Availability and utilization of electronic information resources for research activities in agricultural research institutes in Kaduna State, Nigeria

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Abstract
The study investigated the level of availability and utilization of electronic information resources (EIRs) in agricultural research institutes in Kaduna State, Nigeria. The institutes are Institute for Agricultural Research (IAR), National Animal Production Research Institute (NAPRI) and National Agricultural Extension and Research Liaison Services (NAERLS). The study adopted the principles of positivist assumptions using descriptive cross-sectional survey design on a sampled 187 researchers from the population of 373 research scientists. Data were collected through questionnaire and analyzed using descriptive and inferential statistics. The findings revealed that AGORA, TEEAL and AGRIS were available (mean=3.07) while AGRICOLA (mean=2.22) and PROTA (mean=2.18) were not available; that e-dissertations, e-books and e-journals (mean=4.00) were highly utilized for laboratory and/or field research purposes (mean=4.00) by research scientists. The inferential analysis through Regression Model rejected the broad null hypothesis of the study where it showed the extent of available EIR had positive statistical correlation (r=0.648, N=119, $r^2 = 0.420$ p < 0.05) with the level of utilization for enhanced research activities in agricultural research institutes in Kaduna State. It was concluded that EIRs are necessary vehicles for research activities and are available and adequately utilized in agricultural research institutes in Kaduna State. The study recommended that the institutes should increase investments in ICT facilities, provide more relevant EIRs and organize sensitization workshops.

Keywords: Agricultural research institutes, Availability of EIRs, Electronic information resources, Institute of agricultural research, Research activities, Utilization of EIR, Kaduna State, Nigeria

Introduction

The 21st century has witnessed an exponential improvement on the availability, application, and utilization of electronic information resources in most developing countries of the world particularly institutes established purposely for research activities. The utilization of electronic information resources (EIRs) can improve work performance, enhance research activities and support decision making of research scientists. It has been observed by Okiki and Asiru (2011) that one of the strongest factors that influence the utilization of EIRs is the need to carry out research.

Electronic information resources are information resources which require access through any electronic product that delivers a collection of databases, full text or multimedia products being published on CD-ROMs, on tape or via the internet. Availability of EIRs refer to the electronic materials identified bibliographically as relevant to one's subject of interest that could be sourced and accessed electronically through the emerging technologies as means for creating, storing and using for solving

scientific problems or research activities. The utilization of electronic information resources constitutes the process that enables researchers to effectively and efficiently access the soft copy, online or digital information to assist with investigating agricultural issues, solving problems and creative solutions to support and develop new understanding in area of agricultural research activities. Research activities are processes that facilitate the contribution of knowledge by research scientists towards finding solutions to societal and human problems; consequently, access to information is critical in agricultural research.

The study of Okiki (2013) concluded that availability of information resources does not necessarily determine research productivity while Sejane (2017) opined that challenges such as budget cuts, lack of up-to-date IT infrastructure and high cost of subscription fees posed many of the threats to availability and utilization of EIRs in research institutes. In effect, therefore, testing hypotheses to determine relationships to substantiate the claims of Okiki (2013) or proves it otherwise becomes imperative. Notwithstanding, this situation present issues and challenges for further empirical investigation and research in agricultural research institutes (ARIs).

This study would be of benefit to the agricultural research institutes and the society with empirical agricultural research findings for enhancing and promoting more food production, enhanced revenue, tackling hunger and the ravaging effect of poverty. Thus, agricultural research institutes, researchers, librarians and other stakeholders in Nigerian research institutes will benefit from the results of the study. The study will raise the level of awareness of researchers on the need to apply and utilize EIRs as modern tools for global

research and integration, make a significant contribution towards proffering solutions to the ongoing debate in the field of Library and Information Science on the need of availability and utilization of electronic resources for research development to ameliorate the relative low level of research and publications of researchers and reduction in the cost of acquisition of printed resources.

Thus, the current study adopted the principles and methodology of positivist assumptions to develop numeric measures of analysis and study the available EIRs and the preferences of research scientists in utilizing them for their research activities. Due to inadequate documented empirical evidence on the influence of EIRs in facilitating research activities in agricultural research institutes in Kaduna State, which include Institute for Agricultural Research (IAR), National Agricultural Extension and Research Liaison Services (NAERLS) and National Animal Production Research Institute (NAPRI), the present study became imperative and therefore conducted.

