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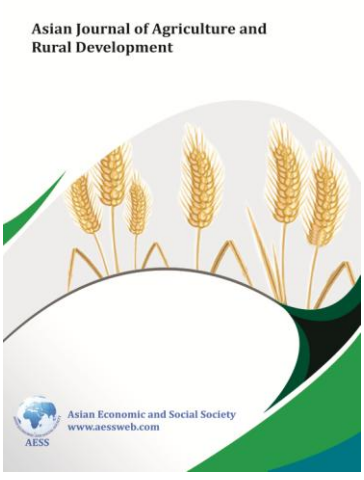

Food Security Index and Socio-Economic Effects of Climate Change on Rural Farming Households in Delta State, Nigeria

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Food Security Index and Socio-Economic Effects of Climate Change on Rural Farming Households in Delta State, Nigeria

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Abstract

The study examined the food security status and the socio-economic effects of climate change on rural farming households in Delta State, Nigeria. The main objective of the study was to determine the food security status of the rural farming households in the state while the specific objective was to determine the socio-economic effects of climate change on rural farming households in the state. Multistage sampling procedure was used in the random selection of local government, communities and rural households for the research study. The data for the study were obtained with the aids of structured questionnaire survey randomly administered to rural farming households in the state. Food security index was used to determine the level of food insecurity (food security status) among the rural households in communities that have been affected by flood and or other climate hazardswhile descriptive statistics was used to summarize the socio-economic effects and their food security status of the rural farming households in the state. Most respondents (65.10%) were married with low annual income of ₦54,702 ($353) which is less than the poverty line of less than $1 (one dollar) a day. Most rural farming households witnessed loss of investment on farm lands, lives and income respectively in the state. The study also reveals that rural farming households suffered ill health, such as malaria, water borne diseases and skin infections that were on the increase in the state. The study also revealed that majority of respondents was moderately food insecure. The study also recommends that Government planning agencies and policy makers should put into consideration these food insecurity situations in their planning and policy implementation to prevent future chronic food insecurity situation in the state.

Keywords: Food security, Socio-economic effects, Nigeria

Introduction

Climate change adversely affect socio-economic sectors, which include water resources, agriculture, food security, forestry, fisheries and human settlements, ecological systems and human health, with developing countries being the most vulnerable (IPCC, 2000). Fishing and fisheries are important occupation and operations that provide income, employment and protein to Nigeria thereby enhancing food security in the country, but in a situation of global warming, fisheries in Northern Nigeria as in other Northern parts of West Africa, would evidently be impacted (IPCC, 2007). This is applicable to Delta state where most rural households engage in fish farming and crops production for their livelihoods and attainment of food security. Darnton-Hill *et al.* (2005) also stated that lack of dietary diversity and poor diet quality will lead to micronutrient malnutrition or hidden hunger. This hidden hunger can cause illness, blindness and premature death as well as impair the cognitive development of survivors. Iron deficiency among female agricultural workers in Sierra Leone will cost the economy $100

million in the next years. This is applicable to Delta state were women labour (work) under harsh environment condition in their farming operations. Extreme high air temperatures contribute directly to deaths from cardio-vascular and respiratory disease, particularly among elderly people (Robine, 2003). High temperatures also raise the levels of ozone and other pollutants in the air that exacerbate cardiovascular and respiratory diseases, urban air pollution causes about 1.2 million deaths every year and rising sea levels and increasingly extreme weather events will destroy homes, medical facilities and other essential services (www.who.int/mediacentre/factsheets/fs266/en/). People may be forced to move, which in turn heightens the risk of a range of health effects, from mental disorders to communicable diseases. Arnell (2004) reported that increasingly variable rainfall patterns are likely to affect the supply of safe water can compromise hygiene and increase the risk of diarrhea disease, which kills 2.2 million people every year.

