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CLIMATE CHANGE AWARENESS STRATEGIES AND FARMERS' CLIMATE CHANGE MITIGATION MEASURES IN IKOM EDUCATION ZONE, CROSS RIVER STATE, NIGERIA

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ABSTRACT

The main purpose of this study was to examine climate change awareness strategies and farmers' mitigation measures in Ikom Education Zone, Cross River State, Nigeria. To achieve the purpose of this study, a null hypothesis was formulated to guide the study. A review of related literature was carried out based on the variables under study. The survey research design was considered useful for the study. A multistage sampling technique was adopted in selecting the wards and six hundred and fifty two (652) respondents used for the study. A thirty-item four point Likert scale questionnaire titled climate change awareness strategies and farmers' climate change mitigation measures (CCASFCCMM) was the instrument used for gathering data for the study. To test the hypotheses formulated for the study, multiple regression statistical tool was used for data analysis. The hypothesis formulated was tested at .05 level of significance. The results from data analysis and hypothesis testing indicated that there was a joint significant positive influence of seminar, agricultural extension services, mass media and community-based/non-governmental organizations' activities on farmers' climate change mitigation measures. Based on these findings it was recommended among others that the use of mass media in disseminating climate change information should be widely encouraged and utilized in helping farmers to continue to adopt sustainable climate change mitigation measures.

Keywords: Climate Change, Awareness, Strategies, Farmers, Mitigation Measures, Ikom Education Zone.

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INTRODUCTION

Climate change is one of the most critical environmental issues facing the world today. This is evidenced by the spate of conferences, campaigns, reports and researches on climate change in the last 20 years (Agenda 21 of Rio declaration, 1992, Intergovernmental Panel on Climate Change (IPCC) 2001, Copenhagen, 2009, Paris, 2016), to mention a few. The agricultural sector has a multiplier effect on any nation's socio-economic and industrial fabric because of the multifunctional nature of the sector. In Nigeria, agriculture is the main source of food and employer of labour employing more than half of the population. It is a significant sector of the economy and the source of raw materials used in the processing industries as well as a source of foreign exchange earnings for the country. Since agriculture in Nigeria is mostly rain-fed, it follows therefore that any change in climate is bound to impact its productivity in particular and other socio-economic activities in the country. The impact could, however, be measured in terms of effects on crop growth, availability of soil water, soil erosion, incidence of pest and diseases, sea level rises and decrease in soil fertility. The issue of climate change has become more threatening not only to the sustainable development of socio-economic and agricultural activities of any farmer but to the totality of human existence.

United Nations Framework Convention on Climate Change (2007) defined climate change as a change of weather which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability. The changes in climate are attributed directly to human activities and composition of global atmosphere over a period of time (Kankam & Oden, 2013). Climate change impacts pose great dangers in Cross River State, Nigeria with consequences such as, sea level rise, flooding, water salinity, increase in pests and diseases among others. These impacts could manifest in food security challenges, damage to infrastructure, social dislocation, and decrease in soil fertility and changes in seasons. Additional impacts include threat to health as rising temperature could bring about diseases such as chronic heat rashes, Cerebra-Spinal Meningitis (CSM), stroke, malaria and other related diseases.

Climate change will affect every citizen, every part of our environment and our natural resources, and thus practically every aspect of our lives, our economy, our urban and sub-urban development patterns. Global concern regarding the devastating impact of climate change has emphasized the need for creating awareness strategies such as seminars, agricultural extension services, mass media and building community based capacity for adaptive measures to mitigate the effects of climate change. These problems of climate change persist by decades in Ikom Education Zone of Cross River State, because farmers are reluctant to fight or keep the local climate on check by their refusal to apply any of the mitigation and adaptive measures provided to them through some if not all of the awareness strategies such as seminars on climate change, environmental campaign groups and others mentioned above in their farms.

Climate Change Mitigation refers to efforts to reduce or prevent emission of greenhouse gases, through reduction in the use of fossil fuel engine to generate power, crop rotation, mulching by farmers to prevent heat from the sun to penetrate the soil, encouraging mix farming, decrease from bush burning, planting trees in farm, engage cover cropping. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behaviour.

