

# Information Needs and Challenges of Agricultural Researchers and Extension Workers in Edo State, Nigeria

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**Abstract.** This study investigated information needs and challenges of agricultural researchers and extension workers in Edo State, Nigeria. Proportionate sampling technique was used to select 106 respondents. Descriptive and inferential statistics were used to analyse the data. The majority (71.6 %) of respondents indicated their need for information with respect to climate change and adaptation measures (71.6 %). Extension workers communicated more with agricultural researchers monthly (77.5 %). Lack of office-wide internet connectivity ( $2.06 \pm 1.08$ ), unstable power supply ( $2.05 \pm 1.07$ ), and non-subscription to relevant online resources by employer ( $2.05 \pm 1.07$ ) inhibited respondents from meeting their information needs. The study recommends that Edo State ministry of agriculture and the management of the research institutes, should improve ICT infrastructure in their establishments in order to enhance access to e-resources by staff.

**Keywords:** agricultural communication; agricultural extension; agricultural researchers; extension workers; information needs.

## INTRODUCTION

For rapid growth and development in any nation's agricultural sector, a basic stock of usable information is necessary. Adequate information is key to enhancing knowledge. Thus, research institutes and extension organizations play vital roles in helping farming communities/farmers' access to accurate information. They help to provide information that would facilitate supply and distribution of modern inputs like fertilizer, improved seeds, effective adoption of new production techniques and development of small-scale irrigation, conservation of natural resources and environment, decision making on markets, prices, and methods of conserving water, soil and vegetable resources [7]. To achieve the aforementioned, research institutes and extension organizations engage researchers and extension workers as intermediaries.

Researchers and extension workers have to be well informed and up-to-date with relevant information to meet their information needs and those of their clientele. This makes their need for information and collaboration inevitable. Expec-

tations are that much of this information sought for, acquired, and processed should be disseminated through various media (television, radio, magazines, newspapers, and outreaches) to the farmers. This means, when the information needs of researchers and extension workers are met, their clientele (farmers) benefit greatly. However, the information needs of researchers and extension workers are barely met; hence the overall benefits expected to accrue to their clientele are not met, and where attempts are made, they are inadequate [19]. A number of factors could be responsible for these inadequacies such as: lack of financial resources<sup>1</sup> to acquire and access relevant information, inadequate ICT/online resources, incompetence to operate and use available ICT/online resources to get relevant information by researchers/extension workers, acute shortages of well-trained scientists, lack of farmer feedback to ensure relevance of research results, lack of access to external sources of knowledge, inadequate research facilities and equipment, low staff morale, and inadequate operating budgets, staff incentives, and remuneration [9, 17].

Furthermore, lack of close working rapport between national agricultural research and extension organizations, and with different categories of farmer organizations, is one of the difficult institutional problems confronting ministries of agriculture in many developing countries [18]. Author [2] posits that if the barriers between two systems are permeable enough for messages and responses to flow out of each to the other, then a link has been created between the two. From this viewpoint, research institutions and extension organizations are systems which are linked by information flow and feedback. The constraints which hinder linkage between the aforementioned, potentially affect effective administration of agriculture and the agricultural output of farmers, whereas effective links will allow farmers to enhance their output through the availability of farming innovations provided by research institutions and extension organizations. With this in mind, it is necessary to critically investigate the information needs and challenges of agricultural researchers and extension workers in Edo State, Nigeria.

Edo State is home to two research institutes headquarters (Nigeria Institute for Oil Palm Research and Rubber Research Institute of Nigeria), and a sub-station of Cocoa Research Institute which has its headquarters in Ibadan, Oyo State of Nigeria.

Nigeria Institute for Oil Palm Research (NIFOR), is an agricultural research institute located in Edo State, Southern Nigeria in the heart of the oil palm belt region. It is on latitude 06033'N and longitude 05037'E and on altitude 149.4 m [13]. The formal mandate of the Institute is to conduct research into the production and products of oil palm and other palms (coconut, raphia palm, date palm, and Shea butter) of economic importance and transfer its research findings to farmers.

Rubber Research Institute of Nigeria (RRIN) was established in 1961 at Iyanomo, Benin City, Edo State. RRIN is the only government agency in the country mandated to conduct research in the production and development of Natural Rubber (NR), Gum Arabic (GA) and other latex-producing plants of economic importance.

