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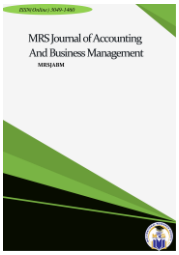

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Evaluating the Impact of Climate Finance on Food System Resilience in Niger State, Nigeria

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Abstract: This paper discusses how climate finance affects food system resilience in the Niger state of Nigeria and specifically covers the smallholder farmers and community-based organisations (CBOs). A mixed-methods design was used to gather data, which was collected via the use of structured survey and semi-structured interviews to farmers, local government officials, and NGO representatives who participated in climate finance programs. The paper focuses on climate finance, its implementation in fostering climate-smart agriculture, reducing risks related to climate changes, and improving food security. It further looks into how institutional capacity, quality of governance and gender influences access to climate finance. Its results indicate that climatic funding does positively affect the resilience of the food system, but its effect is limited due to institutional vulnerabilities, gender inequalities, and community-based limitations. Women farmers are faced with systemic barriers to access climate finance, which restricts them to use climate-adaptive strategies. The research proposal suggests gender and gender specific policies, improved governance, institutional building on capacity, and increased community involvement to optimize the success of climate finance in developing resilient food systems in the state of Niger.

Keywords: *Climate Finance, Food System Resilience and Mixed Methods Approach.*

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Introduction

Agriculture has been the most significant contributor to the GDP in Nigeria which supports the state of Nigeria as it employs over 60 per cent of the rural population (Magaji and Musa, 2024). Food security is under severe risks due to climate change in sub-Saharan Africa and Nigeria is not an exception. Mostly the state of Niger located in the North-Central region of Nigeria has relied on rain-fed farming in which they cultivate their staple food, including maize and millet, rice and Yams, as well as sorghum. Weather phenomena (unpredictable precipitation, droughts, and temperatures) have become more frequent with the climate change (FAO, 2020; Kang et al., 2019; Zougmore et al., 2019) and such crops are susceptible to them. The signs of the previous crop production in the Niger state reveal that the crop production has dropped by 20-30 percent over the past decade because of dry spells and flooding that disrupt the planting and storage of harvests (Idagu et al., 2016).

To contain these risk that are increasing, climate finance, which may be described as the funds employed to help communities reduce and adapt to climatic changes (Al-Amin et al., 2025) has emerged as a key tool to help in resilience of food systems (UNFCCC, 2021). International programs also finance agricultural adaptation; some of these include: Green Climate Fund (GCF) and the Adaptation Fund which are employed to fund irrigation infrastructures, seed banks and agroforestry programmes. It is also observed that access and utilisation remains limited in most of the developing nations, due to institutional, social and infrastructural limitations (Pauw et al., 2022; Escalante et al., 2018). The inflows of climate finance in the Niger state are approximated to be about 5-10 percent of national allocations that have been utilized to finance local initiatives such as the Nigeria Climate Change Adaptation Strategy but the local implementation is normally low benefiting certain farming communities over others (Freitas and Mwanik, 2024).

The Niger state has been facing protracted issues that have threatened the sustainability of the food system despite the access to climate finance. The smallholder farmers are generally under-resourced, knowledge and institutional access to make efficient use of climate finances. The main factors that marginalise women farmers include social norms that are gender based, lack of access to land, financial services (Abiola et al., 2025), and the inability to take part in the decision making process in the community (Chakrabarty and Nag, 2023; Njuki et al., 2011). To provide an example, in northern Nigeria the system of land tenure has been skewed to favor males in such a way that women are left with unsecure pieces of land that render them ineligible to loans provided by finance institutions or grants (Hess et al., 2014). Moreover, climate finance is often unsuccessful due to the absence of institutional capacity, poor governance, and low community

engagement (Magaji et al., 2025a). The latter can lead to the inefficiency of climate adaptation projects distribution and the lack of optimal performance (Miller et al., 2018; Lwesya, 2025). These issues are also compounded by the fact that security issues like the farmer-herder disputes disrupt the projects delivery and the participation of the farmers (Olusola et al., 2025).

In this paper the paper will examine the possibility of utilizing climate finance to help in contributing towards the resilience of food systems in the state of Niger in Nigeria. To this end, it possesses several objectives, which include, but are not limited to, testing the extent to which the climate finance contributes to the promotion of the climate resilient agricultural practices in the state of Niger and evaluating the mediating effect of institutional strength and good governance in the relationship between climate finance and developing resilient food systems and advising policy recommendations to enhance the effectiveness of climate finance.

