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# Dissemination of Agricultural Research Findings for Development Through Digitization: The Case of Institute for Agricultural Research Library, Ahmadu Bello University Zaria

**By**

**Kasa, M. Gabriel and Nock, I. Grace,**
**Agricultural Library**
**Institute for Agricultural Research**
**Ahmadu Bello University, Zaria**

**Abstract**

This paper investigated how digitization can improve the dissemination of agricultural research findings to farmers and researchers for agricultural development. Data were collected using purposively sampling from 411 respondents of Agricultural Library of the Institute for Agricultural Research, Samaru. The respondents comprised of academic staff, technical staff and postgraduate students. The data were analysed using simple descriptive statistics. Subject areas were ranked based on the responses received in an order of 1 to 3. The result revealed that there was marked significance in the productivity of researchers who used IAR resources for theses writing, teaching, journals, learned proceedings, seminars and workshops. It was recommended that digitization is necessary to facilitate research, collaborations, serve as medium for resource exchange, while ensuring that duplication of research and funds are avoidable.

## INTRODUCTION

The Agricultural Library of the Institute for Agricultural Research, Ahmadu Bello University, Zaria is also a satellite library of the University Library Complex. It started with the inception of the institute in 1922. The institute was established with the mandate to improve agricultural products in quality and quantity, and to provide raw materials for agricultural industries as well as salvage the aggravated rate of increasing population which consequently vents demand on food (Momoh, 1979; Lawoe, 1983; Kasa, 2008).

### Agricultural Information Disseminating Methods and Techniques

Agricultural extension agents, farm walk, off-station research activities, trade fair, radio and television advertisements/agricultural enlightenment programmes, the research libraries, bill boards and recently the internet are the basic agricultural disseminating methods and their focuses represents the techniques they embarked upon to ensure agricultural development.

Numerous authors argued that the sure way to reaching the world is through digitization of resource materials (Urban, 2002; UNESCO, 2002; Kajberg and Lorring, 2005). This had earlier been stated in independent studies by Aina (1983) and John (1998) who reported on agricultural dissemination through two agricultural journals – Nigerian Agricultural Journal and Samaru Agricultural Newsletter. They conclusively reported that there was an up thrust of resources used by this sector in terms of journals and monographs; and when compared to other fields, agricultural science has the most prominent area of research in Nigeria and the world. Therefore, stirring the need and solutions to agricultural sustainability and food security.

### The Place of Institute for Agricultural Research Library in Dissemination of Information

One of the major aims of agricultural information dissemination is to increase knowledge (Gathegi, 1994). The Institute for Agricultural Research (IAR), Ahmadu Bello University, Zaria has been saddled with this responsibility. Momoh (1979) in a bi-study of IAR and VTH Vom, posited that the reasons for establishing agricultural research institutes are to conduct research that would improve production in quality and quantity of agricultural product. The IAR library according to Momoh (1979) is the only library with a large evolutionary trends of northern Nigeria agriculture and its food sufficiency.

The activities by scientists have not only led them to demand the numerous scientific records published and unpublished but have also

generated numerous publications about their own research (Anonymous, 1996).

Studies by Kashim Ibrahim Library (Bozimo, 2005/2006), University of Jos Library (Ndor, 2007), and Obafemi Awolowo University (Jagboro, 2007) all emphasizing the need for publicity of the numerous resource collections, and as the cardinal point of library services, they recommended digitization. Hazen *et al.* (1998) gave some imperative but critical factors in selecting and acquiring materials for digitization in libraries.

**Collection for Digitization**

Institute for Agricultural Research as presently organized is a literacy-based facility, therefore the use of her contents presumes literacy on the part of the user. Since the inception of the institute in 1922 has been contributing knowledge of research findings to agricultural development in areas as Agronomy, Crop Protection, Farming Systems, Extension, Animal Science, Plant Breeding, Plant Physiology, Soil Science, Agricultural Economics and Sociology.

Priority for digitization now in IAR are Samaru Miscellaneous Papers (Papers that are unlikely to be found in journals because of their local interest or length) which makes them probably more important because it will not ordinarily be found in any other information store. They may require proportionally more time and effort to locate and organize. Samaru Miscellaneous papers contain reports to governments, file reports, tour notes, station report and agricultural notebooks.

