Original Research Article

FARMERS' INFORMATION SOURCES AND CONSTRAINTS TO CLIMATE ADAPTABILITY IN ONDO STATE NIGERIA

ABSTRACT

The study assessed farmers' information sources and constraints to climatic adaptability in Ondo state, Nigeria. Specifically, the study ascertained the socio-economics characteristics of the respondents; examined the sources of information on climate change adaptability available to both gender respondents; compared the perceived knowledge of climate change adaptability of the respondents; determined the factors influencing respondents' access to information on climate change adaptability; determine the factors influencing respondents utilization of information on climate change adaptability; and also identified the constraints faced by respondents relating to climatic adaptability. Multi-staged sampling technique was used to select and interviewed equal samples of male and female farmers of 120 respondents. Both the descriptive and inferential analyses were carried out and results showed that the mean age of farmers was 43.5 years, 82.5% of the farmers were married, with an average household size of 7 members. The average years of experience was 12.3 years, average size of farm land is 4.7 hectares. Results showed that farmers had access to information mainly through family and friends (70.8%). Majority of the farmers perceived climate change through higher sunshine intensity (97.5%), the adaptation activity embarked upon mostly by farmers was mulching (97.5%). The major factor influencing respondent's access to information was electricity ($\bar{x}$=2.58). The major factor influencing utilization of information was past experience about climate change ($\bar{x}$=2.47), the major constraint to climatic adaptability were power ($\bar{x}$=4.28) and poor information on warning system ($\bar{x}$ =4.27).

KEYWORD: Information, Climate. Adaptability, Farmer, Knowledge

INTRODUCTION

Climate change is a global problem which has brought about much anxiety and confusion (Adeleke and Omoboyeje 2016). Currently, climate change impacts and responses are observed in physical and ecological systems. Adaptation to these impacts is increasingly being observed in both physical and ecological systems as well as in human adjustments to resource availability and risk at different spatial and societal scales (Adger *et al.*, 2017). Nevertheless, there is increasing evidence from ecological studies that the resilience of socio-ecological systems coupled to climate change will depend on the rate and magnitude of climate change, and that there may be critical thresholds beyond which some systems may not be able to adapt to changing climate conditions without radically altering their functional state and system integrity (Adger *et al.*, 2017).

The primary aim of adaptation is to moderate the adverse effects of un-avoided climate change through a wide range of actions that are targeted at the vulnerable system of the community. The ultimate goal of adaptation is to develop flexible and resilient societies and economies that have the capacity to address both the challenges and the opportunities presented by changing climatic conditions (IDRC/ CCAA 2009).

Better information about weather conditions would help small-scale producers to adapt to foreseeable variations in climate by, for example, adjusting planting dates or timely sheltering of livestock. Surveys have found that farmers in Eastern and Southern Africa who were able to access seasonal forecasts changed at least some management decisions, which helped them to reduce harvest losses (Mudombi and Nhamo, 2014). Investing in institutions that share seasonal forecasts, a key area of climate information, can increase farmers' capacity to reduce their exposure to risks (Hansen *et al.*, 2011).
Nigeria is vulnerable to climate change impacts due to its geography, climate, vegetation, soils, economic structure, population and settlement, energy demands, and agricultural activities. The location and size of and the characteristic relief in Nigeria give rise to a variety of climates ranging from tropical maritime climate characterized by the rainforest along the coastal and southern section to the tropical hinterland climate associated with the Sahel in the northeastern section of the country. Knowledge about the environment is an important factor which is very crucial in handling the variability experience daily, farmers may be at a disadvantage, as they have less access to crucial information and fewer means to interpret that information. This can affect their ability to understand and

to act on information concerning climate risks and adaptation measures. This study therefore seeks to understand the underlining factors crucial to farmers' access to information and utilization of such information especially as it relates to the environment. The following research questions formed the basis for which the following objectives were specified; What are the socio-economic characteristics of farmers in rural communities of Ondo state? What are the sources of information on climatic adaptability available to the farmers?

What are the factors influencing farmers access to information on climatic adaptability? What are the factors influencing farmers utilization of information on climatic adaptability? And, What are the constraint to having access to and utilizing climatic adaptation information?.

Objectives of the study

The main objective of the study was to analyse farmers' knowledge source and constraint on climate adaptability in Ondo State Nigeria.