According to United Nations Environment Programme (2006), mitigation refers to actions that reduce the human contribution to the planetary greenhouse effect while adaptation

refers to responses to the changing climate and policies to minimize the predicted impacts of climate change. Mitigation actions include lowering emissions of greenhouse gases like carbon dioxide, methane, and particles like black carbon (soot) that have a warming effect. Increasing the net uptake of carbon dioxide through land-use change and forestry can make a contribution as well. As a whole, farming activities result in higher global concentrations of greenhouse gases and to a warming of the planet and the effect is increased by various self-reinforcing cycles in the Earth system (such as the way melting sea ice results in more dark ocean water, which absorbs more heat, and leads to more sea ice loss). Also, the absorption of increased carbon dioxide by the oceans from farming activity is leading to increased ocean acidity with adverse effects on marine ecosystems.

UNEP (2006) in Onnoghien et al. (2023) also pointed out that there is need to make farmers sensitive towards nature through a strong programme (seminars, agricultural extension services, mass media, government policies, community based organizations, news papers, textbooks etc.) of climate change and how to mitigate its impact. Climate change awareness strategies and mitigation measures involves creating knowledge, understanding and values, attitude, skills and abilities through seminars, agricultural extension services, mass media, government policies, community based organizations, textbooks, journals, newspapers, and more among individuals and social groups towards the issues of climate change for attaining a better quality environment.

Climate change specialists Essien et al. (2020) have repeatedly pointed out that a solution to climate change mitigation will require climate change awareness through seminars, agricultural extension services, mass media, community based organizations activities, textbooks, etc and its proper understanding of the mitigation measures. The education of farmers through the above mentioned strategies will go a long way in achieving this purpose; farmers after being educated can provide a vital link in the delivery of environmental knowledge, its associated problems and solution. In order to fasten their awareness towards climate change it is necessary to know how far climate change awareness strategies have been able to influence farmers perception and behaviour towards climate change and investigate what level of awareness farmers poses from some awareness strategies such as, seminars, agricultural extension services, community based organization as well as mass media and the mitigation skills farmers posses from these strategies to aid the reduction of the impact of climate change to global environment. This research therefore assesses climate change awareness strategies and farmer's mitigation measures in Ikom Education Zone of Cross River State.

THEORETICAL FRAMEWORK

Experiential Learning Theory by Kolb (1984)

Experiential learning theory (Kolb, 1984) propounds that individuals learn more effectively by 'doing' than by 'listening' (active rather than passive rote learning). In a four-stage cyclical theory of learning, Kolb's experiential learning theory is a holistic perspective that combines experience, perception, cognition, and behaviour. The environmental philosopher emphasized that the people will act on behalf of the natural world if they have exposure to it and therefore acquire knowledge about it. It is now well established that knowledge about the natural world will influence attitudes regarding the natural world, which will in turn impact one's actions on behalf of the natural world.

The implication of this theory to the study is that ELT learning model suggests that learning requires abilities that are polar opposites, and that the learner (farmer) must continually choose which set of learning abilities he or she will use in a specific learning situation. In grasping experience some of us perceive new information through experiencing the concrete, tangible, felt qualities of the world, relying on our senses and immersing ourselves in concrete reality. Others tend to perceive, grasp, or take hold of new information through symbolic representation or abstract conceptualization thinking about, analyzing, or systematically planning, rather than using sensation as a guide. Similarly, in transforming or processing experience some of us tend to carefully watch others who are involved in the experience and reflect on what happens, while others choose to jump right in and start doing things. The watchers favour reflective observation, while the doers favour active experimentation.

The relevance of the theory to this study is to give guide to the dependent variable which is farmers' climate change mitigation measures; this is because major strength of learning is in the field where farmers are involved in environmental projects. Climate change mitigation has been reported to increase confidence and motivation, when farmers engaged in practical experience which enable them get firsthand information about the impact of farming activities on climate change and how to limit this impact by applying some mitigation and adaptive measures.

Statement of the Problem

Nigeria is experiencing adverse climate conditions with negative impacts on the welfare of millions of people. Farmers are complaining of persistent droughts and flooding, off season rains and dry spells have sent growing seasons out of orbit, on a country dependent on a rain fed agriculture. Climate change is an unprecedented phenomenon and poses threats to food security in Nigeria as the rain forest regions of Nigeria including that of Cross River State are changing with regards to crops planting seasons.

Climate change has increased the region temperature, reduced the air quality we breath, pollute water, caused flooding, changes in seasons, infrastructural decay; increased pests and diseases, reduced soil fertility and reduced crops yields over the years and farmers are blaming the supreme being for the changes in climate and seasons while they keep on exploring and exploiting the earth's resources. Unless climate change is tackled, all the "best efforts" to help this great country, to come out of food shortages could be to no avail. One of the biggest threats is growing climate unpredictability, which makes subsistence farming difficult. This study posed the following questions: are farmers aware that the earth's temperature is rising because of some of their farming activities?, are awareness strategies or sources of information that farmers in Ikom Education Zone obtain information are assessable to farmers?, are the climate change awareness strategies in anyway influences the mitigation measures adopted by farmers?, does the mitigation measures applied by farmers in Ikom Education Zone reduce climate change impact on farm productivity and environmental safety?.

