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COMMUNITY PARTICIPATION IN FOREST CONSERVATION AND MANAGEMENT IN HADEJIA NATIONAL PARK (BATURIYA WETLANDS), JIGAWA STATE, NIGERIA

***[1]Jibrin Gambo, [2]Abdulmajid Abubakar, [3]Abubakar Ahmed, [1]Umar Ali Madaka, [4]Yusuf Ahmed Yusuf, [1]Bashir Sabo Babura, [1]Suleiman Muktari Muhammad and [5]Maryam Babangida Adam**

[1]School of Agriculture, Department of Forestry and Environmental Technology, Binyaminu Usman Polytechnic, Hadejia, Jigawa, Nigeria
[2]Department of Geography, Faculty of Earth and Environmental Science, Bayero University, Kano, Nigeria
[3]Department of Geography, Faculty of Social and Management Science, Sule Lamido University, Jigawa, Nigeria
[4]Department of Environmental Management, Faculty of Earth and Environmental Science, Bayero University, Kano, Nigeria
[5]School of Science, Department of Science Laboratory Technology, Binyaminu Usman Polytechnic, Hadejia, Jigawa, Nigeria.

*Corresponding authors' email: J.gambo@bupoly.edu.ng

ABSTRACT

Community participation has become a central strategy in forest and environment management, particularly in areas where local livelihoods depend on natural resources. This study looks at the nature and extent of community involvement in the protection and management of the Baturiya wetland, focusing on the five neighbouring municipalities of Kadera, Abunabo, Musari, Baturiya and Chachamnau. Using a mixed methodology, data were collected from 100 respondents (75 male and 25 female) through structured questionnaires and interviews. Quantitative data were analysed by means of descriptive statistics and chi-square tests, while qualitative answers were coded by thematic means. The results show a moderate but uneven level of participation. Baturiya and Musari showed the most interest, given their proximity to the park offices and previous efforts. Chachamnau, on the other hand, showed low participation, hampered by poor awareness and weak institutional links. Component-wise, chi-square analysis confirms a significant variation in the average participation rate between communities ($x^2 = 9.84, p < 0.05$). Awareness of conservation initiatives is generally high, but awareness of policies and formal roles in forest management is still low. The main benefits of participation have been accessing to non-timber forest products, training and improved relations with local communities. The main obstacles were lack of motivation, exclusion of women and poor communication with the authorities on vandalism. The findings highlight the need for formalised community-based protection structures, targeted training programmes, gender mainstreaming strategies and benefit-sharing mechanisms. Reinforcing these areas could increase local ownership of conservation initiatives, ensure fair participation and promote sustainable forest management in semi-arid regions. The results of this research also contribute to achieving the UN Sustainable Development Goals (SDGs), in particular Goal 13 (climate action), Goal 15 (life on Earth) and Goal 5 (gender equality), by promoting environmentally friendly practices, inclusive participation and resilience of ecosystems through community-based approaches.

Keywords: Conservation, Forests, Livelihoods, Local Communities, Participation, Wetlands

INTRODUCTION

Forest ecosystems provide vital environmental, social and economic benefits worldwide. They are essential for climate control, carbon sequestration, biodiversity conservation and the maintenance of human livelihoods (Cherinet & Lemi, 2023; Nzabarinda et al., 2025). In developing countries, especially in Sub-Saharan Africa, forests are the primary source of food, medicine, energy and income for rural populations. However, these forests are under increasing threat from deforestation, habitat fragmentation, over-exploitation and poor management practices (Davis, 2003; FAO, 2018; Food and Agriculture Organization of the United Nations (FAO), 2020). As natural forest landscapes are disappearing, the role of local communities in forest protection and management has become one of the key strategies in the world for sustainable development and the protection of biodiversity (R. Agrawal et al., 2022). In Nigeria, deforestation and forest degradation are rampant, causing widespread unemployment. According to the Global Forest Watch (2022), Nigeria alone will lose around 96,500 hectares of forest by 2021, which will contribute significantly to climate change, desertification and biodiversity loss (Zanin & Sillère, 2015). Jigawa State, situated in the semi-arid northern part of Nigeria, is particularly vulnerable because of its fragile ecosystem, growing human population and dependence on natural resources for agriculture and household consumption (Gambo et al., 2020). Hadejia National Park, home of the Baturiya wetland area - a Ramsar site of international importance - is the focus of a conservation effort. wetlands play a crucial role in flood control, groundwater recharge and as a habitat for migratory birds and other aquatic species (Adams & Thomas, 1996; Gambo et al., 2020; Olalekan, 2014).