Methodology

The Study Area

Delta state is located within Longitudes 5° and 6.4°E and latitudes 5°00 and 6.30'N, the state is bounded Northwards by Edo state, on the East by Anambra State, on the South East by Bayelsa state and on the South west by the Bight of Benin which covers approximately 160 km of the states coastline, (Delta State Government Diary Year?). Southern parts of the state which is transverse by numerous flat floored rivers that drain into the Atlantic ocean is generally low lying without remarkable hills, consisting of unconsolidated sediments of quaternary age. Some hills can be found northwards within the LGA's of Ika North and Aniocha North. The major rivers include the Niger River, Ethiope, Warri, Kiagbodo **(**Aweto, 2002). Drainage is done in the eastern flank by the Niger River via its several distributaries such as the Forcados, Escravos, and the Warri rivers and creeks such as the Bomadi creek. Rivers Jamieson and Ethiope rise from the north and northeast respectively subsequently join and form the Benin River which eventually drains into the sea in the west (online Nigeria, 2003.)

Delta state was created on the 27th of August 1991 out of the former Bendel state. There are 25 local government areas and occupy a land mass of about 17,163 square kilometer with a population of about 4,098,398 persons (NPC, 2006). The state shares similar climatic features with other states in the Niger-delta. The general climate is characterized by a long rainy season from March/April through October. The climate in Delta state shows latitudinal fluctuation in humidity ranging from the humid tropical in the south to the sub- humid in the north east. Lessening humidity towards the north is accompanied by an increasingly marked dry season (online Nigeria, 2003)

Method of Sampling / Sampling Size

Multistage sampling procedure was used in random selection of local government areas, communities and rural households for the research study. Firstly, three Local Government Areas each were selected from each of the three agricultural zones in the state making up to nine (9) Local Government Areas from the twenty-five (25) Local government areas. Secondly, two communities from each of the local government areas were selected, making it up to 18 communities. Finally, twenty five rural households were randomly selected from each of the sampled communities making it up to four hundred and fifty (450) rural households. Only four hundred and ten (410) respondents were utilized for the study.

Method of Data Collection

The data for the study were obtained with the aids of structured questionnaire survey randomly administered to rural farming households in the state.

Analytical Framework

Descriptive Statistics

Descriptive statistics was used to summarize the socio-economic effects and their food security status of the rural farming households in the state.

Food Security Index of Respondents

Food security index was used to determine the level of food insecurity (food security status) among the rural households in communities that have been affected by flood and or other

climate hazard over the past thirty eight years. Food security equation used by Feleke *et al.* (2003) and ways of measuring household food security status by Hoddinott (2001) were adopted for this study. The equation is stated as

$$\mathbf{C^* = C_j - Y_j} \quad \ldots\ldots\ldots\ldots \text{ i}$$

Food security indicator for this study is defined by frequency and the number of different food consumed over a period of time. Where:

C* = food security index of rural farming household
$\mathbf{C_j}$ = Quantity of food consumed (N = 1 to 5)
$\mathbf{Y_j}$ = Expected required food to be consumed (N = 5)
If C* = 0 = Household will be said to be a food secured.
If C* < 0 = Then the household will be said to be a food insecure.

The required food = carbohydrate, fat/oil, vitamin, mineral, and protein given food.

Hoddinott (2001) outlined four ways of measuring household food security status; among them is dietary diversity which involves determining the frequency and the number of different foods consumed by an individual over a period of time. Dietary diversity method of measurement was preferred to other methods as it is very difficult to calculate exactly the quantity of rural household food consumption in kilogrammes or calories as most daily food consumed by the rural farming households are not measured.

Therefore, food security index of the rural farming household were obtained based on the total household daily consumption (Carbohydrate, Vitamins, Water, Proteins, Minerals and Fat/oils). A food secured household is expected to consume all the five categories. It must be noted that water was generally consumed by all respondents hence it was excluded in the categories.

Expected required food to be consumed ($\mathbf{Y_j}$) = 5
Quantity of food actually consumed daily ($\mathbf{C_j}$) ranges from 1 to 5

Food security index of rural household ($\mathbf{C^* = C_j - Y_j}$) = 5-5 = 0 (food secured household)
While **C* < 0** is food insecure household, but for the purpose of this study the food insecure household category was further categorized into mild food insecure, moderately food insecure and severe food insecure household.

Food security index of rural household ($\mathbf{C^* = C_j - Y_j}$) = 4-5 = -1 (Mild food insecure)
Food security index of rural household ($\mathbf{C^* = C_j - Y_j}$) = 3-5 = -2 (Moderately food insecure)
Food security index of rural household ($\mathbf{C^* = C_j - Y_j}$) = 2-5 = -3 (Severe food insecure).