Purpose of the Study

The main purpose of the study was to examine climate change awareness strategies and farmers climate change mitigation measures in Ikom Education Zone, Cross River State, Nigeria. Specifically, the study seeks to:

- Ascertain if there is joint influence of seminar, agricultural extension services, mass media and community-based/non-governmental organizations' activities on farmers' climate change mitigation measures

Hypothesis

The following hypothesis was formulated to guide the study:

- There is no joint significant influence of seminar, agricultural extension services, mass media and community-based/non-governmental organizations' activities on farmers' climate change mitigation measures

LITERATURE REVIEW

Seminar Attendance and Farmers' Climate Change Mitigation Measures

In the study of Anderson et al. (2016) in Onnoghen et al. (2023) on climate change education for mitigation and adaptation. The article presents evidence-based findings on the factors that influence skills, attitude and behaviour change the most, in order to determine what works for formal and non-formal climate change education content, including environmental education, climate change and scientific literacy, and education for sustainable lifestyles and consumption. The evidence shows that educational interventions are most successful when they focus on local, tangible, and actionable aspects of sustainable development, climate change and environmental education, especially those that can be addressed by individual behaviour. Finally, given that the majority of evidence that exists is anecdotal, often in case study format without monitoring and evaluation processes in place that could lead to quantitative as well as qualitative data, the article highlights remaining questions and areas of research that need to be investigated in order to guide effective climate change education policy and practice.

Nwobodo and Agwu (2015) in Essien et al. (2020) carried out a study on Knowledge level of youth farmers on climate change in Benue State of Nigeria. The study examined the knowledge of youth farmers in Benue State of Nigeria on climate change. Multi-stage sampling technique was used to select 120 respondents from two agricultural zones in the study area. Data was collected using interview schedule. Descriptive and inferential statistics were used in data analysis. Results show that majority (92.4%) of the respondents had moderate knowledge of climate change, major sources of climate change information include: radio (85.0%), friends and neighbours (60.8%), personal observation (55.8%), and family members(46.7%). The socio-economic factors affecting knowledge of climate change by youth farmers include: sex ($t = 2.353$; $p \leq 0.022$) and household size ($t = 3.888$; $p = 0.000$). It was recommended that the knowledge level of youth farmers on climate change should be improved by providing them relevant information through the mass media, movies; and by providing climate change educational platforms in schools and through outreaches.

Oruonye (2011) in Essien et al. (2020) conducted a study on an assessment of the level of awareness of the effects of climate change among students of tertiary institutions in Jalingo Metropolis, Taraba State Nigeria. A descriptive survey design using data collection instrument such as questionnaire was adopted. Two hundred and twenty five (225) students were drawn disproportionately from the tertiary institutions in Jalingo Metropolis. Structured questionnaire

and focus group discussion were used in eliciting information from the student on their knowledge of climate change, effects of climate change on the individual and community and ways of reducing the effects of the problem. The frequency counts and item analysis method were used to analyse the data collected. The result of the findings showed that 18.2% of the students interviewed have never heard about climate change before. Of the 81.8% that have heard about climate change, 89% do not know what climate change is all about, its causes, effects, and possible adaptive or mitigative measures. This study recommended the need to establish climate change awareness club in the tertiary institutions in Jalingo metropolis of Taraba State and the nation at large so as to mobilize the students who are future leaders on the importance of bracing up to the challenges of climate change. The author posited that climate change has become one of the major global challenges of the 21st century. It has been observed that the developing countries of the world (Nigeria inclusive) will suffer most from the impacts of climate change. As the world battles with measures of finding lasting solution to the problem of climate change, this study examines the level of awareness of the problem among students of tertiary institutions in Jalingo Metropolis of Taraba state, Nigeria.

