

Assessment of climate change training needs of agricultural extension agents in Abia state, Nigeria

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ABSTRACT

The study assessed the agricultural extension agents' climate change training needs in Abia state. Eighty-three extension agents were chosen for the study using a simple random sampling procedure. Questionnaire was used to collect data, which was then summarized using percentages, frequency counts, and the mean. The findings indicated that male agricultural extension agents comprised a majority (53%) of the state's agricultural extension agents. The average household contained between one and five members (60%). Only 10% have a master's degree, while the majority (69%) have a bachelor's degree. The average length of employment was 15 years. The study's findings indicated that there are still extension agents who are unaware of climate change (1%). Agricultural extension agents in the study area have a limited understanding of all six climate change statements. Extension agents provide significant climate change services to farmers, including technical advice on climate change ($\bar{x} = 2.0$), the establishment of Small Plot Adaptation Techniques (SPAT) to monitor the impact of climate change ($\bar{x} = 2.1$), and educating farmers on appropriate agrochemicals for climate change adaptation (weed and pest control) ($\bar{x} = 2.2$). Additionally, the results indicated that understanding fundamental climate change concepts ($\bar{x} = 3.7$), utilising cultural practises to mitigate and adapt to climate impacts ($\bar{x} = 3.4$), and environmentally friendly management practises to mitigate and adapt to climate change ($\bar{x} = 3.4$) were the primary areas of need for climate change training among extension agents. Inadequate funding for training ($\bar{x} = 3.4$), a lack of financial support from organizations ($\bar{x} = 3.3$), and an inability to access financial support from funders ($\bar{x} = 3.3$) were the major barriers to attending climate change training for extension agents. Regular climate change seminars and training workshops for agricultural extension agents at the federal and state levels will help to improve their overall knowledge of climate change issues. The Agricultural Development Program should utilize Forth nightly training (FNT) meetings to educate extension agents about climate change issues.

Keywords: Extension agents, climate change, training needs, constraints

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1. INTRODUCTION

Adapting the Nigerian agricultural system effectively to the effects of climate change will significantly aid the country's efforts to achieve the sustainable development goals of hunger and poverty eradication. This may be possible if agricultural extension agents and farmers' capacities and competencies are strengthened to deal effectively with the vagaries of climate change. Nigeria's agricultural system employs 70% of the workforce, generates about 40% of the country's Gross Domestic Product (GDP), supplies over 80% of the country's food needs, and accounts for 70% of non-oil exports (FAO & ECOWAS, 2018). Despite agriculture's critical role in the Nigerian economy, the sector is gravely threatened by climate change. Climate change is having a negative impact across the country, with increased floods and resulting loss of farmland, increased drought, and sea level rise, as well as increased pest and disease infestation of farms (Olaniyi, *et. al.*, 2013; Beyioku, 2016; Haider, 2019). Despite the increasing devastation caused by climate change on the country's largest sector of the economy, farmers' knowledge and capacity remain inadequate (Ozor & Nnaji, 2010; Ifeanyi-obi, *et. al.*, 2017).

Farmers' ability to respond effectively to climate change is contingent upon their access to and quality of information (Onokala, Enete, *et. al.*, 2010). Unfortunately, the majority of Nigerian farmers lack the necessary information, knowledge, and resources to adapt to climate change. This suggests a gap in the role of agricultural extension agents, who are tasked with the responsibility of disseminating agricultural information throughout the country via the Agricultural Development Programme (ADP). The ADP, which houses agricultural extension agents in Nigeria, was formed in response to the pressing need to raise farmers' standards of living and welfare. This it accomplishes by disseminating information to farm families about agricultural technologies and improved practices and by strengthening their capacities to address emerging contemporary issues (such as climate change) that affect their farming activities. According to Davis (2009), Extension should play a critical role in information technologies and information management, capacity development, and facilitating and implementing policies and programmes aimed at increasing local capacity for adaptation. Extension is expected to facilitate knowledge generation, awareness raising, knowledge/technology transfer, and the implementation of effective risk management actions (FAO, 2008).