Cocoa Research Institute of Nigeria (CRIN) was established in Ibadan, Oyo State on 1st December, 1964 as a successor autonomous research organization to the Nigerian substation of the defunct West African Cocoa Research Institute

(WACRI) (Nigeria Statute, Act No. 6 of 1950). CRIN today has the mandate to conduct research on five crops, namely, Cocoa, Kola, Coffee, Cashew and Tea throughout the country. The Institute has established and sustains substations in six locations in which the mandate crops of the Institute can be economically cultivated. Uhonmora sub-station (Edo-State) caters for cocoa in marginal forest areas.

Furthermore, Edo State is divided into three agricultural zones as follows: Edo Central, Edo North, and Edo South. Edo Central Zone is divided into five extension blocks as follows: Esan Central, Esan West, Esan North-East, Esan South-East and Igueben. Edo North Zone comprises 6 extension blocks, namely: Owan West, Akoko-Edo, Etsako West, Etsako East, Owan East, and Etsako Central. Edo South Zone consists of seven (7) extension blocks namely, Oredo, Ovia South West, Ovia North East, Ikpoba-Okha, Egor, Uhumwode and Orhionwon. In all, there are a total of 18 extension blocks in the study area [15].

### Objectives of the Study

The overall purpose of the study was to ascertain the information needs and challenges of agricultural researchers and extension workers in Edo State, Nigeria. Specifically, the study sought to:

- ascertain the information needs of agricultural researchers and extension workers in Edo State;
- ascertain if agricultural researchers collaborate with extension workers in meeting their information needs;
- identify problems that inhibit agricultural researchers and extension workers' from meeting their information needs.

### Methodology

This study was carried out in Edo State, Nigeria. Edo State lies between longitude 06004'E and 06043'E, latitude 05044'N and 07034'N. It is bounded in the south by Delta State, in the west by Ondo State, in the north by Kogi State and in the east by Kogi and Anambra States. It occupies a land area of about 17,802 square kilometres (National Boundary Commission (NBC), 2007) with 180,000 farm families [15]. It has a population of about 3,218,332 (National Population Commission (NPC), 2006).

*Population and sampling procedure.* The population for the study comprised all research officers in research institutes in Edo State and all extension workers with Edo State agricultural development programme (ESADP). Proportionate sampling technique was used to select respondents. Thirty percent of the total number of research officers and extension workers were sampled with exception to CRIN-Uhonmora Sub-station where 100% was used. Thus, the total sample size for the study was one hundred and six (106) respondents (Table 1).

Table 1 – Sampling frame

No	Institute or organization	Number of research officers or extension workers**	Sample (30% of staff)
1	Nigerian Institute for Oil Palm Research (NIFOR)	134	41
2	Rubber Research Institute of Nigeria (RRIN)	79	24
3	Cocoa Research Institute of Nigeria (CRIN) - Uhonmora Sub-station	1	*1
4	Extension workers with ESADP (in the three agricultural zones)	132	40
Total		346	106

Notes: \*100%; \*\* Number of research officers and extension workers as at July, 2017.

Data for the study was collected using structured questionnaire. The questionnaire was used to elicit response from respondents in line with their information needs, collaboration between agricultural researchers and extension workers, problems inhibiting access to information and suggestions to ameliorate the challenges. A total of 106 questionnaires were administered. However, errors were identified in four of the questionnaires and they were discarded bringing down the total number of responses to 104.

*Measurement of variables.* To ascertain the information needs of respondents, they were asked to indicate the types of information they required, purposes for seeking the information they required, etc. Further questions were asked

with respect to who they consult first when in need of information and the sources of information they consult first when they needed information.

To ascertain if agricultural researchers collaborated with extension workers in meeting their information needs, respondents were asked how often they interacted with each other, the nature of problems they communicated among themselves, if they are satisfied with the way they communicate, and ways their communication can be improved if not satisfied.

To identify the problems inhibiting the respondents' access to information, a list of constraints was presented. A four-point Likert-type scale of extreme barrier (3), moderate barrier (2), somewhat a barrier (1), and not a barrier (0) was used to ascertain their perceived constraints. The values were added to obtain 6, which was further divided by 4 to obtain a mean value of 1.5. Any response option, whose mean value is  $\geq 1.5$  was regarded as a constraint hindering respondents' access to information. Any response option, whose mean is  $< 1.5$  was reported on the contrary. Strategies to address the problems in the areas mentioned were elicited from the respondents.