As much as the aspect of climate finance has been considered in literature, with respect to national and regional level, there is a lack of research on the impact of climate finance on the local food system resilience, particularly in Niger State. The research gaps areas include the fact that it sought to answer insufficiently how gender and community-level variables influence the effectiveness of climate finance; lack of sufficient empirical studies on the relationship between climate finance and food system resilience among rural Nigerian communities; and lack of interdisciplinary methods that integrate institutional, social, and economic variables to determine the effectiveness of climate finance. These are the gaps that should be filled in an attempt to improve the design of polices, agricultural adaptation and sustainability in food security, in the Niger State. The research is useful as it presents localised data that can be applied in the creation of particular interventions and reliance on the mixed-methods data makes it possible to bridge the gap between quantitative and qualitative data (Creswell and Plano Clark, 2017).

Literature Review

Conceptual Review

Concepts of Climate Finance

Climate finance is developed to provide financial support in mitigation and adaptation interventions as a reaction to climate change (Suleiman et al., 2025). In the agricultural sector, climate finance results in incorporation of climate smart agricultural practices (Abubakar et al., 2025), including, but not limited to, drought-resistant varieties of crops, water-saving methods, and sustainable soil management (FAO, 2020; Zougmore et al., 2019). The practices not only enhance the climate shock resilience but also productivity and nutrition because GCF-funded projects in West Africa have shown a 15-25 percent improvement in yield caused by a combination of soil fertility control (Tandukar et al., 2025).

Food System Resilience

The capacity of the food system to endure the effect of shocks, adjust to changes in the environment, and at the same time be able to provide adequate, nutritionally balanced, and affordable food can be considered as food system resilience (IPCC, 2022). The resilience can be improved in various ways: diversification of the cropping systems (Musa et al., 2025) and strengthening the market access and the institutional and community support systems (Kang et al., 2019; Olsson et al., 2014). Beyond the vulnerable settings, resilience must extend to encompass the existence of crops, household-based food stores, income diversification, and social protection (Yakubu et al., 2025), which can be boosted with climate money allocated equitably (Browne et al., 2020).

Theoretical Framework

To understand the impact of climate finance on food system resilience in the state of Niger, the study is grounded on three intersecting theoretical frameworks including the agency theory, the institutional theory, and the stakeholder theory. All these frames are concerned with the main agents, structural regulations and participate mechanisms involved in allocate and use of finance that provides a solid foundation to examine interaction of institutional, social and governance environment in the process of agricultural adaptation.

The agency theory provides a backdrop perspective of the relationship issues in the financing of climate which revolves around the potential conflict between the principals (the international donors, such as the Green Climate Fund) and the agents (local governments and community-based organisations, or CMOs) who must execute it (Jensen and Meckling, 1976). This paradigm enables selfishness of agents towards long term goals of adaptation in terms of short term gains, e.g. political prominence or personal gains and results in mis-allocation or inefficiency in the absence of a strong oversight. This is particularly applicable in the Niger State whereby the donor funds are faced with a plethora of bureaucracies such as those of the federal ministries, state agencies and local CBOs thereby increasing the agency costs associated with information asymmetries and monitoring gaps. This could include things like the fact that when high standards of accountability are not provided the money that has been set aside to finance irrigation or seed dispersal would be redirected to sabotage the resilience-building process and augment vulnerabilities of the smallholder farmers who are to be assisted in time.

It is by virtue of these relations that the institutional theory examines the rules of a general nature of either formal or informal nature, which govern the utilisation of climate finance with particular emphasis on how organisational systems contribute to good performance or hindrance of the same (DiMaggio and Powell, 1983). The allocation of funds can be efficient in the good institutions provided that they give the appropriate guidelines of transparency and coordination. Weak ones, in its turn, advance isomorphism: organizations reproduce minimally efficient practices without adapting to them fundamentally, thereby diluting the role of finance (Kuhl, 2021). Institutional failures of sub-Saharan Africa and Nigeria are also characterized by lacking regulations and fragmented policy frameworks that do not allow the data absorption of resources, and causes the under-utilisation of resources that do not correspond to local climate risks, e.g. droughts in Niger State (Lwesya, 2025). The theory is concerned with institutional changes to create a conducive environment within which adaptive governance can render global finance sensitive to the context-specific imperatives in enhancing the overall efficacy of resilience interventions.

As a balance to these perspectives, the stakeholder theory advises that all the interested parties be incorporated in the decision making process to entail the farmers, women, NGOs, local governments, and donors to equitable and sustainable use of

climate finance (Freeman, 1984). This model will address the unequal power of the agricultural systems, one of which marginalises women in terms of agricultural cooperatives through exclusion in the negotiations of the resources to acquire (Adisa et al., 2024). In the state of Niger where gender norms and hierarchies have the tendency to marginalise vulnerable group, the stakeholder involvement will aid in the establishment of trust and collaborative development of the adaptation mechanisms, which will lead to robust food system. Together, these theories can serve as the conjectural approach of the study to provide insight into the role of the agency conflicts, the institutional structures, and the incorporation of the stakeholders as the mediating factors in the relationship between the climate finance and agricultural resilience.