Unfortunately, in Nigeria, the agricultural extension system has failed to live up to this expectation in terms of climate change adaptation (Ebenehi, Ahmed, & Barnabas, 2018), owing in large part to the extension agents' lack of climate change knowledge and capacity, who are the system's primary information disseminators. The majority of agricultural extension agents in Nigeria are ignorant of climate change issues, impeding their ability to effectively deliver information and services to farmers in the same (Godson Ibeji, *et. al.*, 2020; Mustapha, *et. al.*, 2012). Other African countries have also noticed this trend (Antwi-Agyei & Stringer, 2021; Zafezeka, *et. al.*, 2019;

Ogunlade, *et. al.*, 2014). They require additional training to gain a better understanding of climate change issues and to communicate this to farmers (Enete & Amusa, 2010; Ifeanyi-obi, Etuk & Jike-wai, 2012; Mustapha, Undiandeye & Gwary, 2012; Ogunbameru, Mustapha & Idrisa, 2013). There is an increased need for extension agents to expand their capacity and role in order to meet the contemporary needs of farmers. Olorunfemi, Olorunfemi, and Oladele (2019) discovered that involving extension agents in climate change training positively influences their participation in disseminating climate smart agricultural initiatives in South West Nigeria, implying that extension agents will be willing to get involved in climate change issues effectively.

With the increased threats posed by climate change to the country's most vital sector of the economy, there is an urgent need to address the agricultural extension agents' knowledge and capacity needs in the area of climate change. This cannot be accomplished effectively unless their area of need is properly defined. This enables the development of programmes and training that effectively address their capacity requirements. This study aims to contribute to closing this gap by assessing extension agents' climate change information needs in order to identify possible areas of training for extension agents.

Objectives of study

The broad objective of the study was to assess climate change training needs of agricultural extension agents in Abia State.

The specific objectives were to:

1. describe the socio-economic characteristics of agricultural extension agents in Abia State.
2. determine the climate change knowledge level of agricultural extension agents in the study area.
3. determine tasks performed by agricultural extension agents in climate change issues in the study area.
4. determine the climate change training needs of extension agents in Abia State and
5. identify ways to improve agricultural extension agent's knowledge and skill in climate change issues in the study area.

2. METHODOLOGY

The study was conducted in Abia State. The climate is generally tropical, with two distinct seasons: rainy and dry. Early rainfall typically occurs in January/February, with the rainy season fully commencing in March and concluding in November of each year (though it varies now). The dry season lasts between four to five months. The state has a significant amount of rainfall and experiences moderately high temperatures. The peak times are June to October, with a brief respite between July's end and August. The average annual rainfall is approximately 1952 mm. Daily and annual mean temperatures of 28°C and 27°C, respectively, characterize the temperature pattern.

Aba, Ohafia, and Umuahia are the state's three (3) Agricultural Zones. The population for this study was all Agricultural Extension Agents in Abia State Agricultural Development Programme (ADP), which is the primary public agency mandated by the state government to provide extension services. Eighty-three (83) agricultural extension agents were chosen randomly from a total of 106 in the state using a simple random sampling technique. The data for the study were gathered via questionnaire and described using percentages, frequency counts, and the mean.

3. RESULTS AND DISCUSSION

3.1 Socio-economic characteristic of extension agents

The socioeconomic characteristics of Agricultural Extension Agents in Abia State are summarized in Table 1. It was indicated that there were more male agricultural extension agents (53%) than female agricultural extension agents (47%) in the state. This is consistent with Hassan (2010) and Rad *et al.*, (2011) findings that extension services have historically been staffed primarily by men. Similarly, Airemen (2005) noted that in the past, extension jobs were exclusively reserved for men, based on the belief that only men were farmers and thus required male extension agents to reach them. This is perhaps unsurprising, given that women are largely regarded as farm hands, even though they farm and own large farms. Additionally, male dominance in extension work may result in a gender-blind approach to information and innovation dissemination (Salau & Saingbe, 2008; Adeola & Ayoade, 2011).

The average age of extension agents was found to be 46 years, indicating that most extension agents are still youthful and vibrant. This is consistent with Adisa and Balogun's (2012) and Okeowo (2015). Many extension agents (88%) were married with households ranging in size from one to five people (60%). In terms of educational qualifications, only 10% have a master's degree, the majority (69%) have a first degree, 6% has HND, and 6% has OND. The findings of this study demonstrated that extension agents possess solid educational credentials, contrary to popular belief and assumption that extension work is a low-profile job reserved for the illiterate (Ejembi, Omoregbee & Ejembi, 2006). The average length of employment was found to be 15 years. Regarding area of specialization, 41% specialize in crop production, 23% in agricultural economics and extension, 12% each in animal science and agricultural education, 5% each in agricultural engineering and marketing, and 2% in fisheries. Monthly earnings range primarily between N61,000 and N90,000 (49%) and between N30,000 and N60,000 (36%). A sizable proportion (65%) of agricultural extension agents are members of professional associations. The majority (66%) of them have participated in training programmes in the last decade, with 78% attending climate change-related training. Only 64% of those who have attended one or more training sessions expressed satisfaction with the training they attended.

