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RURAL COOPERATIVES; A CLIMATE CHANGE MITIGATION TOOL AMONG RURAL DWELLERS IN ITESIWAJU LOCAL GOVERNMENT AREA OF OYO STATE

[1]SALAU MUSLIM A.; [2]YAQOOB A. MAJID; & [1]ADEDIRAN YUSUF A.

[1]Department of Agricultural Extension and Management, The Oke-Ogun Polytechnic, Saki. Oyo State. [2]Department of Agricultural Economics, Prime University, Abuja, Nigeria.

Corresponding Author: salauma@tops.edu.ng

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Abstract

The study investigates the role of rural cooperatives in rural dwellers mitigation strategies against the impact of Climate change in Itesiwaju Area of Oyo State, Nigeria. Due to lack of coordinated planning in Africa make teeming population in Africa to be vulnerable without any way out that need urgent and adequate attention. A two stage sampling techniques was used for this study. The first stage involves the consideration of 80% of the ward out of 6 wards in the study area; the second stage involves random selection of 40% of cooperators from each of the 5 wards making a total of 125 respondents' interview through the use of standard structured questionnaire. The findings revealed that 58.4% of the respondents were male with majority 68.8% of the respondents' age fell between 30 – 49 years of age and majority 64% of the respondents source finance was through personal savings. The result also revealed drying of natural rivers (98.4%), irregular rainfall (94.4%), and excessive heat (100%) as the major climate change affecting the respondents in the study area. The findings further revealed intentional afforestation (96%), discouraging the use of firewood (84%) and digging of borehole were some of the mitigation strategies employed by the respondents. Result of the regression analysis reveals that factors such as; respondents educational level, farming experience,

Keywords: Rural cooperative, Rural dweller, Climate Change, Mitigation strategies, Itesiwaju.

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crop year and credit availability wee determinant factors affecting the mitigation strategies adopted by the respondents in the study area. Based on the finding of this study, the study recommends promoting co-operative participation by government and NGOs through sponsor awareness programs to encouraging rural dwellers to join co-operatives and broadening credit opportunities by collaborating with microfinance institutions to create accessible, low-interest loan packages for co-operative members.

Introduction

Cooperative as a business organization owned and operated by a group of people for their mutual benefits, this aid smallholder farmer's cooperators to mitigate climate indicators which lead to high transaction costs (ICA 2020) while, Climate change is defined as long-term shifts in temperature and weather patterns primarily caused by human activities such as; past industrialization, deforestation and greenhouse gas emission, these poses a direct and formidable threat to global food security (Oyadeyi *et al*, 2024). Cooperative play an important role in improving smallholder farmer's livelihoods and reducing poverty, by enabling economic growth, skill development, partnership building and creating employment. Cooperative facilitate the collective purchase of inputs and marketing of produce, which lower the cost of production and enhances bargaining power for favourable prices and builds resilience (Sugden *et al*, 2021).

Cooperative is a collaborative models that integrate traditional cooperative principles with climate-resilience practices, making them powerful tools for addressing the multidimensional challenges of climate change. As a collective organization, it facilitates resources pooling, knowledge sharing and sustainable development through democratic governance, empowering communities to adapt the changing climatic condition while foastering socio-economic resilience (Panagiota *et al*, 2023 and Manjula, 2020).

It adversely affects agricultural outcome, leading to reduced crop yields, soil degradation, and increased water scarcity. This risk is amplified in sub- Saharan African (SSA) Nigeria inclusive; where the effects of climate change such as temperature increase, soil degradation, the intensification of droughts and floods, exacerbate food scarcity challenges and impede efforts to combat hunger (Molotoks *et al*, 2021, Nguyen *et al*, 2023, Oyadeyi *et al,* 2024 and Oyadeyi *et al*, 2025) and affecting every region on earth, in multiple ways (IPCC, 2021).

