

Gender Differences in farmers' Participation in Decision-making on Adaptation to Climate Change in southwest Nigeria

Ogunjinmi K. Oluwaseye¹, Fakoya E. Olugbenga¹ and Ogunjinmi A. Adekunle²

¹*Department of Agricultural Extension and Rural Development, Federal University of Agriculture, Abeokuta, Ogun State*

²*Department of Ecotourism and Wildlife Management, Federal University of Technology, Akure, Ondo State*

Corresponding Author Email: ogunjinmiko@funaab.edu.ng; Tel: +2348039724973

ABSTRACT

*The effects of climate change on the agricultural sector urgently call for rural farmers' involvement in adaptation decision-making even at the community level for climate change interventions to be effective. This study assessed gender differences in farmers' Participation in decision-making on adaptation to Climate Change in southwest Nigeria. A multistage sampling procedure was employed to select 358 male and 222 female respondents using a questionnaire survey and discussions in focus groups. Data were descriptively summarized and presented while t-test was used for data analysis. Findings showed that more female respondents (24.2%) than male respondents (13.5%) had no formal education, and also more male (85.5%) than female farmers (25.2%) participated in making decisions on adaptation to climate change at the community level. The study indicated that traditional knowledge of adaptation (males- 19.5%, females-14.0%), adaptation strategies from the extension agents (males-19.2%, female-13.5%), and formation of self-help groups for financial support (males- 17.5%, females-13.1%) were the main focus of discussion on adaptation at the community meetings. In addition, the engagement of the female farmers in domestic tasks and their unresponsive attitudes were the major reasons attached to their non-attendance of the community meetings. The study showed a significant difference ($P<0.01$) between male and female farmers' participation ($\bar{x} = 0.0541^{**}$) in decision-making on adaptation to climate change at the community level. This study therefore recommended that gender be considered while developing active adaptation policies that continue to be gender-responsive.*

Key words: Agriculture, Attendance, Change, Gender, Meeting, SDG 5

1.0 Introduction

Climate change is globally real and recognized as a threat to all sectors of human endeavours. African countries are facing significant risks from climate change owing to increased exposure and limited adaptive capacity (Glenn *et al.*, 2016). Its impact is made visible, especially in the agricultural sector where it has significantly affected production in most developing countries (Elum *et al.*, 2017) like Nigeria. The economy of Nigeria is agricultural-based and depends mainly on precipitation (Onyeneke *et al.*, 2019).

Minor negative changes in climate are capable of prompting damage on the socioeconomic outcomes of agricultural activities (Ofuoku and Obiazi, 2021). The occurrence of extreme weather and temperature events as well as shifting rainfall patterns are the primary indicators of climate change (Bryan, 2013). The effect of climate change is worse on agriculture, therefore smallholder farmers face complex and insecure decision-making to adapt to climate change on their production (Azizi-Khalkhali *et al.*, 2021). Poor rural agricultural households in developing countries that depend on precipitation bear the brunt of the burden of climate change (Omerkhil *et al.*, 2020).

Therefore, adapting to climate change is essential to managing its consequences and coping with its changing environment. Through a variety of adaptation strategies, growers in developing nations are strengthening their resilience to climate change-related hazards like drought and flood (Belay *et al.*, 2017).

Most of the available studies dealing with gender and climate change adaptation illustrate that gender inequality remains omnipresent and is exacerbated by increasing climate risks (Ackerl *et al.*, 2023). Gender explores logical structures that institutionalize men's dominance over women on a different scale that is influenced by social, economic, and cultural factors (Acheampong *et al.*, 2023). Davidson (2016) noted that women are often excluded from participation in adaptation decision-making, so their unique knowledge and needs associated with specific roles in farming tend not to be related to those decisions.

Recent research on household decision-making about adaptation has been conducted by Belay *et al.* (2017), Orlove *et al.* (2020), Danso-Abbeam *et al.* (2021), and Azizi-Khalkhali (2021). However, there is a paucity of research on gender involvement in decision-making on levels of economic and social adaptation at the community level especially in Southwest Nigeria. Farmers of both sexes must take part in community-level decision-making on climate change adaptation to create a united effort to mitigate the threat of gender-specific consequences. This research provides gender disaggregated data that could be relevant for policy formation on a gender-responsive adaptation measures and also for extension agents' understanding of how the socially constructed norms affect the female farmers' adaptation to climate change.