TABLE 1: Socio-economic characteristics of extension agents

Variables	Frequency	Percentage	Mean
Gender	44	53.0	
Male	39	47.0	
Female			
Marital status			
Single	8	9.6	
Married	73	88.0	
Divorced	1	1.2	
Widowed	1	1.2	
Age			45.5
25-34	8	9.6	
35-44	22	26.5	
45-54	43	51.8	
55-64	10	12.1	
Education status			
No formal education	1	1.2	
Primary school certificate	1	1.2	
Secondary school certificate	6	7.0	
First degree certificate	57	69.0	
Master certificate	8	10.0	
OND	5	6.0	
HND	5	6.0	
Household size			5.1
1-5	50	60.3	
6-10	32	38.5	
11 and above	1	1.2	
Religion practice			
Christianity	81	97.6	
Islam	0	0.0	
Traditional	2	2.4	
Working experience			15
1-10	21	25.3	
11-20	53	63.9	
21-30	9	10.8	
Area of specialization			
Agricultural economics & extension	19	23.0	
Crop production	34	41.0	

Fishery	2	2.0	
Animal science	10	12.0	
Agriculture education	10	12.0	
Agriculture marketing	4	5.0	
Agriculture engineering	4	5.0	
Monthly income			
30,000-60,000	30	36.2	
61,000-90,000	41	49.4	
91,000-110,000	9	10.8	
111,000 and above	3	3.6	
Membership of professional association			
Yes	29	35.0	
No	54	65.0	
Number of professional associations registered with			
1-5	27	93.0	
6-10	2	7.0	
Number of training attended in the Last ten years			
Yes	55	66.0	
No	28	34.0	
Training related to climate change			
Yes	43	78.0	
No	12	22.0	
Satisfaction with the training			
Not at all	20	36.0	
To a little extent	7	13.0	
To a moderate extent	13	24.0	
To a high extent	15	27.0	

Source: Field Survey, 2019

3.2 Climate change knowledge level of agricultural extension agent

According to Table 2, some extension agents have never heard of climate change (1%). This is surprising given that climate change has become very topical in the agricultural sector in recent years due to its devastating effects on crops and animals. A sizable proportion (81%) of extension agents indicated that they are knowledgeable about climate change issues, with the majority having a moderate level of knowledge (54%). All extension agents (100%) agreed that climate change knowledge is important to them, with 76% indicating that it is extremely important. Almost all uniformly (99%) stated that climate change influences agricultural production. The findings

corroborate Iwuchuku and Onyeme's (2013) findings that extension agents were aware of the effects of climate change on natural resources such as agricultural produce.

TABLE 2: Agricultural Extension agent general knowledge of climate change

Variables	Frequency	Percentage
Awareness of climate change		
Yes	82	99.0
No	1	1.0
Knowledgeable in climate change issues		
Yes	67	81.0
No	16	19.0
Level of knowledge in climate change issues		
Little knowledge	9	10.8
Moderate knowledge	45	54.2
High knowledge	13	15.7
Relevance of climate change to extension agent		
Yes	83	100.0
No	0	0.0
Level of relevance		
Little relevance	1	1.0
Moderate relevance	19	23.0
High relevance	63	76.0
Does climate change have much effect on agriculture?		
Yes	82	99.0
No	1	1.0
Level of severity of climate change effect on agriculture		
Mild effect	2	2.0
Severe effect	16	19.0
Very severe effect	65	79.0

Source: Field Survey, 2019

3.3 Agricultural Extension Agent knowledge level in areas of climate change.

The results in Table 3 indicated the extent to which agricultural extension agents were knowledgeable about various aspects of climate change. Agricultural extension agents disagreed with the assertion that they possessed superior knowledge in each of the six statements used to characterise climate change. This indicates that agricultural extension agents' knowledge of climate change issues is still limited. The findings corroborate Yanfika, Listiana, Mutolib, and

Rahmat's (2019) findings that agricultural extension staff have not made a sufficient effort to mitigate climate change as a result of their limited knowledge of climate change.

TABLE 3: Agricultural Extension Agent knowledge level in areas of climate change.

