

Assessing the Extent of Provision and Constraints of Utilization of Library and Information Service Delivery on Scholarly Communication Output in Agricultural Research Institutes in North-Central Nigeria

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Abstract: The focus of this study was to assess the utilization of library and information service delivery for effective scholarly communication output in Agricultural Research Institutes in North-Central. The study defined Current Awareness Services (CAS), Selective Dissemination of Information (SDI), Internet Services (IS), Inter-Library Loan Services (ILLS), Reference Services (RS) and Circulation Services (CS) as the aspects of library and information service delivery provided by agricultural research institutes in North Central Nigeria. The results of the assessment revealed that respondents in the agricultural research institutes libraries showed that CAS, SDI, IS, ILLS, RS and CS have a high extent of provision. Furthermore, the results identified slow Internet connectivity as the most important constraint for effective scholarly communication outputs. The study recommended that Agricultural Research Institutes Libraries in North Central Nigeria should intensify their efforts towards adequate provision of library and information services to enable effective scholarly communication outputs in Agricultural Research Institutes in North-Central. The study also recommended occasional training for academic staff in order to improve their skills in accessing appropriate information materials in the Agricultural Research Institutes Libraries.

Keywords: Current Awareness Services; Selective Dissemination of Information; Internet Services; Inter-Library Loan Services; Reference Services; Circulation Services.

1.1 INTRODUCTION

Scholarly communication output is one of the strong determinants of research productivity of researchers (Agh & Omekwu, 2021). Researchers may disseminate their findings either through oral presentation at conferences, workshops or seminars or in forms of recorded sources in print and electronic formats, such as, books (monographs), chapters in books, conference papers and proceedings and articles in scholarly journals. Other avenues include theses, dissertations, patents and creative works such as performances and exhibitions of the visual arts among others (Tascona, Harman & Price, 2021). Indeed, scholarly communication output is the fruit of the labour of research activity and a major parameter by which the productivity of researchers is adjudged in any research environment. The significance of scholarly communication outputs in the academia is that it enables academics to share insights, demonstrate academic scholarship and gain recognition for creative thinking, exposing researchers to current information sharing of scholarly communication outputs with others in the field through quality research. Libraries help researchers in their attempt to improve their scholarly communication outputs. In the context of this study, special libraries are germane in developing scholarly communication outputs. Agricultural research institute libraries by their special nature are expected to acquire and process into retrievable forms and make available, the much needed and specialized information to the academic community and general public that may require such information for teaching, learning and research activities (Daudu & Shehu, 2014).

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The thrust of every library including agricultural research libraries is to provide information services and resources that will enhance the study and research output of the user community. Making information services readily available and the consequent accessibility and utilization by library users (agricultural researcher) could significantly increase scholarly communication outputs (Rhima, 2014). Library and information service in the broadest sense include all the library and information functions designed to satisfy users information needs to facilitate the inter-operability of library systems and to support the delivery of agricultural information to agricultural scientists. Scholars such as Poopola and Ebiwole have identified different services as comprising library and information services. Scholars have conceptualized library and information services variously (Izuagbe, Ifijeh & Ilo, 2021). However, this study adopts the conceptualization by Ebiwole (2010) as referral services (RS), current awareness services (CAS), selective dissemination of information (SDI), internet services (IS), inter-library loan services (ILLS), reference services (RS), circulation services (CS). It can be argued that all things being equal, if these library and information services are adequately delivered and effectively utilized, researchers scholarly communication outputs would be enhanced. Hence, researchers' scholarly communication outputs are often linked with effective library and information service delivery.

Current Awareness Service (CAS) is services that inform users about new acquisitions in the library. Selective Dissemination of Information (SDI) provides an opportunity for individualized service delivery while Internet Services (IS) constitute a paradigm shift for storing, accessing and delivery of information for research productivity. Inter-Library Loan Service (ILLS) is a veritable avenue of augmenting the limited resources of libraries. Similarly, Reference Service (RS) provides a user of library and information service, an interface with the large body of knowledge to meet their information requirements while Circulation Service (CS) applies to the process of lending books and other information resources to users and then accurately re-shelving them after they have been returned to the library so that the next user(s) could retrieve them. Scholars such as Okiki (2013) and Uganneya, Ape and Ugbagir (2012) have submitted that the much needed library and information services in support of scholarly communication output in Nigeria are inadequately provided in educational institutions generally and agricultural research institutes in particular. In essence, the extent to which library and information service delivery are provided is a subject of controversy and debate (Bashir, Gul, Bashir, Nisa & Ganaie, 2021). In addition, empirical research to establish the true picture of the extent to which library and information services are provided to researchers' in agricultural research institutes in North Central Nigeria is lacking providing a motivation for this study. This has informed the decision to carry out this study to assess the extent to which CAS, SDI, IS, ILLS, RS and CS are provided and to also evaluate the constraints militating against the use of library and information service delivery by researchers' in agricultural research institutes in North Central Nigeria.

1.2 Statement of the Problem

Libraries exist to provide information services and resources to its users. This is also true of libraries in agricultural research institutes that are established to provide timely, accurate, accessible and reliable information and services to users, greatly increasing the user's capacity to take on teaching responsibilities and carrying out and reporting research findings. These services can be in the form of current awareness services, selective dissemination of information, Internet services, inter-library loan services, reference services and circulation services. All things being equal, if these services are adequately and effectively delivered researchers' scholarly communication output is expected of being enhanced. And when the researchers are thus satisfied, it implies that they have the necessary literature support and other library and information service delivery that would enhance their productivity in terms of research and publications. Unfortunately, the decline in physical library utilization by agricultural researchers together with unclear evidence of information delivery access has left the agricultural research institute libraries without any hard data to justify their role in meeting the information needs of researchers. Attempts to address this have not improved the extent to which researchers utilize the library information services. This seemingly low visible patronage is capable of causing no or low research productivity such as scholarly communication outputs, which has informed the decision to carry out this study. This study therefore hopes to evaluate the extent to which CAS, SDI, IS, ILLS, RS and CS are provided and the constraints militating against the utilization of the services by researchers in the Agricultural Research Institutes Libraries in North Central Nigeria.

1.3 Research Questions

The study seeks to find out answers to the following questions.

