



Investigation of the Perception of Climate Change among Arable Crop Farmers in Akinyele Local Government Area of Oyo State, Nigeria

*OGUNWALE, OG; ABEGUNRIN, OO; UGEGE, BH; TUNDE-FRANCIS, AA;
OYEWOLE, OO

Federal College of Forestry, Jericho, Ibadan, Oyo State, Nigeria

**Corresponding Author Email: tobi.ayodele@yahoo.com; Tel: +2348139525101*

ABSTRACT: This study was designed to investigate the perception of climate change among arable crop farmers in Akinyele local government area of Oyo state, Nigeria using a well-structured questionnaire for data acquisition. Descriptive and inferential (chi-square) statistics were used to analyze the data. The study revealed that majority of the respondents (50.8%) were between the ages of 40-49 years and majority of them (85.8%) are married with household size of 7-10 persons. The study further revealed that (33.3%) of the respondents had no formal education while, (42.5%) of the respondents had a farming experience of 16 years and above. However, it also shows that majority of the respondents are aware of the effect and causes of climate change. Significant association exists between marital status ($\chi^2=68.426$, $P=0.000$), family size ($\chi^2=25.777$, $P=0.012$) and perceived effect of climate change. The study therefore recommended that the government and extension agents should enlighten the women farmers more about climate change and should also help in making them adapt excellently to climate change.

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Agriculture is overly important in every society and its impact cannot be quantified. Climate change has a variable effect on Agriculture. The perception of the farmers on the causes and effects of climate is very paramount and salient. However, perceived causes of climate change refer to respondent's personal understanding of the roots, source, origin, beginning and genesis of climate change. Perceived effect of climate refers to the respondent's assessment, views, observations, opinions, belief, thoughts, and understanding about the result, consequences, outcome, and aftermath of climate change. Bomuhangi *et al.* (2016) state that human perceptions of this change are worth exploring, as they could provide insight into erratic nature of climate change. The knowledge gained from investigating how local populations perceive changes in weather could be used to develop community-specific adaptation strategies which address the most relevant effects of climate change (Slegers, 2008). Undoubtedly, understanding how the public perceives climate change impacts is critical to motivating successful adaptation and mitigation efforts (Leiserowitz 2006; Lorenzoni and Pidgeon 2006). Slegers (2008) and Ejembi and Alfa (2012) add that human perceptions of environmental changes are informed by experiences of how the changes influence people's livelihoods. Water

scarcity, poor crop yields, declining plant and animal life, drought, and increased temperatures are some of the ways in which changes in climatic conditions affect local communities (Macchi, 2011). Bomuhangi *et al.* (2016) assert that these types of people-centered effects cannot be examined through meteorological observation alone. However, Lynam and Brown (2011) believe that perceptions of increased temperature are shaped by observations of changing weather patterns. Further, Scherer and Cho (2003) identified that perception can be augmented through social network via information sharing, resulting in differential perception among farmers. These findings assert that there exists heterogeneity in climate risk perception among different farmers who are endowed with differential resources (Menapace *et al.* 2015; Niles and Mueller 2016). Thereby, a conscientious assessment of perception of climatic risk by heterogeneous farmer households is warranted to gain insight into locally differentiated concerns by farming communities and to efficiently support the Climatic Change needs of diverse farmers in adapting their tactical (short-term) and strategic (long-term) planning to the evolving climatic risks. Importantly, perception of climate change among rural communities is driven by multiple forces. Different household and farm factors influence whether and to what extent farmers

**Corresponding Author Email: tobi.ayodele@yahoo.com; Tel: +2348139525101*

perceive climate change and its impact on local agriculture (Deressa *et al.* 2011). The age of a subsistence farmer is closely related to farming experience and their accumulated knowledge of the environment including changes in climatic conditions (Patt and Schröter, 2008; Deressa *et al.* 2011; Juana *et al.* 2013) that may go back many decades. Therefore this study was designed to investigate the perception of climate change among arable crop farmers in Akinyele local government area of Oyo state of Nigeria.

MATERIALS AND METHODS

This study was carried out among women farmers in Akinyele local government area oyo state, Nigeria. Akinyele local government area was created in 1976 with the administrative headquarters located at Moniya. The local government shares the same boundaries with Afijo local government to the north, Lagelu local government area to the east, ido local government area to the west and Ibadan north local government area to the south. It occupies a land area of 464.892 square kilometers with a population density of 516 persons per square kilometer. Using 3.2% growth rate from 2006 census figures, the 2010 estimated population for the local government is 239,745. It is dominated by the Yoruba's among other resident tribes such as Ibo, Hausa, Fulani etc. the residents are of Christianity, Islamic, and traditional religion.

