

## KNOWLEDGE AND SKILL OF AGRICULTURAL EXTENSION AGENTS IN RESEARCH AND DATA MANAGEMENT IN SOUTHWEST, NIGERIA

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### ABSTRACT

*Research and data management are important to knowledge generation and development initiatives. Therefore, the research and data management needs of Agricultural Extension Agents (AEAs) in Southwest, Nigeria was studied. A cross-sectional survey was conducted in 3 states with 382 AEAs. Data were collected using self-administered structured questionnaire and analysed using means, standard deviation and Mean Weighted Discrepancy Score (MWDS). Findings of the study showed that the ratio of AEA to farm family was 1:485 and the average length of years of service of the extension agents was 10.34 years. The average monthly income of the AEAs was ₦60, 274. Furthermore, the study revealed that AEAs required 8 major competencies in research and data management which are use of participatory rural appraisal tools, participatory needs analysis, triangulation using qualitative data collection methods, identifying priorities in extension problems, participatory monitoring and evaluation, designing and conducting research survey, data collection techniques and using statistical methods in data analysis. The MWDS of the identified competencies ranged from 1.53 to 0.60. It was concluded that for AEAs to become co-creator of scientific knowledge and innovations needed for agricultural development, these identified core competencies must be given priority during pre-service and in-service training depending on state context.*

**Keywords:** *Research, Data management, Agricultural extension agents, Training needs, Competencies*

### INTRODUCTION

Agricultural extension is indispensable to agricultural development. According to Ajayi and Jibowo (2012), agricultural extension is intertwined with agricultural development. Agricultural extension plays a strategic role in bringing various stakeholders in agricultural development together. Specifically, it links together scientists and researchers working on different aspects of agriculture and the farmers on the field who implements the various research findings to improve production and processing of agricultural produce. Furthermore, it helps to improve

the livelihood of farmers and contribute to the development of rural communities. The goal of agricultural extension is to disseminate useful knowledge, skills and information to farmers to enhance their technical knowledge, effective information system, and farm management skills which in the long run will lead to improved production and increased economic return (Lukuyu *et al.*, 2012; Benjamin, 2013). The implication of this is that extension agents, the field officers of extension systems or organization, occupy a crucial position in influencing farmers' attitude towards improving their livelihood. This is the

reason why the extension agents must be abreast of information and facts needed to improve their competence in discharging their responsibility.

According to Food and Agricultural Organization (FAO, 2019), innovation is important to agricultural development. Realizing the potential of agricultural innovation requires research and extension systems and other knowledge institutions to be stronger and better connected with each other and with farmers and their organizations. This informs the fact that extension agents cannot but be knowledgeable in and participate in research as collaborators with both basic and applied scientists as well as social scientists for knowledge generation and scaling up of already established findings in these days of ever-changing development space. The participation of extension agents in research activities like the analysis of agricultural problems, the prioritization of rural problems, the design and implementation of projects alongside the collection of data using appropriate methodologies and using of various analytical tools for data analysis calls for training and retraining of the agents in the various competencies listed above. This will help to improve the human capital of these agents thereby increasing their versatility in performing their roles and ensuring agricultural development.

Training and continuous capacity development of extension agents will help them develop the relevant skill set in research and data management activities. Alabi (2014) opined that extension agents are adults most of whom are starters, mid-level career people and people almost at the end of their career and are sourced from