Statement of the problem

The vulnerabilities in Sub Sahara agricultural systems (SSAS) were not just caused by current climate challenges but were part of a long process that began over two centuries

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ago and is still on going (Bjornlund *et al.,* 2020). Ncube (2020) explains that during the colonial era, export-oriented farming was introduced, disrupting local agricultural system well-suited to the region's environment and needs. These colonial policies prioritized growing cash crops for export over producing food for local communities, which weakened food security and disrupted ecological balance. Chen *et al* (2021) opined that these practices introduced farming methods that were not sustainable, leading to environmental damages and reduced resilience which did not end with independence, as many post - colonial policies have struggled to rebuild or improve local systems. As a result, SSA remains dependent on narrow agricultural models vulnerable to external shocks continuing to impact food security and agricultural productivity today (Bjourlund, 2020). Recent evaluation of green revolution-style strategies further revealed that these externally driven approaches have largely failed to address the needs of smallholder farmers in African, instead reinforcing market dependency favouring export-oriented production, and entrenching inequalities in land access and food security (Bjornlund, *et al* 2020).

The vulnerability of SSA's agricultural sector to climate change is compounded by the region's reliance on subsistence farming and the limited access that many smallholder farmers have to technology and financial resources. Aghakouchak *et al*, (2020) argue that marginalized communities, particularly smallholder farmers, were disproportionately affected by climate –induced risks because they lack the necessary resilience to cope with environmental shocks. These farmers depend heavily on rainfall for agricultural productivity, making them especially vulnerable to erratic weather patterns, which can result in severe food insecurity.

Out of the ten countries considered most threatened by climate change globally; seven are in African which include; Sierra loane, Chad, Nigeria, South Sudan, Eritrea, Ethiopia, and Central African Republic (CAR). This is due to devastations from flooding, droughts, desertification and conflict across the continent responsible for 700 death and displacing up to 650 thousand people (Sahel, 2019).

In 2019 heavy rainfall cause flooding that destroy properties in Lagos and several fishery research facilities worth millions of naira destroyed in university of Ibadan. Also cyclone Idal placed 1.85 million people in need of aid, almost 715,000 ha of farm land affecting 500,000 farming households in country such as Malawi, Mozambigue and Zimbabwe. It further causes the outbreak of water borne diseases, cholera and acute respiratory tract infection. These need for urgent action by all stakeholders, (CCAFS, 2019).

It was also reported that 35% of land across West African is under threat of desertification especially, in the Northern Nigeria where land degradation and climatic change have exacerbated poverty. Also, severe threat of desert encroachment with sand dunes becoming common geological features in places like Borno, Jigawa, Katsina, Sokoto and

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Yobe burying large area of arable land and grazing rangeland and limiting agricultural production [AII, 2019].

Furthermore, agricultural sector is largely dependent on rainfall. The United Nation predicts that access to water will be the single biggest cause of conflict and war in African in the next 25 years. Also there is limited dry season production and mineral use of irrigation system. And 90% drying up of lake chad has contributed to the displacement of 10,000's of people causing significant harm to fishing, grazing of livestock and crop lands in the area (Sahel, 2019).

Excessive drought lead to land degradation which compound the challenges of livestock production and fragmentation of grazing area in several African countries like Nigeria, Niger, Ghana, Mali and Senegal. It leads to prevalent clashes or social conflict between farmers and herdsmen resulting in death and hampered productivity of the Agricultural sector (Sahel, 2019).

From the aforementioned scenarios; it can be emphatically deduced that the climate change have great impact on the food security, livelihood and economic future of sub-Sahara African. This study is therefore a timely novel idea to bridge the gap on how Agricultural cooperatives can be a panacea to how the rural dwellers at all level can mitigate the effect of climate change in their economic and find answers to the following Research Questions

1. What are the Socio-economic characteristic of the respondents?
2. What are the challenges of climate change on rural dwellers?
3. What are mitigation strategies adopted by cooperators?
4. What are the determinant factors influencing the climate change mitigation strategies adopted?

Thus, the major purpose of this study is to examine the effect of agricultural cooperatives as a Climate change mitigation tool among rural dwellers in Itesiwaju Local Government Area while the specific objectives of the study are;

1. To examine socio-economic characteristic of respondents in the study area.
2. To identify the challenges of climate change on rural dwellers in the study area.
3. To examine the mitigation strategies carried out by cooperators in the study area.
4. To examine the determinant factors influencing the climate change mitigation strategies adopted by the respondents in the study area.