Statement of the problem

Electronic information resources are useful to agricultural researchers as they enhance convenient access to information needed for research work. Agricultural research scientists can use the tools of EIRs to forward practical problems to research institutes and use the same tools to access information from different sources. Many of the institutes might have made significant investment providing services through e-resources and computer-based technologies so that research scientists can gain access to information that can enhance their scholarly research activities. Despite the efforts to advance agricultural research in Nigeria, the full contribution of agriculture to the

economic growth and poverty reduction has not been fully realized.

Agricultural research institutes as establishment known for fostering research activities supposed to acquire relevant and current electronic information resources. In spite of this, it is not certain if these resources are available for use in ARIs in Kaduna state and where there are, access to the resources could pose a major threat. However, Musa, Sahabi, Lawal and Amishe (2017) submitted that the poor state of availability of EIRs and inadequate infrastructure to enhance utilization in research institutes affect the process and conduct of research; and thereby reducing the standard of the research institutes in the research world.

It is in view of this that this study aimed to find out the type of EIRs available for research scientists in complimenting utilizationof these resources and the extent to which the resources contributed to research activities in the research institutes under study.

Objectives of the study

The main objective of this study is to investigate the availability and utilization of electronic information resources in agricultural research institutes in Kaduna State, Nigeria for research activities. The specific objectives are to:

1. identify the different electronic information resources that support research activities in agricultural research institutes in Kaduna State, and

2. ascertain the extent of utilization of the electronic information resources for research activities in the Institutes under study.

Hypothesis

A broad null hypotheses was formulated to guide the conduct of this study and was tested at 0.05 level of significance:

$H_0 1$: The availability of electronic information resources has no statistically significant correlation with utilization of the resources for enhancing research activities in agricultural research institutes in Kaduna State, Nigera.

Literature review

Research institutes play an important role in facilitating availability and utilization of different types of electronic information resources. Kamau and Ouma(2003) noted that awareness about the availability of EIRs can be raised through the use of in-house bulletins, brochures, posters, seminars, conferences. Other methods include the use of bookmarks with important uniform resource locators (URLs) and training sessions for research scientists, although, training sessions on EIRs may generates low attendance, research institutions without a library can create awareness on these valuable resources through user groups, conference packs and internal advertising. Bhatia and Venkata (2011) outlined the types of EIRs to include online public access catalogue (OPAC), search engines and websites. Other e-resources include e-journals, online and CD-ROM databases.

Tyagi (2014) studied the rate and purpose of the use of e-resource by the scientists at pharmacopoeia libraries in India using non-probability sampling of purposive technique and found that pharmacopoeia libraries subscribeed to EIRs. All the 73 scientists agreed to the availability and utilization of topical websites, e-journals, online databases, e-monographs and CD-ROM databases while e-books were not available (9.59%). The study concluded that pharmacopoeia librarians should use new

information technologies and new approaches to better serve their scientists and new ways of acquiring information and relevant EIRs are provided for the research scientists research process. Bhatia and Venkata (2011) outlined the types of EIRs to include OPAC, search engines and websites. Other e-resources include e-journals, online and CD-ROM databases while Ahmad and Panda (2013) study revealed that e-books, e-journals, e-newspapers, e-databases, e-theses were available and useful to research activities.

The study of Okiki (2013) showed that electronic information resources available included books (M = 2.74), followed by journals (M=2.48) then the Internet (M=2.54), search engine (M=2.54), e-journals (M =2.14), e-books (M = 2.01), references sources (M=2.48) and OPAC (M = 2.14). CD-ROM had the lowest mean score of M=1.86. This implies that CD-ROM databases resources were less available when compared to other information resources explored in the study. The study further revealed that there was no significant relationship between availability of information resources and research productivity of academic staff (r = 0.162, df =871, p=<0.05). This can be attributed to the low level of the different types of electronic information resources in the institutions. This implies that availability of information resources does not necessarily determine research productivity since the relationship tested was not significant. The present study aimed at substantiating this claim or proves it otherwise in agricultural research institutes in Kaduna State.