Empirical Review

Empirical research literature also still indicates the brute impact of gender relations on climate financing availability and subsequent agricultural adaptation in the sub-Saharan African sub-region of Africa where women form the center of food production but are systematically marginalised. The detailed observation of the rural populations in five African countries (Chakrabarty and Nag, 2023) revealed that already up to 60 percent of women farmers in these nations have lower access rates to climate finance compared to men, which is attributed to the firmly established culture that impedes mobility, freedom of choice and possession of collateral. The obstacles are compounded by the insecurity of land tenure, where women cannot receive such credit programs that are based on finance because they do not even own a title to the land that they are working on, which may be a community or family parcel (Sunderlin et al., 2020). In some cases, gender-sensitive projects that incorporate gender-specific training and women-dominated cooperatives have experienced a 30 increase in the adoption of climate-sensitive practices, such as drought-resistant seeds and agro forestry, which leads to higher resiliency of the household and reduces food insecurity among women in Ethiopia (Sunderlin et al., 2020). This fact indicates the possibility of the transformative character of inclusive interventions, where the reaction to gender inequities does not only expand the agency of individuals but also expands the results of adaptation on a communal level.

The situation in Nigeria is already experiencing acute trends since women already constitute about half of all agricultural labor forces, yet less than 20 percent of all the extension services, as well as the finance opportunities (Adeyemi et al., 2020; Njuki et al., 2011). The Adeyemi et al. (2020) survey established that over half a thousand farmers in southwestern Nigeria had gap problems according to gender where women practiced resilient activities that are 25-35% less than men thus putting more pressure on women during climate shock and other issues such as unpredictable rainfall. This is backed up in more recent literature, as Adisa et al. (2024) surveyed communities in northern Nigeria and discovered that another aspect of culture, such as early marriage and division of labour in household, decreases the participation of women in the process of finance application by 40 percent, perpetuating cycles of poverty and food insecurity. Similarly, how the described dynamics interact with institutional biases, e.g. targeting in favor of men in government programs, is exemplified by Olsson et al. (2014) and a follow-up by Hess et al. (2014), in which they note that gender-mainstreamed policies are needed to redistribute climate finance and achieve sustainable adaptation (Chakrabarty and Nag, 2023; Adisa et al., 2024).

The relevance of the community-level factors, and in particular, the impact of community-based organisations (CBOs), comes critical in facilitating the process of delivering climate finance to the smallholder farmers and enabling the collective action and execution of the program within the resource-constrained rural setting. Adebayo et al. (2023) contrasted 15 rural districts in Nigeria and established that CBOs enhance access to climate finance by offering technical assistance, such as training to utilize grants and track projects that would elevate the adoption of climate finance by 45 per cent of those CBOs participating. This facilitative role is especially acute in those areas, in which the state is absent and the CBOs coordinate their resources, social networks to negotiate between the international donors and the demands. This is informed by comparative Kenyan evidence whereby Browne et al. (2020) state that collective bargaining that is led by CBOs has increased the rate of finance absorption by 40 percent, via social means, including group savings plans and community irrigation projects that make benefits more evenly distributed and spread individual risks.

However, the effectiveness of these community systems is not free of issues since the problems of elite capture and internal inequalities can ruin the fair distribution in the event that it is not managed appropriately (Millan et al., 2019). Millan et al. (2019) in a review of 20 cases in sub-Saharan Africa have discovered that, in 30% of CBOs with high influence, up to 25% of money was stolen by influential individuals to their own or faction interests, and marginalised subgroups (e.g. youth and women) represented overrepresent. This is furthered by recent studies, in which Adisa et al. (2024) indicate the importance of social capital in Nigerian CBOs in mitigating such risks, which is done through trust-building forums; in this case, project sustainability is amplified by 35 percent in case inclusiveness is given precedence. In addition to that, Zougmore et al. (2019) state that community-led climate-smart agricultural initiatives such as farmer field schools are needed to strengthen the impacts of finance by exchanging knowledge and adopting localised adaptive innovations to agro-ecologies locally. The general conclusions support the mediating role of CBOs, but require monitoring systems to assist in preventing exclusionary behavior and resilient the community (Browne et al., 2020, Adebayo et al., 2023).