Area of the study

The study was carried out in Itesiwaju Local Government area of Oyo state, Nigeria. Itesiwaju LGA is located in the north-western part of Oyo State and shares a boundaries with Irepo Local Government to the north, Olorunsogo LGA to the east, Ibarapa North to

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the south, and Kajola to the west. The headquarter of is Itesiwaju Local Government is Otu while other prominent towns are; Okaka, Komu, Igbojaye, Ipapo, Oke-Amu and Babaode. The Local Government Area lies approximately between latitude 8°30'N and 8°55'N of the Equator and longitude 3°00'E and 3°35'E of the Greenwich Meridian.

Itesiwaju Local Government area falls within the derived savannah vegetation zone, characterized by a mix of forest and savannah grasses. The area experiences two major seasons: rainy (April-October) and the dry season (November-March). These climatic conditions supports agricultural activities. Some notable physical features of the Local Government Area includes, Rivers, like (Atan, Oyan, Kojuoba).

According to the National Population Census (2006), Itesiwaju Local Government Area had a population of 128,652 people. The population is predominantly rural, and agricultural practices are largely small-scale and traditional, marking the area suitable for studies related to agriculture, rural development and extension services.

Sampling procedure and techniques.

A two stage sampling techniques was used for this study. The first stage involves the consideration of 80% of the ward out of 6 wards in the study area; the second stage involves random selection of 40% of cooperators from each of the 5 wards making a total of 125 respondents' interview through the use of standard structured questionnaire.

Data analysis.

The data collected was analyzed using both the descriptive statistics such as; table, frequency and percentage while inferential statistics such as Logisitic Regression analysis was used to ascertain the determinant factors affecting the mitigation strategies adopted by the cooperators in the study area. The Logisitic regression model adopted (Gujarati and Porter, 2009) was of the form;

$$\text{Log}\ (Y_i = 1) = F\ (X_j)$$

Where Y= Awareness of climate change (Yes or No)

X_1 = Sex

X_2 = Age

X_3 = Educational level.

X_4 = Family size

X_5 = Farm Experience

X_5 = Primary occupation

X_6 = Cooperative year

X_7 = Member of Association

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X_8 =Access to credit

$\beta_1 - \beta_8$ = Coefficients

E = Error term

Distribution of Respondents on their Social economics characteristics

Table 1 indicates that majority (68.8%) of the respondents' age fells between 26 - 45 years of age. This implied that the cooperators were agile and active to adopt sustainable strategies in their environment and this outcome coincide with the findings of Sirajul and Gronlund (2011).The result revealed 58.4% of the respondents were male while 41.4% were female. This connotes that cooperators in the study area were dominated by males. This is consistent with Bolarinwa and Oyeyinka, (2011). It was revealed that, 32% and 40% of the respondents have primary and secondary education respectively. This suggests that more efforts would be needed to convince the respondents on the adoption strategies to curtail the effect of climate change in the study area. This is consistence to the findings of Fafchamps and Miten, (2011) who reported only cooperators with tertiary education would adopt strategies easily and seamlessly.

The result revealed majority 67.2% of the respondents engage in farming as their primary occupation with majority (72.8%) of them have house hold size of 7 - 10 people. This might be unconnected with the use of family labour in the farming activities, as corroborated by Furuholt (2011) and Egyir *et al* (2011). The result further revealed majority (92%) of the respondents' source of finance were through cooperatives and personal saving. This may be due to the fact that, both sources of finance were the easiest way to access fund by the rural dwellers with less interest. This is consistence with Qiang *et al*, (2011).

Table1; Distribution of Respondents on Socioeconomics characteristics

Variable `	Frequency	Percentage
Age (Years)		
< 25	10	8
26-35	28	22.4
36-45	58	46.4
46-55	07	5.6
>55	22	17.6
Gender		
Male	73	58.4
Female	52	41.6
Educational level		
Primary	30	24
Secondary	88	70.4

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Tertiary	07	5.6
Household size		
1-3	21	16.8
4-6	04	3.2
7-10	91	72.8
Above 10	09	7.2
Primary occupation		
Farming	84	67.2
Trading (Agro-allied)	36	28.8
Artisan	05	4
Source of finance		
Personal	80	64
Bank loan	10	08
Cooperative	35	28

Source; Field Survey, 2026.

The report in table 2 revealed the effect of climate change among rural dwellers livelihood in the study area. The findings revealed 98.4% of the respondents agreed to drying up of the Natural Rivers while 94.4% experienced irregular rainfall due to climate change. Also, all respondents (100%) experience excessive heat while 84% and 96.8% of the respondents experienced extreme drought and farm product failure respectively.