The specific objectives of the study were to:

1. Describe the socioeconomic characteristics of male and female farmers.
2. Determine the farmers' involvement in community decisions, examine their deliberations at the community meeting on adaptation to climate issues and the reasons for non-attendance of community meetings.

The study hypothesized that there was a difference between male and female farmers' participation in decision-making on adaptation to climate change at the community level.

2.0 Materials and Methods

2.1 The study area

The study was conducted in Ekiti and Ogun States Nigeria. Ekiti State was carved out from the old Ondo State on October 1st, 1996. The State is geologically situated in the southwest of Nigeria, between longitudes of 4°51' and 5°45' east of the Greenwich meridian and latitudes of 7°15' to 8°51' north of the equator. Ekiti State experiences temperatures ranging from 21° to 28°C on an annual average, with a 75% humidity level. The State is a highland region with an annual rainfall average between 1200mm and 1800mm. Rainforests, deciduous forests, and semi-grasslands make up the majority of the vegetation.

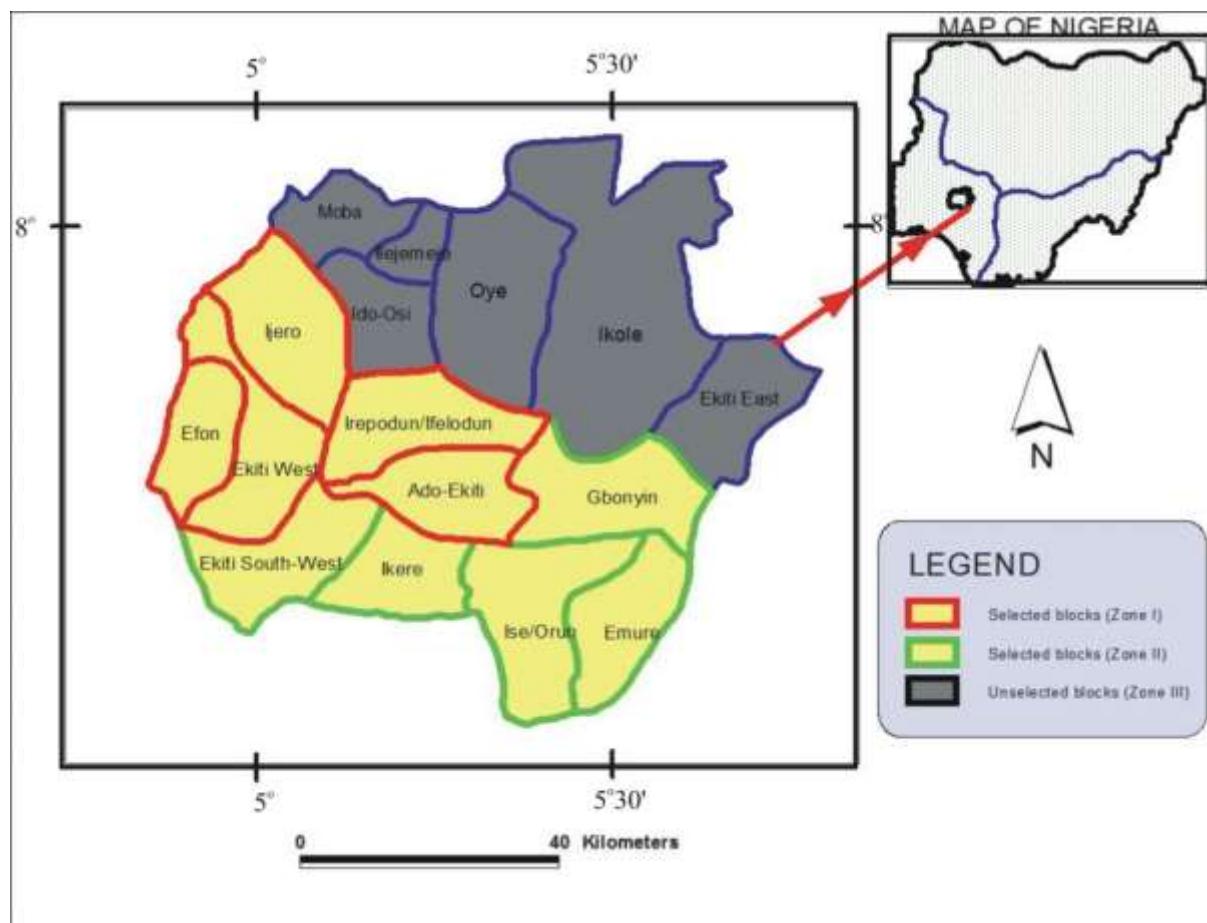


Figure 2.1: Map of Ekiti State showing the study area

Ogun State was established on February 3rd, 1976. The State is located between tropical latitudes of 6° 121° and 7° 471°, and east of the Greenwich meridian between longitudes of 3° 01° and 5° 01°. The State is located in southwest Nigeria in a tropical climate zone that is moderately hot and humid. With a mean temperature of 30°C, it receives between 1,400mm and 1500mm of rainfall annually. The wetness is typically between 37 and 54 percent at the height of the dry season in February and between 78 and 85 percent from June to September.

Guinea savannah and tropical rainforest make up the two main types of vegetation in Ogun State.