different specializations in agriculture and even some of them from non-agriculture related specialization. Therefore, to keep upgrading the knowledge, skills and abilities of these people in recent agricultural development concepts and issues, training as a tool already established in improving human capital is encouraged. Training that is not focused on identified needs of the trainees is bound to fail as it will definitely not address what is needed to improve performance and it might not command adequate clientele participation since adults are self-directed in learning and only learn for immediate application (Alabi and Ajayi, 2018). This therefore, calls for a proper training needs analysis that will identify specific areas in the task that is problematic and also identify specific knowledge and skill that is needed to overcome problem situation and also to avoid creating new problem situations (Proctor and Thornton, 1961 cited in Alabi, 2014). Training needs analysis is done using different models such as skill gap analysis (Alabi, 2010), criticality function model (Abdel-Maksoud, 2010; Alabi *et al.*, 2020), Borich model (Alabi and Ajayi, 2018) and Delta N method (Abdel-Maksoud, 2010). How competent then are the extension agents in research and data management issues in southwest geopolitical zone of Nigeria? What specific areas of research and data management do they require training on? These germane questions are answered by the study.

### **OBJECTIVES OF THE STUDY**

The main objective of the study was to analyse the training needs of extension agents in research and data management in Southwest geopolitical zone of Nigeria. Specifically, the study

1. determined the perceived levels of knowledge and skill of the agents in research and data management activities; and
2. identified the training needs of the extension agents in research and data management using Borich model of needs assessment.

### METHODOLOGY OF THE STUDY

Southwest geopolitical zone of Nigeria was the area studied. The area covered latitude 60°North to latitude 40°South and marked by longitude 40°West to longitude 60°East. The area has a land mass of approximately 114, 271 km<sup>2</sup> (Akinlade, Balogun and Obisesan, 2013). The zone comprised of six states: Lagos, Ogun, Oyo, Osun, Ondo and Ekiti states. The population of the zone according to 2006 population census was put at 27, 722, 432 (National Bureau of Statistics, 2011). The population of the study included all extension agents working with the Agricultural Development Programme (ADP) in all the states in Southwest geopolitical zone of Nigeria. A multi-stage sampling procedure was used for the study. In the first stage, 3 states ADPs (Lagos, Oyo and Ondo) were randomly selected. The total number of extension agents in the three states in 2014 was 490 (180 in Oyo, 160 in Ondo and 150 in Lagos states respectively). In the second stage, a proportionate selection of 85% of the extension agents in each of the states was done to give a total of 415 (153 in Oyo, 136 in Ondo and 126 in Lagos states respectively). All the sampled extension agents were reached with a copy of the questionnaire. A total of 382 copies of the questionnaire were returned giving 92% rate of return. The questionnaire comprised of three sections which were selected socio-economic characteristics of the extension

agents, their levels of knowledge and skill in research and data management processes.

Selected socio-economic characteristics such as age, years of formal education and years of experience on the job, income per month, farmer or farm families covered were measured with their absolute numbers as supplied by the extension agents. A total of 18 items were generated on research and data management to be used for the survey. Extension agents were asked to rate their perceived level of knowledge and skill on a scale of 1 to 5. Mean value was calculated for each item for knowledge and skill and was categorised into no knowledge/no skill ( $\bar{x} = 1 - 1.49$ ), little knowledge/little skill ( $\bar{x} = 1.5 - 2.49$ ), moderate knowledge/moderate skill ( $\bar{x} = 2.5 - 3.49$ ), high knowledge/high skill ( $\bar{x} = 3.5 - 4.49$ ) and very high knowledge/very high skill ( $\bar{x} = 4.5 - 5.0$ ) following Ajayi and Alabi (2012), Alabi (2014), Alibaygi and Zarafshani, (2008) and Alabi *et al.* (2020) categorizations. Descriptive statistics such as frequency, percentage, mean and standard deviation were used to summarize the data collected.

Borich model of needs assessment (Borich, 1980 cited in Alabi, 2014) was used to determine the training needs of the agents on research and data management processes. In operationalizing the model, the following five steps were followed. In the first step, 18 competencies in research and data management were listed. In the second step, the extension agents were surveyed to rate their perceived level of knowledge and skill in the competencies. In the third step, mean score was calculated for each item for knowledge and skill. The fourth step saw the calculation of Mean

Weighted Discrepancy Score (MWDS) by comparing the mean values of knowledge and skill for each item. The fifth step saw the ranking of the MWDS from the highest to the lowest. According to Borich (1980) cited in Alabi (2014), the higher the MWDS, the higher the need for training in the said competence. A Borich calculator (Mckim and Saucier, 2011 cited in Alabi 2014) was used to avoid computational errors that might arise with manual computation with many numbers. The calculator generated Mean Weighted Discrepancy Score (MWDS) for each competence from the mean values for knowledge and skill.

