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How are Rural Women Crop Farmers in Southern Nigeria Coping with Climate Change?

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Abstract

Women constitute 75% of agricultural workforce in Nigeria yet suffer marginalisation in accessing information and resources. Despite the fact that they are more exposed and vulnerable to climate change, they are less represented in climate change initiatives in the country hence their needs scarcely addressed. The need to understand their strategies to adaptation and challenges faced hence proffer relevant advisory services that better address their felt needs prompted this study. The study assessed adaptive strategies and constraints to climate change adaptation among rural women crop farmers in Southern Nigeria. Four hundred and twenty rural women crop farmers were selected for the study using multi-stage sampling procedure. The study employed a mixed method approach of data collection to ensure holistic data comprising both qualitative and quantitative was collected for the study. Descriptive statistics and Varimax rotated factor analysis was employed to describe the data collected. Majority (91%) of the rural women interviewed were married with mean age of 48years. Average household size and farming experience was 5persons and 13years respectively. Five major climate change adaptation strategies used by the rural women crop farmers as shown by the Varimax rotated factor analysis were soil and crop management practices (Factor 1), use of indigenous knowledge and socio-economic practices (Factor 2), Land-based and water management practices (Factor 3), financial management practices (Factor 4) and use of herbicides and pesticides (Factor 5). The major challenges experienced by the rural women in adaptation to climate change were found to be poor state feeder roads for easy access to markets ($\bar{X}$ = 3.84), financial incapacitation ($\bar{X}$= 3.76), non-functional government climate change adaptation frameworks ($\bar{X}$= 3.57), unavailability of needed resources and inputs($\bar{X}$= 3.52), low knowledge and capacity to adapt ($\bar{X}$= 3.51), barriers and limitations placed on women by traditional beliefs ($\bar{X}$= 3.37), inadequate government support ($\bar{X}$= 3.32), relegation of women needs in community development projects and programmes ($\bar{X}$= 3.22), crude/traditional storage methods and facilities ($\bar{X}$= 3.19) and unfavourable land tenure system ($\bar{X}$= 3.11). Understanding and recognizing the key role of women in adaptation initiatives by government agencies, non-governmental agencies and private sector could inspire more programmes that could help build the rural women adaptive capacity to climate change impacts as well as their ability to overcome adaptation challenges.
Keywords: gender-responsiveness, adaptation responses, soil and crop management, gender barriers,

Introduction

Climate change is no longer news, even a farmer in the most remote village knows there is change in climate. But the problem lies in the understanding of the concept of climate change, causal factors and adaptive strategies. Climate change could simply be defined as significant increase in average global temperatures over a prolonged period of time. It is caused by both natural events and human activities though human activities are believed to be the major causal factor. All human activities that result in emission of greenhouse gases are among the contributing activities to the change in climate. IPCC 4th Assessment report noted that Africa, Nigeria inclusive, will be worst hit by the effects of Climate Change. A more recent report, the IPCC 6th Assessment Report, (2021) reaffirmed the existence of the change in climate, noting that climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes. It highlighted

that each of the last four decades has been successively warmer than any decade that preceded it since 1850. Global surface temperature in the first two decades of the 21st century (2001-2020) was 0.99 °C higher than 1850-1900. Global surface temperature was 1.09°C higher in 2011– 2020 than 1850–1900, with larger increases over land (1.59°C) than over the ocean (0.88°C). This shows the unavoidable risk posed by climate change. The case of Nigeria may not be far from available global data. Energy Commission of Nigeria (2018) noted that Agriculture accounted for 25% of emissions (excl. land use) in 2017, with the majority attributable to livestock (through enteric fermentation and manure). United Nations Department of Economic and Social Affairs Population Division, (2020) noted that Nigeria's GHG emissions per capita (incl. land use) are 3.37tCO2e per capita. The 2021 report of the Nigerian Meteorological agency stated that the country in 2021 experienced 0.5 – 1.5^{o}C warmer than normal temperatures when compared with the 1991 – 2020 long term averages. It highlighted that very high temperatures were observed beyond the normal period in the year 2021. Cases of extreme weather events were recorded; severe flooding was recorded in 210 Local governments across the 36 states and Federal capital territory resulting in loss of lives, livelihoods and properties; approximately 155 lives were lost and 250,000 persons displaced between August and October, 2021. These events have negative implications on the economic status of the people, increasing number of people particularly rural dwellers are pushed further below poverty line. Rural farmers who heavily rely on weather events for the livelihood activities bear the major grunt of these extreme weather events. The Nigeria National Climate Change Policy Response and Strategy (NCCPRS) noted that the agriculture and food security, water resources, public health, and settlements sectors are particularly vulnerable to climate change with the most vulnerable regions around the coastal regions and erosion and desertification-prone areas in the south eastern and northern parts of the country. Though everyone is vulnerable, farmers (particularly female farmers), fisherfolks, the elderly, women, children and poor people living in rural areas are the most vulnerable groups.