Table 2: Effect of Climate Changes among the rural dwellers

S/N	Variable	Yes	No
1.	Drying up of Natural Rivers	123 (98.4)	02 (1.6)
2.	Irregular Rainfall	118 (94.4)	07(5.6)
3.	Extensive drought	105 (84)	20 (16)
4.	Excessive heat	125 (100)	
5.	Farm Products failure	121(96.8)	04 (3.2)

Source; Field Survey, 2026.

The table 3, revealed Climate Change Mitigation Strategies among Rural dwellers. 96% of the cooperators were encouraged to be practicing afforestation while 84% of the respondents were discouraged in the use of firewood as the source of heat. 33.6% of the respondents explore other sources of energy at their household level with only 4% of the respondents explore bore hole during scarcity of water. 92% of the respondents result to off farm jobs as a mitigation strategy against climate change

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Table 3: Climate Change Mitigation Strategies among Rural dwellers

S/N	Mitigation strategies	Yes	No
1.	Encouraging Afforestation	120 (96)	05(4)
2.	Discouraging Firewood use	105(84)	20(16)
3.	Exploring Alternative Heat source	42 (33.6)	58 (46.4)
4.	Digging of borehole	25 (4)	120 (96)
5.	Cultivating of hybrid seeds	90 (72)	35 (28)
6.	Off farm jobs	115 (92)	10 (8)

Source; Field Survey, 2026.

Determinants of Climate Change Mitigation Strategies

The estimated adjusted R^2 of 0.79 implied that 79% variables used in the factors determining Climate Change mitigation strategies in the area was explained by the explanatory variables. The F value of 65% is significant at 1% level of probability connotes the joint significance of the specified variables on factors influencing rural dwellers adaptability in the study area which implies that the model has a good explanatory power on the variation in the model. Thus, factors such as; education level, farming experience, Cooperator's membership duration and credit accessibility had significant effect on mitigation strategies adopted by the respondents.

The estimated parameter of the educational level had positive (0.05, 0.64) effect on the flexibility and mitigation strategies adopted by the rural dwellers which support the finding of Okonkwo *et al.,* (2022).

It was revealed that, farming experience had positive significant (0.01, +0.44) effect on climate change mitigation strategies among the rural dwellers. This implied that a year increase in farm experience would lead to 44% improvement climate change management. This corroborate with the result of related research by Okafor *et al*, (2023) where they opined that, the farmers experience greatly improved awareness and translated into better climate change mitigation strategies.

The Cooperators' year of membership had positive significant (0.05, 0.62) effect on net revenue of rural dwellers. This implied that if running cost of respondents' economic production increases, revenue will decrease. Therefore, decrease the profitability of their enterprise. This assertion corroborated the report Onyekuru *et al*., (2021) that, being an active member of a cooperative provide financial and moral supports in time need.

Furthermore, access to credit had positive (0.05, +0.85) effect on rural dwellers ability to manage climate change which also support the finding of Ncube (2020) that, more capital to expand farm production or trading irrespective of their level of education; with proper credit facility will serve as means of their standard of living and have ability to manage climate change effect in the area.

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Table 4: Binary Regression result of determinant to Climate Change Strategies

Variable	Co-efficient	ratio
Constant	1.347	2.57
Sex	2.33	1.89
Age	- 0.341	2.21
Education level	0.64	2.66***
Family size	2.05	0.573
Farm experience	0.438	6.12***
Coopyear	0.623	0.443**
Association	0.2822	0.68**
Accesscred	0.851	2.55**
R^2	0.793	
Adj R^2 value	67.5	
Fvalue	64.52	

Source: Field survey, 2026 ***Significant at p<0.01 ** Significant at p<0.05

CONLUSION AND RECOMMENDATIONS

Base on the finding of this study, the study thereby concludes that co-operative membership and access to credit collectively strengthen rural dwellers income stability and productivity in the regions, illustrating how joint participation and inclusive financing foster resilience, sustain livelihoods, and reinforce economic survival in rural areas. The study recommends promoting co-operative participation by government and NGOs through sponsor awareness programs to encouraging rural dwellers to join co-operatives and broadening credit opportunities by collaborating with microfinance institutions to create accessible, low-interest loan packages for co-operative members.

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