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*Research Article*

# Challenges Facing Agricultural Extension Agents in Disseminating Climate Change Innovations to Farmers: Insight from Anambra State, Nigeria

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**ABSTRACT**

**The study investigated the challenges which agricultural extension agents in Anambra State face with regards to the dissemination of climate change innovations to farmers. A sample of sixty (60) respondents randomly selected was used for the study. Data were collected using structured questionnaire and analyzed with percentage and factor analysis. Statistical analysis of the data shows that the mean age of the respondents was forty seven (47) years. The majority (43%) of the respondents were HND/BSc Degree holders and have spent a mean year of 22 in the State ADP. The challenges facing the respondents range from manpower (-.067), organizational (0.54) to poor motivational (0.65) problems. The work recommends adequate capacity building for the workers in the area of climate change. Further, there is need to incorporate climate change subject matter specialist in the state ADP.**

## INTRODUCTION

Agricultural production depends highly upon weather and climate in order to produce the food and fibre necessary to sustain human life. Consequently, this dependency makes agriculture vulnerable to climate variability and change (Intergovernmental Panel on Climate Change (IPCC), 2007). Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (IPCC, 2007*)*. Agricultural production, including access to food, in many African countries is projected to be severely compromised by climate variability and change (Cribb, 2008; Harris, 2009). Due to increases in temperature, caused by climate change, the oceans are expanding, raising sea levels and reducing the amount of land available for agriculture. A rise in the sea level results in loss of agricultural land due to flooding and salinization of agricultural lands, surface water and ground water (Arnell, Cannel, Hulme, Kovats *et al*. 2002; Devereux and Edwards 2004). Warmer oceans experience greater evaporation resulting in higher rainfall, which, together with rising sea levels contribute to erosion and flooding (McCarthy, Canziani, Leary, Dokken, *et al*. 2001; Lama and Devkota, 2009).

The current scientific consensus attributes climate change to anthropogenic activities associated with increasing atmospheric concentrations of greenhouse gases (GHGs) **(**IPCC, 2001). Following the Industrial Revolution which began about 150 years ago, man-made activities have added significant quantities of GHGs to the atmosphere (IPCC, 2001). According to IPCC (2001), the atmospheric concentrations of these GHGs have been on the increase; between 1750 and 2000, carbon dioxide has increased by 31%, methane by 151% and nitrous oxide by 17%. Similarly, Organisation for Economic Co-operation and Development (OECD) (2008) also noted that the world GHG emissions have roughly doubled since the early 1970s, and on current policies could rise by over 70% during 2008-2050.

Agriculture as one of the anthropogenic activities is responsible for approximately fifteen (15) percent of all GHG emissions that help aggravate climate change. Since agricultural production contributes to climate change and also being adversely affected by climate change, there is the need to disseminate information/innovation on climate change adaptation and mitigation to farmers to help them cope with the adverse impacts of climate change and also reduce activities that aggravate climate change. Such important and relevant information can only get to the farmers through the agricultural extension agents.

Agricultural extension is a series of embedded communicative interventions that are meant, among other things, to develop and/or induce innovations which supposedly help to resolve (usually multi-actor) problematic situations (Leeuwis (2006). Lyon (1949) defined agricultural extension as the term used to describe the complex of process by which rural people are persuaded to adopt improved farming methods and improved way of life. According to Legan (1968), extension is the primary means through which farmers learn about change, the reason for it and its value, the result it can achieve, the process by which it is achieved and also uncertainties inherent in it. Given the disturbing negative impact of climate change on agricultural production, it is expected that extension should disseminate climate change information/innovation which will help farmers to adequately adapt. In disseminating such innovations, there may be problems and challenges facing the agents. It is therefore apt to address the following questions: who are the extension agents in Anambra State? At present, do they disseminate climate change information/innovation, if they do what are the problems and challenges they face? How would such challenges be tackled? Specifically, the paper aims at:

1. describing the socio-economic profile of the respondents
2. identifying the challenges facing extension agents in disseminating climate change and climate change related information.

## MATERIALS AND METHOD

The study was conducted in Anambra State, Nigeria. Agriculturally, Anambra State is divided into four zones, namely; Aguata, Anambra, Awka and Onitsha. All the extension workers in Anambra State Agricultural Development Programme (ANADP) in the four zones formed the population of the study. A sample size of sixty (60) respondents was randomly selected from the eighty-seven (87) workers in the State using simple random sampling.

Structured questionnaire was used for data collection. The questionnaire was divided into two sections based on the objectives of the study. Section 1 was devoted to information on socio-economic characteristics of the respondents (objective one) while section 2 investigated the challenges facing the respondents in disseminating climate change innovations to the farmers (objective 2).