The increasing temperature and subsequent global warming are unhealthy for the agricultural system because of the resultant higher evapotranspiration and water loss. Plant growth and development depends mainly on the availability of the required temperature and proper amount of water. Previous studies have shown that climate change will not only affect the productivity of stable crops whose growth and development of crops are mainly dependent on sunlight, temperature, and water (Deutsch, et al., 2018), it will also reduce suitable areas for the production of many crops (Deryng, et. al., 2014) as well as limit the overall production of some crops in many areas [Kumar & Sharma, 2014; Carvalho, et al., 2015; Duli & Yang-Rui, 2015). IPCC AR5 (2014) and AR6 (2021) noted that crop yields in sub-Saharan African will drop by 22% by 2050 due to climate change. These available climate data buttresses the critical need for increased effort in adaptation particularly in the agricultural sector.

Adaptation implies all measures used to reduce the adverse impact of climate change occasioned by global warming on human life and the environment. According to Ahmed, Ullah, Rahman, Ahmad, Wajid, Ahmad, & Ahmed, (2019), it is the action to global warming which helps to reduce the vulnerabilities in the social and biological system. The main objective of adaptation strategy is to build resilience in societies against climate change. Farmers in different regions of the country have resorted to varying strategies to adapt their farming systems to climate change effects. These ranges from land and cropping practices, soil and water management practices, development and use of high-yielding and drought-tolerant crop varieties to livelihood diversification, pest management practices and usage of information from extension services(Ifeanyi-obi, 2016; Aderinoye-Abdulwahab & Abdulbaki, 2021). While efforts are made to withstand the effects of climate change threats and risks, it is also important to note that the vulnerability of agriculture is not solely determined by the nature and magnitude of environmental stress like climate change, but by the combination of societal capacity to cope with and/or recover from environmental change (Aryal, et al., 2019). Socio-economic variables that heighten

vulnerabilities of individuals to climate extremes and supportiveness of existing institutions should also be addressed. The fact that farmers are a heterogenous group with varying levels of exposure and vulnerabilities to climate change must be recognized.

Rural women who constitute 75% of the agricultural workforce in Nigeria (Federal Ministry of Agricultural and Rural Development, 2019). They play major role in agricultural activities, particularly in production, processing and marketing. Despite the significant contributions of women in Nigerian agricultural sector, they still face marginalization and hinderances orchestrated by traditional beliefs and practices. These exclusions are mainly in the area of access to information and needed resources as well as opportunities and representations in leadership positions. For instance, in most rural community-based associations, it is difficult for a woman to be elected as president even when she is known to possess better qualities than the male counterpart. It is seen as an abnormality for a woman to lead a group comprising of both male and female. Similarly, in most rural farm families where the woman is the main farmer. The man has other livelihood activities like trading as the major source of income. It has been observed that when there is opportunity for capacity building or important information for farmers, it is the man who is not fully involved in farming that answers such calls. Such representation does not help the agricultural sector as feedback given by the man may not represent the real farm situation, and in relating the acquired knowledge/information back to the women who is the real farmer, sometimes, the information is disrupted. Generally, in Nigeria, women are not regarded as farm owners, they are only seen as farm wives or helpers depriving them of their proper place in farm decision making.

These varies across to ethnic groups. The recognition or negligence of women in farm activities in most cases is tied to cultural beliefs and practices among the people.