Data for the study was analysed using percentage, mean score, and standard deviation. The Statistical Product and Service Solutions (SPSS) Version 20 software package was used for analysis.

## RESULTS AND DISCUSSION

*Socio-economic characteristics.* The majority (87.3%) of the respondents were males while relatively few (12.7%) were females (Table 2). Also, a sizeable proportion (34.3%) of them were in the age bracket of 41 and 50 years with a mean age of 45 years. Also, 85.3 % of the respondents were married with 52.0 % having M.Sc./Ph.D. as their highest educational qualification. Furthermore, 82.4 % of the respondents were agricultural science inclined with less than half (48.0 %) working between 1 and 10 years in their place of work. The average year in service was 14 years.

The mean age of the respondents indicated that they are still in their economically productive age hence, may have the ability to synthesize information/instructions accessed from varied sources to meet their information needs. The findings further suggest a positive relationship

between age and marital status. With an average age of 45 years, most people should ideally be married and settled. It is also possible that married people in most cases, tend to be spared the unnecessary distractions that attend the lives of most single persons. This could help them focus better to achieve set objectives in their work-place.

In terms of academic attainment, respondents generally had relevant educational qualifications to work in their establishments. Higher level of education and professional qualification is a very good springboard for intake or access of information by researchers and extension workers. This is helpful for credible, efficient performance in agricultural research and extension service delivery. With an average work experience of 14 years, it could possibly mean respondents are young, growing on the job and may be more zealous in accessing resources to meet their information needs. This could as well help them reach out to farmers and colleagues more efficiently thus enhancing promotion opportunities (Table 2).

Table 2 – Socio-economic characteristics of respondents

Socio-economic characteristics	Percentage	Mean ( $\bar{x}$ )
Sex		
Male	87.3	
Female	12.7	
Age (years)		
≤ 30	4.9	
31–40	29.4	45
41–50	34.3	
51–60	27.5	
61 and above	3.9	
Marital status		
Single	12.7	
Married	85.3	
Widowed	1.0	
Separated	1.0	
Educational level		
OND/HND	12.7	
B.Sc.	35.3	20
Postgraduate	52.0	
Area of academic qualification		
Agricultural	82.4	
Non-Agricultural	17.6	
Occupational categories		
Agricultural researchers	60.8	
Agricultural extension workers	39.2	

Socio-economic characteristics	Percentage	Mean ( $\bar{x}$ )
Length of service		
1-10 years	48.0	
11-20 years	31.4	14
21-30 years	15.7	
31 and above	4.9	

*Information needs of agricultural researchers and extension workers.* The majority (71.6 %) of the respondents indicated their need for information with respect to climate change adaptation measures (71.6 %) and soil fertility improvement techniques (70.6 %). Also, 69.6% needed information bordering on crop production, crop storage (67.6 %), crop protection (66.7 %), climate change mitigation strategies (65.7%) and agricultural entrepreneurship (64.7 %). Furthermore, respondents needed information on broiler production (49.0 %), biotechnology (48.0 %), pig production (40.2 %) and bee-keeping (39.2 %).

A closer look at the disaggregated results presented in Table 3 below show that the extension workers were more in need of information than the researchers. Reasons for this may be for the sake of extension workers having to interface more frequently with farmers than the researchers. Extension workers' quest to meet the needs of farmers with recent innovations leave them no choice but to be in dare need of information regularly.

Climate change is a major threat to agricultural production especially due to its impact on crops and livestock. The recent adverse climate change events in Nigeria in terms of excessive rainfall, flooding and drought in the extreme north may not be unconnected with respondents drive to meet information deficiencies in this regard. According to [5, 8], an information need may arise when an individual recognises that his or her current state of knowledge is insufficient to cope with the task at hand, or to resolve conflicts, or to fill a void in some area of knowledge.

*Purpose of seeking information.* As seen in Table 4, most (77.5 %) of the respondents indicated that they required information to conduct research, assist researchers (67.6 %), for general awareness (63.7 %), assist extension workers (40.2 %) and 8.8 % when preparing feasibility report. Furthermore, agricultural researchers sought information to basically conduct research (93.5 %) while extension workers sought information to assist researchers (87.5 %), for general awareness (72.5 %) and to assist farmers (65.0 %).