Specific objectives were to:

i. ascertain the socio-economic characteristics of respondents

ii. examine the sources of information on climate change adaptability available to both gender respondents

iii. determine the factors influencing respondents' access to information on climate change adaptability

iv. determine the factors influencing respondents utilization of information on climate change adaptability

v. identify the constraint faced by respondents relating to climatic adaptability.

METHODOLOGY

The study was carried in Ondo state Nigeria which falls within the tropical zone with two distinct seasons of rainy and dry seasons. The rainy season occurs between April and October while the dry season begins in November and lasts till April, although in recent times minor alterations are noticeable in rainfall regions due to global climatic change. The state is blessed with 12 diurnal sunshine hours and a moderate all year-round temperature of about 25°C. With high relative humidity of 75% to 95%, Annual rainfall varies from 2000mm in the southern part to 1150mm in the northern extremes. The major occupation of the people of Ondo state is Agriculture and arable crops planted include Yam, cassava, maize, plantain, rice, millet, and vegetables while tree crop planted is majorly Cocoa.

Ondo state has good water supply with vast network of water bodies (rivers and streams) that provides a huge potential for SMART agricultural practices. The study employed a multistage sampling technique. Simple random sampling technique was used to choose Idanre and Ifedore local government areas out of the 18 local governments in Ondo state. Three communities were randomly chosen in each local government area, ten (10) respondents were also randomly chosen making a total of 60 farmers per local government area. A total number of 120 respondents were administered questionnaire on and data obtained for the study.

Descriptive statistics such as frequency distribution, percentages were used to analyse the objectives, Likert scale was used to measure the factors influencing access and utilization of information, and constraints to getting information on climate change.

RESULTS AND DISCUSSION

Socio-economics characteristics of Respondents

Table 1 presents the summary of the key socioeconomic characteristics of the respondents in the study area. It was revealed that about 31.5% of the farmers were between the age range of 31-40 years while 28.4% were in the range of 41 -50 years. The mean of the age of respondents is 43 years. The implication of the finding is that most of the respondents are at their middle age. At this stage, farmers are most active in seeking information and trying climatic adaptability practices given necessary support. This is in line with the assertion that education is related not only to ability to obtain and process information, but also to the use of more sophisticated techniques by farmers (Akinwalere, 2017). Majority (82.5%) of the respondents were married, while few (5.8%) were divorced and about 0.8% are single. Study indicated that 43.4% of the respondents had primary education, 34.2%, secondary education while 5% had tertiary education. This implies that learned people are involved in agriculture, and majority of the present day farmers are literate (Akinwalere and Osanyintuyi, 2018). High literacy among farmers is a pre-requisite for the adoption of climatic adaptability practices (Akinwalere *et al*; 2016).

Also, 81.6% of the respondents were Christians, 14.2% muslims and 4.2% were traditionalists. The implication is that majority of the respondents are Christian.

Most of the respondents (49.2%) had household size of 6-10 members, while 37.5% had 1-5 members, 10.9% had 11-15 members. The mean of the family size is 6 members.

This implies that family labour will readily be available for majority of the respondents in their farms.

Study indicated that 47.7% of the respondents had between 1-10 years of farming experience, 38.4% had between 11-20 years of farming experience, while 3.2% of the respondents had been farmers for more than 30 years. This implies that majority of the respondents were well experienced in the business of agriculture with the farm size ranging from 1 to 5 hectares (69.9%), 6 to 10 hectares (22.9%), 11 to 15 hectares (6.6%) and 0.8% having farmland above 15 hectares(Table 1). The average farm size of respondents was 4.7 hectares. Majority (58.3%) of the respondents operated on a leased land, 40% personally own the land, while 1.7 percent operated on a communal land.

Study also revealed that 45.8% of the respondents had at one point or the other been exposed to one form of agricultural training while 54.2% had never attended any form of training in agriculture**.** Table 1 showed that majority (68.7%) of the respondents had no form of irrigation in place on their farms, 21.7% had a semi-technical irrigation system in place, while 9.6% had some sort of technical irrigation system as a form of adaptability.