The impact of institutions on climate finance effectiveness has been well documented and good and competency of governance are the unlocks to the efficient allocation, execution and effects in the African agro environment. Pauw et al. evaluated 25 African nations on the adaptation efforts and established that effective institutional frameworks - in terms of transparency in budgeting and proper coordination of the stakeholder engagement - can successfully increase the financial efficiency by 30-40 percent and thus enable them to match the global funds with the local priorities. More so, in better governed countries, such as the presence of well-developed anti-corruption institutions, countries are better placed to digest and utilize 25% of capital with more efficiency resulting to measurable agricultural growth and minimization of risks (Miller et al., 2018). On a case study of governance of the climate in Nigeria, Freitas and Mwanik (2024) further illustrate that the absence of institutional capacity like poor policy coordination translates to 20-30 percent leakage of funds through bureaucracy and organizational delays in Nigeria, in particular subnational institutions, including states, are not sufficient to absorb the funds.

New issues are also represented by institutional dynamics together with security concerns that complicate the issue of delivery of finance in areas of potential conflicts. Sub Saharan conflicts that are analyzed by Fisher et al. (2017) revealed that the farmer-herder conflicts in northern Nigeria permeate the climate programs by up to 50 per cent because the logistics and the faith in the institutional actors are impacted by insecurity. The latest article by Lwesya (2025) includes these points and holds that the risks can be neutralized with the adoption of hybrid institutional mechanisms, which entail institutionalized government and informal organizations at the community level that have power over them. This is evidenced by the East Africa where there is an improvement of 28 percent rate of project completion through improved governance. Kuhl (2021) builds on this, taking into account the comparative strategies of adaptation, where weak institutions will pursue the inefficient international patterns, institutional isomorphism will only keep deteriorating performance, which implies that capacity-building will be a method to sell adaptive governance. Overall, these articles show the significance of the role of institutions in scaling climate finance but suggest that the interplay between institutions and security and policy coherence is the key to achieving food system resilience in volatile conditions, such as in Niger State (Pauw et al., 2022; Freitas and Mwanik, 2024; Lwesya, 2025).

Literature on the local context of the Niger State is scarce, most of the research focuses on overall trends of Nigerian or West Africa in general rather than specifics of the state agro-climatic and socio-economic setting, which means that integrated studies of gender-, community-, and institutional forces of climate finance systems have to be carried out. Idagu et al. (2016) introduced early assessment of climate variability in Niger state indicating that the zone-specific risks and threats such as droughts in the north and the floods in the south have led to a reduction in the variability of yields of staple crops by 15-25 percent, but with no further follow-ups that could link it to the intervention of finances. Very scanty empirical literature incorporates these factors. In one instance, Adebayo, I. A. et al. (2023) are marginally covering the issue of institutional hindrance in the North part of Nigeria, yet they never touch on how gender goes with CBOs in the different communities of the state of Niger.

It is being filled with emerging literature, e.g. Tandukar et al. (2025) evaluates agricultural adaptation finance in West Africa, including a snippet of case study of the Niger State and finds that localised institutional reform would enhance resilience by 20% by better targeting funds. Similarly, Kang et al. (2019) critically reviewed the impacts of climate on sub-Saharan agriculture where they proposed that state-level researches should unpack the performance of finance in rain-fed systems, such as those in Niger. This comparative research gap, particularly in mixed-methods case studies, leaves a research gap that must examine the nature of interaction between gender exclusions and CBO facilitation and institutional weaknesses depending on first indications of Niger State, where female access is 35 percent lower when the governance is moderate (Freitas and Mwanik, 2024). The urgency of filling this regional gap is due to the fact that the conditions of the largest agrarian state in Nigeria put the state of Niger into the position of belligerence of scalable adaptation reactions in the Sahel (Idagu et al., 2016; Tandukar et al., 2025).

Despite the growing body of research on climate finance and agricultural adaptation, there are still several gaps that do not allow a comprehensive perspective on the role it can play in enhancing the resilience of the food system, particularly on the localised level through the case of Niger State. One of the most remarkable gaps is the lack of the local-level assessments as most of the existing studies are conducted on a nationwide or regional level and they usually cannot address the nuances of how the concept of climate finance can be converted into tangible mechanisms of influence on a smallholder farmer. As an illustration, studies of macro-levels can refer to the circulation of finances and the policy frameworks (Pauw et al., 2022), but they omit micro-level indicators, such as changes in the crops, household food availability, or adaptive behaviour of various agro-ecological areas. This becomes particularly acute in rain-fed farming regions, including Niger State, where local environmental variability, i.e., drought patterns on zones, needs to be specifically assessed to reveal the way in which finance influences the resilience in facing instant shocks, i.e., flooding or erratic rainfall (Idagu et al., 2016). Without this kind of localised empirical study, policy makers will be tempted to apply blanket interventions that fail to take into account the community based vulnerabilities that will persist in causing inefficiency in the distribution of resources and adaptation response.