Sampling Procedure and Sample Size: Multistage sampling techniques were used to select the respondents in the study area. First stage involved randomly selecting Six(6) wards which is 50% of the total number of wards in Akinyele local government and they are; Wards 1,2,3,5,9,10. Twenty villages were randomly selected from the randomly selected wards. 120 questionnaires were distributed evenly to each of the purposively selected villages. Six (6) respondents were randomly selected in each of the twenty purposively selected villages.

Data Analysis: Descriptive statistics such as frequency distribution and percentage was used to analyse the objectives while Chi- Square was used to analyze the hypothesis.

RESULTS AND DISCUSSION

The findings revealed that (50.8%) of the respondents falls between the ages of 40-49 years. This implies that most of the women farmers are still in their active age and are able to seek for constructive agricultural information. This also agrees with the findings of Odebode (2008) who reported that perception and

acceptability of innovation is mainly associated with useful and active age of farmers. It also in line with the findings of Gingras *et al.* (2005) which states that the younger the farmers the more productive they are. This means that farmers in the study area are relatively young and that could play a considerable role in climate change adaptation since younger farmers are economically active and thus, can undergo stress and have the man-power to carry out labor intensive response strategies (Kutir, 2015).

Table 1 also shows that most of the respondents were married (85.8%) while the divorced and widow are 8.3% and 5.8% respectively. This is in line with the findings of Pratt (2004) who reported that married people tend to be responsible for the needs of their family at all times. This implies that been married comes with a lot of responsibilities that automatically ignites excellence. In being excellent, awareness is a key factor that helps in achieving one's goal. More so, the table further shows that majority of the respondents (40.8%) has a family size of 7-10. According to Olumba (2014) citing Onu (2005), large family size could be as a result of polygamous nature of the rural farmers. He further opined that this could be linked to the fact that most rural farmers look at large household size as a good and economical way of maximizing farm returns by using family labour. This implies that the women farmers have a lot of responsibilities and will do anything in their power to know more about climate change and its effects and what can be done to combat it, so that productivity is not reduced. Furthermore, (55.0%) of the respondents were Christians, followed by Muslims who were (43.3%) and only 1.7% of the respondents were traditionalists. In addition, the results pointed out that majority (79.2%) of the respondents are Yoruba. This implies that Yoruba tribe dominated the population of the study area, which is expected since the study area is in the south western part of the country. The table further revealed that (33.3%) of the respondents had no formal education, (27.5%) had primary education, also, (23.3%) had secondary school leaving certificates. Furthermore, (11.7%) of the respondents were Nd/Nce holders, finally, 4.2% of the respondents are HND/BSC degree holders. This implies that majority of the women farmers in the study area not well educated. It is suggested that educated farmers tend to be more efficient in production and readily accept new innovation when compared to uneducated ones that rely on their experience (Martey *et al.*, 2013; Enete and Igbokwe, 2009). Ifeanyi-obi *et al.* (2012) noted that educated farmers are expected to be more aware of climate change impacts and they can easily adapt to it. Apata *et al.* (2010) indicated that education influenced adaptation positively. This implies that the

level of awareness of climate change impacts would be high as education affects the awareness level positively. The result further shows that majority of the respondents (42.5%) have a farming experience of 16 years and above. This result is in line with the findings of Danso-Abbeam *et al.* (2014) which stated that a good farming experience could help farmers in making good decisions and choices in their crop production process hence, has a positive implication for crop productivity. Maddison (2007) asserted that educated and experienced farmers are expected to have information and knowledge about climatic change and adaptation measures to use in response to the changing climate.

Table 1: Socio-Economic characteristics of respondents

Variables	Frequency	Percentage (%)
Age		
30-39 years	12	10
40-49 years	61	50.8
50-59 years	38	31.7
Above 60 years	9	7.5
Marital Status		
Single	0	0
Married	103	85.8
Divorced	10	8.3
Widow	7	5.8
Family Size		
4-Feb	40	33.3
7-May	49	40.8
10-Aug	23	19.2
13-Nov	8	6.7
14-16	0	0
Religion		
Christianity	66	55
Muslim	52	43.3
Traditional	2	1.7
Ethic Background		
Yoruba	95	79.2
Igbo	16	13.3
Hausa	9	7.5
Educational Background		
No formal education	40	33.3
Primary education	33	27.5
Secondary education	28	23.3
Nd/Nce	14	11.7
HND/BSC/PHD	5	4.2
Year Of Farming Experience		
1-5 years	5	4.2
6-10 years	18	15
11-15 years	46	38.3
Above 16 years	51	42.5
Secondary Occupation		
Farming	97	80.8
Teaching	7	5.8
Trading	16	13.3
Primary Occupation		
Farming	107	89.2
Teaching	2	1.7
Trading	11	9.1

Source: field survey, 2019

In addition, the result also shows that majority of the respondents 80.0% of the respondents reported that

farming is their secondary occupation. Finally, the table shows that 89.2% of the respondents reported that farming is their primary occupation, while 9.1% are into trading. This shows that majority of the respondents depend on farming as their source of income in the study area. Majority of the respondents been farmers is in consonance with the assertion of Falusi and Adeleye (2002) who reported agriculture as the main occupation of 75% of women in most developing nations.