Statements	Knowledgeable	Moderately knowledgeable	Highly knowledgeable	Mean
Basic concepts of climate change	53(63.9)	21(25.3)	9(10.8)	1.5*
Climate change effects on agricultural activities	32(38.6)	42(50.6)	9(10.8)	1.7*
Climate change effects on farmer's livelihood	26(31.3)	50(60.2)	7(8.4)	1.7*
Climate change mitigation options	55(66.3)	17(20.5)	11(13.3)	1.4*
Adaptation strategies to climate change	48(57.8)	24(28.9)	11(13.3)	1.5*
Constraints to climate change adaptation among farmers	34(41.0)	31(37.3)	18(21.7)	1.8*

Source: Field data, 2019

Midpoint = 2.0; * low knowledge level, ** high knowledge level

3.4 Major task performed by agricultural extension agent in climate change issues

Table 4 reveals that, of the 19 statements used to characterize agricultural extension agents' primary role in climate change issues, the agricultural extension agent agreed to only three. The extension agent agreed that they provided technical advice to farmers regarding climate change ($\bar{x} = 2.0$), the establishment of Small Plot Adaptation Techniques (SPAT) to monitor the impact of climate change ($\bar{x} = 2.1$) and educating farmers about relevant agrochemicals used for climate change adaptation (weed and pest control) ($\bar{x} = 2.0$). The results indicated that the extension agents performed few other tasks. This could be because their limited knowledge of climate change places them at a disadvantage when it comes to educating farmers about climate change issues. As a result, it is critical to plan and implement climate change training requirements for agricultural extension agents. The result corroborates Adisa and Balogun's (2012) assertion that extension agents' primary responsibilities include educating farmers about pest control and providing technical assistance to farmers.

TABLE 4: Major task performed by agricultural extension agent in climate change issues

Climate change tasks	Task not performed	Task performed	Task frequently performed	Mean
Creating climate change awareness among farmers	39(47.0)	26(31.3)	18(21.7)	1.7*
Rendering of technical advice to farmers on climate change	16(19.3)	43(51.8)	24(28.9)	2.0**
Establishment of SPAT to monitor climate change impacts	23(27.7)	26(31.3)	34(41.0)	2.1**
Educating farmers on relevant agro chemicals use for climate change adaptation (weed and pest control)	23(27.7)	31(37.3)	29(34.9)	2.0**
Linkage to credit facilities for climate change adaptation	40(48.2)	32(38.6)	11(13.3)	1.6*
Statistical analysis of field data on climate change	42(50.6)	25(30.1)	16(19.3)	1.6*
Record keeping on climate change effects/impacts	36(43.4)	41(49.4)	6(7.2)	1.6*
Assisting subject matter specialists on climate change issues	28(33.7)	45(54.2)	10(12.0)	1.8*
Organizing climate change training and workshops for farmers	34(41.0)	30(36.1)	19(22.6)	1.8*
Conducting demonstrations for teaching farmers on climate change issues	27(32.5)	34(41.0)	22(26.5)	1.9*
Weather forecasting on climate change	37(44.6)	34(41.0)	12(14.5)	1.6*
Analyzing farmers' problems on climate related issues	52(62.7)	19(22.9)	12(14.5)	1.5*
Educating farmers on soil conservation methods	34(41.0)	23(27.7)	26(31.3)	1.9*
Use of information communication technologies (ICTs) for effective climate change communication	35(42.2)	33(39.8)	15(18.1)	1.7*
Preparation/use of audio-visual instructional materials in teaching climate change related issues	36(43.4)	21(25.3)	26(31.3)	1.8*
Indigenous technology development to mitigate climate change	39(47.0)	26(31.3)	18(21.7)	1.7*
Improving farmer's knowledge on climate change through use of multi-media projector to teach issues on climate change	47(56.6)	31(37.3)	5(6.0)	1.4*
Programme Planning on climate change issues	50(60.2)	24(28.9)	9(10.8)	1.5*

Source: Field Survey, 2019

Midpoint = 2.0; *Task not performed; ** Task performed

3.5 Training needs of agricultural extension agent on climate change issues

The results in Table 5 indicate that agricultural extension agents agreed on the 19 statements used to characterize their climate change training needs, with the primary areas of need being an understanding of fundamental climate change concepts (\bar{x} =3.7), the use of cultural practices to mitigate and adapt to climate impacts (\bar{x} =3.4), and environmentally friendly management practices to reduce climate change (\bar{x} =3.4). This finding is consistent with previous research (Adisa & Balogun, 2012; Anka, 2016), which identified significant training needs for agricultural extension agents in climate change as weather forecasting skills, use of cultural practices to mitigate climate change impacts, pest control skills to reduce pest attack, soil conservation skills to reduce evapo-transpiration, and programme development skills.