Table 3 – Information needs of agricultural researchers and extension workers

Areas of information need	Agric. Researchers	Extension workers	Total, %
Climate change adaptation measures	59.7	90.0	71.6
Soil fertility improvement techniques	54.8	95.0	70.6
Crop production	59.7	85.0	69.6
Crop storage	56.5	85.0	67.6
Crop protection	53.2	87.5	66.7
Climate change mitigation strategies	53.2	85.0	65.7
Agricultural entrepreneurship	50.0	87.5	64.7
Land preparation operations	53.2	80.0	63.7
Agricultural program planning and evaluation	40.3	92.5	60.8
Soil treatment	50.0	77.5	60.8
Weed control	46.8	84.6	60.8
Agricultural marketing	38.7	92.5	59.8
Crop processing	43.5	85.0	59.8
Soil classification	35.5	95.0	58.8
Environment and resource management	48.4	72.5	57.8
Soil conservation	41.9	80.0	56.9
Agricultural communication	38.7	82.5	55.9
Plant pathology	38.7	80.0	54.9
Plant breeding	33.9	85.0	53.9
Soil survey	37.1	80.0	53.9
Animal health	25.8	97.5	53.9
Extension education	33.9	85.0	53.9
Policy developments	41.9	72.5	53.9
Crop harvesting	40.3	72.5	52.9
New seed varieties	40.3	72.5	52.9
Agribusiness	43.5	67.5	52.9
Broiler production	29.0	80.0	49.0
Fisheries	22.6	90.0	49.0
Biotechnology	35.5	67.5	48.0
Animal breeding	24.2	80.0	46.1
Plant entomology	32.3	65.0	45.1
Range management	19.4	82.5	44.1
Agricultural administration	30.6	65.0	44.1
Rural sociology	32.3	57.5	42.2
Agroforestry	27.4	62.5	41.2
Pig production	19.4	72.5	40.2
Layer production	25.8	60.0	39.2
Bee-Keeping	24.2	62.5	39.2

Notes: \*multiple responses

Of importance to note is that respondents in their majority, sought information to conduct research and for general awareness. This has a multiplier effect in their ability to first, meet their information needs and those of farmers. The goal of information seeking is to identify potential knowledge, data, information, or raw material that will contribute to the theoretical or empirical devel-

opment of a field or to the solution of a practical problem [19].

*First point of call when in need of information.* The first point of call for a greater proportion (61.0 %) of the respondents when in need of information was the internet (Table 5).

Table 4 – Purpose of seeking information by agricultural researchers and extension workers

Purpose of seeking information	Agric. Researchers	Extension workers	Total (%)
Conduct research	93.5	52.5	77.5
Assisting researchers	54.8	87.5	67.6
General awareness	58.1	72.5	63.7
Assisting farmers	59.7	65.0	61.8
Assisting extension workers	29.0	57.5	40.2
Feasibility report preparation	11.3	5.0	8.8

Notes: \*multiple responses

Personal collections (17.6 %) and departmental collections (11.5 %) among others were consulted at the instance of an information need. Most (77.4 %) agricultural researchers consulted the internet, while the extension workers (67.5 %) consulted departmental collections.

Table 5 – First point of call when in need of information by agricultural researchers and extension workers

First point of call	Agric. Researchers	Extension workers	Total (%)
Internet	77.4	10.0	61.0
Personal collections	11.3	27.5	17.6
Departmental collections	-	67.5	11.5
Library	17.7	-	5.0
Colleagues	8.1	-	4.9

The internet is one of the fastest and easy ways to access information using the World Wide Web (www). Timely information is available on the go and would not hinder agricultural researchers and extension workers from meeting their information needs, reach out to themselves as well as resolve farmers' challenges in a timely manner. There is increase in the use of online resources. This has affected the use of physical libraries in a great way as the discovery of free content through search engines such as Google continually deter many from visiting the library. Furthermore, the decreasing acquisition of current print resources among libraries in most developing countries which is partly due to dwindling funds for subscription is also a contributing factor [16].