Table 1: Distribution of Respondents according to Socio-economic characteristics

Socio-Economic characteristics	Frequency	Percentage (%)	Mean
Age			
Less than 30 Years	17	14.5	
31 – 40	38	31.5	
41 – 50	34	28.4	43
51 – 60	18	14.9	
61 – 70	10	8.3	
Above 70	3	2.5	
Marital status			
Single	1	0.8	
Married	99	82.5	
Divorced	7	5.8	
Widowed	6	4.9	
Separated	1	3.2	
Educational Level			
No Formal Education	21	17.5	
Primary Education	52	43.4	

Secondary Education	41	34.2	
Tertiary Education	6	5	
Adult Education	1	0.8	
Religion			
Christianity	98	81.6	
Islam	17	14.2	
Traditional Religion	5	4.2	
Household Size (Members)			
Less than 5	45	37.5	
6 – 10	59	49.2	
11 - 15	13	10.9	6
Above 15	3	2.4	
Farming Experience (Years)			
Less than 10	57	47.7	
11 – 20	46	38.4	12
21 – 30	13	10.7	
Above 30	4	3.2	
Farm Size			
1 – 5 hectares	84	69.9	
6 – 10 hectares	27	22.9	4.7
11 – 15 hectares	8	6.6	
Above 15 hectare	1	0.8	
Land Ownership			
Personal	48	40	
Leased	70	58.3	
Communal	2	1.7	
Access to Agricultural Training			
Yes	55	45.8	
No	65	54.2	
Irrigation system			
Technical	8	9.6	
Semi Technical	26	21.7	
None	86	68.7	

Source; Field Survey, 2019

Sources of Information on climate change

Table 2 revealed the sources through which the respondents got their information on climate change. Majority of the farmers got information on climate change through family and friends (70%), radio (68%), town hall meetings (65%), extension agents (48%), television (47%). The implication is that farmers have many sources available for accessing climate related information needed for farming activities.

Table 2: Respondents according to Sources of Information

Sources of Information	**Yes**	**No**
	Freq(%)	Freq(%)
Television	57 (47.5)	63 (52.5)
Radio	82 (68.3)	38 (31.7)
Internet	23 (19.2)	97 (80.8)
Social Media	20 (16.7)	100 (83.3)
Workshop	11 (9.2)	109 (90.8)
Books and Journals	9 (7.5)	111 (92.5)
Extension Agents	58 (48.3)	62 (51.7)
Town hall Meetings	78 (65.0)	42 (35.0)
Newspaper	18 (15.0)	102 (85.0)
Family and friends	85 (70.8)	35 (29.2)

Source: Field Survey, 2019

Climate Change Adaptation Activities of the respondents

Result in table 3 showed the various activities embarked upon by the respondents as means of adapting to climate change based on their knowledge of adaptation activities entails**.** These include mulching (97.5%), mixed cropping (94.2%), making ridges (90.8%), early planting (88.3%), fallowing (83.3%), intensive use of chemical fertilizer (82.5%), using certified seed (81.7%), zero tillage (79.2%), agroforestry (69.2%), mixed farming (65%) among others.

Table 3: Respondents according to knowledge of adaptation activities

Adaptation activities	**Yes**	**No**
	Freq(%)	Freq(%)

Mixed farming	78	(65)	42	(35)
Zero Tillage	95	(79.2)	25	(20.8)
Soil conservation	46	(38.3)	74	(61.7)
Mulching	117	(97.5)	3	(2.5)
Mixed cropping	113	(94.2)	7	(5.8)
Making ridges	109	(90.8)	11	(9.2)
Irrigation	37	(30.8)	83	(69.2)
Early Planting	106	(88.3)	14	(11.7)
Changing crop varieties	52	(43.3)	68	(56.7)
Planting drought resistant varieties	45	(37.5)	75	(62.5)
Harvesting Rainwater	9	(7.5)	111	(92.5)
Improved watershed system	8	(6.7)	112	(93.3)
Dependency on pipes	7	(5.8)	113	(94.2)
Traveling long distance for water	13	(10.8)	107	(89.2)
Using certified seed	98	(81.7)	2	(18.3)
Intensive use of chemical fertilizer	99	(82.5)	21	(17.5)
Crop Rotation	59	(49.2)	61	(50.8)
Use of compost fertilizer	62	()51.7	58	(48.3)
Fallowing	20	(16.7)	100	(83.3)
Intensive use of pesticide	40	(33.3)	80	(66.7)
Equalize opportunity for climate information	72	(60)	48	(40)
Agroforestry	83	(69.2)	37	(30.8)

Source: Field survey, 2019

Factors influencing Respondents' access to Information on climate change

Result in Table 4 revealed the factors that mostly influenced farmers' access to information on climate change. Some of these included, electricity ($\bar{x}$=2.58), perceived benefit ($\bar{x}$=2.55), mode ($\bar{x}$=2.22), difficult terms ($\bar{x}$=2.20), education ($\bar{x}$ =2.02), airtime schedule ($\bar{x}$ =1.96), cost of service ($\bar{x}$=1.92), inadequate usage training ($\bar{x}$ =1.91), gender of famers ($\bar{x}$=1.72)

