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# RESEARCH PRODUCTIVITY AND DIGITAL LITERACY SKILLS AMONG RESEARCHERS IN AGRICULTURAL RESEARCH INSTITUTES (ARIs) IN OYO STATE, NIGERIA

***AKOUN, M., OGUNKEYEDE, A.N., OSALUSI, M.A. AND AGBENU, D.O.**
Forestry Research Institute of Nigeria Information and Documentation (Library)
*Corresponding author: m.akoun@yahoo.com

**Abstract**

*This study examined research productivity and digital literacy skills among researchers in Agricultural Research Institutes (ARIs) in Oyo State, Nigeria. A descriptive survey design was adopted. The study population comprised 322 researchers in four institutes: The Institute of Agricultural Research and Training (IAR&T), the National Horticultural Research Institute (NIHORT), the Forestry Research Institute of Nigeria (FRIN), and the Cocoa Research Institute of Nigeria (CRIN). Total enumeration of 322 was used, data were collected through a structured questionnaire. The reported results were summarised using frequencies, percentages, means, and standard deviations. In the research-productivity results, published articles in international journals recorded the highest reported mean (M = 3.23), followed by manuscripts accepted in peer-reviewed journals (M = 3.00) and capacity-building workshops or training programmes (M = 2.92, as listed in the table). Research-based grants received (M = 0.86), books or book chapters (M = 1.35), and development of new agricultural technologies, models, proposals, or products (M = 1.6474) recorded comparatively low means. For digital literacy, locating and selecting digital resources through internet sites and search strategies had the highest mean (M = 2.1987), while evaluating the credibility of online resources had the lowest (M = 1.6346). Collaboration through digital platforms and online discussion, media capture and editing, and ethical use of online materials were also comparatively weak areas. The findings point to a need for sustained digital skills development and stronger institutional support for research. The paper recommends targeted training in information evaluation, research collaboration, digital content creation, research ethics, and data analysis, alongside improved access to digital infrastructure and research support.*

**Keywords:** *Research productivity, Digital literacy skills, Agricultural research institutes, Researchers digital research competencies*

## Introduction

Agricultural research contributes to food security, climate resilience, sustainable natural-resource management, and improvements in agricultural productivity. In Nigeria, agricultural research institutes are expected to generate and disseminate scientific knowledge, technologies, and innovations that can support farmers, policymakers, extension personnel, and rural communities. In Oyo State, institutions

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including the Institute of Agricultural Research and Training (IAR&T), the National Horticultural Research Institute (NIHORT), the Forestry Research Institute of Nigeria (FRIN), and the Cocoa Research Institute of Nigeria (CRIN) undertake research relevant to crops, horticulture, forestry, and related areas. Their contribution depends in part on researchers' ability to produce credible evidence and communicate findings in forms that can inform practice and policy.

Research productivity is commonly understood through the scholarly and practical outputs generated by researchers over a defined period. These may include peer-reviewed journal articles, books and chapters, monographs, conference presentations, research grants, citations, technical reports, and technologies or products developed from research. Productivity is not solely a matter of counting publications: the value of research also depends on its quality, relevance, visibility, reproducibility, and potential contribution to social and economic development. Nevertheless, output indicators remain important for understanding the extent to which research activity is translated into documented scholarly and practical outcomes.

Research productivity can be affected by several interacting factors, including funding, workload, institutional expectations, access to information resources, collaboration, mentoring, and the availability of appropriate research infrastructure. Digital technologies increasingly mediate these conditions. Researchers use online databases to discover literature, digital tools to collect and analyse data, reference-management software to organise sources, collaborative platforms to work with colleagues, and online publishing and networking services to disseminate results. As a result, digital literacy is relevant not only to routine computer use but also to the quality and efficiency of contemporary research practice.

Digital literacy encompasses the knowledge and skills required to access, evaluate, manage, create, and communicate information through digital technologies. Ng (2012) presents digital literacy as involving technical, cognitive, and socio-emotional dimensions. In a research setting, these dimensions may include effective searching, critical evaluation of online sources, responsible use of information, digital communication, data analysis, content creation, and collaboration through online platforms. The ability to use a tool is not equivalent to the ability to judge the reliability of its outputs or apply it appropriately to a research problem; therefore, digital literacy development should address critical and ethical practices as well as technical proficiency.