Agricultural Extension Services and Farmer's Climate Change Mitigation Measures

The study of Unimtiang (2018) in Onnoghen et al. (2023) examined climate change awareness strategies and farmers' mitigation measures in Ikom Education Zone, Cross River State, Nigeria. To achieve the purpose of this study, five null hypotheses were formulated to guide the study. A review of related literature was carried out based on the variables of this study. The survey research design was considered useful for the study. A multistage sampling technique was adopted in selecting the wards and six hundred and fifty two (652) respondents used for the study. A thirty-item four point Likert scale questionnaire titled climate change awareness strategies and farmers' climate change mitigation measures (CCASFCCMM) was the instrument used for gathering data for the study. To test the hypotheses formulated for the study, simple linear regression and multiple regression statistical tools were used for data analysis. The hypotheses formulated were tested at 0.05 level of significance. The results from data analysis and hypotheses testing indicated that there was a significant influence of seminar, agricultural extension services, mass media, and community-based / non-governmental organizations' activities on farmers' climate change mitigation measures in the study area. Based on these findings it was recommended among others that the use of mass media in disseminating climate change information should be widely encouraged and utilized in helping farmers to continue to adopt sustainable climate change mitigation measures. Community-based organizations as well as non-governmental organization should be used more effectively in sensitizing and building the capacity of farmers to be able to cope with and adopt positive and climate change mitigation measures.

In a study of Iwuchukwu et al. (2014), on knowledge and roles of Non-Governmental Organizations (NGOs) in Climate Change Mitigation and Adaptation in Anambra State. The study ascertained knowledge and perceived roles of state based-Non Governmental Organizations (NGOs) in climate change mitigation and adaptation in Anambra State, Nigeria. Multistage random sampling technique was employed to select thirty-five respondents from 4 local government areas and 7 NGOs in the state while data were collected with questionnaire. Percentage and mean scores were used in analyzing the data. Results revealed that greater proportion (60%) of NGO members were not aware of climate change while about 63%

indicated that issues on climate change have not been included in their programme. They perceived major causes of climate change as over industrialization ($M=2.77$) and use of automobiles ($M=2.74$) while land degradation and over flooding ($M=2.77$ each) were major effects of climate change. Proper land use and management ($M=2.89$) and reforestation/ ($M=2.83$) were mitigation measures while minimum tillage ($M=2.74$) and use of resistant varieties ($M=$) were adaptive measures to climate change as perceived by them.

They further perceived creation of awareness and sensitization of rural people/farmers about climate change (77.1% each) and helping government in enforcement of policies and laws that will help to mitigate climate change (57.1%) as roles they can play in climate change mitigation and adaptation. They did not perceive any major problem that can mar their contributions to climate change issue. The study emphasized on the need for private sector especially NGOs investment and participation in global and sensitive issues like climate change. This will go a long way in discovering and disseminating quick and useful information on climate change and probably ultimate solution to it.

In the study of Okoro et al. (2016) on Climate Change Information Needs of Rural Farmers in Enugu State, Nigeria. The study assessed the information needs of rural farmers on climate change issues in Enugu State, Nigeria. Using the multistage sampling procedure, 152 respondents were selected and data were collected through the use of a structured interview schedule. Descriptive statistics, factor analysis and multiple linear regression model were used for the analysis. Results of the study showed that all (100.0%) the respondents were aware of climate change, but lacked adequate knowledge of key climate change issues. The multiple linear regression model revealed a significant influence of years of formal education ($t= 2.020$; $p\leq 0.05$), membership of social organizations ($t=2.385$; $p\leq 0.05$), number of climate change training ($t= -2.438$; $p= p\leq 0.05$), farm size ($t=2.564$; $p\leq 0.05$), and access to credit ($t=2.833$; $p\leq 0.05$) on the respondents' level of knowledge on climate change. The information needs on climate change as perceived by farmers were: use of improved varieties ($\chi= 1.80$), occupational diversification ($\chi=1.78$), and change in timing of farm operations ($\chi=1.76$), among others. Poor extension services and infrastructure were the major constraints to effective communication of climate change information. The study recommends the empowerment of extension agents by government to teach farmers climate change adaptation and mitigation measures using languages they can understand and in a participatory manner so as to enable them cope with the challenges of climate change.

Hamisu et al. (2017) conducted a study on A Review on Current Status of Agricultural Extension Service in Nigeria. This study reviewed on the current status of agricultural extension in Nigeria. Numerous extension approaches have been used in Nigeria. The basic and essential task of agricultural extension has been and still is: The exchange and means of sharing information, knowledge and skills for improved livelihood regardless of its organization. In a changing world and its environment, however, the context and hence the challenges in agricultural extension service changes; such as: improvement in agricultural production, environmental degradation, biotechnology, HIV/AIDs; reduced government support for public research and extension; entrance of private service providers; increasing private sector involvement and development of information and communication technology in extension service. The conventional development paradigm (T & V, University extension approach, ministry of agriculture approach, commodity/sectorial agency extension, non-profit organizations or NGOs,).