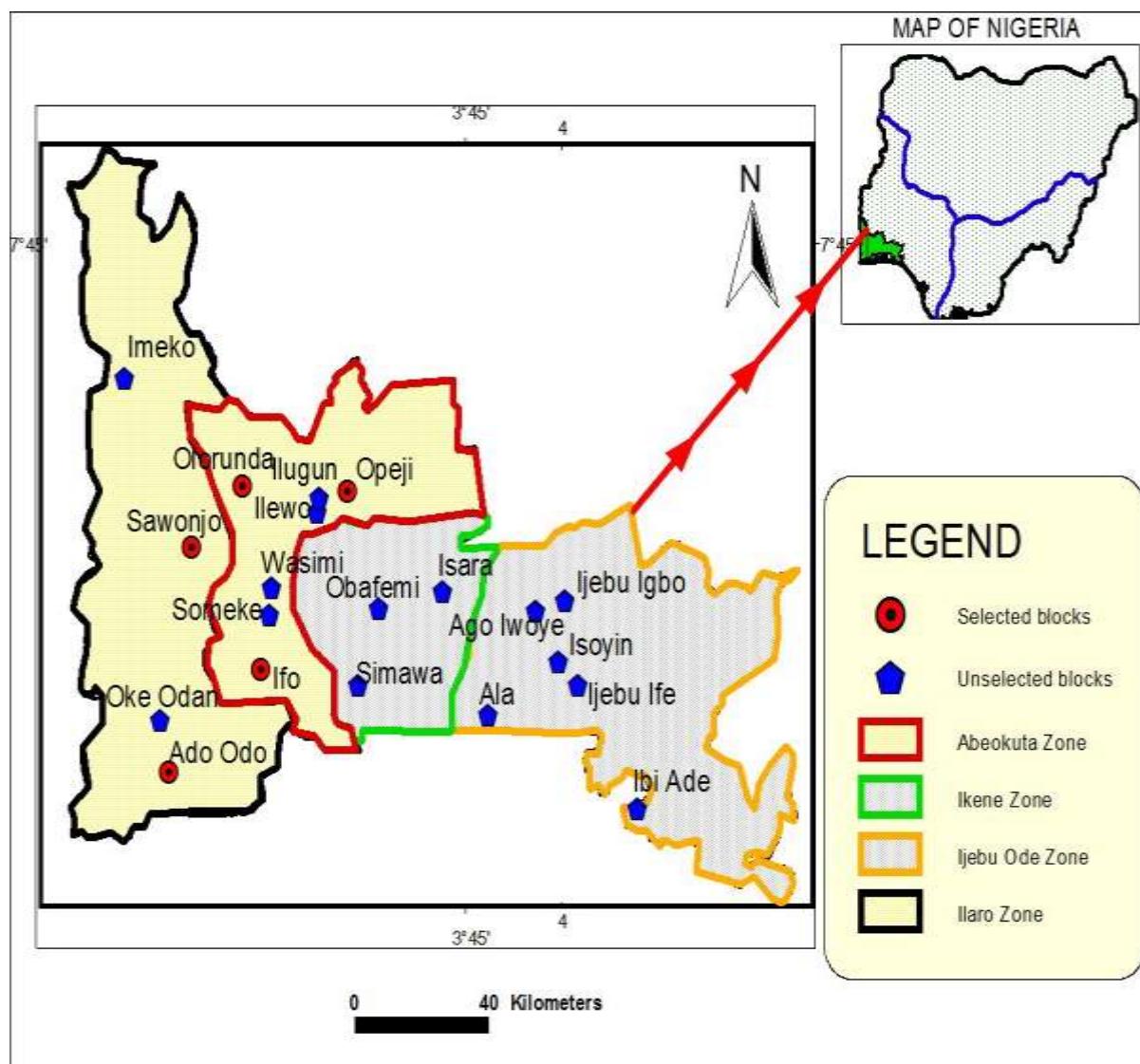


Figure 2.2: Map of Ogun State showing the study area

2.2 Selection procedure and sample size

A multi-stage procedure was employed in this study. Firstly; Ekiti and Ogun States were purposefully chosen from the six States in southwest Nigeria based on the similarities in their ecological features. Secondly, two and four zones were arbitrarily selected from the zones in Ekiti and Ogun States Agricultural Development Programme respectively. Thirdly, six and eight blocks were randomly selected from the zone chose from Ekiti and Ogun States respectively. Lastly, farmers were randomly selected from the lists obtained from the headquarters of the National Agricultural Cooperative (NACOOP) in both States. Using the sample size determination formula and table proposed by Krejcie and Morgan (1970), at 95% confidence level and 0.05% confidence interval (margin error), a sample size of 302 NACOOP members (174 males and 128 females) were selected in

Ekiti State while a sample size of 278 NACOOP members (184 male and 94 females) was selected in Ogun State for the study. A total of 358 male and 222 female farmers were surveyed in this study.

Table 2.1: Selection Procedures for Sample Size in Ekiti and Ogun State

ADP Zones	No. of blocks	Selected blocks	NACOP Members	Male farmers Selected	Female farmers Selected	Total
Aramoko	5	3	500	56	31	87
Ikere	5	3	900	118	97	215
Total	10	6	1400	174	128	302
Abeokuta	12	6	574	86	44	130
Ilaro	4	2	428	98	50	148
Total	16	8	1002	184	94	278

2.3 Data collection

Both quantitative (questionnaires) and qualitative (focus group discussions) methods were used in the study. Each of the chosen blocks hosted a focus group discussion, resulting in a total of fourteen (14) groups. A checklist was used to monitor the sessions, and a video recording of each was made and later transcribed. Farmers' responses on participation, attendance of community meetings, deliberations at the community meeting, and the reasons for non-attendance of community meetings were measured using a response scale of 'yes and no'. Individual responses were summed to determine the farmers' scores on the variables measured.

2.4 Data analysis