Digital research practices are particularly relevant to agricultural research, where researchers may work with complex datasets, geospatial information, field observations, remote-sensing outputs, and technologies associated with precision agriculture. Digital tools can support analysis, knowledge exchange, and dissemination, but their potential depends on researchers' competencies and the infrastructure available to them. Poor connectivity, limited access to software or databases, insufficient training, and inadequate institutional support can restrict the effective use of digital technologies. Digital literacy should therefore be considered alongside the organisational

conditions that enable researchers to convert skills into research outputs.

Prior studies cited in the literature have considered research productivity in Nigerian research institutes and the relationship between digital or information literacy and scholarly output. For example, Simisaye and Popoola (2022) examined determinants of research productivity among academic staff in Nigerian research institutes, while Avwioroko and Ogbomo (2024) studied digital literacy and research productivity among university librarians in Delta and Edo States. Research on agricultural researchers has also considered computer self-efficacy and access to electronic resources. These studies provide useful context, but their populations, constructs, and settings do not fully substitute for a focused assessment of both research productivity and digital literacy skills among researchers across the four agricultural research institutes covered by the present study.

Izuogu *et al*. (2023), in their review of agricultural digitalisation in Nigeria, identified digital skills and the effective use of digital services as important requirements for successful digital transformation. The review also highlighted inadequate technical skills, poor infrastructure and the high cost of acquiring and maintaining digital technologies as challenges to digitalisation. Although the review focused broadly on agricultural digitalisation rather than the research productivity of scientists, its findings provide a useful basis for examining whether researchers in agricultural research institutes possess the digital competencies required to maximise the benefits of digital technologies in their scholarly activities. Ibrahim *et al*. (2025) considered e-resource literacy among agricultural researchers and extension personnel in North-Western Nigeria, while Avwioroko and Ogbomo (2024) examined digital literacy skills and research productivity among librarians in Delta and Edo States.

Abubakar *et al*. (2025) investigated the utilisation of electronic information resources and publication output among researchers in agricultural research institutes in Oyo State, using 217 respondents from four institutes. The study found that researchers used resources such as Access to Global Online Research in Agriculture (AGORA), Online Access to Research in the Environment (OARE) and the Essential Electronic Agricultural Library (TEEAL). It also reported a statistically significant relationship between electronic information resource utilisation and researchers' publications, although the correlation was weak ($r = .127$), ($p < .05$). This finding suggests that access to and utilisation of digital information resources may support scholarly publication, but the relatively weak relationship indicates that other factors may also contribute to research productivity.

Adeyeoye *et al*. (2026), in an article accepted for publication in the International Journal of Library and Information Science, examined computer self-efficacy and research productivity among 56 researchers in three selected agricultural research institutes in Ibadan, Oyo State. Their findings indicated high levels of computer self-efficacy and research productivity, as well as a significant positive relationship between the two variables. Although computer self-efficacy is related to digital literacy, the two concepts are not identical: self-efficacy concerns confidence in using

computers, whereas digital literacy encompasses a broader range of knowledge and practical competencies. Consequently, the study provides relevant local evidence while leaving room to investigate digital literacy skills more comprehensively.

Similarly, Oguntoye *et al*. (2026) examined digital literacy skills and research productivity among 202 librarians in public universities in South-West Nigeria. Their study reported a significant but moderate influence of digital literacy skills on research productivity ((R 2 = .215), (p < .05)). Although the study concerns academic librarians rather than agricultural researchers, it offers relevant evidence that digital literacy skills may contribute to scholarly output within Nigerian research and higher-education environments. Its findings also suggest that strengthening digital competencies should be accompanied by institutional support, including access to scholarly databases, research funding and opportunities for academic dissemination.