- 1) To what extent are CAS, SDI, IS, ILLS, RS and CS provided by the Agricultural Research Institute Libraries to agricultural researchers in North- Central Nigeria?
- 2) What are the constraints militating against the utilization of library and information service delivery by researchers in Agricultural Research Institutes in North- Central, Nigeria?

1.4 Research Objectives

The following research objectives are achieved in this study.

- 1) To evaluate the extent to which CAS, SDI, IS, ILLS, RS and CS are provided by Agricultural Research Institute Libraries to agricultural researchers in North- Central Nigeria.

- 2) To ascertain the constraints militating against the utilization of library and information service delivery by researchers in Agricultural Research Institutes in North- Central, Nigeria.

2.1 LITERATURE REVIEW

2.1.1 Library and Information Service Delivery

Library and information service delivery are library processes and activities that are deployed by libraries to deliver information services and resources to library users, with the aim to enhance the activities and productivity of library users. Library and Information service delivery therefore, can be said to include those activities that create, store, and disseminate knowledge, skills and artifacts that define new technologies such as the Internet, E-mail, etc. Uganneya (2011) stress that the service delivery performance and effectiveness of any library depends not only on how the individual service performs in isolation, but also on how they interact with each other as elements of a collective system of knowledge and information dissemination and use and their interplay with other information resource bases. This study considers library and information service delivery as a synergy of library activities whose interplay enhances effective and efficient library and information service delivery consequently enhancing the researcher's scholarly communication output and the productivity of library users. Details of these services CAS, SDI, IS, ILLS, RS and CS are reviewed below.

According to Guha (2005), Current Awareness Services (CAS) is a device of an information system through which the users of information can be informed promptly after the publication but before absorption into comprehensive secondary sources of current literature on a broad based subject field or on an area in which a group of persons are interested, and presented in a manner, volume, rhyme intended to facilitate or cultivate current approach to information. Straus (2012) define CAS as the establishment of a system for reviewing publications immediately upon receipt, selecting information pertinent to the programme of the organization served, and recording individual items to be brought to the attention of those persons whose work they are related to. Cabonero, Tindaan, Attaban and Manat (2019) maintain that today, CAS alert scholars, researchers, agricultural practitioners' etc. to recently published literature in their fields of specialization. Uzhue and Yaya (2016) reported that CAS is designed to alert users of new or current information services/resources that might satisfy their needs.

Selective Dissemination of Information (SDI) services is primarily concerned with keeping users up-to-date with information; matching a user profile as it arrives at an information provider. Defined by Luhn as cited in Uganneya (2011), SDI is seen as that service within an organization which concerns itself with channeling of new items of information, from whatever source to those points within the organization where the probability of usefulness in connection with current work or interest is high. SDI or simply called selectivity is the ability of a service to notify a client of materials that matches the interest of the client. To Roy (2010), scholarly communication output information in the hand of research development experts through SDI means knowledge empowerment. Therefore, effective and efficient SDI system such as matching and routing of relevant and current information with scientist's fields of specialization will facilitate scientists and researchers critical role in decision-making towards improved researchers communication output in general.

Another library and information service delivery in agricultural research institute libraries is the Internet Services (IS) is frequently described as a network of computer networks. According to Oladele (2011) in some respects, it may be considered as a "virtual" network in so far as it is not separately administered and has never been designed. Oladele maintains that the Internet constitutes new paradigm for storing, accessing and using information in agricultural research library system. The excitement surrounding them is fully justified. Kumbhar & Bidve (2018) reported that the Internet has significantly impacted on developing countries educational sector through ICT-enabled solutions for study and research production. He maintains that ICT has improved access to financial services, which a large body of theoretical and empirical literature suggests could have significant impact on research production.

Inter-Library Loan Services (ILL) is another form of library and information service delivery. Before the advent of technologies such as computers and networks, ILL was an established service of sharing among libraries. Vicha (2007) defines ILL as a process which the library request materials from another library. The author asserts that the aim of the service is to obtain, upon request by users, materials that are not available in the user's library. It supplement library's collection by obtaining materials needed for research, scholarship and private study that are, not available at a user's home institutions library. Aguolu and Aguolu (2002) posits that ILL is based on the premise that no single library can acquire and own all the materials its users need due to information explosion and the increasing cost of materials. They further maintain that through ILL, libraries are able to deliver the best reading materials to the great number of users at the least cost; thereby, achieving the concept of 'joint consumption'.

Reference Services (RS) on the other hand provide an avenue by which library and information service delivery users can interface with a large body of knowledge to obtain the information he/she desires. Depending on the type of

library or information centre, the service may range from the provision of the desired information to the training and educating of the user to identify and locate what he/she needs. Technological advancements have greatly improved the accessibility of the broad range of information relevant to the field of agriculture with many implications for the achievement of successful reference services (Fisher & Kinch, 2011; Adetomiwa, 2020). Frank (2010) stated that for a successful agricultural reference services, there are at least three main attributes the reference librarian must possess. These include knowledge of agriculture, an understanding of agricultural information and librarianship (and its new technologies), and possession of the interpersonal skills to deal successfully with clients. Frank maintains that subject knowledge is important for understanding and interpreting the information needs of agricultural clients, while an understanding of agricultural information and technology is vital in appreciating the incredible diversity of the field's literature. Garfield (2010) therefore argued that in agricultural literature, one must be familiar with the larger body of scientific literature. The third attribute needed by the references librarian; interpersonal skills, is the one that is often underrated. To perform reference service well and increase the productivity of agricultural scientists, an agricultural librarian should be a good listener and a skilled, yet gentle inquisitor in order to perform the reference interview – a brief but important interview or consultation used to determine exactly what the patron needs.

With the explosion of user's information needs, libraries and information centers are expected to share their information resources with their prospective users. Library resources are expected to be utilized by prospective users; these can be achieved through circulation services. According to Daudu and Shehu (2014), Library circulation or library lending comprise activities around the lending of books and other materials to users of a lending library. They further state that the main public service point is the circulation desk or loan desk, usually found near the main entrance of a library. Library circulation provides lending services, facilitates for return of loaned books, renewal of materials and payment of fines. It is the process that involves a circle where an item moves from shelf to user and back to shelf, in addition to proper record keeping. The whole activity according to Uganneya (2011) is based on the policies that the libraries have adopted concerning who may borrow what, for how long and what happens if the item is not returned. The main aim of circulation services is to ensure equitable distribution of library and information services among users based on their individual needs. The service contributes immensely to document and information exposure and use for effective productivity. Brown (2010) and Jahangir, Saddique and Adil (2021) are of the opinion that library circulation services should provide a client with whatever it is he wishes, just so long as other individuals are not injured in the process.