Tammaro (2006) gave what digital resources are and what services are available in a digitized library system. She argued that for any meaningful digitization a policy must be made that focuses on users' needs, expectations and skills. Table 1 shows digital resources and expected services.

Table 1: Digital resources and services available.

| Digital resources | Services |
|---|---|
| E-journals | OPAC |
| E-books | Remote access |
| Data bases | Portal/Site |
| CDROM | User education |
| Learning material | Promotion |
| Audiovisual and multimedia | Staff assistance |
| Dissertations and student's works | |

Source: Tammaro, 2006.

One of the major aims of agricultural information is to increase knowledge on all agricultural production (Gathegi, 1994). This is why Uganneya (2001) focuses on the location and dissemination processes that occur before, and up to the point where the information is passed to the farmers. To a great extent as noted by Idachaba (1996) the inability by the agricultural research system to disseminate information, is responsible to our agricultural under development.

Russell (1984) revealed agricultural user population and their information needs to be deterred by scarcity of documented evidence not readily and easily made accessible and available. This to some extent has caused the unnecessary duplications of research and waste of resources (Nzotta, 1985). The implication of the above statement was justified by Govert (1991), who asserted that there is lack of awareness among agricultural researchers of research activities conducted locally and internationally which is expected to serve as retrospectives to ongoing research and experimental activities.

It is clear that accessibility to agricultural information has a direct relationship to its functionalities. Tammaro (2006) was of the opinion that access functionalities is of two fold, viz; that functionalities differ from information retrieval which are based upon navigation, virtual space for collaboration, function links and form basis of collaboration with other cultural institutions (both formal and informal collaboration). The second fold sees access in light of the integration of digital collections with one access interface (and personalization) and lastly, the integration with the user (not only unidirectional communication).

Inspite of this, there are some constraints attributable to institutional policies and priorities for material digitization. IAR is placing high priority on the breakthroughs, she

has been able to achieve over the years and have now formed the basis for scientific and research development. Lancaster (1982) argued that many scientists in developing countries prefer to publish in foreign journals rather than in their native journals for the sake of prestige and recognition. Garfield (1983) agreed with Lancaster when he said that only 17 percent of Latin American research articles were published in local languages. On another plane, Alabi (1989) said that there has been tremendous growth in scientific activities in most of the Third World countries. Earlier, Saracevic (1977) also expressed similar sentiments when he said that the rate of scientific activities have been tripling in most developing countries compared to the doubling tempo in the developed countries. However, most scientists in the West are not aware of the research and publication productivity that goes on in the Third World countries. The main reason for this could be that scientists from some of these Third World countries fail to publish or share the results of their research in reputed international journals and on the web (Jacobs and Ingwersen, 2000). This is the case when research findings from IAR since 1922 are not accessed and assessed for agricultural development.

Dissemination of these findings has been a problem especially with globalization, which is why the Agricultural Library in her computerization efforts and activities is focused on complementing the institute's efforts by paying attention to the end-users' information needs and increasing access and preservation through digitization (Kasa, 2008).

**Statement of the Problem**

The library as the institute repository is challenged with the responsibility of communicating research findings in it custody. Prioritizing the dissemination of the institute's information resources remains a great concern considering the vast information collections and its proliferation in many subject areas.

Though, the resources are characterized as 95% print materials on paper and in organic forms thereby restricting remote access to physical presence in the institute and sometimes perpetual search without results. Digitization has all the required attributes that could facilitate dissemination through ensuring remote accessibility and availability of information resources at all times and as an improved technology conforming to globalization, it is expected to salvage the library's organic resources during preservation and storage. The directions and prospects of the institute's information dissemination for the development of agriculture for food sufficiency, security and sustainability cannot be compromised. This forms the study statement of the problem.

**Objectives of the Study**

The objectives of the study are to:

(i) assess the library services and how it affects the registration status of patrons;

(ii) examine patrons knowledge base of the library subject areas;

(iii) determine the use of IAR publications in national and international information resources;

(iv) determine the capabilities and skills of users during information search; and

(v) investigate the effect of digitization on the dissemination of IAR information resources for agricultural development in Nigeria.