In a similar research conducted by Angello (2010) to investigate the accessibility and use of electronic information resources by livestock researchers in Tanzania, it was discovered that e-resources used by livestock researchers for their research work included various CD-ROMS, subject gateways, local and international databases; that 25 researchers (55.6%) were aware of these e-resources although only few of these resources were available in their research institutes. Other livestock researchers had only few CD-ROMs at their institutions such as TEEAL (42.2%) though some researchers complained that it was not up-to-date, forcing them to rely on the internet for more current information.

Based on the findings from the review, although, most of these studies dealt with the e-resource types available for research activities, only few actually explored quantitatively relationship between the different types of EIRs and research activities particularly in agricultural research institutes in Kaduna State. The study of Okiki (2011) revealed that there was no significant relationship between availability of information resources and research productivity, which this study is interested in proving. Therefore, this study intends to fill this knowledge gap.

The utilization of EIRs can also be influenced by the budget for purchasing devices, such as computers, to access these resources and for subscriptions paid to the publisher for access to a resource (Martin, 2010). When this budget is limited, availability and utilization of e-resources may be low. Electronic information in the context of agricultural research therefore makes scientific information readily available for an increase in the quality and effectiveness of research.

Priyadharshini, Janakiraman and Subramanian (2015) investigated the awareness, access and use of e-resources available in the Agricultural College and Research Institute, Madurai and found that

the most frequently used EIRs were e-journals (70%); followed by e-books (65%) and online databases (50%), while least preference was given to the use of e-archives and CD ROM databases (5%). In the same vein, Ahmad and Panda (2013) study of Indian libraries found e-mail and e-journal to be the highest used e-services as indicated by 96.6% and 83.33% respectively, followed by search engines (66.66%) for finding information on the Internet and the libraries specific resources (i.e. OPAC, online databases/journals and library website, etc.) were the least frequently used.

From the above review, the contribution in Nigerian Agricultural Research Institutes setting on the subject matter seems to be relatively insignificant, but researchers extensively identified the rate of utilization of EIRs for research in other settings. The review identified a knowledge gap of level of utilization EIRs which this study will investigate to fill this knowledge gap in agricultural research institutes in Kaduna state.

Methods

Quantitative research method was adopted in line with the research objectives and a cross-sectional survey design to collect data at one point in time was employed since it allows data to be collected from a large sample and allowed testing of hypotheses. Therefore, this design in relation with the objectives and hypotheses of this study necessitated the use of questionnaire in collecting relevant statistical data for the study.

The population of the study consisted of research scientists conducting research in the Institute for Agricultural Research (IAR) (248 research scientists), National Agricultural Extension and Research Liaison Services (NAERLS) (63 research scientists) and National Animal Production Research Institute (NAPRI)(59 research scientists) in Kaduna State. Therefore, the population of the study was 370 (IAR, 2017). A stratified random sampling was employed and a sampling size determination based on the Israel (2012) table was adopted where it stated that if the population is ≥ 350 and ≤ 375 the sample size is 187; this constructed a 95% confidence interval with about $\pm 5.0\%$ margin of error. Therefore, IAR = 125, NAERLS = 32 and NAPRI = 30 using the formula: - SS = $\frac{N \times S}{TP}$; where: SS = Sample Size, N = Number of population of each institution, S = Sample size taken and TP = Total Population

The data collection instrument was an adapted survey questionnaire and known as Availability and Utilization of EIRs in Agricultural Research Institutes Questionnaire **(AUEARI-Q)** developed by the researcher organized under sections A to C, comprising of 28 items and covered the following themes: **Section A:** Demographic Information. **Section B:** Types of Electronic Information Resources and **Section C:** Extent of Utilization of EIR. The data obtained were presented and analyzed on SPSS using descriptive statistics of measure of dispersion to summarize the data and inferential techniques in drawing out conclusions.