2.1.1 Constraints of Library and Information Service delivery on Researchers' Scholarly Communication Outputs

Research productivity estimates for Nigeria has declined recently according to Ocholla and Onyancha (2010). They noted that Nigeria has witness a strong agricultural research information growth in the past few years but lagged behind from 2007. Therefore, reviewing library and information service delivery constraints affecting research productivity in Nigeria is an important step in formulating policies by stakeholders to reverse these trends in future. In spite of the fact that there has been some recognition of the importance of library and information service delivery in Nigeria, there are still many constraints facing service delivery towards agricultural productivity. According to Anyim (2021), private sector involvement in academic and agricultural research library and information services has remained negligible to date. They argue that low federal and states expenditure on libraries has been associated with low service delivery. Low expenditure on agricultural information sources of delivery explains eventual low research productivity growth. Idachaba (2008) reported that when agricultural information centers (libraries) are poorly funded, agricultural technologies and research growth could not be improved. He argues further that the absence of new technologies in Agricultural Research Institutes slows the growth of agricultural research output generally.

Oluwakemi (2021) enumerated a range of constraints faced by agricultural research library and information services in developing countries to include: limited core agricultural resources/services for effectual study and research, lack of modern reference and documentation services, inadequate interlibrary loans and cooperative services, limited often inadequate budgets to achieve excellence in service delivery. Similarly, Ejedafiru (2011) opined that poor financial background of the library, lack of information materials, lack of qualified personnel, poor facilities and lack of communication facilities are some hindrances to effective library and information service delivery for scholarly communication output. Relatedly, Uganneya *et al.* (2012) in their study submitted that irregular Internet services, expensive Internet services, outdated materials and staff unresponsiveness are some constraints that affect service delivery in agricultural libraries in Nigeria. Camillone, Duiker, Bruns, Onyibe and Omotayo (2020) also reported that poor public relations of library extension workers (librarians), poor radio/television signals, poor transportation system and lack of funds not only dislodge the linkage between agricultural libraries but also cut off the desired link between the libraries and scholarly communication output in research institutes in Nigeria.

According to Ifidon (2010), Ebiwole (2010) and Kannappanavar and Swamy (2013), very important library services like CAS and SDI are not effectively delivered in agricultural libraries in Nigeria. They associated these impediments to inadequate teaching and research materials, inadequate finance support, inadequate trained staff, un-

automated library services, poor infrastructure, and epileptic power supply. Relatedly, Daudu and Shehu (2014) assessed the role of agricultural research institute libraries and identified low provision of e-resources which is the trend in contemporary research, inadequate funding of the libraries. This inadequate funding according to them exposes the libraries to inadequate delivery management techniques, such that, they cannot keep pace with current developments in the delivery of library and information services to agricultural researchers in Nigeria. Contributing on circulation services in academic libraries, Echezona, Asogwa and Asadu (2011) identified the following as impediments to circulation service delivery in academic and agricultural libraries in Nigeria: inadequate funding, incessant power outage, inadequate and obsolete working tools, and computer illiteracy of circulation staff, inadequately trained staff and increase students enrolment. Hart (2011) also reported that inadequate loan period, insufficient number of materials for loan, poor staff public relation and delay in service delivery as constraints to circulation services delivery to users. Jahangir (2021) stated that the degree to which these problems affect service delivery in agricultural research libraries differ from country to country. In developing countries like Nigeria, he identified some of the major problems facing service delivery to include: low priority given to information service delivery at the planning stage, unqualified personnel, low status of libraries and inadequate facilities for communication and linkages among others. Researchers such as Ezeala and Yusuff (2011), Rheo, Oboh and Shelton (2010), Nwankwo (2006), Afolabi and Abidoye (2011), Ogunjobi and Fagbami (2012), Adedoyin (2005), Oduwole (2005), Ugbah and Blessing (2010), Eke and Ekwelem (2014) identified numerous constraints militating against the use of library and information service delivery by researchers'.

3.1 RESEARCH METHODOLOGY

This Section deals with the research methodology adopted for this study. In terms of the research design, descriptive research design was adopted for this study. For the area of study, the North-Central geopolitical zone was selected, specifically, the study centers of the four (4) National Agricultural Research Institutes Libraries in North-Central, Nigeria. They include: National Cereal Research Institute (NCRI), Bida, Niger State; Nigerian Store Product Research Institute (NSPRI), Ilorin, Kwara State; National Veterinary Research Institute (NVRI), Vom, Plateau State and National Institute for Freshwater Fisheries (NIFF), New Bussa, Niger State. The researcher decided to choose Agricultural Research Institutes in North-Central, Nigeria because majority of the populace in the zone are full time farmers that need to improve on their agricultural productivity. Effective and efficient library and information service delivery at Agricultural Research Institutes therefore stands as a viable channel through which their expectations are achieved.

3.1.1 Population and Sample of the Study

The target population of the study is 1,642 registered library agricultural research scientists/researchers in the four (4) National Agricultural Research Libraries in North-Central, Nigeria (RIU, Nigeria, 2010). Based on the population of 1,642, a total number of 820 researchers were selected and included in the sample. The 820 was arrived at by selecting in the first instance the first name on the list with subsequent selection done by selecting the next name after the second name on the list. This process was done on the entire list in the four study areas resulting in a sample size of 179 from the National Cereal Research Institute, Niger State; 211 from the Nigerian Store Produce Research Institute, Kwara State; 199 from the National Veterinary Research Institute, Plateau State; and 231 from the National Institute for Freshwater Fisheries, Niger State. However, out of the 820 questionnaires distributed, 621 were returned giving a response rate of 76%.