This result implies that unavailability or inadequate electricity and perceived benefit affects every farmers' access to information, and are mostly inhibitors, this is further

supported by (MacGregor, 2010, Me-Nsope, 2015 and FAO, 2015), it is also revealed from this finding and supported by (IUCN/UNDP/CCGA, 2009 and Grant 2012) that the mode of disseminating the information either pictorial, audio or audio visual form, is one of the cardinal factor that dictate the level of access to information rural farmers

Table 4: Factors influencing respondent's access to information

Factors	**Strong influence**	**Moderate influence**	**No influence**	Mean
	Freq (%)	Freq (%)	Freq (%)	
Airtime Schedule	47 (39.2)	30 (25)	43 (35.)	1.96
Age of farmer	66 (55)	43 (35.8)	11 (9.2)	1.54
Sex of farmer	53 (44.2)	47 (39.2)	20 (16.7)	1.72
Difficult terms	19 (15.8)	58 (48.3)	43 (35.8)	2.20
Perceived benefits	12 (10)	29 (24.2)	79 (65.3)	2.55
Storage difficulties	65 (54.2)	28 (23.3)	27 (22.5)	1.68
Lack of program control	105 (87.5)	6 (5)	9 (7.5)	1.20
Mode (Audio/Visual)	28 (23.3)	37 (30.8)	55 (45.8)	2.22
Inadequate usage training	42 (35)	46 (38.3)	32 (26.7)	1.91
Cost of service	37 (30.8)	55 (45.8)	28 (23.3)	1.92
Electricity	11 (9.2)	28 (23.3)	81 (67.5)	2.58
Roles in the family	52 (43.3)	27 (22.5)	41 (34.2)	1.49
Education	32 (26.7)	53 (44.2)	35 (29.2)	2.02

Source: Field survey, 2019

Factors influencing respondents' utilization of climate change Information

Study revealed that Farmers' utilization of information on climate change and adaptability is strongly influenced by previous bad experience($\bar{x}$=2.47), poor infrastructure ($\bar{x}$=2.46), access to equipment ($\bar{x}$=2.45), Cost of utilization ($\bar{x}$=2.41), High cost of maintenance ($\bar{x}$=2.35), Inadequate labour ($\bar{x}$=2.27), Property right/ ownership ($\bar{x}$=2.20), Size of farmland ($\bar{x}$=2.05), Inadequate training ($\bar{x}$=1.99), Fear of the unknown ($\bar{x}$=1.88) Inadequate support ($\bar{x}$=1.75), and Religious believes ($\bar{x}$=1.52) (Table 5)

This is tandem with the findings of (Alaimo 2012) which also indicates these as inhibitors to farmers' utilization of information. The factors that does not severely influence farmers' utilization of information are fear of the unknown, Inadequate support, and Religious believes, this indicates that farmers do not perceive these as serious factors

influencing for utilizing information on climate change, this is also supported by the findings of (Safi et al, 2012).

Table 5: Factors influencing utilization of information on climate change

Factors	**Strong influence** Freq(%)	**Moderate influence** Freq(%)	**No influence** Freq(%)	Mean
Cost of utilization	69 (575)	32 (26.7)	19 (15.8)	2.41
Inadequate training	29 (24.2)	61 (50.8)	30 (25)	1.99
Inadequate labour	64 (53.3)	25 (20.8)	31 (25.8)	2.27
Property right/ownership	59 (41.2)	26 (21.7)	35 (29.2)	2.20
Past experience	75 (62.5)	27 (22.5)	18 (15)	2.47
Inadequate support	30 (25)	30 (25)	60 (50)	1.75
Size of farmland	46 (38.3)	34 (28.3)	40 (33.3)	2.05
Access to equipment	61 (50.8)	52 (43.3)	7 (5.8)	2.45
High cost of Maintenance	63 (52.5)	36 (30)	21 (17.5)	2.35
poor infrastructure	7 (61.7)	28 (23.3)	18 (15)	2.46
Fear of the unknown	27 (22.5)	49 (39.2)	46 (38.3)	1.88
Religious believes	14 (11.7)	35 (29.2)	71 (59.2)	1.52

