Central Nigeria.

Table8: Constraints to the Use of Electronic Databases by Agricultural Scientists

	Constraints	SA	A	D	SD	n	FX	\bar{X}	Std
1	Old age	38	35	120	174	367	671	1.83	0.67
2	My religious activities preoccupy me	7	39	167	154	367	633	1.72	0.78
3	My marital status does not allow me to explore electronic databases very well	9	155	157	46	367	861	2.35	0.15
4	Low level of ICT proficiency	17	241	86	23	367	986	2.69	0.56
5	I do not have a personal computer	43	53	133	138	367	735	2.0	0.50
6	Lack of enabling environment	37	167	127	36	367	939	2.56	0.06
7	Lack of ICT infrastructure	134	124	79	30	367	1096	2.99	0.49
8	Low Internet connectivity	107	181	40	39	367	1090	2.97	0.47
9	Preference for hardcopy material over electronic material in conducting research	43	170	119	35	367	955	2.60	0.10
10	Lack of constant subscription to databases	111	126	78	52	367	1030	2.81	0.31
11	Some subscribed databases lack relevant materials	137	65	82	83	367	990	2.70	0.2
12	Power supply is a major constraint	162	112	81	12	367	1158	3.16	0.66
13	I am always preoccupied with domestic activities, so I do not have time to surf	43	65	178	81	367	804	2.19	0.31
Weighted Mean								2.51	0.01

Key: SA = Strongly Agreed A = Agreed D = Disagreed SD = Strongly Disagreed

Table8 indicates that some items had high mean scores above the 2.50 benchmark on a four-point Likert scale. They are item 5: Low level of ICT proficiency (\bar{X} =2.69, SD =0.56), Item 7: Lack of enabling environment (\bar{X} =2.56, SD =0.06), Item 8: Low Internet connectivity (\bar{X} =2.97, SD =0.47), Item 9: Preference for hardcopy materials over electronic materials in conducting

research (\bar{X} =2.60, SD=0.1), Item 10: Lack of constant subscription to databases (\bar{X} =2.81, SD=0.31), Item 11: Some subscribed databases lack relevant materials (\bar{X} =2.70, SD=0.2), Item 12: Power supply is a major constraint (\bar{X} =3.16, SD=0.66). These were the fundamental constraints to the use of electronic databases by scientists in agricultural research institutes in North Central Nigeria. Item 1: Old age (\bar{X} =1.83, SD=0.67), item 2: My religious activities preoccupy me (\bar{X} =1.72, SD=0.78), item 3: My marital status does not allow me to explore online databases very well (\bar{X} =2.35, SD=0.15), item 4: Lack of ICT infrastructure (\bar{X} =2.99, SD=0.49). Item 6: I do not have a personal computer (\bar{X} =2.00, SD=0.5) and Item 13: I am always preoccupied with domestic activities, so I do not have time (\bar{X} =2.19, SD=0.31) all recorded low mean values below 2.5 indicating that they were not constraints to the use of electronic databases by scientists in the agricultural research institutes libraries in North Central Nigeria.

Hypothesis Testing

Ho1: There is no significant relationship between availability of electronic databases and their use by scientists in agricultural research institutes in North Central Nigeria.

Table9: Pearson Product Moment Correlation on the Relationship between Availability of Electronic Databases and their use by Scientists in Agricultural Research Institutes Libraries in North Central Nigeria.

Variables	N	Mean	Std	Pearson Correlation (r)	Sign (p)	level
Availability of electronic databases	367	2.75	0.25	0.644**	0.000	
Use of electronic databases by scientists in Agricultural Research Institutes Libraries	367	2.32	0.18			

**Correlation is significant at 0.05 level (2-tailed)

Table9 presents the result of the Pearson Product Moment Correlation on the relationship between availability of electronic databases and their use by scientists in agricultural research institutes in North Central Nigeria. The table revealed that there is significant relationship between availability

of electronic databases and their use by scientists in agricultural research Institutes at 0.05 level of significance ($r = 0.644$; $p > 0.05$). Therefore, the null hypothesis which states that there is no significant relationship between availability of electronic databases and use of electronic databases in agricultural research institutes in North Central Nigeria is rejected.

Summary of Major Findings

The major findings of the study are as follows:

1. There were agricultural electronic databases in the agricultural research institutes studied in North Central geo-political zone of Nigeria. Some electronic databases were available in some agricultural research institutes while in other research institutes, some were not available.
2. There were adequate and relevant resources in some of the available electronic databases like Access Digital Library, AGORA, AGRIS, ASFA and particularly AGRICOLA had very adequate and relevant resources for scientists in agricultural research institutes libraries in North Central Geo-Political zone of Nigeria.
3. Out of fourteen (14) items listed on the available electronic databases seven (7) items had higher degree of use and other seven (7) had low degree of use of electronic databases for research in agricultural research institutes libraries in North Central Geo-Political zone of Nigeria.
4. The study shows that seminars/workshop, conference proceedings, research reports, laboratory reports and technical reports are the major research outputs used by agricultural scientists in the institutes studied.
5. The study showed that there were positive influences on the use of electronic databases on research outputs of scientists in agricultural research institutes libraries in North Central Geo-Political zone of Nigeria.
6. Low Internet bandwidth, lack of subscription, erratic power supply and lack of information and communication technology infrastructures were some of the major factors militating

against the use of agricultural electronic databases in agricultural research institutes libraries in North Central geo-political zone of Nigeria.