To summarize and display the collected data, descriptive statistical analyses (such as frequencies, percentages, and tables) were used. The difference between the means of male and female farmers' involvement in decision-making about climate change adaptation was also determined using a t-test.

3.0 Results and Discussion

3.1 Farmers' socioeconomic characteristics

3.1.1 Age distributions of the respondents

Results of descriptive analysis showed that the mean age for male and female farmers were 49 and 45 years respectively. The implication is that both categories of farmers could be agile in attending community meetings and thus participate in decision-making on adaptation to climate change. This result is consistent with Adeyolu and Oni (2014) who argue in favour of these findings.

3.1.2 Educational status

In addition, the study shows that 86.5% of male farmers and 75.8% of female farmers had formal education. The majority of respondents tend to have had formal training, which may have improved their comprehension of climate change issues. However, female farmers may not have had the same access to formal education as male farmers. These results are in tandem with Balogun and Odjugo (2020) that 91.6% of male and 84.5% of female farmers had formal education in a related study.

3.1.3 Marital status and household size

The survey also reveals that, on average, farmers' households comprised six persons, with male farmers being married at a rate of 85% compared to female farmers' 82%. These findings could inform the availability of the family workforce who can represent their household at the community meetings. The results of this study corroborate Okunlola *et al.* (2018) and Adeagbo *et al.* (2021) who observed a mean of 6 persons in a similar study conducted in southwest Nigeria.

3.1.4 Farming experience

Additionally, the male and female respondents had an average of 23 and 19 years of farming experience, respectively. This suggests that the respondents may have had to adjust to climate change for almost two decades. This result is in a similar trend with Owombo *et al.* (2014) which reported 21.1 years for male farmers and 14.7 years for female farmers.