Table 2; shows that 86.7% of the respondent's belief that sewage is one of the causes of climate change. The level of uncertainty in the "carbon profile" of the wastewater industry is unacceptable in the emerging business environment of carbon pricing, and managerial commitments to "zero carbon emission". Methane and nitrous oxide emissions in particular have much higher global warming potentials than carbon dioxide (Foley, 2008). Also, (82.5%) believes or perceived that fertilizer is not one of the causes of climate change. It was further revealed that (55.9%) of the respondents perceive that in organic waste is one of the causes of climate change. table 4.7 also shows that 72.5% of the respondents perceives that pesticide usage is a major cause of climate change. Furthermore, it also shows that 54.2% perceive that cars and lorries horn are one of the cause of climate change. In addition, 100% of the respondents perceived that electrical gadget e.g radio, television is not a main cause of climate change.

Also, the respondents 54.2% stated that mining activities that produces noise cause climate change while 45.8% disagreed with the statement. Also, 59.2% of the respondents stated that liquid sewage waste is a major cause of climate change while 40.8% do not agree with the statement. Also, 78.3% of the respondents belief that oil spill from oil pipe is also the causes of climate change.

Furthermore, the results also shows that majority of the respondents 93.3% agreed that toxic indiscriminate use of pesticides is a major cause of climate change. Also, Majority of the respondents 99.3% of the respondents stated that rapid deforestation for agricultural commercial and industrial purposes are one of the causes of climate change. This is in line with Garba (2006) who stated that rapid deforestation is the major cause of climate change. Lastly, majority of the respondents 74.2% stated that increase in usage of chemical fertilizer on crops is a major cause of climate change.

Table 2: Perceived Causes of Climate Change

Perceived Causes Of Climate Change	YES	NO
Water pollution		
Sewage.	104(86.7)	16(13.3)
Fertilizers.	21(17.5)	99(82.5)
Inorganic wastes.	53(44.2)	67(55.9)
Pesticides.	87(72.5)	33(27.7)
Noise Pollution		
Cars and Lorries horn.	65(54.2)	55(45.8)
Electrical gadget for example: - Radios, Microphones, Television.	-	120(100.0)
Mining activities that produce noise.	65(54.2)	55(45.8)
Soil Pollution		
Liquid sewage wastes.	71(59.2)	49(40.8)
Oil spill from oil pipes.	94(78.3)	26(21.7)
Toxic chemicals from Indiscriminate use of pesticides.	112(93.3)	8(6.7)
Rapid for deforestation Agricultural commercial and Industrial purposes.	112(93.3)	8(6.7)
Increase in usage of chemicals.	89(74.2)	31(25.8)

Source: Field Survey, 2019.

Table 3 shows that 39.2% of the respondents perceived that rise in sea level globally is not as a result of climate change. This suggests that the respondents are not aware that the rise in sea level globally is as a result of climate change. This is in accordance with Ngaira (2007) which states that the impacts of climate change might lead to insecurity challenges and conflicts within countries on the continent as the competition for scarce resources intensifies; competition for land, water etc. and coastal regions might also be submerged because of increasing sea levels and constant flooding. This is contrast with Medugu (2009) which states that Nigeria is one the countries expected to be most affected by climate change through rise in sea level, desertification, coastal erosion and flooding. Also, 81.7% perceived that climate change has brought about drought. This is an accordance with Kimaro et al (2018) which states that climate change effects on agriculture include more erratic and decreased rainfalls, prolonged drought and increased ambient temperature, cattle death and diseases outbreaks such as contagious bovine pleuropneumonia and tick-borne diseases and increased heat stress which would be reflected in lower animal fertility (Nardone et al., 2010; Kima et al., 2015). Furthermore, 73.3% of the respondents stated that rising in temperature is as a result of climate change. More so, 90.0% of the respondent perceived that climate change brought about desertification. The result further shows that majority of the respondents 83.3% agreed that massive crop failures is another resultant effect of climate change. Climate change will have several impacts on arid and semi-arid rangelands which covers 70% of the African continent (Galvin et al., 2001) and this will affect millions of crop farmers and pastoralist communities that depend on natural resources for a

living (Adhikari et al., 2015). In addition, 81.7% of the respondents view that rapid and widespread of extinction of species is also a resultant effect of climate change. Lastly, majority of the respondents 77.5% stated that increasing intensity and frequency of extreme weather event is another resultant effect of climate change. Climate change is a major challenge to humanity because it exerts stress on the environment. (UNEP, 2010) and affects water, land and other natural resources availability as well as agriculture productivity.

