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Research

Capability Competence of Agricultural Extension Staff for Helping Rural Farming Communities Adapt/Mitigate to Climate Change Variability in Imo State, Nigeria

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ABSTRACT

The study examined the capability of extension staffs of Imo ADP (Agricultural Development Programme) in helping rural farmers adapt/mitigate to climate change variability in agriculture. The specific objectives were to identify extension capability indicators of the staff; ascertain climate change awareness of the staff; examine the adaptation strategies promoted by extension staff; and identify perceived climate change capability competence of extension staff. One hundred and twenty extension staff of the Imo ADP was purposively selected and questionnaire administered to them. Percentage and mean were used to analyse the data. The findings reveal that the Imo ADP had more middle level personnel and few Subject Matter Specialists (SMS) with a low extension agent farmer ratio of 1:5947, with few bicycle and motorcycles. The staffs were aware of climate change menace through several sources with 91.7% receiving training on climate change. Extension workers promoted adaptation strategies like conservation agriculture (M=2.54), use of improved crop varieties (M=2.61), awareness campaigns (M=2.70), use of indigenous plants (M=2.81). The capability competence included having a good understanding of climate change (M=2.64), help others obtain credible climate change information (M=2.56) and ability to identify climate change impacts (M=2.63). It is recommended that more extension staff be engaged to reduce the low extension farmer ratio, train staff regularly on climate change issues to prepare them to address rural farmer climate information problems.

Keywords: Climate change, capability, adaptation, competence, Information, Extension staff.

INTRODUCTION

Climate change has currently become an emerging prominent issue in the world. The changing climatic conditions, severely affect agriculture because it depends on local weather parameters like temperature, rainfall, humidity, etc. in long term [1]. Agriculture therefore is affected in several ways such as: productivity and yield, in terms of quantity and quality of crops; agricultural production practices, through changes in irrigation and agricultural and farming inputs such as herbicides, insecticides and fertilizers. Others include environmental effects, in relation to frequency and intensity of water drainage, soil erosion, reduction of crop diversity; rural space, through loss and gain of cultivated lands, land speculation; adaptation, as plants may become more or less competitive, such as flood resistant or salt resistant varieties of rice.

Therefore, to find technical solutions for boosting agricultural productivity sustainably, capacity building of agricultural personnel (Extension and advisory services providers) need be pursued. Rural advisors will need new capacities and skills and rural service providers will have to undergo institutional changes. Developing closer linkages between agricultural researchers and extension providers than currently exists in most countries is critical because of the strong need for researchers to tap local knowledge, have a clear understanding of farmers ' needs and problems as well as obtain feedback on how technological interventions are working. This is because climate change adaptation calls for changes in managing natural resources at the landscape level [2]. Rural Advisory Services (RAS) providers will need to move beyond their typical focus at household/farmer level to working at other scales.

Extension providers can play a major role in strengthening and supporting sustainable agricultural practices through the following: technology development and information dissemination, strengthening farmers ' capacity, facilitation and brokering, and advocacy and policy support. It contributes to achieving sustainable agriculture by

disseminating climate information and technologies on production practices for climate change adaption through innovative approaches [1]. Extension support for farmers ' production and especially, smallholders is therefore, critical considering the variable climate of their production systems. Again, the lack of climate change and variability-related competencies among extension staff for effective support to farmers is a very big problem globally and seemed overlook by many [3,4].

To achieve these objectives an extension organization needs to develop human, logistics and financial capability [5]. Capability here is the command an extension organization has over physical, financial and human resources enabling it to serve its clients-the farmers [5]. Specifically, capability in this paper relates to issues such as extension coverage, intensity, the quality and quantity of staff, distribution of farmers by gender, budgetary provision for extension compared to other areas of agriculture and governance. While competency here according to Lucia and Lepsinger citing Parry is a cluster of related knowledge, skills and attitudes that affects a major part of one's job [6]. Studies on the type of climate variability competencies needed by extension staff in Imo State to support smallholder producers have not received the attention it deserves.