Against this background, this study describes the level of research productivity and the digital literacy skills reported by researchers in selected ARIs in Oyo State, Nigeria. Its value lies in identifying areas of relative strength and weakness that may inform professional development and institutional research-support strategies. Because the study uses a descriptive survey, its results are interpreted as descriptions of reported output and skill levels rather than evidence that digital literacy causes changes in research productivity.

***Statement of Problem***

Agricultural research institutes are expected to produce knowledge and innovations that respond to challenges such as food insecurity, changing climatic conditions, sustainable land and forest management, and agricultural development. Achieving these goals requires researchers to generate scholarly outputs and communicate findings effectively. Yet research productivity can be constrained by limited research funding, inadequate infrastructure, restricted access to scholarly resources, insufficient collaboration, and uneven opportunities for professional development. Digital literacy is increasingly important in this environment because research tasks from literature discovery and data analysis to scholarly communication depend on the effective and responsible use of digital tools. Although previous studies have examined research productivity, computer self-efficacy, information literacy, or digital literacy in related populations, evidence specific to researchers in agricultural research institutes in Oyo State remains limited in the literature reviewed for this paper. It is therefore useful to document the kinds of research outputs reported by these researchers and to identify the digital literacy skills in which they feel more or less competent. Such evidence can help institutes target training and support rather than assume that access to digital technology automatically translates into effective research practice. This study consequently examines the level of research productivity and the level of digital literacy skills among researchers in four ARIs in Oyo State, Nigeria.

***Objective of the study***

The main objective was to examine research productivity and digital literacy skills among researchers in Agricultural Research Institutes in Oyo State, Nigeria. The specific objectives were to:

Determine the level of research productivity among researchers in ARIs in Oyo State, Nigeria; and assess the level of digital literacy skills possessed by researchers in ARIs in Oyo State, Nigeria.

***Research Questions***

1. What is the level of research productivity among researchers in ARIs in Oyo State, Nigeria?
2. What level of digital literacy skills do researchers in ARIs in Oyo State, Nigeria, possess?

## Research Methodology

***Research Design***

The study adopted a descriptive survey research design. This design was suitable for collecting and summarising respondents' reports about their research outputs and digital literacy skills at the time of the survey. The study did not manipulate respondents' access to digital tools or establish a causal effect of digital literacy on productivity.

***Population of the Study***

The population comprised 322 researchers in four Agricultural Research Institutes in Oyo State, Nigeria. According to the nominal payroll records reported by the study, the distribution was as follows.

| S/N | **Agricultural Research Institute** | **Number of researchers** |
|---|---|---|
| 1 | Institute of Agricultural Research and Training (IAR&T) | 101 |
| 2 | National Horticultural Research Institute (NIHORT) | 99 |
| 3 | Forestry Research Institute of Nigeria (FRIN) | 106 |
| 4 | Cocoa Research Institute of Nigeria (CRIN) | 16 |
| | Total | 322 |

Source: Nominal payrolls of the Agricultural Research Institutes, as at December 2025.

***Sample Size and Sampling Technique***

Total enumeration was adopted. All 322 researchers in the population were included in the intended sample because the population was considered manageable. The manuscript reports the sample as 322. This aligns with the perspective of Farouqa, (2021who asserted that the use of the entire enumeration approach becomes necessary when the study's respondents are not excessively numerous and large.

***Research Instrument***

Data were collected using a structured questionnaire with two sections. Section A addressed research productivity, while Section B assessed digital literacy skills. The supplied manuscript does not provide details of the instrument's development, expert validation, pilot testing, or reliability assessment. These details should be added only if the procedures were actually conducted; they should not be reconstructed or assumed.

***Data Collection Procedure***

The questionnaire was administered by the researcher with assistance from colleagues (librarians) in the agricultural research institutes. These should be supplied where applicable to ensure transparent reporting. Three hundred and twenty –two (322) were distributed and returned also found useful for analysis

***Method of Data Analysis***

The data collected from respondents (researchers) using the questionnaire, and

analysed using descriptive statistics including tables and inferential statistics and it was subjected to simple frequency count and percentage.