The decision rule for mean marks is as follows:

1.00 - 1.99 Not Significant / Not Applicable / Rejected

2.00 - 2.49 Low Significant / Low Extent / Not Available / Rejected

2.50 - 2.99 Moderately Significant / High Extent / Available / Accepted

3.00 - 4.00 Highly Significant / Highly Available / Accepted

Key:

VHE	=	Very High Extent
HE	=	High Extent
LE	=	Low Extent
NA	=	Not Applicable

Results

In order to determine whether all strata of the population were captured to allow objective generalization, demographic data relevant to the study were collected. A total 187 copies of questionnaire were distributed proportionately according to the sampling technique of the study, out of which 68 (36.36%) copies were unreturned while 119(63.64%) samples were returned which include IAR 75 (63.03%), NAERLS 23 (19.33%) and NAPRI 21 (17.64%).

The experience of conducting research of the respondents showed that 21 (17.6%) respondents served below 5 years conducting research, 54 (45.4%) respondents conduct researches up to 10 years and 40 (33.6%) respondents were conducting research up to 15 years while only 4 (3.4%) respondents conduct research beyond 15 years in agricultural research institutes in Kaduna State. From this analysis it shows that majority (80%) of the respondents have being conducting research for not fewer than 5 years. This indicates their familiarization with the electronic environment and knowledge about the availability and utilization of EIRs within the institutes.

The respondents were asked to indicate the EIRs available in ARIs in Kaduna State. The data are presented in Table 1. Table 1 represents the different electronic information resources. The table reveals that all the respondents rated that e-journals and e-books (mean=3.12), Access to Global Online Resources in Agriculture (AGORA) (mean=4.00), The Essential Electronic Agricultural Library (TEEL) (mean=4.00), Online Access to Research in the Environment (OARE) (mean=3.82) and International System for Agricultural Science and Technology (AGRIS) (mean=3.77), E-Theses, E-Dissertation E-Reports (mean=3.12) are readily available in agricultural research institutes in Kaduna State. The table further shows that items 11, 12, 13, 15, 18, 19 and 20 with the following mean=3.93, mean=3.75, mean=2.85, mean=3.26, mean=3.88, mean=3.66 and mean=3.48 respectively are also available that support research activities of research scientists because their mean marks are greater than 2.49 bench mark.

The table also reveals that items 6, 10, 14, 16, 17, 21 and 22 with the following mean=2.22, mean=2.21, mean=1.98, mean=1.08, mean=1.84, mean=2.18 and mean=2.42 respectively are not available. Among the major electronic information resource databases related to agricultural researches, the analysis shows that AGRICultural OnLine Access (AGRICOLA) (mean=2.22) and Plant Resources of Tropical Africa (PROTA) (mean=2.18) databases are rated low and therefore considered not available in the research institutes based on the decision rule.

The analysis in Table 2 represents the total mean descriptive statistics for total responses of the different electronic information resources available in ARIs in Kaduna State. The analysis revealed that out of the 119 valid questionnaire analyzed, they generated a total 2,618 responses where 1,256 (47.97%) responses rated "Readily Available", 533 (20.36%) responses rated "Available", 613 (23.42%) responses rated "Not Available" while only 216 (8.25%) responses rated "Not Applicable". The analysis further shows that 68.33% of the total responses rated the types of EIRs identified in Table 2 are available in the institutes with a total mean mark of 3.07 which is significant based on the decision rule of the study. This shows that electronic information resources provided in agricultural research institutes in Kaduna state are available (mean=3.07) for research activities.

This analysis is significant because it forms the basis for generalization of the level of availability of the different electronic information resources and their rate of utilization for research activities by research scientists in agricultural research institutes in Kaduna state.

In order to obtain the extent of utilization of EIRs, the respondents were asked to indicate their rate of utilization of the electronic information resources in Table 3. Table 3 represents the extent of utilization of electronic information resources by research scientists. From the analysis on Table 3 above, it was revealed that all the respondents indicated the utilization of e-dissertations, e-books and e-journals (mean=4.00), On-line databases and scholarly websites (mean=4.00) and CD-ROM/DVD Searching Service (mean=4.00) EIRs for their research activities. Audio-visual graphical images in agriculture (mean=3.97), audio reports on agricultural research (mean=3.79), CAS to enquire about status of newly subscribed EIR (mean=3.39), are also highly utilized. While the analysis shows that Selective Dissemination of Information (SDI) for online reference services on EIRs (mean=1.98) and OPAC services to access databases (mean=1.95) are not significantly utilized EIRs by the research scientists.