Mass Media and Farmer's Climate Change Mitigation Measures

The study of Admire (2011) in Onnoghen et al. (2023) on Climate change, Mediation and Mediatisation in Southern Africa: towards climate and environmental journalism, discussed climate change which has become an issue of concern for media in recent years. Given the primacy of mediation and mediatisation in modern societies, this paper argues that development journalism which treats audiences as citizens, while prioritising public listening, and deliberative citizenry on climate change discourses is the missing link in current advocacy strategies. This paper demonstrates that representations and news discourses of climate change in selected South African and Zimbabwean newspapers have largely been framed within the strictures of the global scientific hegemony which gives primacy to alarmism, technocratic jargon, and officialdom. Such reportage has thus far been instrumental in the creation, reproduction and circulation of top down approaches to climate change adaptation which obfuscates the role of indigenous knowledge systems and constricts voices of the poor in local debates. It also argues that advocacy and translation role of media in Africa is being constrained by the dearth of science journalism, news commoditisation, media commercialisation, and urban bias of newsrooms.

In a context where climate change is threatening to wipe off livelihoods of billions of people, the media is crucial for the dissemination of truthful information on weather forecasts and disaster warning to the public within the climate information cycle. It argues that both traditional and citizen centric media are important cogs in the climate information cycle as information disseminators, mobilisers, translators, environmental scanners, platforms for debate and fora for intercultural learning.

Also, Matthew et al. (2015) conducted a study on Using Web 2.0 and Social Media Technologies to Foster Pro-environmental Action in United State of America. The authors agreed that Research from a variety of disciplines suggests that online technologies (i.e., Web 2.0 and social media) have considerable potential for spurring pro-environmental action; however, relatively little work examines how to effectively capitalize on these communication and organization tools. This review describes the Technologies for Pro-environmental Action Model (TPAM), a conceptual framework that explicates how different functions of Web 2.0 and social media (i.e., informational, relational, and experiential) can generate and/or facilitate personal, social, and contextual pathways to environmentally responsible behaviors.

As derived from the TPAM, the likelihood of achieving practical goals of increasing pro-environmental behaviours is enhanced when technological functions are matched to the different pathways to pro-environmental action. For example, the relational function of technologies, as exemplified by Social Networking Sites (SNSs), should be particularly effective in communicating social norms supportive of environmentally responsible behaviors. The TPAM is intended as a guide to develop novel approaches, research questions, and methodologies in leveraging Web 2.0 and social media technologies to promote pro-environmental action. Results will contribute to basic theory development and work in applied settings (e.g., local environmental organizations) in order to effectively communicate and organize with different segments of the population to increase sustainable behaviours.

Community base Organization/Nongovernmental Organizations Activities and Farmer's Mitigation Measures

A study by Josiane and Khaldoun (2017) on the role of community based organizations in transferring climate change information in Rwanda revealed that the authors agreed that climate change poses a threat for agriculture and development in Rwanda. The agricultural sector in Rwanda is the engine of economic growth and modernization. This study examined the role of community based organizations (CBOs) in transferring climate change information to farmers' communities in Rwanda. Three districts (Kirehe, Rwamagana and Ngoma) were studied and two active CBOs (RWIRRI and RADO) were selected for data collection. A total of 100 farmer households were interviewed. A focus group discussion of fifteen participants was conducted in the community. The results showed that the CBOs played a good role in increasing farmers' awareness related to climate change and adaptation strategies. CBOs had built a capacity in the local communities regarding improved agricultural methods, climate variability and climate change effects. The adaptation strategies could improve the livelihood conditions of the communities. CBOs had played a role in increasing farmers' awareness and had built their capacity regarding to climate change and crops productivity.

The study of Abamara (2014) in Essien et al. (2020) on factors affecting the youth involvement in community development in Umueshi autonomous community of the Eastern Nigeria focused on the factors affecting youth involvement in community development in Umueshi Autonomous Community of the Eastern Nigeria. The paper x-rayed the need for community development as a catalyst to achieve optimal potentials among youth in various communities. The paper went further to discuss factors affecting the youth in community issues with reference to climate change. Maslow theory of hierarchy of needs was used to demonstrate the motives and stages Umueshi youths would pass through before attaining a meaningful livelihood. The development index bar chart was plotted showing the developmental rise and fall in the said community. Abamara (2014) then emphasized that education is the bedrock for any meaningful community development globally. In conclusion he posited that community development is a collective responsibility that must be achieved by the youth of this community, and recommendations were made among others that Federal and State Governments should provide enabling environment for youths to ply their trades in order to be empowered economically.