## Results

### Research Question 1: What is the level of research productivity among researchers in Oyo State, Nigeria?

Table 2 presents the reported distribution of research outputs during the specified reference periods

| S/N | Research Productivity Indicator | 1–3 | 4–6 | 7 and above | Mean | SD |
|---|---|---|---|---|---|---|
| 1 | Research-based grants received in the last five years | 290 (92.9) | 20 (6.4) | 2 (0.6) | 0.86 | 0.29 |
| 2 | Monographs published in the last five years | 265 (84.9) | 38 (12.2) | 9 (2.9) | 1.71 | 0.40 |
| 3 | Published articles in international journals in the last five years | 216 (69.2) | 70 (22.4) | 26 (8.3) | 3.23 | 0.64 |
| 4 | Scholarly presentations at local, national, regional and international conferences in the last five years | 226 (72.4) | 69 (22.1) | 17 (5.4) | 2.62 | 0.58 |
| 5 | Manuscripts accepted for publication as research studies in peer-reviewed journals in the last five years | 209 (67.0) | 72 (23.1) | 31 (9.9) | 3.00 | 0.67 |
| 6 | Books or book chapters published in the last five years | 279 (89.4) | 24 (7.7) | 9 (2.9) | 1.35 | 0.42 |
| 7 | Manuscripts accepted as critiques, responses, comments, abstracts, book reviews and other publications | 240 (76.9) | 57 (18.3) | 15 (4.8) | 2.42 | 0.55 |
| 8 | Publications cited in existing published works in the last four years | 233 (74.7) | 51 (16.3) | 28 (9.0) | 2.81 | 0.64 |
| 9 | New agricultural technologies, models, proposals or products developed in the last five years | 268 (85.9) | 42 (13.5) | 2 (0.6) | 1.64 | 0.37 |
| 10 | Capacity-building workshops or training programmes organised/facilitated in the last five years | 220 (70.5) | 62 (19.9) | 30 (9.6) | 2.92 | 0.66 |

As shown in Table 2, the highest reported mean was for published articles in international journals (M = 3.23), followed by manuscripts accepted for publication in peer-reviewed journals (M = 3.00) and capacity-building workshops or training programmes (M = 2.92). Publications cited in existing works had a reported mean of 2.81, while scholarly presentations at conferences had a mean of 2.62. The mean for manuscripts accepted as critiques, responses, comments, abstracts, book reviews and other publications was 2.42. Lower reported means were recorded for monographs (M = 1.71), new agricultural technologies, models, proposals or products (M = 1.6474), and books or book chapters (M = 1.35). Research-based grants received recorded a mean of 0.86. These results indicate variation across types of output: journal publishing was comparatively prominent in the reported data, whereas book-length outputs, grants, and applied innovation outputs were less prominent.

**Research Question 2: What level of digital Literacy skills do research in ARIs in Oyo state possess?**

Table 3 presents respondents' ratings of their digital literacy skills across strategic, information and internet, operational, content-creation, and communication domains. The original category counts and percentages are retained.