Table 4 reveals the mean descriptive analysis of extent of utilization of electronic information resources by research scientists. The analysis revealed that out of the 119 valid questionnaire analyzed, they generated a total of 1187 responses where 856 (72.11%) rated "Very High Extent", 106 (8.95%) rated "High Extent", 172 (14.49%) rated "Low Extent" while only 53 (4.47%) rated "Not Applicable". The analysis further shows that over 81.06% of the total responses rated high extent utilization of

EIRs for their research activities with a total mean score of 3.48 which is highly significant. It is an indication that the different types of available databases have the necessary resources the research scientists are looking for.

Hypothesis testing
The hypothesis is tested at 0.05 level of significance.

$H_0.1$. The availability of electronic information resources has no statistically significant correlation with utilization of the resources for enhancing research activities in agricultural research institutes in Kaduna State.

Table 5 represents the linear regression analysis of the availability and utilization of EIRs for enhancing research activities in agricultural research institutes in Kaduna State. The analysis revealed that the correlation is significant at 0.01 level of confidence with a strong positive significant relationship (r=0.648, N=119, $p < 0.05$) between availability and utilization of EIRs for enhancing research activities in Agricultural Research Institutes.

The table further reveals the unstandardized B column value of 0.206 which is the slope of line of interception and an indicator of the level of effect the predictor variable (availability of EIRs) has on the extent of utilization of the resources. In practice it means an average increase in availability of EIRs will lead to 0.206 increase in utilization. A 5% increase in availability of EIRs database will lead to only (5×0.206) 1-unit increase in the extent of utilization of the resources in Agricultural Research Institutes in Kaduna state. However, this low value is as a result of the low mean (mean=2.99, see table 2) of the

availability of EIRs in the institutes. Table 6 represents the regression model summary of availability and utilization of EIR. The analysis reveals the regression equation ($r = 0.648$) and the 'R' Square coefficient ($r^2 = 0.420$). The 'R' value revealed how closely the data points resembles a perfectly straight-line relationship while the 'R' Square coefficient ($r^2 = 0.420$) measures how much variation in the dependent variable is explained by variation in the independent variable. That is, 42% of the variation in utilization of electronic information resources by research scientists is explained by the variation in the availability of the different types of electronic information resources in agricultural research institutes in Kaduna State. In practice, availability of electronic information resources in agricultural institutes in Kaduna State accounts for 42% influence on utilization of the resources for enhancing research activities. While about 58% of the influence of utilization are responsible from other factors.

According to Bornmann and Leydesdoff (2013), if the P value significant level is less than 0.05 ($p < .05$) the Null Hypothesis of the study will be rejected while if the P value significant level is greater than 0.05 ($p > .05$) the null hypothesis of the study will be retained. Therefore, according to this analysis, the H_0 is rejected ($p < 0.05$ i.e. Sig = 0.00), because there is sufficient evidence of significant correlation between availability and utilization of electronic information resources. The difference between the mean of availability and utilization of EIRs are not happening by chance but as a result of influences of the variable "Availability of EIRs". Therefore, the availability of electronic information resources has statistically significant correlation with utilization of the resources for enhancing research activities of research scientists in agricultural research institutes in Kaduna State.

Table 1: Electronic information resources available

S/N	Electronic information resources	N	Mean	Std. Deviation	Decision
1	E- journals	119	3.1261	.65813	Available
2	E-books	119	3.1261	.65813	Available
3	Access to Global Online Resources in Agriculture (AGORA)	119	4.0000	.00000	Available
4	The Essential Electronic Agricultural Library (TEEL)	119	4.0000	.00000	Available
5	International System for Agricultural Science and Technology (AGRIS)	119	4.0000	.00000	Available
6	AGRICulturalOnLine Access (AGRICOLA)	119	2.2269	.54364	Not Available
7	Online Access to Research in the Environment (OARE)	119	3.4202	.86843	Available
8	E -theses and Dissertations	119	3.1261	.65813	Available
9	E -reports and Manuals on Agriculture	119	3.1261	.65813	Available
10	Health Internet Network Access to Research Initiative (HINARI)	119	2.2185	.87488	Not Available
11	Directory of Open Access Journals (DOAJ)	119	3.9328	.25147	Available
12	Directory of Open Access Books (DOAB)	119	3.7563	.58173	Available
13	EBSCO Host Integrated Search	119	2.8571	1.12209	Available
14	International Network for the Availability of Scientific Publications (INASP)	119	1.9832	1.12734	Not Available
15	African Journals Online (AJOL)	119	3.2605	.88741	Available
16	Nigerian Virtual Library (NVL – NUC)	119	2.0504	1.08024	Not Available
17	MEDLINE	119	1.8403	.77002	Not Available
18	Agricultural CD/DVD	119	3.8824	.32355	Available
19	Online Encyclopedia Services relating to Agriculture	119	3.6639	.65454	Available
20	Elsevier Science Direct	119	3.4874	.95550	Available
21	Plant Resources of Tropical Africa (PROTA)	119	2.1849	.50365	Not Available
22	Database of African Theses and Dissertations (DATAD)	119	2.4202	.93424	Not Available