3.1.2 Instrument for Data Collection

The instrument that was used for data collection was questionnaire titled: *Questionnaire on Library and Information Service Provision (QLISP) meant for Agricultural Research Institute Librarians*. Section contained questions regarding the respondent's characteristics while Section B focused on the extent to which the selected library and information services are provided in Agricultural Research Institutes in North Central Nigeria. It contained six (6) major clusters with each having five (5) items. Cluster 1, sought to find out information on the extent of Current Awareness Services (CAS) provision, while cluster 2 and 3 sought information on the provision of Selective Dissemination of Information (SDI) and Internet Services (IS). Cluster 4 sought to find out the extent of the provision of Inter-Library Loan (ILLS), Cluster 5 focused on the provision of Reference Service (RS) while cluster 6 focused on the Circulation Services (CS). The questionnaire was designed using a four (4) point rating scale, with a total of thirty (30) questions. Section C consisted of a checklist of possible constraints of library and information service delivery in the Agricultural Research Institutes in North Central Nigeria, which contained thirteen questions.

3.1.3 Validity and Reliability of the Instrument

The questionnaires were subjected to face and content validation by the following professionals: two lecturers in the Department of Library and Information Science and a lecturer in Test and Measurement in the Social Science Education Department, University of Nigeria, Nsukka. After a thorough review, irrelevant questions were eliminated while questions that were deemed relevant but omitted were included. For reliability, Cronbach alpha was calculated accordingly using a sample of forty-two (42) respondents of National Animal Production Research Institute, Shika, Zaria,

which is not a part of the study sample. The Cronbach’s Alpha coefficient indicated the following: Current Awareness Services (CAS) = 0.771, Selective Dissemination Services (SDI) = 0.728, Internet Services (IS) = 0.742, Inter-library loan Services = 0.727, Reference Services (RS) = 0.733, Circulation Services = 0.887 and Constraint of Library and Information Services Delivery on researchers’ scholarly communication outputs = 0.782. This indicated that the instruments was reliable and therefore, appropriate for further analysis.

3.1.4 Method of Data Analysis

Descriptive statistics, specifically mean and standard deviation were calculated. The following presentation of the descriptive result of the analysis of the questionnaires was as follows: 1.00 – 1.49 means “Very Low Extent (VLE)”, 1.50 – 2.49 means “Low Extent (LE)”, 2.50 – 3.49 means “High Extent (HE)” and 3.50 – 4.00 means “Very High Extent (VHE)”. The calculated mean scores were compared to the specifications to enable the researcher to determine the extent to which CAS, SDI, IS, ILLS, RS and CS are provided by the Agricultural Research Institutes Libraries to researchers in North Central Nigeria. The same criteria was also used to evaluate the level of constraints militating against the utilization of library and information service delivery by researchers’ in agricultural research institutes in North Central Nigeria.

4.1 RESULTS

The study was carried out to answer two research questions. The first research question sought to evaluate the extent to which CAS, SDI, IS, ILLS, RS and CS are provided by the Agricultural Research Institutes Libraries to researchers in North Central Nigeria while the second research question sought to understand the constraints militating against the utilization of library and information service delivery by researchers’ in agricultural research institutes in North Central Nigeria. This section presents the findings of the study.

4.1.1 Research Question One

This research question sought to find out the extent to which library and information services are provided for agricultural researchers by the agricultural research institute libraries in North Central Nigeria. Table 1a to Table 1f, which shows the mean and standard deviation scores for each question captures the responses by the respondents representing library and information service delivery provided by agricultural research institutes in North Central Nigeria. Table 1g captures the summary of the findings in form of the cluster mean and standard deviation. The Table 1g presents the overall perceptions by the respondents regarding the extent to which library and information services are provided for agricultural researchers by the agricultural research institutions in North Central Nigeria.

To what extent is Current Awareness Services (CAS) provided by the Agricultural Research Institutes Libraries to researchers in North Central Nigeria?

With respect to Current Awareness Services (CAS) provided by agricultural research institute libraries, the respondents indicated high extent provision of all the aspects of CAS listed (see Table 1a). The sub-dimensions of CAS as defined by this study are five, with newspaper filtering services and books and journal alerting services having the highest mean score of 3.25 with SD of 0.96 and 0.50 respectively, followed by journal table of content services 3.00 (SD of 0.82), display/exhibition of important materials 2.75 (SD of 0.96), and creation of awareness of current library holdings having the least mean score of 2.50 (SD of 0.29). The cluster mean and standard deviation values as reported by the respondents on the provision of CAS was 2.95, SD 0.71 implying that indeed CAS has a high extent provision in agricultural research institutes in North Central Nigeria.

Table-1a: Extent to which Current Awareness Services (CAS) is provided by ARI Libraries to Researchers in North Central Nigeria

CAS	Mean	SD	Remarks
Newspaper filtering services	3.25	.96	HE
Books and journals alerting services	3.25	.50	HE
Journal table of content services	3.00	.82	HE
Display/exhibition of important materials	2.75	.96	HE
Creation of awareness of current library holdings	2.50	.29	HE
Cluster Mean and Standard Deviation	2.95	.71	HE

VHE: Very High Extent; HE: High Extent; LE: Low Extent; NE: No Extent

To what extent is Selective Dissemination of Information (SDI) provided by the Agricultural Research Institutes Libraries to researchers in North Central Nigeria?

With respect to the responses regarding Selective Dissemination of Information (SDI), there is high extent provision of SDI in agricultural research institutes in North Central Nigeria. This is indicated by an overall mean and standard deviation of 2.75 and 0.62. As regarding the sub-dimensions of the SDI, sending bibliographical list of publication relevant to users’ needs ranks higher with a mean score of 3.25 (SD of 0.96), followed by matching of

relevant information with users' research interest and abstracting and indexing services both ranking next with the mean score of 2.75 each with SD of 0.56 and 0.96 respectively. Routing of print information in users' field of specialization and users' research interest update services ranks last with the mean score of 2.50 each with SD of 0.34 and 0.29 respectively. This implies that the respondents consider all the sub-dimensions of SDI as having high extent provision. Table 1b shows the result.