## RESULTS AND DISCUSSION

### Selected Socio-economic Characteristics of the Extension Agents in Southwest Nigeria

The result in Table 1 revealed that 38.7% and 37.2% of the extension agents in Southwest Nigeria covered less or equal to 250 farmers and between 751 to 1000 farmers respectively. The average number of farmers covered by an extension agent in Southwest Nigeria is 485. This is against the Food and Agricultural Organization (FAO) (2019) standard of one extension agent to 250 farmers. This average of 1 extension agent to 485 farmers appears too conservative as National Agricultural Extension and Research Liaison Services (NAERLS, 2012) and Haruna and Abdullahi (2013) had reported a ratio of 1 extension agent to 1500 farmers or more in different state across the nation. This large number of extension agent to farmer ratio will impede the effectiveness of the agents and the extension service delivery since the number of farmers is more than what can be adequately handled.

**Table 1: Selected socio-economic characteristics of respondents**

Variables	Percentage	Mean
<b>Number of farm families covered:</b>		
≤ 250	38.7	Oyo = 470 ± 54
251 - 500	6.0	Lagos = 658 ± 88
501 - 750	4.5	Ondo = 441 ± 73
751 - 1000	37.2	SW = 485 ± 75
1001 - 1250	8.1	
1251+	5.5	
<b>Year of experience on the job:</b>		
< 10 years	55.5	Oyo = 18.5 ± 2.40
11 – 20 years	37.2	Lagos = 12.08 ± 3.37
21 – 30 years	7.1	Ondo = 11.27 ± 2.31
31 years +	40.5	SW = 10.34 ± 2.09
<b>Average monthly income:</b>		
≤ ₦40, 000	30.1	Oyo = ₦67, 552 ± 14, 218
₦40, 001 – ₦80, 000	46.6	Lagos = ₦76, 509 ± 15, 682
₦80, 001 +	23.3	Ondo = ₦69, 117 ± 21, 503 SW = ₦60, 274 ± 23, 747

The findings presented in Table 1 showed that the average years of experience of the extension agents in Southwest Nigeria was 10.34 years. From the table, the majority (55.5%) of the agents had been in service for around 10 years while 40.5% of the agents in Southwest Nigeria had been in service for more than 31 years. This finding supports that of Adesiji (2006) who reported that 54.8% of the extension agents in southwest had been in service between 6 and 10 years. This year of experience could impact on the performance of the agents since they are expected to keep learning on the job. The average income of extension agents in Southwest Nigeria was ₦60, 274 and 46.6% of the agents earned between ₦40, 001-₦80, 000 monthly. The finding on average income was lower than ₦81, 865 reported by Ajayi *et al.*, (2013) for extension agents in Ondo, one of the states in southwest, Nigeria.

#### **Perceived Level of Knowledge of Agricultural Extension Agents in Research and Data Management**

The result in Table 2 reveals the mean values of the perceived level of knowledge of the extension agents in southwest Nigeria in research and data management competencies. The result showed that extension agents perceived themselves as having moderate knowledge ( $\bar{x} = 2.5-3.49$ ) in 11 of the 18 competencies in research and