## MATERIALS AND METHODS

**Area of the Study**

The research was conducted in the Agricultural Library, Institute for Agricultural Research, Ahmadu Bello University, Zaria. The library is always active throughout the nyoeiatr. It has a collection size of 37,233 books, 27,278 pamphlets, 3746 journal titles, 2086 Annual reports received, over 4570 indexed articles and inputted into information retrieval (Articles on Nigeria only) and this makes it one of the largest agricultural information resource centre's in Nigeria (Anonymous, 2007).

**Sampling Procedure**

Technical Staff, Postgraduate students and Academic staff registered with the library and are active by utilizing the library services formed the research population. Six hundred and sixty four patrons met the conditions but only 411 were sampled as minimum standard and whose response would facilitated meaningful recommendations and conclusion for policy making. Those sampled include technical staff, postgraduate students and academic staff, the total distribution of respondents are 54 technical staff, 245 postgraduate students and 112 academic staff respectively. Four hundred and eleven population sampled represents 61.89% of the total population of the library which stands at 968 when the research was undertaken.

**Analytical Technique**

A structured questionnaire was used for data gathering information from 411 sampled respondents. The analytical tool used was simple descriptive statistics, which involves measures of central tendency (frequency distribution and percentages). Subject areas with high patronage and the mandate of the institute were considered and ranked. The ranking is based on received responses using a scale of 1 to 3, where 1 represents the most prevailing subject areas covered, 2 representing moderately subject areas covered and 3 representing low/poor representations. This is pertinent for prioritizing items to be digitized.

**Definition of Terms**

Digitization refers to the process of translating a piece of information such as a text, sound recording, picture or video into bits (Akintunde, 2007). It enhances the visibility of a library/document globally through a variety of existing technologies.

Digitization may comprise all or any of the following steps:

**Creation:** This refers to the making of digital copies of analogue objects or the modification of original digital objects for purpose of dissemination;

**Dissemination:** The provision of mechanisms by which the target population of users can gain access to the digitized material in the collection; and

**Organization:** The provision of search tools and findings aids for the user to access the collection of digitized or conventional objects effectively.

## RESULTS AND DISCUSSIONS

**Distribution of Population and respondents according to their library registration status**

A total population of 411 were sampled which comprised of 112 academic staff, 54 technical staff and 245 postgraduate students for the study, only 100 or 43.9% of the academic staff responded to the questionnaire by indicating they are academic staff. Out of the 54 technical staff only 32 or 14% showed that were technical staff and out of the 245 postgraduate students only 96 or 42.1% responded (Table 2). This implies that academic staffs were the most involved with research and teaching and are therefore conscious of the information resources available as it emanates from the findings of the institute.

**Table 2:** Respondents according to Library registration status

| Respondent status | Surveyed population | Respondents | Percentage |
|---|---|---|---|
| Academic staff | 112 | 100 | 43.9 |
| Technical Staff | 54 | 32 | 14 |
| Postgraduate student | 245 | 96 | 42.1 |
| Total | 411 | 228 | 100 |

Table 2 shows that a total of 112 academic staff registered with the library, out of which 100 or 44% were sampled. A total of 54 technical staff registered with the library, only 32 of 14% were sampled. Finally, 245 postgraduate students registered with the library and 96 or 42.1% were sampled. The objective of the above demographic question is to see whether there is a correlation between the numerous registration status and utilization of the library resources. Within the context of this study, registration status is defined as whether a registered patron came in as an academic staff, technical staff or a postgraduate student.

**Sampled Respondents According to their subject area knowledge and utilization of the Library Collection for literary presentation**

Table 3 represents the response from patron on their knowledgeability of the different subject areas on which IAR had documented her agricultural research breakthroughs and contributions to the quality of on trials and farmers' fields. Table 3 shows distribution of responses according to utilization of the institute materials for literary presentation.