Table-1b: Extent to which Selective Dissemination of Information (SDI) service is provided by ARI Libraries to Researchers in North Central Nigeria

SDI	Mean	SD	Remarks
Sending bibliographical list of publication relevant to user's needs	3.25	.96	HE
Matching of relevant information with users research interest	2.75	.56	HE
Abstracting and indexing services	2.75	.96	HE
Routing of print information in users field of specialization	2.50	.34	HE
Users research interest update services	2.50	.29	HE
Cluster Mean and Standard Deviation	2.75	.62	HE

VHE: Very High Extent; HE: High Extent; LE: Low Extent; NE: No Extent

To what extent is Internet Services (IS) provided by the Agricultural Research Institutes Libraries to researchers in North Central Nigeria?

Table 1c shows the mean scores and standard deviation of the extent of provision of Internet Services in ARIs in North Central Nigeria. The respondents exhibited high extent of provision of four (4) out of six (6) internet services listed. They include recall and precision of information from the systems having the highest mean score of 3.25 (SD of 0.50), followed by browsing professional publications and provision/use of search engines mean score of 3.00 (SD of 0.41 and 0.82) respectively and website updates notification services 2.75 (SD of 0.26). However, access to e-journal/book subscription required by users had mean score of 2.25 (SD of 0.60) and conducting saved searches in preferred databases 1.75 (SD of 0.50) both indicating low extent going by the limits defined in this study. This implies that even though all the internet services listed are provided in the libraries, only four (4) services are highly provided. The cluster mean scores as reported indicate that ARI libraries in North Central Nigeria to a high extent provide internet services (IS) to their researchers with a value of 2.67 (SD of 0.62), which is within the limit that will be considered high extent.

Table-1c: Extent to which Internet Services (IS) are provided by ARI Libraries to researchers in North Central Nigeria

Internet Services (IS)	Mean	SD	Remarks
Recall and precision of information from the systems	3.25	.50	HE
Browsing professional publications	3.00	.41	HE
Provision/use of search engines	3.00	.82	HE
Website updates notification services	2.75	.26	HE
Access to e-journal/book subscription required by users	2.25	.60	LE
Conducting saved searches in preferred databases	1.75	.50	LE
Cluster Mean and Standard Deviation	2.67	.62	HE

VHE: Very High Extent; HE: High Extent; LE: Low Extent; NE: No Extent

To what extent is Inter-Library Loan Services (ILLS) provided by the Agricultural Research Institutes Libraries to researchers in North Central Nigeria?

Table 1d shows the mean scores and standard deviation for the Inter-Library Loan Service (ILLS) constructs. Among the constructs, four (4) out of five (5) are highly provided. The mean scores for the four services ranged from 2.00 – 3.50 and the standard deviations ranged from 0.26 – 0.96 which all falls within the limits of high extent. They include: document delivery service having the highest mean score of 3.50 (SD of 0.58). Notification of available services and inter-lending services both have a mean score of 2.75 with SD of 0.96 and 0.26 respectively, obtaining materials not held by the libraries but are needed for research mean score of 2.50 (SD of 0.73). However, only provision of global library services to local patrons indicates low extent provision with a mean score of 2.00 (SD of 0.41). The cluster mean scores for provision to researchers in agricultural research institutes, North Central Nigeria as reported by the respondents indicated a high extent mean scores of 2.70, SD 0.59. The general implication is that, ILLS are to a high extent provided to researchers in agricultural research institutes in North Central Nigeria.

Table-1d: Extent to which Inter-Library Loan Services (ILLS) are provided by ARI Libraries to Researchers in North Central Nigeria

Inter-Library Loan Services (ILLS)	Mean	SD	Remarks
Document delivery services	3.50	.58	HE
Notification of available services	2.75	.96	HE
Inter-lending services	2.75	.26	HE
Obtaining materials not held by the libraries but are needed for research	2.50	.73	HE
Providing global library services to local patrons	2.00	.41	LE
Cluster Mean and Standard Deviation	2.70	.59	HE

VHE: Very High Extent; HE: High Extent; LE: Low Extent; NE: No Extent

To what extent is Reference Services (RS) provided by the Agricultural Research Institutes Libraries to researchers in North Central Nigeria?

Table 1e shows the mean scores and standard deviation on each of the items of Reference Service provision in agricultural research institutes libraries in North Central Nigeria. This study defines reference services (RS) as consisting of five items. Respondents indicated high extent provision of four (4) out of five (5) items listed. The mean score for provision of brief and factual answers to questions that can easily be located was 3.00 (SD of 0.82), assistance in identifying library materials needed to answer questions 3.00 (SD of 0.41), provision of reference services via the telephone 2.50 (SD of 0.54) and assistance provided by reference librarians at information/reference desk 2.50 (SD of 0.29). Only email reference service had a low mean score of 1.75 (SD of 0.96). Regardless, RS have a cluster mean score of 2.55, SD 0.60, indicating high extent of provision of reference services by agricultural research institutes libraries to researchers in North Central Nigeria.

Table-1e: Extent to which Reference Services (RS) are provided by ARI Libraries to Researchers in North Central Nigeria

Reference Services (RS)	Mean	SD	Remarks
Providing brief and factual answers to questions that can easily be located	3.00	.82	HE
Assistance in identifying library materials needed to answer questions	3.00	.41	HE
Provision of reference services via the telephone	2.50	.54	HE
Assistance provided by reference librarians at information/reference desk	2.50	.29	HE
E-mail reference services	1.75	.96	LE
Cluster Mean and Standard Deviation	2.55	.60	HE

VHE: Very High Extent; HE: High Extent; LE: Low Extent; NE: No Extent

To what extent is Circulation Services (CS) provided by the Agricultural Research Institutes Libraries to researchers in North Central Nigeria?

Table 1f above shows the mean scores and standard deviation for all the items of Circulation Services (CS) as provided by agricultural research institutes in North Central Nigeria. Out of five items of the services provided, two (2) are indicated by the respondents as very high extent. They include assistance/instructions in the use of library 3.50 (SD 0.44) and overdue recall fines charged to users with a mean score of 3.50 (SD 0.58). The remaining three (3) items, lending process had mean score of 3.25 (SD of 0.50), shelf arrangement of books and journals 2.75 (SD of 0.26) and opening period of the library 2.50 (SD of 0.29) were indicated high extent. The overall mean scores and standard deviation for CS is 3.10 (SD 0.41) indicating high extent in the provision of circulation services to researchers in agricultural research institute in North Central Nigeria.

