CLIMATE CHANGE AWARENESS AND ITS EFFECTS ON THE PERFORMANCE OF AGRIBUSINESS HOUSEHOLDS IN ABIA STATE, NIGERIA

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Abstract
The greatest challenge that confronts man and societies today and the generations to come is that issue of climate change. Nigeria is no stranger to the menace of climate change and as such, efforts should be geared towards creating awareness to mitigate its quandary. The study examined the sources of climate change awareness in the study area; perceived evidence of climate change by farmers in the area and the effect of climate change on the performance of farmers in the study area. Two hundred and forty (240) agribusiness households were purposively selected for the study and data obtained through primary sources. Multiple regression, descriptive statistics and likert scale were used to analyze data for the study. The results showed that major source of information about climate change was through the print media while extension services were relatively poor in the area. Changed timing of rainfall, reduced yield was among the changes noticed by farmers as a result of climate change. The regression analysis showed that gender, household size, years of education, change timing of rainfall, experience and number of extension visits were statistical significant variables affecting farmers' performance and the study recommended that more extension agents should be trained to help increase the extension network in the study area.

Keywords: Climate, Climate change, Awareness and Agribusiness

Introduction

It has been known that in many developing countries, about two-thirds of the population directly or indirectly earns a living from agriculture (Fischer, Shah and Velthuizen, 2002). Nigeria is one of such developing countries. Researchers have shown that Nigeria is already been ploughed with diverse ecological problems which are directly linked with climate change. The flooding of Benue state, Suleja in Niger state, Victoria Island, Lekki, Ikoyi and other islands in Lagos state and many other incidences predicted to happen shows that the incident of climate change is not a fairytale or a phenomenon in a far way country. Climate change has taken centre stage in the mist of diverse threatening environmental challenges facing the planet right now. It is arguably the most threatening environmental problem of our time, stimulating discourse vis-à-vis the causes, long term effect, as well as how to forestall the lingering and frustrating impacts. The incidence of climate change is more pronounced in African societies because of its geography, its sole dependence on agriculture and its generalized incapacity to cope and adapt to climate extremes (FAO, 2003; Bolaji-Olatunji, Olufolaju, and Awe, 2010). Previous studies such as Ishaya and Abaje (2008); UNDP report (2010); Olorunfemi (2009); all showed that awareness on climate change in Nigeria is inadequate. According to the UNDP report (2010), the level of awareness about climate change is rather low in Nigeria, and it is likely to continue if no intervention measures are taken. The survey noted that the awareness of climate change was highest at the federal level. This dropped sharply at the state and local government levels, where real action is needed. By implication, climate change awareness is quite poor and little effort is made by the government and other agencies to sensitize the public on the menace of climate change and ways to adapt to changes arising from it. Most farmers as a result of lack of awareness still carry out their farming activities with techniques that are not

environmental friendly and as such contribute to the problem of climate change. Although, most farmers may have noticed the changes in rainfall pattern and intensity, the burning heat from the sun and increased temperature among other indicators but cannot attribute them to climate change. This makes it hard for the farmer to seek ways of mitigating its effects. Given the fact that agriculture depends largely on the climate, it follows therefore that any change in climate is bound to impact on the sector and other socio-economic activities (Agwu, Okpokiri and Anyanwu, 2016). Its variability negatively or sometimes positively affects the livelihood of those who engage in farm activities. Therefore, this study identified the sources of climate change awareness in the study area; perceived evidence of climate change by farmers in the area and the effect of climate change on the performance of farmers in the study area.