data management listed. The agents also perceived themselves as having little knowledge ( $\bar{x} = 1.5-2.49$ ) in the remaining 7 competencies. The highest mean score of knowledge of the extension agents in the listed competencies was in utilization of method demonstration ( $\bar{x} = 3.35$ ) followed by utilization of result demonstration ( $\bar{x} = 3.23$ ) and identifying priorities in agricultural problems ( $\bar{x} = 3.20$ ). The moderate level of knowledge of the agents in these competencies might be due to constant practise with the competencies in the discharge of their responsibilities. Demonstrations, either method or result, is a major channel of communication with the farmers during the diffusion of innovation process which is very germane to extension work. The least mean scores of the extension agents were recorded in the competencies: designing and conducting research surveys ( $\bar{x} = 2.46$ ) followed by triangulation using qualitative methods ( $\bar{x} = 2.44$ ), use of participatory rural appraisal tools ( $\bar{x} = 2.41$ ), designing and conducting evaluation studies ( $\bar{x} = 2.35$ ) and using statistical methods in data analysis ( $\bar{x} = 2.31$ ). These competencies are rather not within the mainstream extension work and some of them were not captured in the curricula during the pre-service trainings of the extension agents.

**Table 2: Perceived level of knowledge of extension agents in research and data management**

Competencies	Mean				SW Ranking
	Oyo	Lagos	Ondo	SW	
Knowledge of concept and terms used in research	2.65	2.36	2.40	2.47	13 <sup>th</sup>
Scientific analysis of agricultural problems	2.63	2.48	2.61	2.57	9 <sup>th</sup>
Identifying priorities in extension problems	3.23	3.15	3.21	3.20	3 <sup>rd</sup>
Method of scientific research and extension	2.88	2.87	2.60	2.78	6 <sup>th</sup>
Designing and conducting research survey	2.59	2.38	2.41	2.46	14 <sup>th</sup>
Designing and conducting evaluation studies	2.41	2.25	2.39	2.35	17 <sup>th</sup>
Use of participatory rural appraisal tool	2.48	2.38	2.37	2.41	16 <sup>th</sup>
Data collection techniques	2.83	2.88	2.68	2.80	4 <sup>th</sup>
Participatory needs analysis	2.44	2.53	2.51	2.49	12 <sup>th</sup>
Triangulation using qualitative data collection methods	2.52	2.53	2.27	2.44	15 <sup>th</sup>
Participatory monitoring and evaluation	2.76	2.79	2.74	2.76	7 <sup>th</sup>
Utilization of method demonstration	3.30	3.30	3.46	3.35	1 <sup>st</sup>
Utilization of result demonstration	3.14	3.25	3.29	3.23	2 <sup>nd</sup>
Assessing information for research on the internet	2.74	2.83	2.84	2.80	4 <sup>th</sup>
Documenting events through digital camera	2.70	2.80	2.74	2.75	8 <sup>th</sup>
Documenting events through video recording	2.50	2.64	2.55	2.56	10 <sup>th</sup>
Using statistical methods in data analysis	2.41	2.22	2.31	2.31	18 <sup>th</sup>
Writing and publishing reports and research output	2.72	2.35	2.57	2.55	11 <sup>th</sup>

**Perceived level of skill in research and data management of agricultural extension agents**

The findings presented in Table 3 reveals the mean values of the perceived level of skill of the extension agents on competencies listed in research and data management. The result showed that the agents had moderate skill ( $\bar{x} = 2.5-3.49$ ) in 11 of the 18 competencies on research and data management listed. The agents perceived themselves as having little skill ( $\bar{x} = 1.5-2.49$ ) in the remaining 7 competencies listed. The result on the table showed that the highest mean score of skill of the extension agents was recorded in utilization of method demonstration ( $\bar{x}= 2.82$ ) followed by data collection techniques ( $\bar{x} = 2.81$ ) and utilization of result demonstration ( $\bar{x} = 2.73$ ). The perception of the extension agents of their moderate level of skill in these three competencies mirrors that of their