Ifeanyi-obi and Ugorji (2020) in their study of effect of social exclusion on the climate change adaptation of female arable crop farmers in Abia state found that women suffer exclusion mainly in access to credit facilities, land ownership, farm resources, headship of groups and associations and social services. In the face of changing climatic conditions which is adversely affecting rural livelihoods particularly farming activities, the overall wellbeing of the rural women is threatened. Both the family upkeep which rural women bear the primary responsibilities and farming activities are adversely affected. It is important that rural women are integrated into adaptation interventions and initiatives to ensure their needs are addressed. The extent of climate change impact on a people depends on their social status, gender, poverty, power and access to and control over resources (UNDP, 2019). Women bear the grunt of extreme weather events mainly because they are poorer than men, less educated, less represented in political arena hance their needs marginalized (UNDP, 2019). Efforts to strengthen farmers resilience to climate change impacts in the country must recognize and address the needs of rural women. Furthermore, Lessons from rural women experiences, knowledge and skills could offer deeper insights to adaptation initiatives in the country. Ifeanyi-obi (2022) noted that Gender responsiveness is key to successful adaptation of agriculture to climate change in Nigeria. It noted that strategic collaborations among key stakeholders is important in achieving this.

It is against this background that this study assessed the adaptation strategies and challenges to adaptation among rural women crop farmers in southern Nigeria with a view to collect credible data that will better inform climate change initiatives in the country towards been gender sensitive.

Methodology

This study was conducted in Southern Nigeria. The map of Southern Nigeria is shown below:

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Fig. 1. Map of Southern Nigeria
Source: Ozor., et al (2012)

Nigeria is the most populous country in Africa and ranks the 7th in the world with an estimated population of 215,637,422 as of Saturday, May 14, 2022. The population is estimated to be growing at an annual rate of 3.1% (National Population Commission 2022). Agriculture remains the mainstay of the economy especially for the rural populace. Women constitute 75% of the workforce in the agricultural sector and at the same time more exposed and vulnerable to climate change. Report of 2021 of the Nigerian Meteorological Agency shows marked alteration in Nigeria climate variables particularly in the key variables (Rainfall, solar radiation and temperature). It noted that this may continue bearing in mind that the expected cut in Greenhouse Gas emission may not be achieved soonest. This has negative implication for the agricultural sector which relies mainly on weather variables.

Mixed method approach was used in data collection to ensure diverse data that give more insight to the research objectives was collected. Questionnaire administration, Focused Group Discussion (FGD) and Key informant interview (IDI) was employed to collect data. The sample for the questionnaire administration was selected using a multi-stage sampling procedure. Southern Nigeria has three of the six geopolitical zones of Nigeria. The first stage of the sampling procedure was a random selection of two states each from the three geopolitical zones that make up southern Nigeria. The selected states were Oyo, Osun, Rivers, AkwaIbom, Enugu and Abia. The second and third stage comprised selection of two agricultural zones from each of the selected state and selection of one agricultural block from each zone selected. In the last stage, one agricultural circle was selected from each of the block selected and 35 rural women crop farmers was selected from the list of registered rural women crop farmers in the circle. This gave a total of 420 rural women crop farmers for the questionnaire administration. For the key informant interview, in each of the block that was used for the study, on rural women crop farmer, a village chief and the Extension agent in charge of the circle was interviewed to detailed information on the subject studied. One Focused group discussion was also organized for key women Leaders in each circle used for the study

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Data collected was analysed using mean, frequency count, Percentages Varimax Rotated Factor analysis. Challenges to adaptation was captured using a Four point Likert type scale of Very Serious, Moderately Serious, Less Serious and Not Serious which was assigned weight of 4, 3, 2 and 1 respectively with a midpoint of 2.5 implying statements with mean value of 2.5 and above are serious challenges to adaptation while statements with mean value of less than 2.5 are not serious challenges to rural women adaptation to climate change.

Results and Discussion

Climate change adaptation strategies used by the rural women crop farmers in southern Nigeria

Of the 420 rural women crop farmers used for this study, only 81% indicated that they have taken decision to adapt their farming activities to climate change and 80% indicated supporting their decision to adapt with commensurate action, that is adopting available climate change strategies. Table 1 shows the result of the Factor analysis conducted on the 31 items used to capture adaptation measures used by rural women crop farmers.