7. There was significant relationship between availability of electronic databases and their use by scientists in agricultural research institutes in North Central Nigeria.
8. There was significant relationship between use of electronic databases and output of scientists in agricultural research institutes in North Central Nigeria.

Discussion of Findings

Research question 1: what are the available electronic databases in Agricultural Research Institutes' Libraries in North Central Nigeria?

The result of the analysis on the availability of electronic databases in the agricultural research institutes revealed that in National Cereals Research Institute, six (6) electronic databases were available, National Institute for Freshwater Fisheries Research, New Bussa, Niger State had nine on the list electronic databases, Nigerian Stored Products Research Institutes Ilorin, Kwara State has six (6) electronic databases available and National Veterinary Research Institutes, Vom Plateau State had nine (9) electronic agricultural databases (Table3). The study revealed that there was low availability of agricultural electronic databases in the studied agricultural research institutes, what could be that the agricultural research institutes subscribed to the databases that are relevant to the aims and objectives of their institutions. Information from the heads of some of the units revealed that there were plans to subscribe to more agricultural databases for more productivity.

Research question 2: what is the adequacy of Relevant Resources in the Electronic Databases in agricultural research institutes?

The findings revealed that respondents indicated that ACCESS Digital Library, AGORA, AGRICOLA, AGRIS, ASFA, PubMed and TEEAL contained relevant information resources. This could be that these databases' contents are agriculture inclined (Table 4.4). Institutions subscribe to databases that would help in achieving the aim and objectives of that institution.

Research Question 3. What is the Degree of use of Electronic Databases in Agricultural Research Institutes Libraries in North central Nigeria?

The study revealed that Access Digital Library, AGORA, AGRICOLA, AGRIS, ASFA, PubMed and TEEAL were the electronic agricultural databases mostly used (Table 4.5). The high degree

of usage of these databases could also be attributed to the fact that these were the databases available in most of the agricultural institutions studied. It could also be because these databases are discipline based, that is agricultural science centered and have relevant materials that will support research activities of agricultural scientists. This finding corroborates that of Mtega, Dulle, Andrew and Chailla (2014) who revealed that majority of agricultural researchers use electronic databases for their research activities. This corresponds to findings reported by Nkonoki (2013) indicating that postgraduate students at Sokoine university of agriculture claimed to use e-resources in their research.

Research Question4: what are the constraints to the use of Electronic Databases by Scientist in Agricultural Research Institutes Libraries in North Central Nigeria?

The findings revealed that the major problems encountered by agricultural scientists in the agricultural institutes studied on the use of agricultural databases were low level of ICT proficiency, lack of enabling environment, lack of ICT infrastructure, low Internet connectivity, preference for hardcopy material over electronic material in conducting research, lack of constant subscription to databases, some subscribed databases lacked relevant materials and power supply was a major constraint. This finding is like that of Adedayo (2017) who revealed that some of the challenges facing the utilisation of electronic resources include erratic power supply, low Internet bandwidth and lack of technical skills by library staff. Adeniran (2013) also confirmed problems that impede effective utilization of electronic resources were large mass of irrelevant information, the need to filter the results from search, download delay, failure to find information and inadequate or lack of search skills. The study concluded that electronic resources had impacted positively on the academic performances of the undergraduates but recommended the need for them to acquire more skills in the use of electronic resources.

Ho1: There is no significant relationship between availability of electronic databases and their use by scientists in agricultural research Institutes in North central Nigeria.

The test of the significant relationship between availability of electronic databases and their use by scientists in agricultural research institutes indicated that there is a weak relationship (Table 10). This implies that availability of online databases does not affect output of scientists. This finding is contrary to that of Okiki (2013) who revealed that availability of information resources affects research outputs of academics.

Conclusion

Based on the findings of the study, it could be concluded that there were agricultural electronic databases in agricultural research institutes in North Central Nigeria, although not all the listed items studied were present. The study revealed that there were agricultural electronic databases in the agricultural research institutes studied in North Central geo-political zone of Nigeria.

FINDINGS from the study revealed that ACCESS TO DIGITAL LIBRARY AGORA, AGRICOLA, PUBMED and TEEAL had high degree of use. Respondents indicated that the use of electronic databases had positively increased their research output by encouraging them to do more research, increasing their information literacy level, helped to develop more skills, facilitated more journal publications and improved personal development.

Recommendations

Based on the findings of the study, the following recommendations are hereby made:

1. The managements of agricultural research institutes should make efforts to provide adequate agricultural electronic databases that are not available in some of the research institutes studied, particularly EBSCOHOST, MEDLINE, E-GRENARY, ASFA, OARE, TEEAL etcetera.
2. The managements of agricultural research institutes should provide adequate Internet bandwidth and alternative power supply to be able to effectively use the available electronic resources.

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