knowledge in the said competencies. It could be proposed that the skill of the agents is built up in these competencies because their knowledge in them is continuously being practised thereby reinforcing their skill levels in the said competencies. Furthermore, the lowest mean scores of the agents were recorded in the competencies: use of participatory rural appraisal tools ( $\bar{x} = 2.37$ ), participatory monitoring and evaluation ( $\bar{x}= 2.33$ ), writing and publishing reports and research outputs ( $\bar{x} = 2.31$ ), assessing information for research on the internet ( $\bar{x} = 2.29$ ) and triangulation using qualitative methods ( $\bar{x} = 2.23$ ). Most of these competencies are specialised competencies that became prominent after many of the agents had left school and request training and retraining to master them. Results in Table 3 therefore showed that the extension agents scored below 3.0 mean values in all the 18 competencies listed in research and data

management. This reveals moderate levels of knowledge and skill in research and data

management among extension agents in southwest Nigeria.

**Table 3: Perceived level of skill in research and data management of extension agents**

Competencies	Mean				SW Ranking
	Oyo	Lagos	Ondo	SW	
Knowledge of concept and terms used in research	2.52	2.60	2.76	2.63	6 <sup>th</sup>
Scientific analysis of agricultural problems	2.54	2.55	2.62	2.57	9 <sup>th</sup>
Identifying properties in extension problems	2.77	2.47	2.60	2.61	7 <sup>th</sup>
Method of scientific research and extension	2.79	2.54	2.70	2.68	4 <sup>th</sup>
Designing and conducting research survey	2.69	2.58	2.50	2.52	10 <sup>th</sup>
Designing and conducting evaluation studies	2.70	2.42	2.41	2.51	11 <sup>th</sup>
Use of participatory rural appraisal tool	2.45	2.36	2.30	2.37	14 <sup>th</sup>
Data collection techniques	2.87	2.67	2.89	2.81	2 <sup>nd</sup>
Participatory needs analysis	2.43	2.37	2.53	2.44	13 <sup>th</sup>
Triangulation using qualitative data collection methods	2.27	2.20	2.23	2.23	18 <sup>th</sup>
Participatory monitoring and evaluation	2.31	2.42	2.26	2.33	15 <sup>th</sup>
Utilization of method demonstration	2.90	2.63	2.92	2.82	1 <sup>st</sup>
Utilization of result demonstration	2.72	2.66	2.80	2.73	3 <sup>rd</sup>
Assessing information for research on the internet	2.31	2.28	2.29	2.29	17 <sup>th</sup>
Documenting events through digital camera	2.54	2.04	2.86	2.48	12 <sup>th</sup>
Documenting events through video recording	2.61	2.28	2.89	2.59	8 <sup>th</sup>
Using statistical methods in data analysis	2.69	2.55	2.78	2.67	5 <sup>th</sup>
Writing and publishing reports and research output	2.46	2.23	2.24	2.31	16 <sup>th</sup>

**Training needs of extension agents in research and data management**

The result in Table 4 reveals the MWDS of the extension agents on each of the competencies in research and data management listed. The MWDS ranged from -0.33 to 1.53. Based on this, 8 competencies were identified as the main areas where training is needed. The competency with the highest MWDS was the use of participatory rural appraisal tools (1.53) followed by participatory needs analysis (1.47) and triangulation using qualitative methods (1.46). Other areas of need identified are identifying priorities in agricultural problems (1.26), participatory monitoring and evaluation (1.18), designing and conducting research surveys (0.81), data collection techniques (0.76) and using statistical methods in data analysis (0.60). These identified training needs is in tandem with the findings of Adesiji (2006) who reported that extension

agents in Southwestern Nigeria require training in the area of research methodology and programme evaluation. Specifically, he reported that extension agents require training on designing survey instrument, choosing tools for data analysis, analysis of data and sampling techniques.

The importance of those needs identified in the study to extension agents in Southwest could be explained further.