Table-1f: Extent to which Circulation Services (CS) are provided by ARI Libraries to Researchers in North Central Nigeria

Circulation Services (CS)	Mean	SD	Remarks
Assistance/instructions in the use of library	3.50	.44	VHE
Overdue recall fines charged to users	3.50	.58	VHE
The lending processes (charging and discharging of books to users)	3.25	.50	HE
Shelf arrangement of books and journals	2.75	.26	HE
Opening period of the library	2.50	.29	HE
Cluster Mean and Standard Deviation	3.10	.41	HE

Key: VHE: Very High Extent; HE: High Extent; LE: Low Extent

Summary of findings: extent of provision of CAS, SDI, IS, ILLS, RS and CS

Table 1g shows the summary cluster means and standard deviations of the six libraries and information service delivery provided to researchers in Agricultural Research Institutes, North Central Nigeria. The entire cluster means for

the six service deliveries indicated high extent provision. They include CS 3.10 (SD of 0.58), CAS 2.95 (SD of 0.53), SDI 2.75 (SD of 0.41), ILLS 2.70 (SD of 0.90), IS 2.67 (SD of 0.49) and RS 2.55 (SD of 0.84). Therefore, the average cluster means and standard deviations of CAS, SDI, IS, ILLS, RS and CS is 2.79 and SD 0.75 which fall within the range of “high extent”. It can therefore, be safely concluded that Agricultural Research Institutes libraries in North-Central Nigeria to a high extent provide the six library and information service deliveries (CAS, SDI, IS, ILLS, RS and CS) to their researchers.

Table-1g: Cluster Means and Standard Deviations of Library and Information Service Delivery provided to Researchers in ARIs in North Central Nigeria

Library and information service delivery	Mean	SD	Remarks
Current Awareness Services (CAS)	2.95	.53	HE
Selective Dissemination of Information (SDI)	2.75	.41	HE
Internet Services (IS)	2.67	.49	HE
Inter-Library Loan Services (ILLs)	2.70	.90	HE
Reference Services (RS)	2.55	.84	HE
Circulation Services (CS)	3.10	.58	HE
Average Cluster Mean and Standard Deviation	2.79	.75	HE

VHE: Very High Extent; HE: High Extent; LE: Low Extent; NE: No Extent

4.1.2 Research Question Two

What are the constraints militating against the use of library and information service delivery by researchers’ in agricultural research institutes in North Central Nigeria

Research question two attempted to identify the constraints militating against the use of library and information service delivery by researchers in agricultural research institutes in North Central Nigeria. To expatiate, thirteen constraints are identified as militating against the researcher’s utilization of library and information service delivery in ARI libraries in North Central Nigeria. As shown in Table 2 indicates, the constraint with the highest mean score that is, the constraints most noted by researchers is slow internet connectivity with a mean value of 3.20 (SD of 0.93) followed by delay in service delivery 3.19 (SD of 0.89), inadequate knowledge of search technique 3.17 (SD of 0.85), difficulty to locate most appropriate information materials in the library 3.14 (SD of 0.78), un-cooperative attitude of library personnel, unawareness of library and information service delivery, and rigid library and information service delivery with mean score of 3.12 each and SD of 0.83, 0.82, 0.79 respectively.

In addition, the respondents indicated the following regarding: irregular library and information service provision 3.11 (SD of 0.79), time-consuming to retrieve needed information 3.08 (SD of 0.96), outdated library materials 3.07 (SD of 0.94), inadequate user education 3.06 (SD of 0.86), high recall rate but low precision of information retrieved 3.04 (SD of 0.86) and lastly, financial constraints with the least mean score of 3.02 (SD of 0.88). The result of the analysis therefore implies that, the respondents agree that the constraints influence negatively their scholarly communication outputs as shown by the composite mean and standard deviation of 3.11 (SD of 0.86). The mean score on each constraint defined in this study shows that researchers in agricultural research institutes in North Central Nigeria agree that the thirteen constraints identified influences negatively their scholarly communication outputs.

Table-2: Mean and Standard Deviation Values for Constraints Militating against the Utilization of Library and Information Service Delivery by Researchers in ARIs in North Central Nigeria

Constraints	Mean	SD	Remarks
Slow internet connectivity	3.20	.93	Agree
Delay in service delivery	3.19	.89	Agree
Inadequate knowledge of search technique	3.17	.85	Agree
Difficult to locate most appropriate information materials in the library	3.14	.78	Agree
Un-cooperative attitude of library personnel	3.12	.83	Agree
Unawareness of library and information service delivery	3.12	.82	Agree
Rigid library and information service delivery	3.12	.79	Agree
Irregular library and information service provision	3.11	.79	Agree
Time-consuming to retrieve needed information	3.08	.96	Agree
Outdated library materials	3.07	.94	Agree
Inadequate user education	3.06	.86	Agree
High recall rate but low precision of information retrieved	3.04	.86	Agree
Financial constraints	3.02	.88	Agree
Composite Mean and Standard Deviation	3.11	.86	Agree

Key: SA: Strongly Agree; A: Agree; D: Disagree; SD: Strongly Disagree

5.1 DISCUSSIONS OF FINDINGS

5.1.1 Research Question One

Extent of provision of CAS, SDI, IS, ILLS, RS and CS to Researchers by Agricultural Research Institutes in North Central Nigeria.

Research question one sought to find out the extent to which CAS, SDI, IS, ILLS, RS and CS are provided to researchers by the Agricultural Research Institute Libraries in North Central Nigeria. The result indicated that items under CAS such as newspaper filtering services and books and journals alerting services have the highest mean scores. Others include journal table of content services, display/exhibition of important materials and creation of awareness of current library holdings (in rank order). The overall mean score or composite mean and standard deviation also had a high extent implying that indeed, respondents' consider that CAS has a high extent of provision in agricultural research institutes libraries in North Central Nigeria. This finding does not differ from that of Naqvi (2013) who reported that majority of the respondents expressed satisfaction with CAS provided by College of Business, Hospitality and Tourism Studies (CBHTS), Nasiriu Library at Fiji National University in India where 75% were satisfied with CAS provision. Besides this, Uganneya (2010) also reported a high level of CAS provision in agricultural research libraries in Nigeria where 60% of the respondents indicated that they were aware and use CAS in their research activities. Also noteworthy, is the findings which indicated that respondents in the University of Agriculture libraries and agricultural research institutes libraries differ in their satisfaction with CAS provision where 66.7% of the respondents in agricultural research institutes libraries appear to be more satisfied with CAS provision than those in Universities of Agriculture libraries in Nigeria.