Results and Discussion

The Socio-Economic Characteristics of Respondents in Delta State

The mean age of respondents is 48 years with primary school level of education in the state. Most respondents (65.10%) were married with low mean annual income of ₦54,702 ($353) which is less than the poverty line of less than $1 (one dollar) a day. This might probably due to climate change impact in the state. The rural households were with a large mean household size of 9 persons.

The Socio-Economic Effects of Climate Change on Rural Farming Households in Delta State

The socio-economic effects of climate change on rural farming households in the state were hazardous and enormous. Most rural farming households witnessed loss of investment on farm lands and income respectively in the state. The study also reveals that 13.6% of the rural farming households suffered ill health, such as malaria, water borne diseases and skin infections that were on the increase in the state. Deaths were recorded as result of increased temperature and flooding in the state. The result is in line with Robine (2003) who reported that extremely temperatures contribute directly to deaths from cardiovascular and respiratory disease. Most farms (22.9%) were also lost to flooding placing the rural farming households into hunger and food insecurity situation. This situation needs urgent attention from Government and researchers to combat these socio-economic effects of climate change on rural households in the state.

Respondents Food Security Index in Delta State

The respondents revealed that 2.7% and 62.2% were food secure and moderately food insecure respectively in the state. While 9.5% and 25.6% rural farming households were mild food insecure and severe food insecure respectively. This situation is of great concern as most respondents were moderately food insecure as result of climate event (flooding) that rendered farm land marginal and loss of investment on farm lands in the state.

Conclusion and Recommendations

The mean age of respondents was 48 years with primary school as the least educational attainment in the state. Most respondents were married with low annual income of N54,702 ($353) and lived below poverty level of less than $1 (one dollar) per day. Most rural farming households witnessed loss of investment on farm lands, farms, lives, households' properties, income and ill health respectively in the state. Most respondents were moderately food insecure as result of climate event (flooding) that rendered farm land marginal resulting in hunger and food insecurity situation in the state. The study therefore recommends that short relief measure from donor agencies, multinationals and Government to alleviate the food insecurity situation in the state. The study also recommends that Government planning agencies and policy makers should put into consideration these food insecurity situations in their planning and policy implementation to prevent future chronic food insecurity situation in the state.

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Table 1: Socio-economic Characteristics of Respondents in Delta State (n=410)

Variables	Frequency	Percentages (%)
Age (Years)		
30 – 39	91	22.2
40 – 49	163	39.8
50 – 59	132	32.2
60 – 69	24	5.8
70 – 79	0	
Mean	48 years	
Gender		
Female	195	47.6
Male	215	52.4
Mode	Male	
Marital Status		
Single	29	7.1
Married	267	65.1
Widow	60	14.6
Widower	6	13.2
Divorced	48	
Educational Level		
Informal	126	30.7
Primary	157	38.3
Secondary	87	21.2
Tertiary	40	9.8
Mode	Primary	
Household size		
2 – 4	17	4.1
5 – 7	85	20.7
8 – 10	155	37.8
11 – 13	97	23.6
14 – 16	56	13.8
Mean (persons)	9	
Annual Income(₦)		
21,000-60,000	304	74.1
61,000-100,000	100	24.4
101,000-140,000	6	1.5
141,000-180,000	0	
181,000-220,000	0	
221,000-260,000	0	
Mean (N)	54,702 ($353)	

Source: Field survey data, 2011

Table 2: Distribution of Respondents According to Socio-Economic Effects of Climate Change on Rural Farming Households in Delta State (n=410)

Socio-economic Effects	Frequency	Percentages
Ill health (malaria, diarrhea, skin infections etc)	209	13.6
Loss of roads	83	5.5
Loss of Investment on farm lands	372	24.7
Loss of lives	2	0.2
Loss of households properties	87	5.8
Loss of income	368	24.5
Loss of houses	42	2.8
Loss of farms	345	22.9

Multiple Responses Observed
Source: Field survey data, 2011

Table 3: Distribution of Respondents According to Food Security Index (n=410)

Food security index	Frequency	Percentages
Food secured (0)	11	2.7
Mild food insecure (-1)	39	9.5
Moderately food insecure (-2)	255	62.2
Severe food insecure (-3)	105	25.6
Mean	Moderately food insecure	

Source: Field surveys data, 2011