*Print and electronic sources.* The respondents were asked to indicate what they would consult or choose first between print and electronic

sources when in need of information (Figure 1). Print sources was preferred by extension workers (82.5 %) while researchers (71 %) preferred electronic sources.

The preference for printed information may not be unconnected with the ease with which extension workers could easily reach out to printed materials in their personal or departmental libraries to meet their information needs without necessarily connecting to the internet or use an electronic device as in the case of electronic information. This choice could also, not be unconnected with unstable power supply experienced in offices of respondents in the study, which hinders many from using their laptops and computers to access electronic resources. This further goes to show that respondents may have the zeal to upgrade printed information materials in their personal or departmental libraries when the need arises.

*Collaboration between agricultural researchers and extension workers.* Results in Figure 2 show that extension workers communicated more with agricultural researchers monthly (77.5 %). Agricultural researchers communicated more with extension workers quarterly (43.5 %). On the contrary, 24.2 % of agricultural researchers indicated they never communicated with extension workers.

It would appear that extension workers initiated more communication in the researcher-extension linkage than researchers. By implication, it means extension workers did the much they could to stay abreast with relevant and recent ideas to help farmers. This observation is in contrast with [6, 19], who found in their separate studies that Tanzanian and Zimbabwe extension workers' contact with researchers was very low.

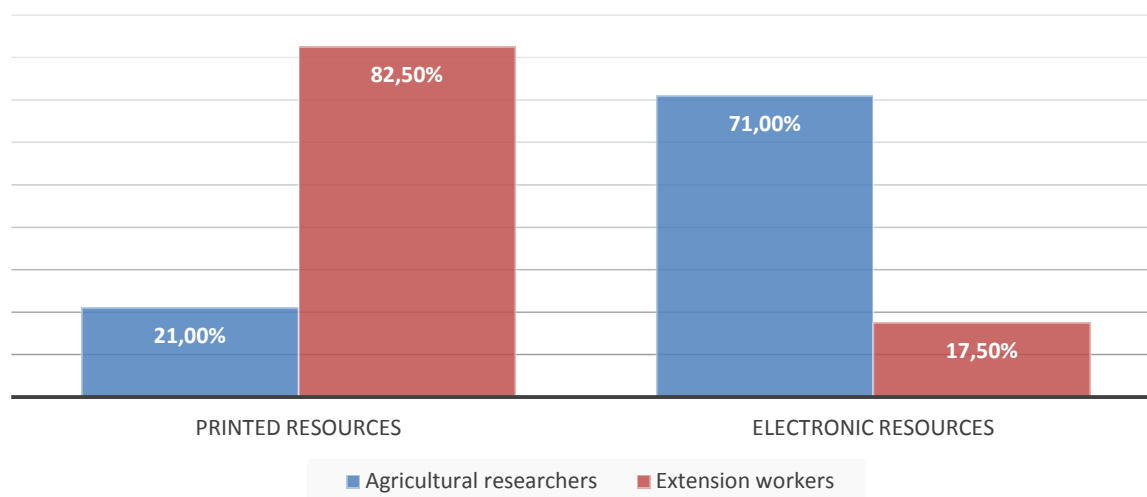


Figure 1 – Print and electronic sources consulted by agricultural researchers and extension workers