The purpose of the study is to determine the extension agents' competencies, regarding their climate variability knowledge and skills to support smallholder farmers in adapting and mitigating climate change variability. To address the above, the following questions are examined in this study: Do public extension agents have the academic qualifications/training, including climate variability knowledge and skills, to support smallholder farmers in the State? What are the climate variability coping and adaptation strategies that public extension agents have been promoting to support smallholder farmers in the study area? The specific objectives were

To identify extension capability indicators of the staff;

Identify perceived climate change capability competence of extension staff;

Examine the adaptation strategies promoted by extension staff

METHODOLOGY

The study was carried out in Imo State ADP (Agricultural Development Project). The population of the study consists of all extension technical Officers, extension supervisors, field agents of Imo State ADP. Stratified random sampling technique (a sampling technique used when the sample does not constitute a homogenous group) was used in selecting the extension respondents for the study. The first strata composed of 18 Technical Officers, ZEOs and SMSs), drawn from the three agricultural zones (see table). The second group comprised 39 Block Extension Supervisors (BES), while the third strata comprised of 113 Extension Agents (EAs) as shown in **Table 1**. Out of the 18 ZOEs/SMSs, 13 were randomly selected and 37 BESs were also selected randomly, while 70 EAs were randomly selected from 113, making a total of 120 extension officers. Data collected with questionnaire were analyzed using descriptive statistics. This includes use of percentage presented in frequency distribution table to achieve objective 1. While objective 2 was achieved on a three point Likert-type scale of highly competent, competent and not competent, assigned scores (weighted index) of 3, 2 and 1. The weight index of 3,2 and 1 were added to give 6 divided by 3 to give 2.0. Any mean value less than 2.0 was taken as incompetence or not competent. Objective 3 was achieved on a four point Likert-type scale of strongly agree, agree, disagree and strongly disagree weighted 4, 3, 2 and 1. The weight indexes were added to give 10 divided by 4 to give 2.50. Any value less than 2.50 was not accepted as coping strategies promoted by extension staff, while 2.5 and above was taken as coping strategies promoted (**Table 1**).

Table 1: Distribution of Imo ADP extension personnel.

Category	Owerri	Orlu	Okigwe	Total selected
ZEOs/SMSs	9	4	5	13
BESs	20	8	11	37
Eas	56	25	32	70
Total				120

RESULTS AND DISCUSSION

Extension workers' capability indicators

Table 2 shows that 36.6% of the extension staff had the Ordinary National Diploma (OND) rechristained ND today, and 26.6% had the National Certificate in Education (NCE), 16.5% had Bachelor's Degree, 16.6% had HND, while 8.3% had M.Sc. academic qualification of a staff exposes him to several challenges in life and the higher the academic pursuit, the more productive. Swanson stated that there are lots of variations in the basic academic qualifications of frontline extension staff in most developing countries and some with low educational qualification [7]. Obiechina supported this when he said that some ADPs in Nigeria use contact farmers and lowly educated staff to face the challenges of today' s agricultural world [8]. Again the agency has the following staff percentage, 10% of Zonal Extension Officers, 30.8% of Block Extension supervisions, 24.2% of Block Extension Agents and 70.3% were Extension Officers. This is grossly inadequate and cannot reach the over 303,333 farm families in the state. There is need to engage more hands that are qualified to reduce the Extension Agent farmer ratio of 1.5947 farmers as shown in **Table 2.** Available research reports have

shown that the ADP extension system is constrained by inadequate funding, dearth of well trained and experienced staff, and inadequate communication and dissemination of research results to farmers [8,9]. Therefore extension organization should develop human, physical and financial command to perform effectively. This is pertinent because extension staffs are saddled with the execution of projects such as the National Special Food Security Programme, the Root and Tuber Expansion Programme and the Third National FADAMA Development Programme and many more.

Table 2: Extension workers capability indicators.

Capability Indicator	Frequency	Percentage
Academic Qualification		
OND	4.4	36.6
NCE	26	21.6
HND	20	16.6
B.Sc	20	16.7
M.Sc	10	8.3
Total number of Extension Worker		
ZEO/SMS	13	10.8
BES	37	30.8
EAs	70	58.3
Awareness of Climate Change		
Aware	120	100
Not Aware	-	-
Training on Climate Change		
Trained	110	91.7
Not Trained	10	8.3
	Total no	
Farm Families	303,333	
EA farm family ratio	1;5947	
Mobility Provision		
Bicycle	10	
Motorcycle	12	
Source: Field survey data,2019		

The agency had no functional vehicles for visits and outreach and had only 10 bicycles and 12 motorcycles more than half of the machines/bicycles broken down and in bad shape. For extension to serve farmers well, they must have functional resources/materials for discharge of their duties. A lack of working resources renders the extension staff incapable. Again, all the extension staff is fully aware of climate change impact and 91.7% agreed to have received training in the area of climate change. During oral discussion, the respondents were asked how they became aware of climate change. They responded that some got information from fellow extension staff, personal experiences, radio/television, books/journals, meetings and workshops.