The second gap is also critical because little evidence exists on how the interactions between the mechanisms of gender relationship, conditions at the community level and institutional frameworks should occur to impact on effectiveness of climate finance. Although the separate elements of the mentioned barriers were previously researched, such as gendered barriers to access (Chakrabarty and Nag, 2023), or the facilitating role of community-based organisations (Adebayo et al., 2023), few studies have brought them together to address the interactive effects of these variables. As an example, how could the inefficiencies of the institutions compound gender inequalities, women rely on the community networks to manoeuvre the finances, or could elite capture be resolved by the networks using powerful local governance? The result of such a piecemeal methodology is that questions on the cumulative challenges that the marginalised groups have gone through such as the household headed by women in rural Nigeria is left unanswered with the socio-cultural practices of the society in conflict with the bureau-cultural challenges whereby uptake of finance is curtailed at max half (Njuki et al., 2011; Hess et al., 2014). Such a gap is important to be filled in order to come up with holistic interventions that take into account such interactions to ensure that climate finance is not limited to reach the most vulnerable participants in the food systems but make them also empowered.

Finally, there are very few effective case studies involving quantitative and qualitative data in assessing the impact of climate finance in Niger state with much of the available literature about the topic employing surveys only or basing their argument on anecdotal evidence without triangulation. It is a methodological weakness, which does not allow giving a full account of the route of causation i.e. how finance-driven practices may lead to resilience indicators (e.g. yield stability). At the same time, social processes of the in-depth qualitative nature point to the background social processes, including building trust within cooperatives (Browne et al., 2020). The combination of such strategies is essential in the environment of the Niger State where the data is scarce and the contextual diversity in agro-zones results in more challenging analysis of the situation and thus the necessity to justify the findings and present actionable findings (Yin, 2018).

The current paper addresses these gaps with the help of mixed-method sequential explanatory design, which involves a quantitative regression analysis of the survey data on the measurements of finance access and finance resilience along with qualitative thematic analysis of data in the form of interviews. This approach breaks down the connections between gender, community and institutional factors on the local level and empirically provides evidence to the special issues of the Niger State. This way, it is not only filling the gaps in localised assessment and the comprehensive analysis but also provides some feasible options in which policymakers can streamline climate finance to provide equitable food system resilience (Creswell & Plano Clark, 2017).

Methodology

The research design used in this paper was mixed-method research design to acquire a profound insight on the climate finance and food systems resiliency relationship in the Niger State. Access to climate finance, food system resilience, and adoption of climate-smart agriculture practices including drought resistant planting and soil conservation measures were measured on the 5-point Likert scales using structured questionnaires on the respondents, who were 262 smallholder farmers. The reliability of the instruments was tested on a small sample of 30 respondents and the Cronbachs alpha was 0.87, i.e. the instrument is very internally consistent. To complement this, qualitative data were gathered as semi-structured interviews of between 45-60 minutes with 25 key informants who were the farmers, local government representatives and NGO representatives to be acquainted with the perceptions of effectiveness of institutions, community participation and gendered barriers to accessing finance. Interpretations of the interviews were transcribed word to word and thematic analysed using NVivo software as per the requirements given by Braun and Clarke (2006) to establish patterns of patterns depending on institutional, social, and gender variables. The subjects were followed by strict ethical protocols that included informed consent, anonymity and confidentiality of the subjects and ensuring that the study was passed through the local university under the Institutional Review Board (IRB) to safeguard the rights and confidentiality of the subject.

Study Area

It was conducted in the state of Niger, which is the largest state in the Nigerian territory in the mean of the land area and the economy is agricultural mainly. Three agro-geographical areas, that is, North, Central and South were selected to capture regional difference in the agricultural systems and the exposure to climate. The Northern zone is subjected to devastating droughts, the Central region is characterized by the fluctuation of rainfall, and the Southern region is characterized by floods, which means that the need of resilience varies (Idagu et al., 2016).

Models and Estimation Techniques.

Multiple linear regression model was used as follows:

$$FSR_i = \beta_0 + \beta_1 CF_i + \beta_2 Gender_i + \beta_3 CBO_i + \beta_4 Institution_i + \beta_5 Governance_i + \varepsilon_i$$

Where:

FSR_i: Food System Resilience (composite index, 0-100)

CF_i: Climate Finance Access (Naira amount, logged)

$Gender_i$: Gender of farmer (female=1, male=0)

CBO_i: Community-Based Organisation involvement (1-5 scale)

$Institution_i$: Institutional strength (1-5 scale)

Governance: Governance quality (1-5 scale)

ε_i: Error term

The quantitative data analysis was done using SPSS software, and factor analysis was then performed in a bid to give the latent variables according to the responses made by the people in the survey i.e. the institutional strength and the quality of governance. To achieve the strength of the regression models, a number of diagnostic tests were performed: the problem of multicollinearity was measured using variance inflation factors (VIF < 5 in all variables), the lack of strong correlations between predictors was measured using the Breusch-Pagan test ($p > 0.05$), the robust standard errors was used when needed according to White (1980); the problem of normality of the residuals was examined with the help of Shapiro-Wilk test ($p > 0.0$ The following procedures reflected the accuracy of the results of the