Methodology

The study was carried out in Abia State, Nigeria. Abia state is in the South eastern geo-political zone of Nigeria and its capital is at Umuahia. The state is approximately within latitudes 4° 41' and 6°14' north of the equator and longitudes 7° 10' and 8'° east of the Greenwich meridian. The state was carved out of Imo state in August 27, 1991. It has 17 local government areas and three senatorial zones of Abia central, Abia north and Abia south. In agriculture, the state is divided into three agricultural zones, namely Umuahia, Aba, and Ohafia. Major agricultural produce includes maize, yam, plantain, rice, vegetable, melon, beans etc. livestock reared in the area include goat, sheep, pigs, poultry and fish. Most prominent of economic activities in Abia state includes: farming, trading, manufacturing, and fabrication. The study adopted a multi-stage sampling procedure as well as purposive and random sampling techniques. Three (3) local government areas namely Umuahia South, Ohafia and Isiala Ngwa North were selected from the three agricultural zones at random. The second stage involved a purposive selection of two (2) autonomous communities from each of the local government areas. These communities were chosen because of the existence of rural agribusiness households. In the third stage, five (5) villages were purposively selected giving a total of thirty (30) villages in all. In the final stage, eight (8) rural households were randomly selected from each of the thirty (30) villages. The sample size for this study was a total of two hundred and forty (240) rural households. Sources of climate change awareness and the farmers perception of climate change was analyzed using likert type scaling to allow multiple responses by the respondents as used by Anyoha, Nnadi, Chikaire (2013). Effects of climate change on the performance of farmers in the study area were analyzed using multiple regressions.

The explicit form of the model is stated as

$Y= b_0+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5+b_6x_6+b_7x_7+b_8X_8+\ldots.+b_nx_n +ei$ ...(1)

Where:

Y = returns of livestock farmers in naira

X_1 = level of education of the famer measured in years

$X_{2=}$ gender (male=1 and female=0)

X_3 = experience of the farmers measured in years

X_4 = household size measured in numbers

X_5 = number of extension visit

X_6 = change timing of rain (yes =1, others =0)

$X_{7=}$ perception to the level of rainfall (high =3, average =2 and low =1)

$X_{8 =}$ perception to the level of sunlight (high =3, average =2 and low =1)

B_i = the parameter

E_i = the error term

Results and Discussion

Climate change awareness and perception of respondents in the study area

Table 1 shows various responses of the respondents on their source of awareness. Multiple responses were recorded from the respondents on their exposure to climate change.

Table 1: Distribution of the agribusiness households heads according to sources of awareness.

Source of awareness	Frequency	Percentage
Friends	149	62.1
Extension worker	23	9.6
Internet	70	29.2
Newspapers	191	79.6
Agricultural cooperatives	123	51.3
Radio/television	175	72.9
Researchers	70	29.2
Do you think climate change can in any way affect your business	164	68.3
Do you think that some of your activities can lead to climate change	159	66.3

Multiple responses; Source: field survey data, 2015

It was observed that 149 respondents heard about climate change from their friends; only 23(9.6%) of the respondents were taught about climate change by extension workers. Seventy percent (70) (29.2%) respondents who are computer literate got to know about climate change through the internet. It was observed that 191 (79.6%) respondents read about climate in newspapers, journal, magazine and other print media. From the results, 123 (59.3%) who belonged to agricultural cooperatives were enlightened by the cooperatives on the challenges posed by climate change. From the results, it was also observed that 175 (72.9%) respondents heard/ listened to or had watched programmes on climate change either on the radio or television. Specifically, 70 (29.5%) learnt about climate change through participating in research works, while 164 (68.3%) agreed that climate change have in one way or another affected their business or farms and 159 (66.3%) believed their activities in one way or another contribute to the climate change. This implied that farmers in the study area have access to climate change information which may enhance easy adaptation to climate change. Earlier studies have noted that farmer's access to information on climate change is likely to enhance their probability to perceive climate change, and hence adopt of new technologies and take-up adaptation techniques to counteract the negative impact of climate change. These studies include Nhemachena and Hassan (2007); Deressa, Hassan, Alemu, Yesuf and Ringler, (2008); Gbetibouo (2009) and Ndambiri, Ritho, Mbogoh, Ng'ang'a, Muiruri , Cherotwo, (2012).

Perception of farmers on climate change effect in Abia state

A 4 point likert scale was used to ascertain descriptively the effects of climate change as perceived by the respondents in the study area. Scores were given to the responses as high = 4, average = 3, low = 2, none = 1. The mean point was calculated and used to determine whether a factor was significant or not. The mean point of 2.5 was used as the decision rule. Any factor which has a mean less than 2.5 will be assumed not to have a significant effect of climate experienced in the study area and any climatic effect equal to or greater than 2.5 is assumed significant.