The 31 items of were subjected to principal components analysis using SPSS version 23. Prior to performing the PCA, the suitability of data for factor analysis was assessed, inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Olkin value was .735, exceeding the recommended value of .6 (Kaiser 1970, 1974) and Bartlett's Test of Sphericity reached statistical significance (0.00) supporting the factorability of the correlation matrix. Principal components analysis revealed the presence of nine components with eigenvalues exceeding 1, explaining 71% of the variance. An inspection of the scree plot revealed a clear break after the fifth component hence the retaining of five components which represent the five major climate change adaptation strategies used by rural women crop farmers in southern Nigeria. These five components explained a total of 59% of the variance. These five components are: soil and crop management practices (Factor 1), use of indigenous knowledge and socio-economic practices (Factor 2), Land-based and water management practices (Factor 3), financial management practices (Factor 4) and use of herbicides and pesticides (Factor 5).

The factors that loaded high on Factor 1(soil and crop management practices) includes more frequent weeding (0.807), bush fallowing (0.801), planting under trees to reduce heat stress (0.761), use of improved varieties of crop (707), fertilizer application (0.619), crop diversification (0.614), planting of cover crops to reduce fast evaporation (0.605), early harvesting of crops (0.516) and crop rotation (0.597). During the Focused group discussion with the rural women, they noted that climate change manifest itself mainly through soil fertility reduction hence not surprising that they use many soil management practices in adapting to climate change.

Under Factor 2 (use of indigenous knowledge and socio-economic practices), the factors that loaded high are application of indigenous knowledge (0.798), joining cooperatives societies (0.793), reduction in quantity of food items given out as gift items (0.758), portfolio diversification (0.634), integrated framing systems (0.599), change in planting dates (0.545) and use of information from extension agents (0.535). Factors that amplified Factor 3 (land-based and water management practices) are water harvesting from roof tops (0.726), digging of tanks (0,687), change in farm location (631), increased fallowing (0.541), making high ridges to increase water retention (0.511) and use of available irrigation facilities (0.504). Under Factor 4 (financial management practices), the factors that loaded high are joining local isusu (0.594), assessing available loans and grants (0.583) and assessing insurance packages (0.501). Only two factors loaded high on Factor five (use of herbicides and pesticides). They include application of pesticides (0.553) and application of herbicides before planting (0.506).

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This result corroborates Stringer et al (2020) and Ojo & Baiyeguhi (2020) which found farmers adaptation strategies to include variation in sowing time, the use of improved crop variety (e.g., stress-tolerant variety), and shifting to new crops. Similarly, Danso-Abbeam et al (2021) found that rural non-farm jobs increase smallholder farmers' adaptive capacities hence the need for portfolio diversification as not only an adaptation strategy but also a means to help boost farmers adaptative capacity.

Specifically, on rural women adaptation, similar results exists, for instance, Chikaire et al (2018) in their study of Climate Change Adaptation Needs/Priorities of Rural Women Farmers in Flood Plain Areas of Owerri Agricultural Zone of Imo State, Nigeria found that rural women survived the menace of climate change by planting early maturing crop varieties, changing of planting dates, engaging in off-farm activities, crop rotation, mixed cropping/farming, use of diseases-resistant crop varieties, practice of cooperative farming, use of local knowledge to diversity crops and use of indigenous knowledge to prevent diseases/pest attack. Similarly, Sangotegbe et al (2014) found use of multiple cropping, crop rotation, changing planting periods, storage of water for future use, and diversifying into other areas of livelihood as the major climate change adaptation strategies among rural women in Savannah and Forest Zones of Oyo State, Nigeria.

Egbule and Agwu (2014) in a gender disaggregated study of information Needs for Climate Change Adaptation in the Niger Delta Area of Nigeria found that the climate change adaptation measures used by men and women farmers include expansion of cultivated farm areas (66.1% and 60.5%), increase in number of weeding of cropped land (67.5% and 56.1%), use of minimum tillage/zero system (61.1% and 49.0%), changing of planting dates (63.1% and 63.1%) and change of harvesting dates (59.9% and 64.3%). This further showed that strategies to adaptation to climate by men and women are not the same hence must be taken into cognizance for adaptation effort to be effective and successful. The finding of this study further agrees with Akinbanmi (2021) which found diversification into other business line, use of fertilizer and wetting of plants from nearby river as major adaptation strategy among rural women entrepreneurs Nigeria.

In the same vein, Onyeneke et al (2019) in their study of Climate change adaptation in Nigerian agricultural sector identified improved soil and land management, crop-specific Innovation, water management practices, climate information services and education, access to finance, and off-farm diversification as the adaptation measures used in crop farming in the country.