Results and Analysis

Descriptive Statistics

Table 1 shows the mean values which give an idea of the significant variables in the form of access to climate finance, institutional capacity and resilience of food system in Niger State. It has a mean climate finance access of 3,500,000 Naira that implies that its access to funding adaptation is moderate. The high standard deviation of 2,400,000, however, shows the high dispersion in distribution, which can presumably be explained by the development of the inequality of the resources between genders and by the inequality of the local government, civic engagement, and institutional endorsement (Freitas and Mwanik, 2024). The implication of this asymmetry is that some farmers might be getting an inflow of finance to the same extent as others in more isolated or marginalised locations are not as well served, which might factor into the widening of the disparity of resilience.

Table 1: Descriptive Statistics

Variable	Mean	SD
Climate Finance Access	3,500,000	2,400,000
Institutional Strength	3.2	1.2
Governance Quality	3.1	1.1
Socio-Economic Status	3.5	0.9
Security Issues	3.4	1.3
Food System Resilience	3.6	1.1

Source: Researcher's Computation, 2025

The mean institutional strength stands at 3.2 with the quality of governance standing at 3.1 indicating a mediocre performance in governing the climate programs. The standard deviations (1.2 and 1.1, respectively) are imbalances within the locality where the discrepancies in the governance practices and effectiveness of institutions can increase or decrease financial effectiveness. It is supported by the fact that the study shows that the lack of proper coordination between the government agencies is often one of the reasons of inefficiencies when distributing the rural climate finance (Pauw et al., 2022). A food system resilience score of 3.6 is indicative of the lowest possible shock survival capability. However, the standard deviation of 1.1 means that there are various outcomes that are defined by the activities of agriculture, the availability of resources, and the institutional support (Kang et al., 2019). Overall, the notion of resilience is correlated with the incorporation of climate-smart practices, the need to allocate financial resources equally and provide supportive local systems.

Climate finance, as it is seen in Table 1 is distributed unevenly but is present considering it is the larger problems of both gendered and vulnerable population in the state of Niger. The average institutional and governance pointers are a good sign of capacity-building to support equitable distribution and reduce variation. The trends align with the studies which propose that good governance mechanisms are preconditions of appropriate climate adaptation (Adebayo et al., 2023). Despite the potential to achieve the concept of food system resilience, it may be enhanced with the institutions support, which would elevate its homogeneity to the point of ensuring that finance can translate into overall benefits of agriculture sustainability.

Survey Responses

Table 2 shows the gendered access to climate finance and facilitative role of community-based organisations (CBOs) in the Niger state. The number of people who had access to climate finance was merely 40.1 per cent of the surveyed, and there is an apparent gap between the availability and distribution that cannot enable mass-based adaptation. The 59.9 percent who are inaccessible leads to the systemic causes which entail the lack of outreach and bureaucracy among many smallholders that cannot use money to construct resilience.

Table 2: Survey Responses on Gender Dynamics and CBO Involvement

Category	Frequency	Percentage
Access to Climate Finance (Yes)	105	40.1%
Access to Climate Finance (No)	157	59.9%
Gendered Access (Female)	33	12.6%
Gendered Access (Male)	72	28.6%
CBO Involvement (Yes)	150	57.3%

Source: Researcher's Computation, 2025

Regression Results

It is highly unequal in terms of gender: there were just 12.6 per cent of women agriculturalists who were eligible as opposed to 28.6 per cent of men. This imbalance is anchored on the laid down blockades, including possessing a small piece of land, inability to make decisions, and socio-cultural beliefs that restrict the contribution of women in adaptation initiatives (Chakrabarty & Nag, 2023). These observations are consistent with broader Nigerian research, whereby women, who form half of the agricultural labour force, have less than 20 percent of extension and finance services, which restricts their access to climate-smart practices (Njuki et al., 2011).

The engagement in CBO is a positive phenomenon, and 57.3% of individuals who became engaged gained access to resources. These organisations provide valuable intermediaries, capacity building, technical advice and advocacy so that application procedures can be made more accessible to marginalised and rural farmers in particular (Adebayo et al., 2023). CBOs will be able to mitigate the impact of isolation and enhance inclusion especially to women who would be left unnoticed.

The data in Table 2 points out the necessity to include the policy of gender sensitivity to overcome the obstacles and increase the level of women inclusion in climate finance programmes. The CBOs have a large contribution to access, which makes their roles potentially an equity-enhancing tool, provided that their roles are supplemented with training and resources. This aligns with the view of Adebayo et al. (2023), who position CBOs in between funders and communities, which makes it easy to incorporate resources in the communities. The supply of access may be solved by empowering these bodies to encourage an equitable process of stability and adjustment of the food system.