3.1.5 Membership of farmers' association

The report also reveals that crop associations are linked with 53.2% of male farmers and 58.1% of female farmers. This could suggest that the primary activity conducted in the study area is crop agriculture. This would imply that farmers' associations could offer forums for talking about climate-related issues.

3.1.6 Average annual income

The majority of respondents earned an average monthly income of less than ₦21,000. The low income could be an indication of the adverse effects of climate change. This finding is in agreement with the report of Obi-Egbedi *et al.* (2017) that 77.5% and 57.1% of their male and female respondents earned less than 21,000 monthly.

3.1.7 Farm size of the respondents

According to the survey, the average size of land cultivated by male and female participants was 4.2 ha and 1.7 ha, respectively. This demonstrates that male farmers were able to access more land than female farmers, and that their ability to diversify into on-farm adaptation strategies may have been superior. The results of this study corroborate Bello *et al.* (2021) that male and female farmers had average farms of 2.26 and 2.17ha respectively.

Table 3.1: Socioeconomic factors of the respondents

Socioeconomic factors	Male farmers (n=358)		Female farmers (n=222)	
	Frequency (%)	Mean \bar{x}	Frequency (%)	Mean (\bar{x})
Age (years)				
> 30	13.7		15.4	
31-40	15.1		20.3	
41-50	29.5	49	41.9	45
51-60	19.8		13.1	
Above 60	24.9		9.5	
Marital status				
Single	11.5		6.3	
Married	85.0		82.0	
Household size				
0-5	17.6		45.9	
6-10	73.5	6	52.3	6
11-15	7.5		1.8	
16-20	1.4		0	
Educational qualification				
No formal education	13.5		24.2	
Formal education	86.5		75.8	
Years of farming experience				
0-5	13.1		19.8	
6-10	18.2		18.5	
11-15	13.7		9.0	
16-20	11.7		14.0	19
Above 20	43.3	23	38.7	
Membership of associations				
Crop	53.2		58.1	
Farm size (ha)				
0-2	17.0		75.2	1.7
3-5	67.1	4.2	9.5	
6-8	8.4		7.2	
Average annual income (₦)				
Less than 21,000	155	43.3	95	42.8
21,000-40,000	45	12.5	32	14.4
41,000-60,000	78	21.7	50	22.5
61,000-80,000	16	4.5	9	4.1
81,000-100,000	14	3.9	12	5.4
Greater than 100,000	50	13.9	24	10.9

Source: Field survey, 2019

3.2 Farmers' Participation in Decision Making on Adaptation to Climate Change.

Results in Table 3.2 show that 85.5% of male and 25.2% of female farmers attended community meetings and consequently took part in deliberations and decision-making pertaining to local adaptation to climate change. However, the female group discussion participants added that:

"We females only attend community meetings more than males when issues concerning us are to be discussed or issues that affect all the villagers"

"We attend community meetings when we are invited"

This study shows that men farmers consistently make up the majority of attendees at community meetings. This shows that the female farmers might have had household responsibilities and chores, which might have restricted their ability to take part in local decision-making about adjusting to climate change and, consequently, might have reduced their capacity for adaptation. The result of this study is in tandem Balogun and Odjugo (2020) that 96.4% of male and 89.6% of female farmers participated in decision-making on adaptation.

Table 3.2: Farmers' Participation in Decision-making on adaptation to climate change at the community level

Respondents	Frequency	Percentage (%)
Male farmers	306	85.5
Female farmers	60	25.2

Source: Field survey, 2019

3.3 Discussion topics on adaptation to climate change at the community level

Results in Table 3.3 reveals the conversations on coping with climate change at community meetings as 'traditional knowledge on adaptation (male-19.5%, female- 14.0 %), strategies for coping with climate change from the extension agents (male-19.2%, female- 13.5%), formation of self-help groups for financial support (male-17.5%, female-13.1%), weather forecast information (male-8.1%, female-17.2%) and performance of rituals (male-1.7%, female-0.9%).

Participants in focus group discussions buttressed that adaptation strategies discussed at the community meeting include:

"Market restriction"

"Warning against bush burning"

"Community levies to scarify to gods for favourable climate"

"Planting periods"

According to study, male farmers were more involved than female farmers in local discussions on adapting to changes. This suggests that farmers who are men may be better able to adapt. The findings of this study is consistent with Amusa et al. (2015) and Myeni et

al. (2019) that men contributed more to decisions on climate change on the average than the women.