- The more knowledgeable extension agents become in the use of participatory rural appraisal tools, the more able they become in conducting community needs assessment to get to the roots of rural problems and proffer necessary solutions.
- Enhancing the ability of extension agents in conducting research surveys situates them within the innovation generation milieu and not just passive transmitters of knowledge. This will

boost their confidence and make them more qualified to participate in the ever-expanding space of agricultural development.

- Training extension agents on data collections techniques will help them in every aspect of their work. It becomes easier for them to collect data for programme planning, implementation and evaluation. It makes it possible for them to work with self-generated data where possible.
- Training extension agents on the use of statistical package in data analysis will help in positioning them for greater relevance in knowledge generation. This is possible since they can participate actively in research design, data collection and analysis, which are all crucial to breaking frontiers in knowledge.

- Triangulation using rural appraisal tools is similar to reliability test in quantitative research. Training extension agents on this inculcates in them the ability to double check their findings at the community level via different rural appraisal tools.

If projects will be sustainable, then local people must be involved in all the stages of programme planning, implementation and evaluation. This will help the people to take responsibility for the project and ownership of the project and also ensure continuity of the projects. Therefore, training extension agents on participatory needs analysis and participatory monitoring and evaluation will help them to be able to help farmers and other rural dwellers in ensuring project sustainability.

**Table 4: Mean weighted discrepancy score of competencies in research and data management**

Competencies	MWDS	Rank
Use of participatory rural appraisal tool	1.53	1 <sup>st</sup>
Participatory needs analysis	1.47	2 <sup>nd</sup>
Triangulation using qualitative data collection methods	1.46	3 <sup>rd</sup>
Identifying priorities in extension problems	1.26	4 <sup>th</sup>
Participatory monitoring and evaluation	1.18	5 <sup>th</sup>
Designing and conducting research survey	0.81	6 <sup>th</sup>
Data collection techniques	0.73	7 <sup>th</sup>
Using statistical methods in data analysis	0.60	8 <sup>th</sup>
Designing and conducting evaluation studies	0.51	9 <sup>th</sup>
Scientific analysis of agricultural problems	0.47	10 <sup>th</sup>
Documenting events through digital camera	0.43	11 <sup>th</sup>
Documenting events through video recording	0.41	12 <sup>th</sup>
Assessing information for research on the internet	0.39	13 <sup>th</sup>
Method of scientific research and extension	0.11	14 <sup>th</sup>
Utilization of result demonstration	0.03	15 <sup>th</sup>
Utilization of method demonstration	0.00	16 <sup>th</sup>
Knowledge of concept and terms used in research	0.00	16 <sup>th</sup>
Writing and publishing reports and research output	-0.33	18 <sup>th</sup>

According to Adesiji (2006), improving the knowledge and skill of the extension agents in the competencies where the need for training is indicated is required. Therefore,

training in the identified areas on research and data management will help improve the skill set of the agents in conducting researches and in management of data

generated in the course of their work. This will strengthen their contribution to agricultural development.

### **CONCLUSIONS AND RECOMMENDATIONS**

Extension agents' knowledge in research and data management was highest in utilization of method demonstration and lowest in using statistical methods for data analysis. Also, extension agents' skill in research and data management was highest in utilization of method demonstration and lowest in triangulation using qualitative methods. Furthermore, the ratio of extension agent to farmers/farm family is large. Some of the training needs identified included use of participatory rural appraisal tools, participatory needs analysis and triangulation using qualitative methods among others.

More extension agents should be employed in the agricultural development programme in each of the state in southwest geopolitical zone of Nigeria to reduce the large extension agent's farm family ratio to ensure effectiveness. Effort should be made towards reinforcing the knowledge and skill of the agents on items where they already displayed high knowledge and skill while effort should be made to boost their knowledge and skill on items where their skill and knowledge is low. The identified training needs should be emphasised in capacity development programmes for the extension agents' both at the pre- and in-service levels to improve their contribution to overall development of agriculture in the region and in Nigeria at large.

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