< 1= No influence, 1.0 – 2.0= Moderate influence, 2.1 – 3.0 = Strong influence

Source: Field Survey, 2019

Constraints faced by respondents on climatic adaptability in the study area

Table 6 revealed that major constraints in adapting to climate change were poor electricity ($\bar{x}$ =4.28), poor information on warning system (($\bar{x}$ =4.27), insurance policy ($\bar{x}$=4.26), inadequate information ($\bar{x}$=4.19), Poor or absence of internet facility ($\bar{x}$ =4.18), high cost of input and technology ($\bar{x}$ =3.90), poor extension program delivery ($\bar{x}$=3.80), farm distance ($\bar{x}$=3.64), off farm jobs ($\bar{x}$ =3.52), land tenure ($\bar{x}$=3.01).

Other constraints includes inadequate credit ($\bar{x}$=2.98), labour constraints ($\bar{x}$=2.97), pubic and institutional constraints ($\bar{x}$ =2.58), neighbourhood norms ($\bar{x}$ =2.35) and religious believes ($\bar{x}$ =2.10)

Table 6: Constraints to climatic adaptability

Constraints	Strongly agreed	Agreed	Neutral	Disagreed	Strongly Disagreed	Mean

	Freq(%)	Freq(%)	Freq(%)	Freq(%)	Freq(%)	
Public and institutional constraints	2 (1.6)	- (-)	84 (70)	13 (10.8)	21 (17.5)	2.58
Labour constraints	18 (15)	39 (32.5)	9 (7.5)	29 (24.2)	25 (20.8)	2.97
Poor electricity	83 (69.2)	11 (9.2)	10 (8.3)	8 (6.7)	8 (6.7)	4.28
Land tenure	32 (26.7)	21 (17.5)	16(13.3)	19 (15.8)	32 (26.7)	3.01
Neighbourhood norms	8 (6.7)	15 (12.5)	31(25.8)	23 (19.2)	43 (35.8)	2.35
Inadequate credit	25 (20.8)	39 (32.5)	13(10.8)	19 (15.8)	24 (20)	2.98
Religious believes	14 (11.7)	3 (2.5)	22(18.3)	23 (19.2)	58 (48.3)	2.10
High cost of input/technology	62 (51.6)	18 (15)	17(14.2)	13 (10.8)	10 (8.3)	3.90
Poor information on warning system	81 (67.5)	10 (8.3)	14(11.7)	10 (8.3)	5 (4.2)	4.27
Farm distance	32 (26.7)	47 (39.2)	20(16.7)	8 (6.7)	13 (10.8)	3.64
Off farm jobs	26 (21.7)	42 (35)	32(26.7)	8 (6.7)	12 (10)	3.52
Poor extension program delivery	37 (30.8)	44 (36.7)	26(21.7)	4 (3.3)	9 (7.5)	3.80
Insurance policies	80 (66.7)	16 (13.3)	9 (7.5)	5 (4.2)	10 (8.3)	4.26
Inadequate information	73 (60.8)	21 (17.5)	10 (8.3)	7 (5.8)	10 (8.3)	4.19
Poor/absence of internet facility	73 (60.8)	21 (17.5)	10 (8.3)	7 (5.8)	9 (7.5)	4.18

Source: Field Survey, 2019

Conclusion and Recommendations

The study assessed farmers' knowledge on climatic adaptability in Ondo state. The study concluded that the perception of the farmers about climatic adaptability is in better agricultural practices which includes mulching, mixed cropping, making ridges, early planting, fallowing, intensive use of chemical fertilizer, using certified seed, zero tillage, socializing information on climate change, mixed farming.

While, the constraints they faced in adapting to climate change includes power, poor information on warning system, insurance policy, inadequate information, Poor or absence of internet facility, high cost of input and technology, poor extension program delivery, farm distance, off farm jobs, land tenure. The inadequate awareness and reliance on personal experiences or friends and families as sources information led to the insufficient usage of the information on climate change to map out better adaptation strategies

Based on these findings, the following recommendations are proposed:

i. There is a need for more educational programs and trainings for farmers on climate change and adaptation activities so as to improve farmers' practices.
ii. Extension agents should be more equipped in delivering programs to the farmers, as well as laying more emphasis on climate change and better adaptation strategies.
iii. The government should consider massive rural electrification and making available incentives such as internet facilities to improve the chances of rural farmers in accessing information on climate change.
iv. There is need for more publicity on climate change and adaptation strategies related issues on social media such as newspapers, television and radio.

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