Table 1. Factor analysis showing the adaptation strategies used by rural women crop farmers in Southern Nigeria

S/N		1	2	3	4	5	Communalities
1	Making ridges across slope to prevent erosion	.324		.476		.311	**.646**
2	Avoid bush burning		.321	.407	.344		**.800**
3	Plant under trees to reduce heat stress	.761	.401	.356			**.736**
4	Making high ridges to increase water retention	.315		.511	.312		**.740**
5	Use of irrigation facilities available		.395	.504	.400		**.731**
6	Use improved varieties of crop	.707	.364			.353	**.696**
7	Digging of tanks	.382		.687	.401		**.745**
8	Portfolio diversification		.634				**.581**
9	Integrated farming system		.599	.443		.313	**.671**
10	Assessing available loans and grants				.583		**.734**
11	Application of pesticides	.421		.307		.553	**.694**
12	Reduction in quantity of foods items given out as gifts		.758	.465	.374		**.703**

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13	Planting of cover crops to reduce speed of evaporation	.605	.450	.411			**.533**
14	Application of indigenous knowledge	.408	.798				**.674**
15	Use of information from extension agents		.535			.311	**.835**
16	Water harvesting from roof tops			.726	.353		**.718**
17	Joining cooperative societies		.793		.386		**.642**
18	Early harvesting of crops	.516		.450			**.691**
19	Change in farm size			.498	.344		**.679**
20	Change in farm location	.411		.631			**.817**
21	More frequent weeding	.807			.487		**.654**
22	Increased fallowing			.541		.347	**.703**
23	Joining local Isusu to raise capital for more effective adaptation		.443		.594		**.639**
24	Change in planting and harvesting date		.545	.402			**.723**
25	Assessing insurance packages	.432			.501		**.861**
26	Fertilizer application	.619				.345	**.721**
27	Bush fallowing	.801		.382			**.780**
28	Application of herbicides before planting		.464			.506	**.568**
29	Migration to urban areas		.437	.390			**.737**
30	Crop diversification	.614			.393		**.772**
31	Crop rotation	.597		.378			**.728**
	Eigen Value	**6.986**	**3.734**	**2.843**	**2.329**	**1.754**	
	Percentage variance	**21.831**	**11.668**	**10.886**	**8.980**	**6.482**	
	Cumulative percentage	**21.986**	**3.734**	**2.843**	**2.329**	**1.754**	

Source: Field Survey, 2021

Responses harnessed from the Focused Group Discussion and Indepth interview showed that the rural women crop farmers used majorly six adaptation strategies namely; use of indigenous knowledge, change of planting and harvesting time, water harvesting, use of pesticides and herbicides, portfolio diversification and use of improved varieties.

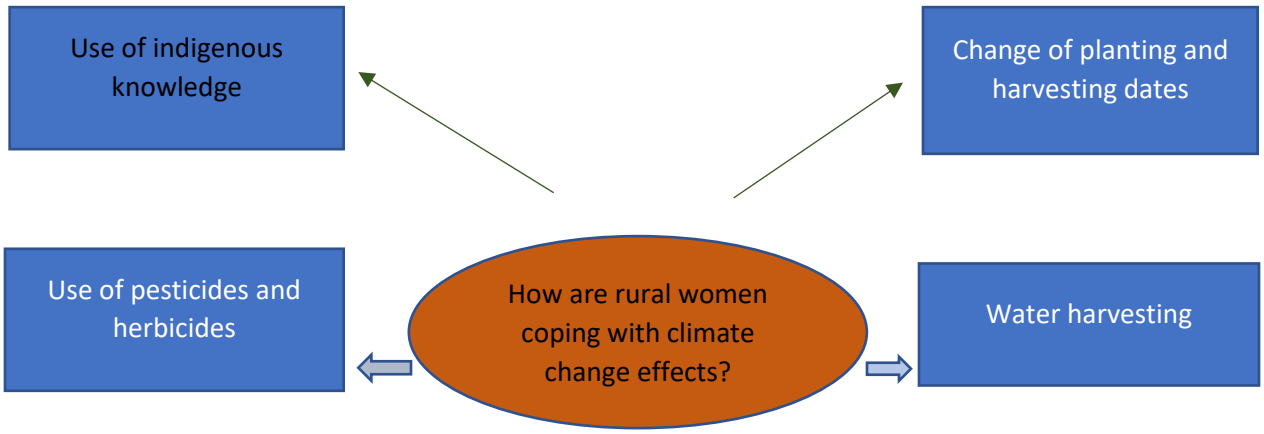

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Fig 2. How rural women in southern Nigeria are coping with climate change