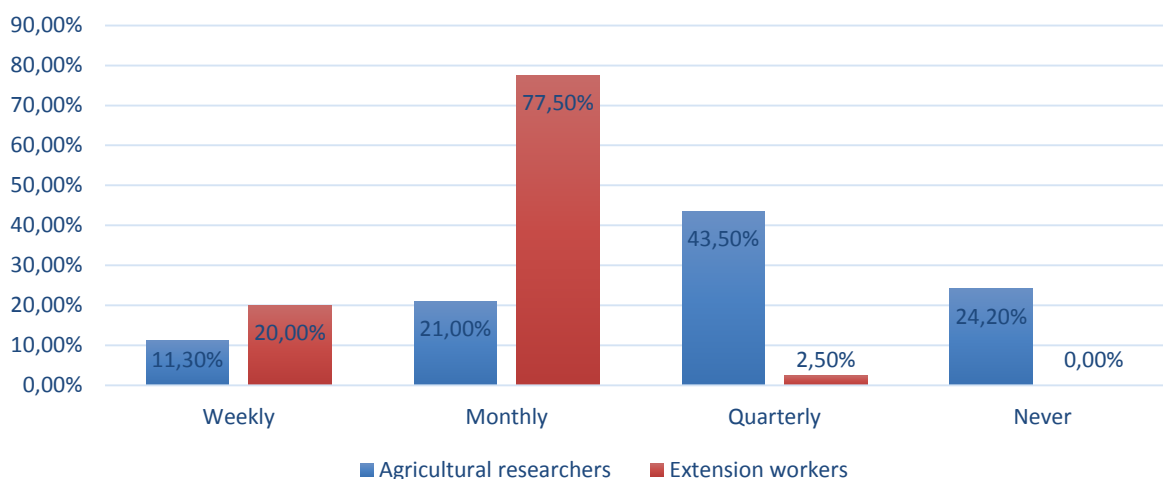


Figure 2 – Regularity of communication between agricultural researchers and extension workers

*Nature of problems discussed by respondents.* Problems relating to the dissemination and acceptability of research innovations by farmers (21.6 %) ranked highest when agricultural researchers communicated with their extension counterparts (see Table 6). For extension workers, their discussion with agricultural researchers was largely to find solutions to disease and pest control measures (14.7 %). These results reveal that broad spectrum of challenges were addressed. These interactions help in the development and promotion of innovation, increase the rate of technology adoption, turn research findings into practices on the farm, and enhance the return on research investments [20].

*Satisfaction with level of communication.* As presented in Table 7, 73.5 % of respondents said they were satisfied with the level of communication between agricultural researchers and extension workers. The few (26.5 %) that were not satisfied with the level of communication attributed it to irregular communication and poor feedback between researchers and extension workers, lack of funds to organize meetings to properly brief extension workers on new findings, difference in the orientation and work style of researchers vis-à-vis extension workers and that some extension workers felt they know it all hence disregard consulting researchers.

Table 6 – Nature of problems discussed by agricultural researchers vis-a-vis extension workers

Nature of problem discussed	Percentage (%)
<i>Agricultural researchers vs extension workers</i>	
Dissemination and acceptability of research innovations by farmers	21.6
Marketing and value-addition to institute's produce and products	8.8
Information on challenges faced by farmers with respect to choosing varieties, production, and transplanting in a given location	5.9
Disease, weed management and yield	4.9
Climate change, soil fertility and storage of produce	4.9
Inadequate communication between researchers and extension workers	1.0
<i>Extension workers vs agricultural researchers</i>	
Crop disease and pest control measures	14.7
Poor soil fertility	4.9
Water control in fish pond	4.9
Storage of produce	2.0
Poor yields of crops	2.0
Weed control measures	2.0

Notes: \*multiple responses

Table 7 – Level of satisfaction in communication between agricultural researchers and extension workers

Satisfaction with level of communication	Agric. Researchers	Extension workers	Total (%)
Yes	61.3	95.0	73.5
No	38.7	5.0	26.5
Reasons for dissatisfaction			
Irregular communication and poor feedback between researchers and extension workers	25.8	5.0	18.6
Lack of funds to organize meetings to properly brief extension workers on new findings	6.5	-	3.9
The orientation and work style of researchers differs from that of extension workers.	3.2	-	2.0
Extension workers feel they know it all hence disregard consulting researchers	3.2	-	2.0
Suggestions to improve communication*			
Proper link should be created to ease communication flow between researchers and extension workers	29.0	-	18.6
Provision of funds to organize meetings to update extension workers	19.4	-	5.9
Extension workers should duly consult with researchers	3.2	-	2.0

Notes: \*multiple response

The articulated suggestions for improving the researcher-extension linkage pointed to the need for: proper link creation to ease communication flow between researchers and extension workers, provision of funds to organize meetings to update extension workers on new findings and extension workers should duly consult with researchers.

*Problems inhibiting agricultural researchers and extension workers' meeting their information needs.* Data in Table 8 indicate that lack of office-

wide internet connectivity ( $2.06 \pm 1.08$ ), unstable power supply ( $2.05 \pm 1.07$ ), and non-subscription to relevant online resources by employer ( $2.05 \pm 1.07$ ) inhibited respondents from meeting their information needs. Nonetheless, lack of interest/poor attitude towards acquiring ICT skills ( $1.44 \pm 1.14$ ), lack of knowledge of the use of computer ( $1.35 \pm 2.00$ ) and poor eyesight ( $1.09 \pm 1.01$ ) did not impede respondents from meeting their information needs.