Table 2: Mean descriptive statistics of EIRs available

Item	Readily Available	Available	Not Available	Not Applicable	Mean	Decision
Mean of different EIRs databases available	1256 (47.97%)	533 (20.36%)	613 (23.42%)	216 (8.25%)	3.0768	Significant
Valid N (Total response)			2618			

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Table 3: Extent of utilization of EIRs by the research scientists

S/N	Utilization of EIRs	VHE	HE	LE	NA	Mean	Decision
1	E-dissertations, e-books and e-Journals	119	0	0	0	4.0000	Accepted
2	Audio-visual graphical images in agriculture	117	1	1	0	3.9748	Accepted
3	Audio reports on agricultural research development	100	14	5	0	3.7983	Accepted
4	Current Awareness Services (CAS) to enquire about status of newly subscribed EIR databases	76	17	23	3	3.3950	Accepted
5	On-line databases and scholarly websites	119	0	0	0	4.0000	Accepted
6	Offline library repository	104	14	1	0	3.8655	Accepted
7	CD-ROM/DVD searching service	119	0	0	0	4.0000	Accepted
8	Selective Dissemination of Information (SDI) for online reference services on EIR	0	23	71	25	1.9832	Not Significant
9	Online public access catalogue (OPAC) services to access databases	0	23	71	25	1.9580	Not Significant
10	Photocopy, printing and scanning services	105	14	0	0	3.8824	Accepted

Table 4: Mean descriptive analysis of utilization of EIR

Item	Very High Extent	High Extent	Low Extent	Not Applicable	Mean	Decision
Extent of utilization of electronic information resources	856 (72.11%)	106 (8.95%)	172 (14.49%)	53 (4.47%)	3.4857	Highly Significant
Valid N (Total Response)	1187					

Table 5: Regression analysis of availability and utilization of EIRs

	Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients		T	Sig.
	B	Std. Error	Beta			
1 (Constant)	2.870	.067			42.596	.000
Types of EIR Available	.206	.022	.648		9.210	.000

a. Dependent Variable: Utilization of EIRs

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Table 6: Regression model summary of different EIRs

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.648[a]	.420	.415	.09511
a. Predictors: (Constant), Types of EIRs Databases Available				

Discussion

The method employed in this study was the descriptive cross-sectional survey design which explored the level of availability and extent of utilization of electronic information resources for research activities in agricultural research institutes in Kaduna State using measure of dispersion for analysis of research objectives and regression analysis for research hypothesis.

The result of the different EIRs available revealed that electronic information resources databases are available in agricultural research institutes in Kaduna State. The different major agricultural EIRs in agricultural research institutes in Kaduna State from the study include E-Journals and E-Books (mean=3.12), Access to Global Online Resources in Agriculture (AGORA) (mean=4.00), The Essential Electronic Agricultural Library (TEEL) (mean=4.00), International System for Agricultural Science and Technology (AGRIS) (mean=3.77) and E-Theses, Dissertations and Reports in Agriculture are available. Other EIRs are Online Access to Research in the Environment (OARE) (mean=3.82), VET CD/DVD (mean=3.76), EBSCOhost Integrated Search (mean=2.86), African Journals Online (AJOL) (mean=2.73), Directory of Open Access Journals (DOAJ) (mean=3.57), Directory of Open Access Books (mean=3.56), Online Encyclopedia on Agriculture (mean=3.05) and Elsevier Science Direct (mean=3.69).