TABLE 5: Training needs of agricultural extension agent on climate change issues

Training needs	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean
Understanding basic concepts in climate change	68(81.9)	11(13.3)	0(0.0)	4(4.8)	3.7**
Soil fertility management to reduce climate change impact	58(69.9)	19(22.9)	3(3.6)	3(3.6)	3.5**
Agro-chemical skills to reduce weed growth	39(47.0)	32(38.6)	7(8.4)	5(6.5)	3.2**
Indigenous technology development to adapt to climate change	52(62.7)	14(16.9)	14(16.9)	3(3.6)	3.3**
Use of cultural practices to mitigate and adapt to climate change impacts	51(61.4)	22(26.5)	8(9.6)	2(2.4)	3.4**
Application of information communication technologies (ICTs) for enhanced climate change communication	36(43.4)	37(44.6)	7(8.4)	3(3.6)	3.2**
Environmentally friendly management practices to reduce climate change	51(61.4)	21(25.7)	6(7.2)	5(6.0)	3.4**
Recording and reporting climate change impacts	28(33.7)	38(45.8)	12(14.5)	5(6.0)	3.0**
Weather forecasting on climate change	24(28.9)	43(51.8)	13(15.7)	3(3.6)	3.0**
Soil conservation methods skills	44(53.0)	25(30.1)	12(14.5)	2(2.4)	3.3**
Multilateral decisions and agreements on climate change	17(20.5)	50(60.2)	11(13.3)	5(6.0)	2.9**
Statistical analysis of field data on climate change issues	16(19.3)	40(48.2)	19(22.8)	8(9.6)	2.7**
Evaluation of trials on climate change related technology	56(67.5)	21(25.3)	2(2.4)	4(4.8)	3.5**

Effective access and procurement of credit facilities for climate change adaptation	29(34.9)	35(42.4)	18(21.7)	1(1.2)	3.1**
Causes of climate change	41(49.4)	30(36.1)	11(13.3)	1(1.2)	3.3**
Pest control skills to reduce pest attack	45(54.2)	30(36.1)	7(8.4)	1(1.2)	3.4**
Overcoming constraints to climate change adaptation	37(44.6)	32(38.6)	10(12.0)	4(4.8)	3.2**
Programme planning for climate change issues	34(41.0)	30(36.1)	12(14.5)	7(8.4)	3.0**

Source: Field Survey, 2019

Midpoint = 2.5, *Disagreement, **Agreement

3.6 Constraints to attending training in climate change

Table 6 shows the barriers agricultural extension agents face in their efforts to attend climate change training. Inadequate funding for training ($\bar{x} = 3.4$), a lack of financial support from employing organization ($\bar{x} = 3.3$), and an inability to obtain financial support from funders ($\bar{x} = 3.3$) were the major barriers to attending climate change training for the extension agent. This indicates that financial constraints were the primary impediment to agricultural extension agents attending climate change training.

TABLE 6: Constraints to attending training in climate change

Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean
Insufficient fund to support myself for training	58(69.9)	16(19.3)	1(1.2)	8(9.6)	3.4**
Lack of financial support from my organization to attend training	40(48.2)	34(41.0)	3(3.6)	6(7.2)	3.3**
Inability to access financial support from other funders outside my organization	40(48.2)	34(41.0)	4(4.8)	5(6.0)	3.3**
Inability to identify the right training to address my needs	8(9.6)	25(30.1)	36(43.4)	14(16.9)	2.3*
Lack of information on the relevant available training	4(4.8)	28(33.7)	33(39.8)	18(21.7)	2.2*
Organization's rejection of my application to travel for trainings	6(7.2)	31(37.3)	34(41.0)	12(14.5)	2.3*
Excessive workload and limited time to attend training	8(9.6)	17(20.5)	16(19.3)	42(50.8)	1.8*

Source: Field Survey, 2019

Midpoint = 2.5, *Disagreement, **Agreement

4. CONCLUSION AND RECOMMENDATIONS

The research concludes that agricultural extension agents in Abia State are aware of climate change but lack sufficient knowledge about it, and thus require training on a variety of climate change-related topics, most notably basic climate change concepts, the use of cultural practices to mitigate and adapt to climate impacts, and environmentally friendly management practices to reduce climate change. Extension agents face significant financial barriers to obtaining climate change training. According to the study's findings, it was recommended that:

- i. State governments and intervention agencies, particularly those concerned with climate change and agriculture, should prioritize organizing climate change training workshops for agricultural extension agents. This will aid in their overall understanding of climate change issues.
- ii. The Agricultural Development Program should leverage Forth nightly training (FNT) meetings to further educate extension agents about climate change issues.
- iii. The State government, through the Agricultural Development Program, should implement measures, such as financial assistance, to assist extension agents in attending climate change training programmes.

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