| S/N | Digital literacy skill | VH (%) | H (%) | L (%) | VL (%) | Mean | SD |
|---|---|---|---|---|---|---|---|
| Strategic skills | | | | | | | |
| 1 | Analysing and interpreting data with digital tools such as Power BI, Tableau, R, Stata, Excel and SPSS | 10 (3.2) | 59 (18.9) | 172 (55.1) | 71 (22.8) | 2.0256 | .738 |
| 2 | Collaborating with peers using digital tools such as Microsoft Teams and Google Drive | 5 (1.6) | 40 (12.8) | 143 (45.8) | 124 (39.7) | 1.7628 | .731 |
| Information and internet skills | | | | | | | |
| 3 | Evaluating the credibility and trustworthiness of online resources before use | 7 (2.2) | 23 (7.4) | 131 (42.0) | 151 (48.4) | 1.6346 | .718 |
| 4 | Keeping up to date through Really Simple Syndication (RSS) feeds | 5 (1.6) | 50 (16.0) | 175 (56.1) | 82 (26.3) | 1.9295 | .695 |
| Operational skills | | | | | | | |
| 5 | Using internet sites and search strategies to locate and select digital resources for research | 24 (7.7) | 87 (27.9) | 128 (41.0) | 73 (23.4) | 2.1987 | .885 |
| 6 | Using other people's online work without committing plagiarism | — | 36 (11.5) | 152 (48.7) | 124 (39.7) | 1.7179 | .659 |
| Content-creation skills | | | | | | | |
| 7 | Using media-capture devices to record and edit podcasts or videos for learning and research | 5 (1.6) | 36 (11.5) | 148 (47.4) | 123 (39.4) | 1.7532 | .717 |
| 8 | Using digital tools to create artefacts such as presentations, videos, images, wikis and blogs | 5 (1.6) | 42 (13.5) | 182 (58.3) | 83 (26.6) | 1.9006 | .675 |
| Communication skills | | | | | | | |
| 9 | Engaging in online discussions and forums using Zoom, WhatsApp, Google Groups and similar platforms | 2 (0.6) | 44 (14.1) | 144 (46.2) | 122 (39.1) | 1.7628 | .709 |
| 10 | Communicating online in real time, sharing screens and responding to verbal and non-verbal cues | 13 (4.2) | 75 (24.0) | 124 (39.7) | 100 (32.1) | 2.0032 | .854 |

Key: VH = very high; H = high; L = low; VL = very low

The highest reported mean was for using internet sites and search strategies to locate and select digital resources for research (M = 2.1987). This was followed by analysing and interpreting data using digital tools (M = 2.0256), online communication in real time (M = 2.0032), and keeping up to date through RSS feeds (M = 1.9295). The reported means for creating digital artefacts (M = 1.9006), collaborating through digital platforms (M = 1.7628), engaging in online discussions (M = 1.7628), media capture and editing (M = 1.7532), and using online work ethically without plagiarism (M = 1.7179) were comparatively lower.

The lowest reported mean concerned evaluating the credibility and trustworthiness of online resources before use (M = 1.6346). This pattern suggests that respondents rated their information-search skills more highly than their critical evaluation skills. The findings also point to possible training needs in online collaboration, multimedia production, ethical information use, and critical assessment of digital sources. These are descriptive patterns in self-reported ratings and should not be interpreted as direct performance tests of respondents' actual proficiency.

## Discussion

### *Research Productivity Among Researchers*

The findings of the present study indicate that research productivity varied across the different categories of scholarly and applied research outputs. International journal articles recorded the highest reported mean of (3.23) while peer-reviewed manuscripts and capacity-building activities were also among the higher-scoring items mean of (3.00). Conversely, books and book chapters, monographs, research-based grants, mean of (2.42) and the development of new agricultural technologies or products recorded lower means (1.64). This pattern suggests that journal-oriented scholarly communication may be more prominent than certain long-form publications, grant-related activities and technology-development outputs among the respondents. The pattern of findings is consistent with the broader evidence reported by Simisaye (2020), who investigated the research productivity of academic staff in research institutes in South-West Nigeria. The study reported that journal articles constituted the largest category of research output, accounting for 22.6% of the publications examined, followed by conference proceedings at 15.3%. It also identified financial constraints, inadequate information access, insufficient information literacy and inadequate employer motivation among the factors hindering research productivity. Further corroboration is provided by Adeyeoye *et al*. (2026), who examined computer self-efficacy and research productivity among 56 researchers in three agricultural research institutes in Ibadan, Oyo State. Their findings indicated high levels of computer self-efficacy and research productivity and a significant positive relationship between the two variables.