Table 3. Perceived Effect of Climate Change

Perceived Effect	YES	NO
Rise in sea level globally.	47(39.2)	73(60.8)
Drought	98(81.7)	22(18.3)
Flooding	113(94.2)	7(5.8)
Coastal erosion	112(93.3)	8(6.7)
Rise in temperature.	88(73.3)	32(26.7)
Desertification	108(90.0)	2(10.0)
Massive crop failures.	100(83.3)	20(16.7)
Rapid and widespread Extinction of species.	98(81.7)	22(18.3)
Increasing intensity and Frequency of extreme weather events.	93(77.5)	27(22.5)

Source: Field Survey, 2019.

Table 4 below shows that 78.3% of the respondents got information on climate change through the radio. This goes in line with Churi et al.(2012) who stated that majority of the women farmers preferred radio broadcast as their sources of climate change and agricultural marketing information. Also, 50.8% of the respondents in the study area do not access to newspaper. More so, the study further shows that majority of the respondents 62.5% do not have access to internet service. This goes is in line with Safdan (2005) which states that lack of access to Internet services as source of information has been the issue women farmers' face because of their high level of illiteracy and the location of the women farmers. In addition, the results also show that 68.3% of the respondents in the study area got vital information on climate change from the television. It was further revealed that majority of the respondents 76.7 % did not get information on climate change from extension agents. This implies that innumerable extension agents are needed to pass across information on climate change to women farmers. These farmers need to be equipped information wise. It was also revealed that 50.8% and 89.2% derived information from researchers and farmers association about climate change respectively. Furthermore, the result also shows that majority of the respondent 83.3% and 90.8% got information about climate change from neighbors and friends respectively. Also, larger percentage of the respondents 94.2% got information on climate change from their family members. This

suggests that the study area is a homogenous society and as such they are closely knitted and disseminate information freely among each other. In addition, the results also show that majority of the respondents 87.5% and 77.5% got vital information from local council and mobile phone respectively. Lastly, majority of the respondents 50.0% and 58.3% respectively got information from government agencies and extension bulleting.

Table 4 Sources Of Information to the Women Farmers

Source Of Information	YES	NO
Radio	94(78.3)	26(21.7)
Newspaper	59(49.2)	61(50.8)
Internet	45(37.5)	75(62.5)
Television	82(68.3)	38(31.7)
Extension agent	28(23.3)	92(76.7)
Researcher	61(50.8)	59(49.2)
Farmers Associations	107(89.2)	13(10.8)
Neighbors	100(83.3)	20(16.7)
Friends	108(90.0)	12(10.0)
Families	113(94.2)	7(5.8)
Local Council	105(87.5)	15(12.5)
Government agencies/information	60(50.0)	60(50.0)
Extension bulletin	70(58.3)	50(41.7)
Mobile phone	93(77.5)	27(22.5)

Source; Field Survey, 2019.

Pearson product method correlation (PPMC): The table below shows that there is significant relationship between sources of information on climate change and the perceived effect of climate change. This implies that where the respondents got their information about climate change does not determine the respondent's perception on the effects of climate change.

Table 5. H01: Relationship between sources of information and perceived effect

Variables	R-Value	P-Value	Decision
Sources of information and perceived effect.	-0.033	0.719	NS

Source; Field Survey, 2019. S- Significant at<0.05

Table 6. HO2; Association between the socio economic characteristics of the women farmers and their perceived effect on climate change.

Variables	X ² -Value	P-Value	Decision
Age	12.451	0.189	NS
Marital status	68.426	0.000	S
Family size	25.777	0.012	S
Ethic background	6.017	0.421	NS
Education	3.795	0.987	NS
Farming size	14.807	0.096	NS
Primary occupation	32.059	0.000	S

Source; Field Survey, 2019; S- Significant at<0.05; NS- Not significant at >0.05

Chi square analysis: Chi-square analysis on table 4.9 shows that significant association exists between marital status ($\chi^2=68.426$, $P=0.000$), family size

($X^2=25.777$, $P=0.012$) and perceived effect of climate change.

Conclusion: The study revealed that majority of the respondents were between the ages of 40-49years and majority of them are married. The study revealed that a huge percentage of the respondents had no formal education. Furthermore, very few respondents got information on the causes and effects of climate change from extension agents. However, it also shows that majority of the respondents perceived the effect and causes of climate change. It is therefore recommended that extension agents should help in disseminating more helpful information to the farmers.

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