Table 2: Perception of climate change effect in the study area

	Non	Low	Averag	High	Tota	Mea	Ranl
Decreased soil	109	51	49	31	240	2.01	9
	(109	(102	(147)	(124)	(482		
Premature ripening of fruits	118	42	44	36	240	1.99	10
	(188	(84)	(132)	(144)	(478		
Reduced production cycle	61	52	64	63	240	2.54	6
	(61)	(104	(192)	(252)	(609		
Prolonged production	46	87	65	42	240	2.43	8
	(46)	(174	(195)	(168)	(583		
Reduction in yield	29	56	55	100	240	2.94	2
	(29)	(112	(165)	(400)	(706		
Reduction in farm income	63	26	51	100	240	2.78	3
	(63)	(52)	(153)	(400)	(668		
Reduction in storage quality	57	50	60	73	240	2.62	4
	(57)	(100	(180)	(292)	(629		
Destruction of wild life	141	14	32	53	240	1.99	10
	(141	28	96	212	477		
Streams drying up	62	37	79	62	240	2.60	5
	(62)	(74)	(237)	(248)	(625		
Reduction in fish production	71	50	59	60	240	2.45	7
	(71)	(100	(177)	(240)	(588		
Reduction in farm size	61	52	49	78	240	2.60	5
	(61)	(104	(147)	(312)	(776		
Loss of pastures	46	63	72	59	240	2.60	5
	(46)	(126	(216)	(236)	(624		
Change timing of rain	14	34	74	118	240	3.23	1
	(14)	(68)	(222)	(472)	(776		

Source: field survey data, 2015

The result as shown in Table 2 indicated that change in timing of rainfall, reduction in yield, reduction in farm income, reduction in storage quality, streams drying up, reduction in farm size, loss of pastures, and reduced production cycle were significant effect of climate change in the study area. Reduction in fish production, prolonged production, decreased soil, destruction of wild life, and premature ripening of fruits were not significant. Change in the timing of rain was the most significant observation made by the respondents as a result of climate change in the area having a mean score of 3.23; followed closely by reduction in yield at second place with a mean score of 2.94. Reduction in farm income was 3rd with a mean score of 2.78; reduction in storage quality of produce with a mean score 2.62 was 4th while loss of pasture, reduction in farm size, streams drying up with a mean score of 2.60 were tied up at 5th place. By this result, it could be concluded that change in the timing and frequency of rainfall were noticed by majority of the respondents as an effect of climate change in the study area which was favoured by the respondents as agriculture in Nigeria is rain dependent and as such will boost agricultural productivity. Anyoha *et al* (2013) observed that farmers complained on the reduction in yield as a result of climate change which have affected their profit and in some cases eaten deep into their capital as bills will not stop coming profit or no profit.

Effects of climate change on the performance of crop production

The semi log functional form was chosen as the lead equation and used for the discussion based on the possession of the highest coefficient of multiple determinations (R–square) of 0.764 and F–value of 2.767. This means that 76.4% of variations in the dependent variable were explained by the independent variables and 23.6% were errors which might have occurred from different sources. Another reason for which the semi log functional form was chosen was because it has the highest number of significant variables.

Table 3: Effects of climate change on the performance of crop production (OLS regression)

	Linear	Semi- log+	Double log	Exponential
Constant	-8009.775	9.333	9.802	-3556.159
	(-0.457)	(24.850)***	(7.854)***	(-0.69)
Gender	4018.613	0.283	-0.307	-11645.191
	(3.350)**	(2.958)**	(-1.523)	(-1.409)
Household size	9558.686	0.46	0.684	9451.162
	(2.136)**	(1.790)*	(1.971)	(0.664)
Education	939.047	0.21	0.042	9327.25
	(1.659)*	(1.736)*	(0.197)	(1.626)*
Change timing	2910.571	0.97	0.169	2647.655
of rain	(1.293)	(2.008)*	(0.856)	(0.327)
Extension visits	-4315.535	-0.99	0.002	1645.968
	(-2.382)*	(-2.841)**	(0.012)	(0.266)
Rainfall	1127.015	1.024	0.285	11854.476
	(0.041)	(2.738)**	(1.996)*	(2.020)*
Sunlight	-660.505	0.003	-0.123	-2752.416
	(-0.404)	(0.088)	(-0.841)	(-0.458)
Decline	-1409.453	-0.24	0.20	-5061.293
in productivity	(-0.790)	(0.617)	(0.127)	(-0.780)
Experience	277.835	1.024	0.251	11343.411
	(1.027)	(5.898)***	(1.662)*	(33.449)***
R^2	0.697	0.764	0.521	0.504
R^2 adjusted	0.554	0.683	0.409	0.395
F - ratio	(2.539)**	(2.767)**	(0.933)	(0.932)