The rural women noted that the indigenous knowledge has been very useful in combating climate change effects as most of the things they do are drawn from the local knowledge. They also noted that they are also involved in adjusting their farming calendar. One of the rural women from Abia state has this to say;

'When we were much longer, we could easily predict when clearing and planting in the farm could start. Once that first rain touches the ground, farm work has started, we know the crops to plant first and the ones to plant later. But we can't do that again, we have plan our farming now watching the weather signal closely. We don't start planting with the first rain least one will encounter huge loss when the sudden drought come in. so we crack our brain a lot in planning our farming activities now to avoid losses'

Another respondent from Rivers state noted

'Climate change has also made us (women) to venture into other things outside farm related jobs. This helps us to guide against total loss in the event of huge loss in the farm. Before now, women depend mostly on farming and agricultural related livelihoods for instance, picking periwinkle from the riverside, selling of agro products etc. but recently, a lot of women are engaged in trading (non agro products), even some now take up menial jobs as cleaners in school, house helps in homes, nannies in schools and homes. All these are geared towards getting extra income incase of massive loss in the farm'

Though indigenous knowledge are mainly used by the rural women, they noted that some of them seem not to be effective again. For instance, spraying of ash on all growing plants in the past keep away pests from eating up the leaves but recently, there are emergence of new pests (for instance, army worm) and diseases resistance to ash.

One of the discussants from Rivers State during the in-depth interview said'

'Most of our responses to climate change is based on our traditional experiences. We have minimal support from concerned agencies or even government. The crop, soil and pest management practices we mention are those we develop and use. Some of them are difficult to use in large farms, reduce effectiveness over time. But because we have no alternatives, we continue to manage them. We rarely see extension agents nor the likes. Even oil companies that were supporting our farming activities before are no longer active'

Another discussant, a vegetable farmer from Osun State has this to say:

'Even though we are managing the adverse effects of climate change with the little knowledge we have, these strategies may not stand the test of time as the change in climate keeps intensifying. For instance, the local water harvesting and management practices we use failed us last year as the heat was too much and dried up the harvested water. We need to upgrade our strategies to match the increasing extreme weather'

Another discussant, a maize farmer from Oyo State noted;

Use of pesticides from chemical dealers has caused me damages instead of helping me kill pests. It dried up my most of my plants and left the remaining one unhealthy. The local ash and plant water we use don't cause such damages. We need more help to guide us in the use of chemicals. Some dealers are not knowledgeable and cannot properly guide us. We encounter losses instead solution in the use of chemicals.

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Responses during the FGD showed that rural women are making sincere efforts to adapt to climate change because of the fact that climate change do not only affect their farming activities, but their livelihoods are also mainly dependent on natural resources which are impacted by climate change. It is a major threat to their overall livelihood sustenance. But unfortunately, the needed support is rarely given to them hence the many challenges they experience in their effort to adapt to climate change.

Challenges faced by rural women farmers in adapting to climate change

Of the 420 rural women crop farmers used for the study, approximately 95% (401) indicated that they are facing challenges in adapting their farming activities to climate change. Table 2 shows the details of the challenges faced by the women. The major challenges experienced by the rural women in adaptation to climate change were found to be poor state feeder roads for easy access to markets ($\bar{X}$ = 3.84), financial incapacitation ($\bar{X}$ = 3.76), non-functional government climate change adaptation frameworks ($\bar{X}$ = 3.57), unavailability of needed resources and inputs($\bar{X}$ = 3.52), low knowledge and capacity to adapt($\bar{X}$ = 3.51), barriers and limitations placed on women by traditional beliefs ($\bar{X}$ = 3.37), inadequate government support ($\bar{X}$ = 3.32), relegation of women needs in community development projects and programmes ($\bar{X}$ = 3.22), crude/traditional storage methods and facilities ($\bar{X}$ = 3.19) and unfavourable land tenure system ($\bar{X}$ = 3.11).