The results of the obtained regression in Table 3 show what the determinants of the resiliency of the food system are and climate finance, gender, and community factors influence it significantly. The positive influence of climate finance is quite substantial (coefficient = 0.42, $p < 0.001$) and it is noteworthy that climate finance assists in improving agricultural adaptation and resilience through investment in such practices as better irrigation and crop diversification (Pauw et al., 2022).

Table 3: Regression Estimates

Variable	Coefficient	Std. Error	t	p-value
Climate Finance (CF)	0.42	0.09	4.67	0.000
Gender (Female)	-0.45	0.10	-4.50	0.000
CBO Involvement	0.36	0.12	3.00	0.003
Institutional Strength	0.25	0.08	3.13	0.002
Governance Quality	0.18	0.09	2.00	0.048
Socio-Economic Status	0.12	0.10	1.20	0.234
Security Issues	0.05	0.07	0.71	0.477

Source: Researcher's Computation, 2025

The drawback of women (which is confined to their encounter with finance and the consequent attainment of power) is predetermined by the negative value of female gender (-0.45, $p < 0.001$). This is based on the results regarding gendered obstacles to the productivity and adaptive capacity of women in climatic-prone areas (Chakrabarty and Nag, 2023).

There is a positive correlation between the results and the involvement of CBOs (coefficient = 0.36, $p = 0.003$), which represents how the community operations address institutional gaps and offer technical support to maximise the utilisation of finance (Adebayo et al., 2023). The importance of such factors as the institutional strength (0.25, $p = 0.002$) or the quality of governance (0.18, $p = 0.048$) is also significant, that is why these aspects are topical in the efficient allocation and control (Pauw et al., 2022). The insignificant variables that include the socio-economic status and security issues show that the structural factor dominates in this model rather than the individual or contextual factors.

These estimates confirm the positive contribution of climate finance to resilience, concomitant with its gender and institutional obstacle to its growth. Sexual inclusive programs, community based initiatives and institutional change should also be targeted to make sure that a fair implementation is done. Niger state has the opportunity to maximize the promise of finance through empowering the CBOs and improving governance, something that can be aligned with the call to come up with specific measures that will overcome the obstacles and result in agricultural resilience.

Discussion

The results confirm that climate finance can enhance the food system resilience in the Niger State and the positive value of the coefficient ($b = 0.42$, $p < 0.001$) indicates that the high access levels are connected with high-quality adoption of the climate-smart practices, such as diversified cropping and soil conservation, to protect against climate shocks, including droughts (Zougmore et al., 2019). This agrees with the empirical analysis in the sub-Saharan Africa, as indexes of resilience have increased by 20-35 percent in similar agrarian context under intervention financed by financiers (Kang et al., 2019; Tandukar et al., 2025). However, the moderate R2 (0.42) means that the effect can be watered down by other moderators, in particular, institutional and social ones since funds fail to reach their target beneficiaries due to the leakage in the distribution channels (Escalante et al., 2018). According to the descriptive statistics in the Niger state, unequal resilience opportunity is found in agro-zone-based geographic and eligibility differences because the average access is = 3,500,000 Nairas and the high variance (SD = 2,400,000) (Idagu et al., 2016).

The correlation with gender dynamics in which the female farmers are 12.6 percent is negative, with $a = -0.45$ and $p = -0.001$. It is possible to state that such difference is explained by such socio-cultural norms as patrilineal ownership of land and mobility that deprive women of the collateral-based loan and groups (Chakrabarty and Nag, 2023; Njuki et al., 2011). It was also justified by the application of explanatory interviews, according to which the female interviewees mentioned male-dominated cooperatives as gatekeepers, and the results are in line with the research on a larger African population, which has determined that gender inequities reduce the adaptive capacity of women by 40 percent (Sunderlin et al., 2020; Hess et al., 2014). These omissions not only limit individual resilience but also flow down to the food security of families, 70-80 percent of subsistence agriculture in Niger state is operated by women (Adeyemi et al., 2020). Theoretically, this goes against the principles of equity that form the stakeholder theory (Freeman, 1984) that suggests the need to interfere in a manner that breaks and not consolidates the power structures such that finance intensifies rather than fixes the vulnerabilities.

It should be noted that the factors on the community level positively influence the outcomes ($b = 0.36$, $p = 0.003$), and access was obtained by 57.3% of the contacted members. Making the bureaucracy easier and marshalling resources towards common projects is congruent with Adebayo et al. (2023), who report 50 percent improvement in the successful adaptation with the mobilisation of grass roots, which makes CBOs trust-builders and brokers. This was elaborated with the use of qualitative data, which demonstrated the significance of CBOs in the region of the so-called farmer field schools, where the knowledge concerning the resilient types is shared, and the social capital is formed (Browne et al., 2024).