Table 3.3: Discussion topics on climate change adaptation at the community level

Discussion topics	Male farmers (%)	Female farmers (%)
Traditional knowledge of adaptation	19.5	14.0
Adaptation strategies from the extension agents	19.2	13.5
Formation of self-help groups for financial support	17.5	13.1
Weather forecasts information	8.1	12.2
Performance of rituals	1.7	0.9

Source: Field survey, 2019

3.4 Respondents' reasons for Non-attendance of Community Meetings

Results in Table 3.4 indicate that domestic tasks (males- 18.4, females: 75.9%), restrictions from a spouse (males: 4.7%, females: 70.5%), not my responsibility (males: 2.5%, females: 60.6%), attending on condition (males: 17.3, females: 58.3%), and culture (males: 2.2%, females: 35.0%) were the respondents' reasons for non-attendance of community meetings. These findings showed that there hadn't been enough representation of female farmers at the meetings.

During the focus group sessions, the female farmers paid a partial attention, making excuses to complete household responsibilities. The results of this study show that gender-constructed obligations are the main cause of female farmers' low attendance at community meetings.

Table 3.4: Respondents' Reasons for Non-attendance of Community Meetings

Reasons	Male farmers (%)	Female farmers (%)
Domestic tasks	18.4	75.9
Attend on condition	17.3	58.3
Restrictions from spouse	2.5	60.6
Not my responsibility	4.7	70.1
Language, religious, and cultural barriers	2.2	35.0

Source: Field survey, 2019

3.5 Test of the difference in the participation of the respondents in decision-making on climate change adaptation

The results of this study demonstrated a statistically significant difference ($P<0.01$) between the participation of male and female farmers ($t= 0.0541^{**}$) in community-level decision-

making on adaptation to climate change. This finding would suggest that there is a disparity between the involvement of male and female farmers in decision-making.

Table 3.5: Test of the difference between male and female farmers' participation in decision-making on climate change adaptation

Sex	Mean	Mean difference	t-value	P-value	Decision
Male	0.7577				
Female	0.8018	0.0541	4.24	0.000	Significant

P<0.01 level of significance

Source: Field study, 2021

4.0 Conclusion and Recommendations

This study aimed at investigating the gender differences in farmers' participation in decision-making adaptation to climate change. The study found that when community meetings were held to discuss collective action on climate change adaptation, male farmers were more likely to participate in talks on climate change adaptation. The inference is that male farmers have a higher propensity than female farmers to adapt to climate change and a reduced susceptibility to its impacts.

In addition, the main barrier preventing female farmers from attending community meetings was socially constructed tasks. As a result, decisions may only take into account the opinions of the male farmers present at the community meeting. Therefore, it is recommended that the extension agents should enlighten the female farmers on the need for attending community meetings.

References

Ackerl T., Weldemariam, L. F., Nyasimi M. and Ayanlade, A. (2023). Climate change risk, resilience, and adaptation among rural farmers in East Africa: A literature review. *Regional Sustainability*, 4(2): 185-193

Acheampong, P. P., Yeboah, R., Asibuo, O.J, Nchanji, E., Opoku, M., Toywa, J. and Lutomia, C. K. (2023). Gendered perceptions and adaptations to climate change in Ghana: what factors influence the choice of adaptation strategies? *Front Sustain. food System*, 7 <https://doi.org/10.3389/fsufs>

Adeagbo, O. A., Ojo, T. O. and Adetoro, A. A. (2021). Understanding the determinants of climate change adaptation strategies among smallholder maize farmers in southwest Nigeria. *Heliyon* (7), <https://doi.org/10.1016/j.heliyon2021.e.06231>

Adeyenu, A. G. and Oni, O. A. (2014). Gender time allocation and farming households' poverty in rural Nigeria. *World Science Research Journal*, 2(5), 123-136

Amusa, T. A. Okoye, C. U. and Enete, A. A. (2015). Gender-Based Vulnerability and Contributions to Climate Change Adaptation Decisions among Farm Households in Southwest Nigeria. *American-Eurasian J. Agric. and Environ. Sci.*, 15 (9): 1779-1789