**Table 3:** Distribution of responses according to knowledge of subject areas documented by IAR.

| Subject area document | Respondents (n = 228) | Percentage |
|---|---|---|
| Agricultural Economics | 125 | 12.9 |
| Agricultural Engineering | 73 | 7.5 |
| Agronomy | 153 | 15.7 |
| Animal Science | 49 | 5.1 |
| Crop Protection | 200 | 20.5 |
| Plant Physiology | 51 | 5.3 |
| Plant Breeding | 56 | 5.8 |
| Sociology/Rural Development | 201 | 20.7 |
| Soil Science | 63 | 6.5 |
| Total | 971* | 100 |

*Multiple responses

The responses show that Sociology/Rural development has the highest response of knowledge represented by 20.7% saying they are aware of documented research findings and breakthroughs by IAR on the subject matter. Immediately following it is Crop Protection with 20.5%, followed by Agronomy with 15.7%. The least is Animal Science (5.1%). Others, include Agricultural Economics with 12.9%, Agricultural Engineering (7.5%), Plant Physiology (5.3%), Plant breeding (5.8%) and Soil Science (6.5%), respectively.

From the above findings, the library has witnessed tremendous contributions of literature as donations in the same trend. Therefore, it is believed that most of the respondents reviewed in this study visit and use the library to conduct their research and literature reviews with the hope of receiving enriched information, authenticate their findings and also build on the old knowledge.

**Table 4:** Distribution of responses according to the utilization of the institute materials for literary presentation.

| Areas of presentation | Response (n = 228) | Percentage |
|---|---|---|
| Peer reviewed journals | 180 | 22.6 |
| Proceedings | 103 | 12.9 |
| Seminars | 200 | 25 |
| Theses | 220 | 27.6 |
| Workshops | 95 | 11.9 |
| Total | 798 | 100 |

Table 4 shows that publications from IAR are utilized for literally presentation, majority i.e. 27.6% use the research finding in their theses, where as 25% used the findings for seminars, 22.6% utilized the materials for peer reviewed journals, 12.6% used the resources for learned proceedings and 11.9% use the findings for workshops. A possible explanation for this behaviour may be that the information got from these research findings are prerequisite to completing theses, seminar reporting, journal articles, proceedings and workshops. This also agrees with a study by Price (1986) who concluded that there is a relationship between the importance of scientific finding and the logarithm of the number of papers published. The result obtained shows that there is significant difference between the number of reference made from IAR research findings and therefore could be asserted that IAR publications are of great relevance to knowledge.

**Distribution of Respondents according to their knowledge of IAR Publications in National and International Information Resources**

Table 5 presents the response on knowledge and use of IAR publications in both national and international information resources. The response shows that 100% agreed that IAR resources where reported in the institute, national and international information sources and where consulted for their works. Majority, 48%, said they found theirs in the institute publications, whereas 11% said they have seen and used the publications in international publications. Forty one percent specified that they consulted the materials in national publications.

**Table 5:** Response according to knowledge of IAR publications in the institute, national and International information resources.

| Publication sources | Response | Percentage |
|---|---|---|
| International | 25 | 11 |
| National | 94 | 41 |
| Institute | 109 | 48 |
| Total | 228 | 100 |

The table above implies that publicity and dissemination practices are very low because 48% of the respondents said they have to be physically present in the institute to have access to the materials, it therefore calls for the globalization of the institute's resources through digitization which has greater benefits like remote access and serving larger audience at the same time. The acceptability of the results is a clear testimony of findings as reported in international and national publications, this means the institute stands a better chance of benefiting from grants and scholarships to advance their findings for the benefits of all.

**Respondents Capabilities and Skills during Search**

In Table 6 below, all respondents indicated they had used one or more of the itemized facilities to search for information. The electronic journals had the highest response of 45%, internet websites had 16%, online databases had 10.5%, library website 6.5%, electronic books had 12%, and finally email had 10%, respectively. The upsurge on the use of electronic journals is encouraging the digitization of the institute's research reports and serving as indications of awareness of the benefits and contributions the digitize information resources has for agricultural development. This has also simplified user education to points where assistance and trainings are specific to problems when patrons can not help themselves during information seeking behaviour as contrast to those revealed when assisting and training patrons using the manual catalogue.

**Table 6:** Response according to capability to use search facilities.

| Items used for searching | Response | Percentage |
|---|---|---|
| Online databases | 24 | 10.5 |
| Electronic journals | 103 | 45 |
| Internet websites | 37 | 16 |
| Electronic mail | 22 | 10 |
| Library website | 15 | 6.5 |
| Electronic books | 27 | 12 |
| Total | 228 | 100 |

**Platform Normally Used for Searching Information**

Majority of the respondents chose Google (60%), followed by Yahoo with 24%, while only 7% used the OPAC. The result is a true situation of the knowledge of users to library services. The low response on the use of OPAC may be because of the infancy of the service in the library as well as the institute. This calls for re-orientation of the users to the essence and benefits of the services now available because of the embarked digitization. Only 9 % said they are still comfortable using the library manual catalogue (Table 7).