Udensi et al. (2013) in Onnoghen et al. (2023) carried out a study on Community leadership and the challenges of climate change mitigation and community development in Nigeria: The case of Boki local government area, Cross River State. The study examined the level and extent to which community leaders contribute towards successful community development projects in Boki Local Government Area, Cross River State. A total of 150 community leaders selected through multi-stage sampling technique participated in the study. Frequency counts, percentage, Group Arithmetic Mean and Mean Weight Value were utilized in realizing the objectives of the study. It was observed that leadership positions are not the exclusive preserve of a particular sex, age group, marital status or educational status; rather result indicated that the duration of residence of community leaders is a significant factor in the success of community development projects in the study area. The study concluded that knowledge on the level to which community leaders have participated in community development and climate change mitigation, and the challenges they face have serious implications for achieving sustainable community development projects. It was recommended among others that for

sustainable community development to be achieved in the area, specific and deliberate strategies should be evolved to remedy some of the problems identified. The study suggests that more and dedicated community leaders should be identified and responsibilities aimed at improving the welfare of the people assigned to them.

METHODS

The research design that was adopted for this study is the survey research design. This design was adopted because the researchers’ has no control of the independent variables; climate change awareness strategies as well as the dependent variable which is climate change mitigation measures among farmers.

This study was carried out in Ikom Education Zone of Cross River State, Nigeria. The area is divided into six local government areas, namely: Abi, Yakkur, Ikom, Etung, Boki, and Obubra. It has a projected population of one million five hundred and twenty five thousand two hundred twenty (1,525,220) (National Population Commission 2017 projection).

The population of the study comprises all the farmers in Ikom Education Zone of Cross River State. There are one hundred thousand, three hundred and sixty two (100,362) registered farmers in Ikom Education Zone, Cross River State. See table 1.

The researchers adopted multistage sampling techniques to select the sample for this study. A stratified sampling technique was used to group the population under study into local government area and Gender. Simple random sampling technique was used in selection of wards in local government areas in Ikom Education Zone, purposive was used to select the number of respondents in each LGA’s in the zone while accidental sampling techniques was used to administer the questionnaire for data collection. The sample for this study was 667 male and female farmers from six (6) local government areas with (66) wards in Ikom Education Zone of Cross River State. The number of farmers selected was to obtain adequate representative samples of farmers from each Local Government Areas. All the selected wards in the six LGA’s selected were used to ensure equal representation in the study. See table 2.

The instruments used for data collection was a set of survey questionnaire called “Climate Change Awareness Strategies and Farmers Climate Change Mitigation Measures Questionnaire” (CCASFCCMMQ). The questionnaire was divided into three sections A, B and C. Section A focused on the personal data of the farmers such as sex, age, local government area of farmer, educational qualification. Section B elicited information on the various climate change awareness strategies under studies while section C measure mitigation measures among farmers. Validity refers to the ability of a research instrument to measure what it is meant to measure. The questionnaire was developed by the researchers through extensive literature review.

Table 1: Population of farmers in Ikom Education Zone of Cross River State

S/N	Local Government	Population		Total
		Male	Female	
1.	Abi	7318	9318	16636
2.	Boki	6730	10000	16730
3.	Etung	7334	9610	16944
4.	Ikom	8468	8468	16936
5.	Obubra	1320	3736	16936
6.	Yakurr	8100	8100	16200

Source: Cross River State Ministry of Agriculture (CRSMA)

Table 2: A representation of percentage sampled from each wards and LGA's in Ikom Education Zone of Cross River State

S/N	LGA's	Population		Total	Total number of wards	Wards sampled	Respondent sampled per LGA	Percentage sampled %
		Male	Female					
1.	Abi	7318	9318	16636	10	2	167	1
2.	Boki	6730	10000	16730	11	2	167	1
3.	Ikom	8468	8468	16936	11	2	167	1
4.	Obubra	13200	3736	16936	11	2	167	1
5.	Yakurr	8100	8100	16200	11	2	167	1
6.	Etung	7334	9610	16936	12	2	167	1

The initial pool was made up of 50 items. The instrument was first given to a lecturer in the Department of Environmental Education and three (3) experts in research and statistics to scrutinize for item relevance to the variables under consideration. While some items were merged few others were re-written for inclusion in the instrument as a result of the scrutiny. Finally a draft of 30 items was used in the study. To ascertain the reliability of the instrument, a trial test was conducted in Akankpa LGA on 50 farmers drawn from the population who are not members of the sample to be used for the study. The single test reliability method was adopted. In this approach, the instrument was administered to the sample. The responses from the administration were correlated using Cronbach alpha Coefficient statistic. The Cronbach alpha coefficient results showed a reliability coefficient ranging from 0.676 to 0.732 which indicated that the instrument was reliable enough to be used for this study. See table 3.