As regards selective dissemination of information (SDI), there is a high extent in the provision of SDI in agricultural research institutes in North Central Nigeria. Sending bibliographical list of publication relevant to users' needs ranks highest, followed by matching of relevant information with users' research interest and abstracting and indexing services having the next highest rank while routing of print information in users' field of specialization and users' research interest update services ranking the least among the high service delivery provided. This implies that respondents consider all the sub-dimensions of SDI as having a high extent provision with the cluster mean and standard deviation of 2.75 (.62). These findings are in line with those of Uganneya *et al.* (2010) who investigated current awareness tools used in creating awareness on the existence of agricultural information for research activities in Nigeria and identified SDI provision with a mean score of 71% as the major key signal to current awareness tools. This result also agrees with earlier report of Ducas, Michaud-Oystryk and Speare (2020) and Momoh and Folorunsho (2019) who emphasized that librarians are now beginning to rise from their slumber as is obtainable in other service organization by providing personalized information service delivery for researcher's satisfaction and retention, which is the thrust of SDI service. No wonder, the respondents in this study agree that all the sub-dimensions of SDI have a high extent provision in the libraries.

With respect to internet service provision, the respondents indicated high extent provision of all the sub-dimensions. Among the items of IS provision, recall and precision of information from the systems ranks higher followed by browsing professional publications and provision/use of search engines, then website updates notification services. However, access to e-journal/book subscription required by users and saved searches in preferred databases has the least mean scores. This finding agrees with Okiki (2013) who reported in a study on availability of information resources and services for research output that the internet is the three most available information services provided for research output. On the other hand, Uganneya (2010) indicated that both Universities of Agriculture and Agricultural Research Institutes found internet service provision to be dissatisfactory. The author attributed this to high cost of internet service, inadequate search engines, slow processing of data, among others.

Inter-Library Loan Services (ILLs) as reported by the respondents indicate a high extent of provision. Document delivery services ranks higher, followed by notification of available services, inter-lending services and obtaining materials not held by the libraries but are needed for research. However, provision of global library services to local patrons indicates low extent. Generally, ILLs has a high extent of provision by agricultural research institute libraries in North Central Nigeria. This finding compares favorably with the findings of Naidu and Gunjah (2001) who disclosed that generally, the agricultural research libraries have established good relations with each other through ILLs. They showed that the most popular document lent were books through document delivery services. In his submission, Yang (2004) reported that ILLs was overwhelmingly well received and appreciated at Edoes Texas A & M University. He concluded that majority of the respondents were satisfied with the provision and turnaround time of document delivery.

For reference services (RS), only e-mail reference services ranks low extent. The most highly ranked RS are provision of brief and factual answers to questions that can easily be located and assistance in identifying library materials needed to answer question, followed by provision of reference services via the telephone and assistance

provided by reference librarians at information/reference desk. Regardless, RS have a high extent of provision by agricultural research institute libraries in North Central Nigeria. This finding agrees with Uganneya *et al.* (2012) that reference services are highly provided in agricultural research libraries in Nigeria. According to them, personal contact service had a high mean of provision followed by timeliness of reference services and assistance of reference librarians. Similarly, Oyelekan and Iyortsuun (2010) reported that assistance to users ranked as the best services provided in the libraries studied. Comparatively, Dauda and Shehu (2014) unveiled that staff had a higher rating of the availability of library and information services provided in the libraries than users. This is clearly evident in the provision of RS where majority of the staff agreed to their provision against the users.

Two items in the circulation service provision cluster ranked very high extent: assistance/instructions in the use of library and overdue recall fines charged to users. However, lending process has the next highest rank, followed by shelf arrangement of books and journals with opening period of the library having the least rank. Overall, CS also has a high extent of provision by agricultural research institutes in North Central Nigeria. This finding does not differ from that of Okonedo, Popoola, Emmanuel and Bamgboye (2015) who found that CS are highly provided on a regular basis by agricultural research institute libraries in Nigeria.

5.1.2 Research Question Two

Research question two sought to evaluate the constraints militating against the use of library and information service delivery by researchers' in agricultural research institutes in North Central Nigeria. The result of the analysis therefore implies that, the respondents agree that the constraints influence negatively their scholarly communication outputs as shown by the composite mean and standard deviation of 3.11 (SD of 0.86). The mean score on each constraint defined in this study shows that researchers in agricultural research institutes in North Central Nigeria agree that the thirteen constraints identified influences negatively their scholarly communication outputs. These findings are in line with those of Adedoyin (2005), Onwubiko (2021) and Ameh, Ukwuoma and Oye (2021) who showed that slow Internet speed, unsuitable library software, network failure and limited number of computers are major constraints' militating against researchers' use of library and information services in educational institutions in Nigeria. Rheo *et al.* (2010) also disclosed that insufficient funding, unreliable power supply, low bandwidth, lack of skilled staff and inadequate computer stations are major challenges facing agricultural research institutes libraries in Nigeria. These he said hinders effective delivery of required information to users.

Also, that slow Internet connectivity, delay in service delivery, uncooperative attitude of library personnel, rigid library and information service delivery, outdated materials among others are constraints faced by researchers' in agricultural research institutes is not surprising since inadequate funding has been a perennial problem common in educational institutions especially agricultural research institutes in North Central Nigeria. This is why Idachaba (2000) reported that when agricultural information (library and information) are poorly funded, agricultural technologies cannot be improved and consequently, there will be no or slow growth in agricultural research productivity thereby resulting in no or low scholarly communication outputs generally in Nigeria. Addressing the identified constraints to the utilization of library and information service delivery by researchers in North Central Nigeria is critical to improving researcher's utilization of library and information services provided by various libraries to improve their scholarly communication outputs.