To achieve objective 1, respondents were asked to indicate their age, level of education, years of working experience in Agricultural Development Programme (ADP) etc. For objective 2, the respondents were required to select from the list provided, possible challenges facing the dissemination of climate change innovation/information to the farmers using a 3-point Likert type rating scale of ‘‘not a challenge (1)’’, ‘‘serious challenge (2)’’ and ‘‘very serious challenge (3). The mean value of 2.0 was used to determine the challenges. Variables that have a mean value of 2.0 and above were considered as the challenges facing extension agents while those below 2.0 were not. Data were further subjected to exploratory factor analysis procedure using the principal factor model with varimax in grouping these challenges. Only variables with loadings of 0.4 and above (10% overlapping variance) were used in naming the factors while variables that

loaded high in more than one factor were discarded (Comrey, 1962).

Information on the socio-economic profile of the respondents (objectives 1) was analysed using percentage. Information on challenges facing them (objective 2) was analysed with mean score and exploratory factor analysis. Version 16.0 of the Statistical Package for the Social Science (SPSS) software was used for the analysis.

## RESULTS AND DISCUSSION

### 3.1 The socio-economic profile of the respondents

Entries in Table 1 show that 57.1% of the respondents were male while 42% were female. This shows an almost equal gender distribution of the respondents. The Table also shows that about 53.0% of the respondents were between the age brackets of 50-59 years, 30.1% were between 40-49 years whereas 14.3% were between 30-39 years. The mean age stands at 47 years. This result shows a relatively youth workforce.

Majority (63.3%) of the respondents were married while only 6.7% were widowed (Table 1). This result shows a workforce of married people. The Table further shows that majority (43.0%) of the respondents have HND/BSc. Degree, 33.3% had MSc. Degree, 19.0% had a PhD Degree while very few (5%) had OND certificate. This result portrays a workforce of people where majority had only first degree. This result supports the findings of Faturoti and Madukwe (2009) that majority in the technology transfer sub-system/ADP are made up of people with BSc Degree. Majority (72.0%) of the respondents have spent a period of between 20-29 years in the ministry, 23.8% have spent between 10-19 years whereas only 5.0% have spent between 30-39 years (Table 1). The mean age spent in the ADP is 22 years. This result shows that the respondents have spent very long time at the ADP. This implies they would have gained a lot of experiences which will directly and indirectly help them in disseminating climate change related information to farmers.

All (100.0%) the respondents are aware about climate change (Table 1). This great awareness may be by personal experience or by experiences their clients share with them. Majority (62.0%) of the respondents view climate change as a product of both human and natural activities, whereas 38.0% said it was caused by human activities only (Table 1).

About 37.0% of the respondents have been involved with dissemination of climate change related issues for a period of between 1-4 years while 2.0% for a period of between 5-8 years (Table 1). The mean year is 2 years. This invariably implies that issues of climate change gained popularity recently.

**Table 1: Percentage distribution of extension agents based on socio-economic characteristics**

| Socio-economic characteristics | Percentage (n=60) | Mean (M) |
|---|---|---|
| **Sex** | | |
| Male | 57.1 | |
| Female | 42.9 | |
| **Age (years)** | | |
| 30-39 | 14.3 | |
| 40-49 | 30.1 | 47.3 |
| 50-59 | 52.9 | |
| **Marital status** | | |
| Married | 63.3 | |
| Widowed | 6.7 | |
| **Educational attainment** | | |
| OND | 4.8 | |
| HND/BSc | 42.9 | |
| MSc | 33.3 | |
| Ph.D | 19.0 | |
| **No of years spent in ADP** | | |
| 10-19 | 23.8 | |
| 20-29 | 71.6 | 22.0 |
| 30-39 | 4.8 | |
| **Awareness of climate change** | | |
| Aware | 100 | |
| Perceived causes of climate change* | | |
| Human activities only | 38.1 | |
| Both human and natural | 61.9 | |
| **No of years involved with dissemination of climate change issues** | | |
| 1-4 | 36.5 | |
| 5-8 | 2.0 | 2.1 |

*Multiple responses

Source: Field survey, 2013.