Table 3: Cronbach alpha reliability of the instrument

Variables	No. of Items	Mean	SD	Cronbach Co-efficient
Seminar	5	13.742	2.836	0.676
Agricultural extension sciences	5	13.284	2.572	0.704
Mass media	5	15.621	3.718	0.732
CBOs/NGOs	5	14.344	3.006	0.684
Famers mitigation measures	10	24.328	5.324	0.713

The researchers with the help of research assistant carryout the administration of the questionnaire in all the wards that were selected to participate in the study. There was prior notice given to all the heads of the villages selected notifying them about the researchers' intention to visit their village. The instrument was administered on the sample group under the closed supervision of the researchers and research assistants. The research assistants were trained of the techniques involved in the administration of the instruments. There are therefore asked to ensure individual farmers' concentration and also prevent exchange of information and discussion of any form among the subjects. Six hundred and sixty seven (667) copies of questionnaire were administered, but six hundred and fifty two (652) were properly filled and returned.

The items was scored on a four point likert scale ranging from Strongly agree (SA), Agree (A), Disagree (D) and Strongly disagree (SD) for each worded items. But the reverse is

the case for negatively worded items. The questionnaires were presented in order to remove ambiguity and misinterpretation before administrating them to the actual samples.

RESULTS

The mean and standard deviation for the main variables in the study are presented below.

Table 4: General description of variables

Variables	N	Mean	SD
Seminar	652	14.3543	1.03484
Extension services	652	16.2331	2.42002
Mass media	652	15.5322	2.36407
Community-based/NGO	652	14.6871	2.39180
Climate change mitigation measures	652	24.2915	3.23181

Hypothesis: There is no joint significant influence of seminar, agricultural extension services, mass media, community-based/non-governmental organizations activities on farmers climate change mitigation measures.

Table 5: Multiple regression analysis of the influence of seminar, agricultural extension services, mass media, community-based/non-governmental organizations activities on farmers climate change mitigation measures in Ikom Education Zone of Cross River State (N = 652)

Model	R	R ²	Adj.R ²	Standard error of estimate	
1	.543	.295	.290	3.56511	
Source of variance	SS	Df	MS	F	Sig
Regression	3434.905	4	858.726	67.563	.000
Residual	8223.371	647	12.710		
Total	11658.276	651			
Variables	Unstandardized coefficients		Standardized coefficient	t	Sig
	B	Std error	Beta		
(Constant)	17.723	2.418		7.330	.000
Seminar	-.128	.136	-.031	-.939	.348
Extension services	-.026	.065	-.015	-.398	.690
Mass Media	.828	.065	.463	12.686	.000
CBOs/NGOs activities	-.270	.070	.153	3.874	.000

The regression coefficient showed that two independent variables out of the four; mass media ($\beta = .463$; $t = 12.686$; $p < .05$), and community-based/non-governmental organizations' activities ($\beta = .153$, $t = 3.874$, $p < .05$) are the most influential variables in the prediction of farmers' climate change mitigation measures because they are statistically significant. The result further showed that seminar ($\beta = -.031$; $t = -.939$; $p > .05$) and agricultural extension services ($\beta = .015$; $t = -.398$; $p > .05$) are not influential in the prediction of farmers' climate change mitigation measures in Ikom Education Zone of Cross River State.

The result of analysis presented in Table 5 showed that the combination of all the predictor variables (seminar, agricultural extension services, mass media and community-based/non-governmental organizations' activities) are joint predictors of farmers' climate change mitigation measures in Ikom Education Zone of Cross River State. The predictor variables accounted for 29.5% of the variance in farmers' climate change mitigation measures in the study area. Furthermore, the regression ANOVA revealed that, there was moderate joint contribution of the predictor variables to farmers' climate change mitigation measures $F(4, 647) = 67.563$; $p < 0.05$. Based on the result, it was revealed that when all the contributor variables; seminar, agricultural extension services, mass media and community-based/non-governmental organizations' activities are used together, they significantly contribute to farmers' climate change mitigation measures.