### *Digital Literacy Skills Among Researchers*

The findings on digital literacy skills reveal variation across the competencies assessed. The highest mean of (2.19) was recorded for finding and selecting digital resources, whereas evaluating the credibility of online information recorded the lowest mean of (1.63). This result indicates a possible difference between researchers' ability to retrieve information

and their ability to assess its quality and suitability for scholarly use. Effective digital research requires more than locating information; it also requires evaluating the authority of sources, checking the currency and relevance of evidence, recognising potential bias and determining whether information is sufficiently reliable for research purposes. The result is consistent with the findings of Ibrahim *et al*. (2025), who examined electronic-resource literacy among agricultural researchers and extension personnel in North-West Nigeria. Their study considered competencies involving computer use, electronic resources and agricultural mobile applications, and highlighted differences in digital-resource skills between agricultural researchers and extension personnel. The authors recommended targeted training, improved information and communication technology infrastructure, and supportive institutional policies to strengthen electronic-resource use. Avwioroko and Ogbomo (2024), who investigated digital literacy skills and research productivity among 130 librarians in university libraries in Delta and Edo States, Nigeria. Their study found that librarians possessed high levels of digital skills and information-retrieval skills, while their overall research productivity was low. The researchers also reported significant relationships between digital skills, information-retrieval skills and research productivity. Similarly, Wagwu *et al*. (2024) investigated information literacy skills and research productivity among 60 academic librarians across Nigeria's six geopolitical zones. They reported a positive influence of information literacy skills on research productivity and identified limited time for skills development and inadequate management support among the challenges affecting information-literacy development.

***Intergraded Interpretation of Research Productivity and Digital Literacy***

Taken together, the findings provide a useful descriptive account of research productivity and digital literacy skills among researchers in agricultural research institutes in Oyo State. The comparatively high rating for international journal articles, alongside lower ratings for some other research outputs, suggests that scholarly productivity is not uniform across output categories. Similarly, the variation in digital literacy ratings indicates that researchers' competencies are not necessarily equally developed across different digital tasks. These findings are relevant to Adeyeoye *et al*. (2026), who reported a significant positive relationship between computer self-efficacy and research productivity among agricultural researchers in Ibadan, and Avwioroko and Ogbomo (2024), who found significant relationships between librarians' digital skills, information-retrieval skills and research productivity.

## Conclusion

This study described research productivity and digital literacy skills among researchers in four Agricultural Research Institutes in Oyo State, Nigeria. The reported productivity indicators varied, with international journal articles recording the highest mean and research-based grants, books or book chapters, and applied innovation outputs recording lower means. Digital literacy ratings were strongest for locating and selecting digital resources and weakest for evaluating the credibility of online information. Collaboration, online discussion, media creation, and ethical use of digital material

were also identified as areas for improvement.

The findings suggest that strengthening research performance requires attention to both individual competencies and the conditions in which researchers work. Digital literacy is relevant to contemporary research, but the descriptive design does not establish a causal relationship between skills and productivity. Institutional investment in training, digital infrastructure, research funding support, mentorship, and collaborative research systems may help researchers use digital technologies more effectively and disseminate research outputs.

**Recommendations**

1. ARIs should provide regular, practical digital literacy training that prioritises evaluating online information, ethical use and attribution of sources, digital collaboration, multimedia content creation, and research-data analysis.
2. Institutes should improve researchers' access to reliable internet connectivity, relevant scholarly databases, reference-management tools, data-analysis software, repositories, and collaborative platforms. Where possible, open-source alternatives and shared institutional licences can be considered.
3. Research management units should strengthen support for grant identification, proposal writing, budgeting, partnership development, and reporting, given the comparatively low reported mean for research-based grants.
4. Institutes should provide mentorship, collaborative writing opportunities, and appropriate institutional recognition for diverse outputs, including peer-reviewed articles, books and chapters, technical outputs, and research-based agricultural innovations.
5. Future studies should investigate the association between specific digital literacy competencies and different categories of research output using clearly specified measures and suitable inferential analyses. Such studies should also consider access to funding, infrastructure, workload, research experience, and institutional support.

**Limitation of the Study**

The study is limited to researchers in four agricultural research institutes in Oyo State and may not represent researchers in other Nigerian states or other types of research institutions. The questionnaire measured reported skills and outputs; the supplied manuscript does not indicate that skills were independently assessed or publication records verified. In addition, the study is descriptive and does not test causal effects or the statistical association between digital literacy and research productivity.

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