The result is similar to the findings of Azong and Naidoo (2018), which found lack of access to and control over land, division of labour, access to education and responsibility for dependents as major challenges faced by female farmers in Cameroun. The findings also corroborate Henri-Ukoha et al (2018) which found major challenges to adaptation among female cassava-based farmers in Gokana Local Government Area to be irregular contact with agricultural extension agents, lack of access to improved cassava varieties and non-availability of credit facilities. In more recent studies (Henri-Ukoha, 2020a & b), inadequate finance was identified as a major constraint to rural farmers procurement of necessary inputs and resources required to practice adaptation in Southern Nigeria. Similarly, Ifeanyi-obi et al (2017) found lack of and high cost of farm inputs and low soil fertility, land and labour, poor access to information and ineffectiveness of cooperatives, lack of/poor access to fund and credit facilities and poor government support, lack of improved varieties of cocoyam, poor value attached to cocoyam, poor infrastructural capacity and technology know-how and transportation as major challenges faced by farmers in southeastern Nigeria in adapting to climate change impacts in Nigeria.

Table 2. Challenges to adaptation among rural women

Challenges to adaptation strategies	VS	MS	LS	NS	Mean
Unfavourable land tenure system	158(39.40	125(31.2)	118(29.4)		3.11**
Poor access to market information	108(26.9)	58(14.4)	235(58.6)		2.68**
Inconsistencies in government policies and plans	195(48.6)		206(51.4)		2.97**
Inadequate support from government	264(65.8)		137(34.2)		3.32**
Limited access to needed information	116(28.9)	55(13.7)	230(57.3)		2.73**
Unavailability of needed resources and inputs	304(75.8)	3(0.7)	94(23.4)		3.52**
Financial incapacitation	352(87.8)	1(0.2)	48(12.0)		3.76**
Lack of access to advisory services	137(34.2)	60(15.0)	204(50.9)		2.84**
No voice in decision making (lack of representation)	108(26.9)	57(14.2)	236(58.9)		2.68**
Gender-irresponsive policies and practices	114(28.4)	30(7.5)	257(64.1)		2.64**
High cost of improved farm inputs	312(77.8)	11(2.7)	78(19.4)		3.59**
Other women farmers non challant attitude	46(11.5)	231(57.6)	124(30.9)		2.88**
Lack of access to land ownership	44(11.0)	255(63.6)	102(25.5)		2.95**
No timely access to market information	73(18.2)	92(22.9)	236(58.9)		2.59**

Crude/traditional storage methods and facilities	220(54.9)	17(4.2)	164(40.9)	3.19**
Poor state feeder roads	363(90.5)	10(2.5)	28(7.0)	3.84**
Relegation of women needs in community development projects and programmes	179(44.6)	130(32.4)	92(22.9)	3.22**
Low returns on investment in adaptation measures	79(19.7)	47(11.7)	275(68.6)	2.51**
Low knowledge and capacity to adapt	78(19.5)	48(12.0)	275(68.6)	3.51**
Covid-19 induced restrictions of physical contact	200(49.9)	30(7.5)	171(42.6)	3.07**
Government climate change adaptation frameworks are not functional	314(78.3)	1(0.2)	86(21.4)	3.57**
Barriers and limitations placed on women by traditional beliefs	383(95.5)	90(22.4)	93(23.2)	3.37**

Source: Field Survey, 2021: VS-Very Serious, MS-Moderately Serious, LS-Less Serious, NS-Not Serious
*Not serious challenge, **Serious challenge

Responses from FGD and IDI was also harnessed for deeper insight. During the FGD, the rural women noted that all the challenges they experience in responding to climate change impacts is rooted in five major factors, namely; lack of access to information and resources, no financial support, low knowledge and capacity on climate change, low educational level of women and low women participation in leadership and decision making. Going further, they explained that informing them of a programme could not be termed participation. They should be given opportunity to be part of the programme from inception to implementation. This will give them opportunity to ensure their needs are addressed in the programme.