Source: survey data, 2015. ***,** *and** statistically significant at 1%, 5% *and*10% respectively + lead equation

Result from the regression results shows that gender, household size, years of education, change timing of rain, rainfall, experience and number of extension visits were statistical significant variables affecting the profit of crop farmers. Sunlight and decline in productivity were not significant. The coefficient of 0.283 of the gender of the household head was positive and statistically significant at 5% probability level. Thus, there is a positive relationship between male farmers and returns of crop producers. By implication, farms managed by males tend to make more profits than female managed ones. This may probably be because they are better equipped with the techniques the required to mitigate the effects of climate change. Education was significant at 10% and positively related to returns of crop farmers. This meant that the more educated the farmer is, the more likely the farmer will make more returns despite the climate change effects. Education among other things will enlighten the farmers on ways there farming activities contribute to climate change, as well as ways to mitigate the effects of climate change. The finding is in line with the results of Onubuogu and Esiobu (2014) who opined that educated farmers have more knowledge of climate change and are already aware of various techniques and management practices that could be employed to combat the negative impact of climate change in the area. Household size was positive and statistically significant at 10% probability level. This meant that the larger the household size, the probability of increased profits. Large household size can be used to combat the negative effects of climate change by offering them in the areas of cheap workforce for early planting, irrigation, cover cropping etc. This result is in line with the findings of Anyoha *et al* (2013) and Teklewold, Dadi, Yami and Dana, (2006). Number of extension visits was negative and statistically significant at 5% probability level. This indicated that there was a negative relationship between number of extension visits to the farmers and crop production returns. This result is plausible given the dwindling services recorded by extension agents which has often times been attributed to lack of funding. Therefore, there is little or no extension visits from the extension agents and the farmers are not educated on ways to prevent adverse effects of climate change and thus reduction in the returns by the farmers.

Frequency of rainfall was positive and statistically significant at 5% probability level. This means that increased rainfall could lead to increase in output, thus profits. For the fact Nigerian agriculture is rain fed and there is little or no irrigation schemes in the study area and besides, most of the crops cultivated require these rains. This result did not therefore come as a surprise. Lastly, the coefficient of experience was positive and statistically significant at 1% probability level having a beta coefficient of 1.024. This means that increased number of years of experience leads to increased returns. Experience may have has taught the farmers various farm management practices and techniques that could be used in the face of anticipated climate change. This may have helped increase the returns of the farmers as they will be well prepared for unforeseen circumstances. Deressa *et al*., (2008) had a similar result and had observed that experience helped farmers in decision making and adaptation of relevant tools to combat climate change.

Conclusion

Climate change is knocking on our front door and efforts should be geared towards limiting its effect on agricultural performance. Results from the study shows that awareness of climate change among farmers in the study is relatively high with newspaper publications playing a crucial role. Extension services in the study area are poor and thus could negatively affect the performance of farmers in the area. The study therefore recommended that: More extension agents should not only be trained to help increase the extension network in the study area but also should be funded and well equipped to carry out the expected functions, especially in the area educating the farmers and to teach farmers on climate change and improved management techniques to mitigate its effects. Government and non governmental agencies should organize seminars, workshops and training where farmers are taught improved and environmental friendly farming techniques which will help curtail the climate change problem. Government should intensify its efforts in creating awareness on climate change with catchy jingles, billboards, radio programs etc. Government should make available improved seedlings at affordable prices or subsidized prices as this has been known as one of the management techniques towards mitigating climate change effects.

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