6.1 CONCLUSION AND RECOMMENDATIONS

This study is an attempt at determining whether the researcher's perceived utilization of library and information service delivery has an influence on their scholarly communication outputs. The study defined CAS, SDI, IS, ILLS, RS and CS as the constructs of library and information service delivery provided by agricultural research institutes in North Central Nigeria. When asked to rate their level of agreement with the provision/perceived utilization of the library and information service delivery by their libraries, the respondents in the agricultural research institutes libraries showed that CAS, SDI, IS, ILLS, RS and CS have a high extent of provision. Furthermore, the researchers identified that slow Internet connectivity has the most negative influence on researcher's scholarly communication outputs. Other constraints with the next greatest negative influence is delay in service delivery followed by inadequate knowledge of search technique, difficulty to locate most appropriate information materials in the library, un-cooperative attitude of library personnel, unawareness of library and information service delivery, rigid library and information service delivery, irregular library and information service provision, time-consuming to retrieve needed information, outdated library materials, inadequate user education, high recall rate but low precision of information retrieved and financial constraints in that order. It can therefore, be safely concluded that Agricultural Research Institutes libraries in North-Central Nigeria to a high extent provide the six library and information service deliveries (CAS, SDI, IS, ILLS, RS and CS) to their researchers. Based on the findings, this study proposes the following recommendations:

- 1) Agricultural Research Institutes Libraries in North Central Nigeria should intensify their efforts towards adequate provision of reference services (RS). They should also improve access to the services (RS) when provided so that the

researchers will be aware of their existence and access them effectively towards their research practices for enhanced scholarly communication outputs.

- 2) Agricultural research institute libraries in North Central Nigeria should focus more on the provision of selective dissemination of information (SDI) to researchers because it has the strongest effect on researcher's scholarly communication outputs.
- 3) Agricultural researchers in Agricultural Research Institutes in North Central Nigeria should be encouraged to utilize more of SDI services provided in their libraries. An increased utilization of them will mean better productivity of researchers' scholarly communication outputs.
- 4) Agricultural research institutes in North Central Nigeria should improve on their Internet service delivery. This entails improving access to e-journal/book subscription required by the researchers, recall and precision of various information from the computer system and provision/use of search engines among others. This would provide individual researchers and research teams with a productive work environment.
- 5) A viable inter-library loan services (ILLS) is necessary. Based on the findings of this study, ILLS has the least capacity of improving researcher's scholarly communication outputs. To provide viable and workable ILLS in the institute libraries studied, it is necessary to create awareness of the need for ILLS among Agricultural Research Institutes by the library administrators. More so, there is need for Agricultural Research Institutes libraries in North Central Nigeria to cooperate with other related established agricultural information service networks such as International Agricultural Information Service Network (IAISN) who render ILLS to agricultural member libraries in both developed and developing countries.
- 6) Agricultural research institute libraries in North Central Nigeria should organize workshops, seminars and other training sessions in order to enlighten and expose researchers and agricultural scientist to various library and information service delivery systems and the need to utilize them.
- 7) The library administration in corroboration with the Agricultural Research Institutes authorities should embark on occasional training sessions for academic staff especially agricultural researchers on information search techniques skills in order to enable the researchers have unlimited knowledge of search techniques to overcome their problems of not being able to access appropriate information materials in the library.

7.1 IMPLICATIONS OF THE FINDINGS

The findings of this study have some important educational implications as they relate to the delivery of library and information services to researchers in Agricultural Research Institutes in North Central Nigeria. Although the overall extent of library and information service provision by the Agricultural Research Institute Libraries in North Central Nigeria may be rated high by the respondents, the libraries still need to ensure that the few services that are less provided (such as conducting saved searches in preferred databases, providing global library services to local patrons and e-mail reference services) are up-graded. The implication of this is that researchers in Agricultural Research Institutes in North Central Nigeria will be denied access to global information and e-mail reference services, which is mostly facilitated through linking the agricultural research scientists to global agricultural subject specialists whose expertise may be useful and valuable for the advancement of their scholarly communication outputs.

The study also revealed that apart from the three services mentioned above with low extent provision, all the other sub-dimensions of library and information service delivery in the study have high extent of provision in Agricultural Research Institutes in North Central Nigeria, making the overall service delivery reliable. This implies that when the regularity and reliability of the services provided are assured, researcher's loyalty to the libraries will be guaranteed to enhance their scholarly communication outputs. It was also found that researchers in Agricultural Research Institutes in North Central Nigeria indicated that the utilization of CAS, SDI, IS, ILLS, RS and CS as dimensions of library and information service delivery has a great extent of increasing their scholarly communication outputs if adequately provided in the institute libraries.

The educational implication of this is that scholarly communication outputs of researchers in Agricultural Research Institutes in North Central Nigeria is tied to their utilization of CAS, SDI, IS, ILLS, RS and CS. If the respondents greatly utilize the services provided and if there is a strong positive and significant relationship between the utilization of all the service delivery and scholarly communication outputs, then it is expected that research interest of the researchers will increase invariably therefore increasing researchers' scholarly communication outputs, their individual visibility and that of their research institutes.

Finally, in terms of the constraints militating against the use of library and information service delivery, institute libraries will find themselves in a position whereby they cannot be able to deliver effectively and efficiently current and up-to-date information service to users either through print, manual or electronic formats, hence there is need for institute libraries to alleviate this challenges by way of improved provision of library services to enable researchers in improving their scholarly communication outputs in Agricultural Research Institutes in Nigeria in general and North Central in particular.

8.1 LIMITATIONS OF THE STUDY

Due to the constraints of time, other possible forms of library and information service delivery such as statistical data analysis, document delivery, referral services, CD-Rom database searching, indexing and abstracting services, photocopying services, etc., were not covered in this study. More so, like any other study where questionnaire is used in data collection, the objectivity of the respondents was always not guaranteed. This is because some of the respondents due to various reasons including their tight schedules ticked the questionnaires in a hurry or even failed to tick the questionnaire at all. This is the case with this study. Lastly, some of the agricultural scientists/researchers were said to be on different types of leaves (study leave, maternity leave, sick leave or sabbatical leave) and were not accessible to complete the questionnaire, therefore they were not included in this study.

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