**Table 7:** Response of respondents on the platform prefer and use to search for information.

| Platform used for information search | Response | Percentage |
|---|---|---|
| Google | 136 | 60 |
| Yahoo | 55 | 24 |
| OPAC | 16 | 7 |
| Others (catalogue) | 21 | 9 |
| Total | 228 | 100 |

**Improving IAR Information Dissemination Through Digitization**

The institute is both an academic and research institution. It rewards and recognizes achievements which also forms the basis for promotion and responsibilities in the institution and the University. But productivity is achieved through wide consultations and in achieving objective v, data received were further analysed using a conditionality standard as described and scaled in sampling procedure. Table 8 shows the ranking of the three most prevailing subject area.

**Table 8:** Analysis and ranking of responses according to knowledge of subject areas documented by IAR.

| Subject area document | Respondents (n = 228) | Percentage | Ranking |
|---|---|---|---|
| Agricultural Economics | 125 | 12.9 | 1 |
| Agricultural Engineering | 73 | 7.5 | 2 |
| Agronomy | 153 | 15.7 | 1 |
| Animal Science | 49 | 5.1 | 3 |
| Crop Protection | 200 | 20.5 | 1 |
| Plant Physiology | 51 | 5.3 | 3 |
| Plant Breeding | 56 | 5.8 | 3 |
| Sociology/Rural Development | 201 | 20.7 | 1 |
| Soil Science | 63 | 6.5 | 2 |
| Total | 971* | 100 | |

*Total number of response more than 228 was due to multiple responses

The table above shows that by grouping resource materials on Sociology/Rural Development, Agronomy and Crop Protection which have the highest percentage and ranking from responses received, implies that apart from considering them for digitization, it also indicate the productive levels of research that was done in the area for the benefit of the institute and farmers. The second grouping includes only Agricultural Engineering and Soil Science scored as moderately consulted subject areas and lastly ranked third are Animal Science, Plant Physiology and Plant Breeding. The policy on digitization could be based on this order, so that

digitizing group 1 first, followed by 2 and lastly group 3 representing low/poor representation.

Digitization improved services, increases access and has helped resolve elimination of duplication of research, waste of time and funds. This implies that, with digitization there is expectancy of more consultations and use, the tendency of improving previous research and conducting new ones are definite. Today, there no speculations on the number of researches that are duplicated. Digitization can show tracking and demand trend of numerous scientific record published and consulted in the course of research and dissemination of information and boost the publishing and report rates of research and agricultural development.

In line with the above findings on productivity, Price (1986) stated that there is a relationship between the importance of the scientists and the logarithm of the number of papers they have published during their life. Probing further into the activities of most of the respondents it revealed that there is a significant difference between the number papers published on these subject fields with high priority when compared to those with low priority. This indicates that, current and up-to-date patrons research and publish significantly more than those with a lower status. This agrees with the study conducted by Cooper *et al.* (1987) who reported that promotion was the driving force behind faculty research and publication, consequently helping to upgrade the faculty member in status and pay.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The findings obtained in this study showed that IAR research findings are directly related to most of research done on the northwest zone of Nigeria. The response from the population produced results which indicated marked significance in the productivity of researchers who used IAR resources. The results showed that these resources were used in theses writing, peered reviewed journals, and learned proceedings, seminars and workshops.

### Recommendations

1. It is recommended that the library should consult well with the academic staff before embarking on digitization. This is expected to facilitate that materials digitized are those on high demand and relevance because of the thin financial capability of the library.
2. The study recommends that the library should frequently organize a sensitization on the relevance of its subject groupings and rating because it informs its use in material selection and acquisition.
3. The study suggests that the parent institution should support the digitization of its resources through the library to increase publicity, contribute to knowledge and save time and funds in terms of duplication.
4. Teaching and learning skills and proficiency in navigating and acquiring information on different platform should be encouraged and taught.

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