Azizi-Khalkheih, T., Aenis, T., Menatizadeh, M. and Zamani, G. (2021). Farmers' decision-making process under climate change: developing a conceptual framework. *International Journal of Agricultural Management and Development*, 11(1), 1-15

Balogun, V. S. and Odjugo, P. A. O. (2020). Gender-based assessment of climate change adaptation strategies in Delta State, Nigeria. *Journal of Geographic Thought and Environmental Studies*, 15(21): 94-114

Belay, A., Recha, J. W., Woldemmanuel, and Morton, J. F. (2017). Smallholder farmers' adaptation to climate change and determinants of their adaptation decisions in the central Rift Valley of Ethiopia. *Agriculture and Food Security*, 6.24, DOI: 10.1186/s40066-017-0100-1

Bello, L. O., Bayeigunhi, L. J. S., Danso-Abbean, G. and Ogundeji, A. A. (2021). Gender decomposition in smallholder agricultural performance in rural Nigeria. *Scientific African*, 13(2021) e00875.

Bryan, E., Ringler, C., Okoba, B., Roncoli, C. and Silvestri, S. (2013). Adapting agriculture to climate change in Kenya: household strategies and determinants. *Environment Management*, 114: 26-35 <https://doi.org/10.1016/j.environ.10.038>

Danso-Abbean, G., Ojo, T. O., Bayeigunhi, L. J. S. and Ogundeji, A. A. (2021). Climate change adaptation strategies by smallholder farmers in Nigeria. *Helijon*, 7: <https://doi.org/10.1016/j.e07162>

Davidson, D. (2016). Gaps in agricultural climate adaptation research. *Nature and Climate Change*, 6 (5):433-435

Elum, Z. A, Modise, D. M. and Nhamo, G. (2017). Climate change mitigation: the potential of agriculture as a renewable energy source in Nigeria. *Environmental Sciences and Pollution Research*, 24(4). DOI. 10.1007/s11356-016-8187-7

Glenn, A., James, W. A. E. and Fuller, R. A. (2016). Global mismatch between greenhouse gas emissions and the burden of climate change. *Sci. Rep.* 6:20281.doi.10.1038/srepp20281

Myeni, L., Moeletsi, M., Thavhana, M., Randela, M. and Mokoena, L. (2019), 'Barriers affecting sustainable agricultural productivity of smallholder farmers in the eastern free state of South Africa', *Sustainability* 11(11), 3003. 10.3390/su11113003

Obi-Egbedi, O., Omotosho, O.S. and Ajayi, O. I. (2021). Livelihood diversification, gender and poverty among rural households in Osun State, Nigeria. *Journal of Rural Economics and Development*, 23(1):34-48

Ofuoku, A. U. and Obiazi, C. C. (2021). Constraints to access and utilization of meteorological service in Delta State, Nigeria. *Yuzuncu Yil University Journal of Agricultural Science*, 31(1), 150- 161

Okunlola, J. O., Oke, D. O., Adekunle, V. A. J. and Owolabi, K. E. (2018). Effects of Climate Change and Coping Strategies among Crop Farmers in Southwest, Nigeria. *Journal of Agroforestry Systems*. 93, 1399-1408.

Omerkhil, N., Chand, N., Valente, J.M., Alatalo, R. and Randey, R. (2020). Climate change vulnerability and adaptation strategies for smallholder farmers in Yangi Qala district, Takhar, Afganistan. *Ecological Indicators*, <https://doi.org/10.1016/j.ecolind.105863>

Onyeneke, R. U., Nwajuba, C. A., Emenekwe, C. C., Nwajuba, A., Onyenke, C. J., Ohalete, P. and Nwazie, U.I (2019). Climate change adaptation in Nigeria agricultural sector: A systematic review and resilience check of adaptation measures. *AIMS, Agriculture and Food*, 4(4), 967-1006

Orlove, B., Shwon, R., Markowitz, E. and Cheong, S. (2020). Climate change Decision making. Annual review of environment and resources. .45: 271-303, <http://doi.org/10.1146>

Owombo, P. T., Koledoye, G. F., Ogunjimi, S. I., Akinola, A. A., Deji, O. F. and Bolarinwa, O. (2014). Farmers' adaptation to climate change in Ondo State, Nigeria: A Gender analysis. *Journal of Geography and Regional Planning*, 17 (2), 30-35.