### 3.2 Challenges faced by extension agents in disseminating climate change and climate change related innovation/information to farmers

Table 2 shows varimax rotated factor matrix on challenges facing extension agents in disseminating climate change information to farmers. Based on variable loading, three factors were identified and named. Factor one was named manpower problems; factors that loaded high under it were inadequate meteorological information (-0.67), inadequate capacity building in the area of climate change (0.60), poor training in the area of climate change (0.76), poor training in decoding metrological information (0.54), lack of climate change subject matter specialist (0.50), inadequate climate change innovation/information (0.52), lack of meteorologist within the ADP (0.62), inadequate equipment for monitoring weather (0.48), poor access to knowledge and information on new technologies about climate change (0.52), lack of training opportunity (0.48). For extension to be relevant in tackling climate change problem through disseminating appropriate information to the farmers they should be adequately trained in the area of climate change and also have handy meteorological information about climate change. To achieve this, there is the need for the incorporation of metrological services within the ADP.

Factor 2 was named organizational problems, issues discussed here include poor funding (0.54), weak/poor linkages between extension and knowledge generating institutions (0.54), poor linkage with metrological centers (0.62), poor funding of ADP (-0.56), poor extension-farmer ratio (-0.62), inadequate in-service training (0.62), unnecessary bureaucracy/ organisational bottleneck (0.46), poor working environment (0.54). If extension will be effective in the transfer of new knowledge to the farmers in order to combat the challenges of climate change, it must have strong linkages with knowledge generating institutions e.g. research institute and metrological centers. Strong linkage implies a good information flow and overall long-term competiveness between extension and research/metrological centers.

Factor 3 was named poor motivational problems and variables that loaded high include inadequate ICT facilities (0.65), logistics problems (0.52), inadequate mobility of staff (0.68) and poor remuneration (0.42). There is need to enhance the remuneration paid to the workers as this will motivate them while they work. It is also important to make movement easy for the workers so that they can get to target communities easily. This will also serve as a motivating factor. These findings agree with Ferroni and Zhou (2012); Mustapha, Undiandeye and Gwarry (2012) who also reiterate the difficulties faced by extension services both in Nigeria and globally.

**Table 2: Varimax rotated matrix on challenges faced by extension agents**

| Challenges | Factor 1: (Manpower problems) | Factor 2: (Organization problems) | Factor 3: (Poor motivational problems) |
|---|---|---|---|
| Inadequate meteorological information | **-0.67** | 0.32 | 0.29 |
| Poor funding | 0.31 | **0.54** | 0.34 |
| Weak/poor linkages between extension and knowledge generating institutions | 0.23 | **0.54** | 0.28 |
| Inadequate capacity building in the area of climate change | **0.60** | -0.37 | 0.32 |
| Inadequate ICT facilities | 0.30 | 0.26 | **0.65** |
| Poor training in the area of climate change | **-0.76** | -0.21 | 0.31 |
| Poor training in decoding metrological information | **0.54** | 0.26 | 0.28 |
| Logistics problems | 0.32 | -0.35 | **0.52** |
| Poor linkage with metrological centers | 0.28 | **0.62** | 0.31 |
| Poor funding of ADP | -0.22 | **-0.56** | 0.25 |
| Poor extension-farmer ratio | 0.31 | **-0.62** | 0.39 |
| Inadequate mobility of staff | 0.25 | 0.20 | **0.68** |
| Lack of climate change subject matter specialist | **0.50** | 0.38 | 0.31 |
| Inadequate in-service training | 0.32 | **0.62** | 0.20 |
| Unnecessary bureaucracy/ organisational bottleneck | 0.38 | **0.46** | 0.31 |
| Inadequate climate change innovation/information | **0.52** | 0.31 | 0.28 |
| Poor infrastructure in farming communities | 0.21 | 0.26 | **0.48** |
| Lack of meteorologist within the ADP | **0.62** | -0.14 | 0.26 |
| Inadequate equipment for monitoring weather | **0.48** | 0.38 | 0.37 |
| Poor remuneration | -0.24 | 0.25 | **0.42** |
| Poor access to knowledge and information on new technologies about climate change | **0.52** | 0.21 | 0.36 |
| Lack of training opportunity | **0.48** | -0.12 | -0.36 |
| Poor working environment | -0.11 | **0.54** | 0.29 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization (loading at.4 and above)
Bold type is used to highlight high factor loads.
Source: Field survey, 2013.

## CONCLUSION AND RECOMMENDATIONS

The study investigated the challenges which extension workers face in the dissemination of climate change innovation/information. The challenges range from manpower, organizational to poor motivational problems. It is important to note that if these challenges are not tackled, important innovation/information on climate change will not get to the farmers and this will be inimical to agricultural production.

The work recommends adequate capacity building for the workers in the area of climate change and also emphasized the need to incorporate climate change subject matter specialist in the state ADP.

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