Summary

Specifically, gender dynamics and communal-level factors at the region were put in the spotlight as this paper discussed the impact of climate finance on the resilience of the food system in Niger State, Nigeria. Having mixed-methods research, the study entailed a combination of quantitative surveys with qualitative interviews to identify how climate finance affects smallholder farmers, mostly women in the adoption of climate-smart agricultural practices and creation of resiliency in the food system overall. It was identified that climate finance has a positive impact on the agricultural adaptation due to the ability to invest in resilience technologies and practices, such as crops that are resistant to drought and improved water management. However, the existence of gender inequities and institutional inefficiencies and community based limits hamper its utilization to a significant extent.

The key conclusions were that there are gender inequities in which accessibility is much low to the female farmers when compared to their male counterparts because of the historical social

norms, lack of resources ownership and power to make decisions. On the other hand, the community based organisations (CBOs) became the key players that facilitated the connections between funders and the local beneficiaries as regards the provision of technical support and advocacy. The paper also mentioned the mediating value of the institutional capacity and the quality of governance with regions that have stronger local institutions expressing more achievement of mobilizing and putting finance to enhance resilience to climate shocks such as unpredictable precipitation and droughts.

Conclusion and Recommendations

Conclusion

Lastly, the results of the research provided in the study also confirm that climate finance is highly prospective in terms of the enhancement of the food system resilience in Niger State yet the realisation of the idea is heavily depending on the gender access pattern, institutional possibility, and social interactions. Not only do women farmers make up a disproportionately underprivileged portion of the agricultural labour force that consequently makes them less motivated to adopt climate-smart practices, but also has an adverse impact on household and community food security. Institutional failures and poor governance also contribute to poor results that are likely to result in dissipated implementation and underutilisation of resources that might not put into consideration the localised vulnerabilities.

As much as they are highly involved in their access and participation, CBOs are likely to operate on small resources and institutional support hence the need to have a systemic support to enhance their impact. Last but not least such barriers are addressed through certain measures to balance the already prevailing differences between genders by strengthening the institutions and empowering the communities to fulfil all the potentials of climate finance. The Niger State can create a more balanced mode of governance using an inclusive and community-based strategy that will result in a higher agricultural resilience and sustainable food security among the rural population.

Recommendations

To optimize the advantages of climate finance to the development of food system resilience in Niger State, it is necessary that the policymakers embrace gender sensitive policies which do not only offer women farmers with equal access to finance, land and financial resources. These include developing accommodative systems that benefit the farming needs of women besides financial literacy intervention programs that assist them in managing such funds and participating in all the facets of adaptation programs. The latter would assist in alleviating the structural factors of exclusion, which would shift towards making the overall impact of finance on vulnerable households more effective.

The other significant thing is to empower community based organisations(CBOs), so that community based organisations are the champions in between the givers of the climate finance and the local communities. Skills and resources that will empower the CBOs to access and practice the climate-smart activities and encouraging equal participation of both men and women in the decision-making process should form the capacity-building activities of the project so that to create the equal distribution of resources. The organisations can play a more valuable conduit roles of inclusive adaptation particularly on the underserved rural areas by enhancing the operational sustainability of CBOs.

It is also expected to enhance institutional capacity and governance by making sure that the reforms are reinforced to bring about coordination between the government agencies, the non-governmental organizations, and the community organizations in the delivery of climate finance effectively and in a transparent manner. The narrowing down on the accountability systems will lead to preventing the misappropriation of funds and disburse funds to those who are vulnerable, but the general administrative adjustments will bring the governance standards to the level of resilience in the long term. As an addition to these, the interventions will be more relevant and effective with the promotion of community involvement in the development and implementation of the program. This will be by ensuring that the finance aligns with the needs in the ground by including local farmers, CBOs, and women leaders in the participatory processes.

The first step is creation of awareness, and certain campaigns such as radio, community meetings, and Internet will assist in raising awareness of the rural population (and women in general) with regard to the available programs and the application procedures. It is also possible to mobilise more resources through building of the public- private partnerships which can provide incentive such as tax breaks and subsidies to get the involvement of the private sector in sustainable agriculture and hence complement the efforts of the public and hence make the initiative of setting up the projects faster. And finally, the establishment of effective monitoring and evaluation mechanisms will help achieve the process of instating data-driven refinements, assessing the economic impact of resilience, and to make programs evolve in accordance with the long-term goals of food security.

These are some of the interrelations between these recommendations that would aid the state of Niger to make the most of climate finance to develop resilient food systems that do not only secure the most vulnerable sectors in the state like women farmers, smallholder communities but also assist them to counter the rising climate risks.

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