Table 8 – Problems inhibiting meeting information needs

Problems inhibiting meeting information needs	Mean ( $\bar{X}$ )	SD
Lack of office-wide internet connectivity	2.06*	1.08
Unstable power supply	2.05*	1.07
Non-subscription to relevant online resources by institute/organization	2.05*	0.98
Lack of access to internet	2.04*	0.97
Cost of acquiring and accessing relevant information	1.91*	2.00
Lack of sponsored training from my institute/organization	1.90*	1.06
Slow connection to the internet	1.82*	0.97
Lack of awareness of relevant online resources	1.79*	1.08
Non-availability of ICT training centres to update ICT knowledge	1.65*	1.06
Lack of user education on access and use of relevant online resources	1.57*	0.95
Unwillingness of some colleagues to teach others what they have acquired	1.57*	0.93
Lack of interest/poor attitude towards acquiring ICT skills	1.44	1.14
Lack of knowledge of the use of the computer	1.35	2.00
Get too much information (difficulty in identifying relevant information)	1.27	1.03
Too much time required for accessing and using online resources	1.25	1.03
Distraction from children	1.22	1.01
Lack of competence in internet searching skills	1.22	0.91
Inability to master the required computer skills	1.12	1.05
Fear of being laughed at by peers	1.11	1.12
Fear of handling/touching a computer	1.10	1.18
Poor eyesight	1.09	1.01

Notes: \* Constraints

A number of constraints indicated by respondents in this study are similar to those found in some studies [3, 4, 10, 14] concerning constraints inhibiting the use of online resources. Some outstanding constraints in this study were: lack of office-wide internet connectivity, unstable power supply, non-subscription to relevant online resources by employer. Authors [1] report that the use of Internet was not popular among extension agents in performing their job. Furthermore, they found that the internet was the most constrained ICT by factors such as; lack of infrastructure facilities, poor connectivity, low technical know-how and unstable power supply.

*Suggestions to resolve problems inhibiting meeting information needs.* Among suggestions to ameliorate the challenges, 77.1 % of respondents were of the view that government should invest in building ICT infrastructure in their place of work and provide stable power supply (70.3%) to ease access and use of e-resources as well as provision of fast, efficient office-wide internet connectivity (67.4 %). Also, colleagues' willingness to teach others skills they have acquired (2.0 %) was canvassed for (see Table 9).

Table 9 – Suggestions to resolve problems inhibiting meeting information needs [N=120]

Suggestions	Percentage (%)
Government should invest in building ICT infrastructures to ease access and use of e-resources	77.1
Stable power supply	70.3
Provision of fast and efficient office-wide internet connectivity	67.4
Training and retraining of staff by the institute/organization on how to access and use online resources	64.2
Institute/organization should subscribe to relevant online resources	58.4
Colleagues should be willing to teach others skills they have acquired	2.0

Notes: \*multiple responses

Government investment in building ICT infrastructure is key to improving the ease with which respondents' access and use e-resources. This will require investment in various aspects like provision of fast and efficient office-wide internet connectivity, provision of e-libraries and subscription to ease access to databases and provision of stable power supply for effective operations.

## CONCLUSION AND RECOMMENDATION

Agricultural researchers and extension workers in the study had broad spectrum of information needs covering several areas and sought information to meet these needs. Agricultural researchers collaborated with extension workers in meeting their information needs. However, it would appear that extension workers initiated more communication with agricultural in the research-extension linkage than researchers. From all indications, most respondents had similar constraints with some outstanding constraints being: lack of office-wide internet connectivity, unstable power supply and non-subscription to relevant online resources by their employer.

The study recommends that Edo State ministry of agriculture and the management of the research institutes should improve ICT infrastructure in their establishments in order to enhance access to e-resources. There should be provision of fast and efficient office-wide internet connectivity, e-libraries with computers and provision of stable power supply for effective operations. To enhance knowledge sharing among researchers and extension workers, there is need for research institutes and state government to develop electronic repositories for their research outputs this will further help other agricultural stakeholders to access local contents immediately.

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