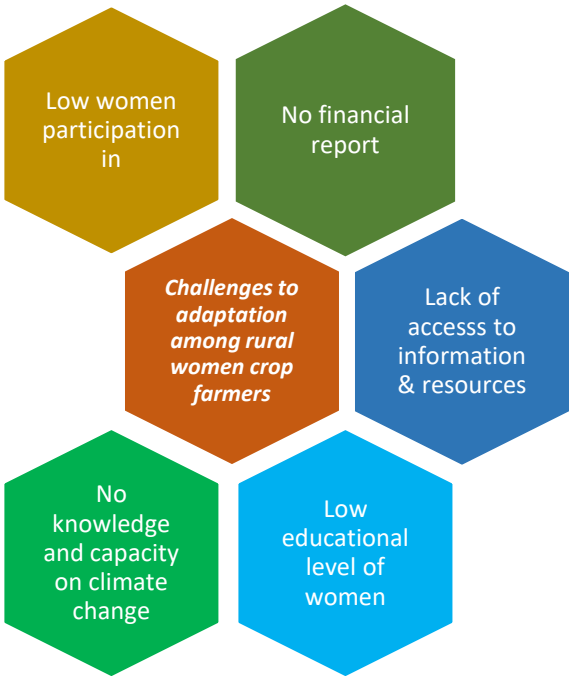

Fig. 3. Challenges to adaptation among rural women crop farmers

During the IDI, a Cassava farmer from Abia State stated that:

'Traditional beliefs and practices are behind the marginalization of women in accessing information and resources in our community. It is because of where tradition has kept women that made them always marginalized. For instance, no woman can own a land in our community, even if you have the money to buy, no family will sell to you as a

woman unless you go through your husband. They will see it as a taboo to sell land to you as a woman. I learnt some places are selling to women now, maybe one day, God will visit our women here and liberate us'

Another discussant in Osun State said;

'*We are always reminded to use weather information to plan our farming activities. How can you use what you don't have? We don't know how to access the weather information talkless of using them to plan our farming activities. Weather information rarely gets to us, so we plan our farming calendar ignorant of weather predictions'*

A vegetable farmer in Rivers state noted that:

'*No woman has a voice in mixed rural community association. Even when your opinion is better than the male, they feel it is humiliating to accept a woman's opinion in place of the man's own. If we are sincere with ourselves, we will agree that our tradition is male centered, it regards women as second-hand citizens'.*

Surprisingly, a woman leader in Rivers state noted that women are the reason behind their exclusion. They believe that they are second class citizens who should never be in the front desk. Even opportunities to help them may be seen as ungodly among them. In the IDI with her, she stated;

'Our problem as women lies within us, we see speaking out as rebellion against the man. We see been financially stable as been masculine, we see participating in decision making as insulting to our husbands. Women who can meaningfully contribute to our development shy away from it because of the stigma other women will place on them as rebels'.

During the Focused group discussion, majority of the women complained about the improved varieties of crop given to them particularly, Cassava. They noted that some of these improved varieties used do not allow for reuse of seedling/stem in subsequent farming system making it a cost unfriendly strategy for an average rural woman.

Conclusion and Recommendations

Climate change is affecting both the farming activities and local resources for livelihood sustenance of rural women. While sincere effort is being made by these women to adapt to these changes mainly through using indigenous knowledge and socio-economic practices, Land-based and water management practices, financial management practices and application of herbicides and pesticides, they still face numerous challenges ranging from financial incapacitation, poor knowledge and skill to gender insensitive traditional belief and practices. It is important to note that most of the adaptation strategies used by these rural women are locally generated through their experiences in farming over the years. Support in the area of access to information including weather information and resources, participation in leadership and decision and mitigating unhealthy traditional beliefs and practices will go a long way to enhance their adaptive capacity. Gender responsiveness is key to successful adaptation of the agricultural sector to climate change. It is therefore recommended that:

1. Women participation in adaptation initiatives should go beyond consulting women to know their interest. The question of how and to what extent should be addressed. Effort should be made by responsible agencies to ensure that women are actively involved from inception to implementation of such initiatives. In addition, knowledgeable women who would guarantee effective representation in ideas and decisions should be used.
2. Indigenous knowledge holds much potentials in climate change adaptation. Effort should be channeled towards better understanding and upscaling of these indigenous practices rather than disregarding them. Researchers could further research in this area; Federal ministry of

agriculture through responsible agencies could work towards profiling these indigenous knowledge and practices among rural women for analysis and identifying potential areas.

3. The ministry of gender and women affairs in the country must work towards enacting operational policies that will eliminate unhealthy traditional beliefs and practices hindering women participation in development programmes particularly responses to climate change in the agricultural sector.

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