Extension staff climate change capability competence

Table 3 showed the capability of extension staff to help farming communities in Imo State, adapt to climate change. With the discrimination mean index of 2.0, the table reveals that the extension staff have a good understanding of climate change (M=2.64), this means that the staff are knowledgeable in this area. Having good knowledge will help the agent to do his work well. They said they can help farmers obtain credible information (M=2.56). They are capable of identifying climate change impacts (M=2.65), identify groups that are vulnerable to climate change (M=2.50), demonstrate to farmers mitigation plans/actions (M=2.51), create and raise farmer awareness on climate change impacts (M=2.33), develop/ determine channels for disseminating climate information (M=2.01), identify target audience for climate information

(M=2.20), ability to give early warnings to farmers (M=2.31) and ability to tailor information to need to farmers (M=2.31).

Table 3: Climate change capability competence.

Capability competence	Mean
Have good understanding of climate change	2.64
Help others obtain credible climate change information	2.56
Ability to obtain credible climate change information	2.57
Ability to identify climate change impacts	2.68
Adequate knowledge of causes of climate change	1.37
Possess adequate knowledge of adaptation strategies	1.51
Assess vulnerabilities of livelihood assets to climate change	1
Identify groups vulnerable to climate change	2.5
Incorporate climate programs into extension mission goals	1.48
Perform economic risk assessment of climate change impacts	1.87
Demonstrate to farmers mitigation plans and action	2.51
Develop climate change education & communication plans	1.8
Create and raise farmer awareness to climate change impacts	2.33
Develop/determine channels for disseminating climate information	2.01
Identifying target audience for climate information	2.2
Ability to give early warnings of climate information	2.31
Tailoring information to the need/perception of rural farmers	2.31
Ability to predict weather	1.71
Source: Field survey data, 2019	

However, the respondents do not have, adequate knowledge of the causes of climate change (M=1.37), possess adequate knowledge of adaptation strategies (M=1.51), access the vulnerability of livelihood assets (M=1.80), ability to predict/ forecast weather condition (M=1.71), develop climate change education/communication plans (M=1.87). The above means that the extension staff still need more training, exposure and knowledge on climate change adaptation, mitigation and others. They should be able to develop and design education programme for teaching farmers. There is great need for extension staff to predict and forecast weather. This will go a long way in helping farmers adapt to climate change and also win the confidence of the local/rural farmers.

Coping/adaptation strategies promoted by extension staff

Table 4 shows the adaptation strategies/measure promoted by extension staff for rural farming communities. The measures included conservation agriculture with a mean (M) score of 2.54, use of improved crop varieties (M=2.61), discourage deforestation/tree falling (M=2.63), effective use of genetic resources (M=2.67), promotion of agro forestry price trees (M=2.11), integrated farming systems (M=2.51), improved soil management practices (M=2.67), promoting biodiversity/ agro-biodiversity (M=2.70), and climate change awareness campaign/workshops (M=2.70).

Table 4: Coping and adaptation strategies promoted by extension staff.

Strategy	Mean	SD
Conservation agriculture	2.54	0.451
Use of improved crop varieties	2.61	0.521
Climate change awareness campaigns/workshops	2.7	1.341
Discourage deforestation/tree falling	2.63	0.741
Diversity their sources of food and income	2.51	0.565

Migrate if there is no other option	2.5	0.611
Effective use of genetic resources	2.67	0.401
Promotion of agro-forestry practice	2.71	0.309
Integrated farming systems	2.51	0.427
Improved soil management practices	2.67	0.421
Promoting biodiversity (agro biodiversity)	2.7	1.11
Planting more water-efficient crop varieties	2.59	0.121
Reusing waste water for agricultural purpose	1.45	0.664
Use of indigenous plant suited to local environment	2.81	0.543
Control wild fires	2.9	0.441
Use of early or late maturing crop variation	2.73	0.347
Early or late planting of crops	2.55	0.342
Planting of drought-resistant crop variation	2.81	0.819
Correct plant spacing/seed rate	2.67	0.742
Timely weeding	2.81	0.61
Source: Field survey data, 2019		

Other strategies promoted included diversify sources of food and income (M=2.51), migration (M=2.50), planting more water efficient crop varieties (M=2.59), control wild fires (M=2.90), use of indigenous plant best sites/to local environment (M=2.80), use of early/late maturing crop varieties (M=2.73), early/late planting of certain crops (M= 2.53), plant drought resistant crop varieties (M= 2.81), correct plant spacing/seed rate (M=2.67), and timely weeding (M=2.81).

CONCLUSION

The recommended ratio of agent to farmers is yet to be met. The middle level man power number is high without adequate graduate personnel. The number of bicycles and motorcycles to work with is grossly inadequate. The agents do not have the capability to predict climate change, and develop climate education/communication plans. They promote conservation agriculture, soil management skills, tree planting among others. It is recommended that training and retraining of staff be regularly done to meet the changing agriculture world.

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