DISCUSSION OF FINDINGS

The finding from analysis and testing of hypothesis revealed that when all the contributor variables seminar, agricultural extension services, mass media and community-based/non-governmental organizations' activities are used together, they significantly contribute to farmers' climate change mitigation measures in Ikom Education Zone of Cross River State. This could be because the level of seminar usage as a strategy for creating climate change awareness is low and the little influence observed in the study is as a result of the few farmers that have attended seminar on climate change. It is believed that the greater the usage of seminar, the more positive mitigation measures farmers in the study area will adopt. The finding of this study agreed with the finding of Unimtiang (2018) which reported that seminars are useful outlets for the promotion of climate change mitigation and campaign. Awareness creation activities carried out through seminars and the various anti-environmental degradation clubs and organizations that deal with environmental protection have been unsuccessful. It is noted that both urban and rural people were not well informed about the mode of destruction and protection of the environment.

The finding of this study contradicted the finding of Oruonye (2011), which reported that of the many sources of information available to farmers, agricultural extension is the most important for analyzing the adoption decision. Also, in the specific case of climate change adaptation, access to climate information may increase the likelihood of uptake of adaptation techniques.

The finding of this study also supported the finding of Admire (2011) which reported that the media has become the important part of life. However, we know that, mass media is to inform and educate the people. Awareness is the key role to reduce these impacts of climate change. Media can play a vital role in creating awareness about climate change. Much research has not been conducted into the representation of climate change in the media. Specifically, the communication of climate change from scientists and policy-makers to the public via the mass media has been a subject of major interest because of its implications for creating national variation in public understanding of a global environmental issue. Media knows the significance of covering environmental issues. All media like T V, Radio, Newspaper and new media spread the news and information at the speed of light. Language press, regional papers, small papers they all give at least minimum importance to climate change coverage. These small papers information helps the people to know the regional climate and weather.

The finding of this study also supported the finding of Brennan, Barnett, and Lesmeister (2007) which stated that the organization, network, the capacity of institutions and agencies

(public, private and non-governmental) are to work in dialogue with citizens to shape and determine change in their communities. Community development and enlightenment plays a crucial role in supporting active democratic life by promoting the autonomous voice of disadvantaged and vulnerable communities in the globe. It has a set of core value/social principles covering human rights, social inclusion, equality and respect for diversity; and a specific skills and knowledge base. Good community development is a catalyst that helps people to recognize and develops their ability and potential and organizes them to respond to problems and needs which they share. It supports the establishment of strong communities that control and use assets to promote social justice and help improve the quality of community life in terms of provision of infrastructures and basic social amenities. It also enables the community and public agencies to work together to improve the quality of government. The merging of community building and youth development has been the core of recent youth engagement literature.

CONCLUSION

The study aimed at assessing climate change awareness strategies and farmer's mitigation measures in Ikom Education Zone of Cross River State. The findings of the study revealed that there is a joint significant influence of seminar attendance, agricultural extension services, mass media and community-based/non-government organizations' activities on farmers' climate change mitigation measures in the study area.

Changes in global climatic conditions have become increasingly obvious especially in the area of this study. The need for people especially the rural inhabitants to develop adaptation and/or mitigation measures has become paramount in order to cushion the harsh effects associated with such changes. Climate is seen as a consequence of poor human-environment interaction that has resulted in severe alterations in natural processes. This call for urgent step that would enable people cope with changes in climate. Environmental awareness has been identified as a viable tool that can be utilized to sensitize and build capacity for climate change adaptation and possible mitigation measures. It has therefore become an issue of utmost consideration among various stakeholders to brace up and empower the vulnerable with requisite support that would enable them cope with the effects experienced as a result of climate change. This is because an uninformed or poorly informed individual lives in uncertainty and cannot save the environment from further degradation and damage. Hence, the need to raise a citizenry that is aware of and capable of participating actively in solving environmental problem and preventing the occurrence of new ones at all times.

Recommendations

Based on the findings obtained in this study, the following recommendations were made:

- Relevant stakeholders should ensure that seminar does form a core environmental awareness strategy that would be relied on to promote farmers' climate change mitigation measures in the study area.
- Agricultural extension services should be expanded and intensified in the study area in order to enable farmers developed better and improved climate change mitigation measures.

- The use of mass media in disseminating climate change information in the study area should be widely encouraged and utilized in helping farmers understand and continue to adopt useful and sustainable climate change mitigation measures.
- Community-based organizations as well as non-governmental organization should be used more effectively in sensitizing and building the capacity of farmers to be able to cope with and adopt positive and climate change mitigation measures.

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