The findings of this study corroborate the study of Tyagi (2014) who found that Directory of Open Access Books (mean=3.56) is available in agricultural research institutes in Kaduna State. The findings of this study also supported the evidences presented

Isiakpona, Deborah and Goodluck, (2012) general findings showed that AGORA and EBSCOHOST are the only databases available, while HINARI, JSTOR and OARE were the least available databases in the libraries.

The study found a very high significant rate of utilization (mean=3.48) of electronic information resources. Research scientists in ARIs in Kaduna State were found to utilize E-dissertations, E-books and E-Journals (mean=4.00), On-line databases and Scholarly Websites (mean=4.00) and CD-ROM/DVD Searching service (mean=4.00) for Research Activities. This finding corroborates the study by Priyadharshini, Janakiraman and Subramanian, (2015) in their case study in Madurai found out E-journals (70%); followed by e-books (65%) and online databases (50%) are the most preferred and highly utilized EIRs for research development.

This study also found that audio-visual graphical images in agriculture (mean=3.97), Audio reports on agricultural research development (mean=3.79) were highly utilized by research scientists. These findings contradict the findings of Angello and Wema (2010) in Tanzania where they found out lack of utilization of EIRs attributed to the unavailability of relevant EIRs.

The broad hypothesis of the study was tested using the Linear Regression Correlation Analysis and found to have positive significant relationship between availability of EIRs and extent of utilization of EIRs for enhanced research activities; (r=0.648, N=119, $r^2 = 0.420$ p < 0.05), therefore, the broad null hypothesis is rejected. This finding is in contrast with the study of Okiki, (2013) where the research findings implied that

availability of information resources does not necessarily determine research productivity; this analysis can be attributed to the low level of electronic information resources.

Implication of the study
The findings of this study have implications for the research scientists, the library management and Agricultural Research Institutes. This study has established that availability and utilization of electronic information resources have significant relationship with enhancement of research activities. Therefore, the more they utilize the services of the EIRs, the better the development of their research activities. The study also revealed AGRICultural OnLine Access (AGRICOLA) (mean=2.23) and Plant Resources of Tropical Africa (PROTA) (mean=2.00) as major agricultural database are not readily available. This lack of availability of relevant EIRs may affect the level at which research scientists use EIRs for research activities.

Conclusion
The study basically aimed at investigating the availability and utilization of EIRs for research activities in agricultural research institutes in Kaduna state. Following the results obtained on the basis of analysis of the data generated, the general conclusion of the research is that electronic information resources are necessary vehicles for effective research processes and are moderately available and adequately utilized for enhancing research activities in agricultural research institutes in Kaduna state. Bases on these findings and in line with the objectives of the study, the following conclusions were arrived at:

The major relevant agricultural EIRs such as AGORA, TEEL and OARE are readily availability and e-dissertations, e-books and e-journals are highly utilized for enhanced research activities of research scientists in agricultural research institutes in

Kaduna State. The study also concludes that Selective Dissemination of Information (SDI) services and online public access catalogues (OPAC) are not significantly utilized by the research scientists. The study concludes that availability and utilization of electronic information resources have positive significant correlations with the dependent variable of enhanced research activities of research scientists in agricultural research institutes in Kaduna state. The more level of availability of EIRs databases and improved rate of utilization of EIRs the better state of enhanced research activities in the research institutes.

The study therefore offers the following recommendations:

1. The study observes that the enabling electronic information environment will lead to increased availability and utilization of there sources by research scientists. Thus, agricultural research institutes in Kaduna state should provide more relevant EIRs for the enhancement of research activities.

2. Agricultural research institutes libraries in Kaduna state should organize sensitization workshops on Selective Dissemination of Information (SDI) services to librarians and OPAC services to researchers in order to expose these services to users in ensuring effective utilization for research activities.

3. Best practices should be encouraged by organizing regular sponsorship of librarians and other staff to attend workshops and conferences on electronic information resources to adequately acquaint and equip them with methods and processes of subscription, maintenance of ICT infrastructural facilities and

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making EIRs available to research scientists.

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