Despite being designated a protected area, Hadejia National Park still faces many challenges. These include illegal logging, overgrazing, land stripping and poaching (Hadejia et al., 2020). The proximity of surrounding communities to the park is often perceived as a threat; the study shows that these communities can be valuable allies in the conservation effort if properly mobilised. Community involvement is increasingly recognised as a key element in effective forest protection, promoting ownership, enforcing conservation rules and integrating traditional ecological knowledge into contemporary conservation practices (Baswant et al., 2024; Bisong et al., 2018; Tauli-Corpuz et al., 2020). Community-Based Forest Management (CBFM) offers a framework where local people are actively involved in the decision-making, planning, implementation and monitoring of forest

resources. This participatory approach contrasts with top-down models of forest management, which often exclude local stakeholders and have historically led to conflicts, non-compliance and unsustainable outcomes (Rahut et al., 2015). The CBFM recognises the rights and responsibilities of local communities and gives them incentives and capacity building for the protection and exploitation of forest resources. The success of CBFM, however, is influenced by a variety of contextual factors, including socio-economic conditions, cultural values, institutional arrangements, legal frameworks, and the nature of community-park relations (Muttaqin et al., 2019).

In the case of Hadejia National Park, understanding the perspectives, challenges and level of participation of the surrounding communities is essential to the development of effective conservation strategies. The Kadera, Abunabo, Musari, Baturiya and Chachamnau communities within 25 km of the park are predominantly agrarian and rely heavily on the resources of the park for cooking fuel, grazing, fishing and medicinal products. The purpose of this study is to examine the nature and extent of community involvement in forest protection and management in the Hadejia National Park Protected Site. In particular, it aims to: (1) assess the level of awareness and knowledge of conservation activities among members of the community; (2) assess the form and frequency of their participation; (3) identify obstacles to effective participation; and (4) assess the gender dimension of forest management practices. The study also contributes to the wider discourse on participatory environmental management by providing empirical evidence from a semi-arid region of Nigeria. It is in line with the UN Sustainable Development Goals (SDGs), in particular Goal 15 (Life on Earth), and the national policies of Nigeria on the environment and biodiversity. The research highlights the importance of inclusive, equitable and context-sensitive approaches to forest management. The introduction of participatory mechanisms in the field of conservation not only improves environmental performance, but also enhances social cohesion, confidence building and local capacity building. The study advocates an integrated conservation model that bridges the gap between environmental sustainability and community development, stressing that the protection of the Hadejia National Park (Baturiya wetlands) cannot be achieved without the people living in and around. A strong human-led conservation strategy is essential to ensure the long-term resilience of these vital ecosystems and the welfare of the communities that inhabit them.

MATERIALS AND METHODS

Study Area

The Hadejia National Park is situated in the north-eastern part of Jigawa State, Nigeria, in the Hadejia-Nguru wetlands. It covers an area of approximately 32 000 hectares and includes a variety of ecological zones, including river forests, seasonal floodplains, wetlands and savannah grasslands (Hadejia et al., 2020). One of its most important components is the Baturiya wetland area, a Ramsar site recognised for its international importance in the support of migratory birds and the biodiversity of wetlands. Wetlands are an important ecological buffer and play an important role in groundwater recharge, sediment filtration and climate control in this semi-arid area of Nigeria. Geographically, the park is located between latitudes 12.40'N and 13.30'N, and longitudes 9.30'E and 10.30'E. The area has a Saheli climate, with a short rainy season (usually from June to September) and a long dry season characterised by hot and dusty winds. Annual rainfall is between 600 and 800 mm, while temperatures vary from 19 degrees Celsius in the winter season to 44 degrees Celsius in the peak dry months. These climate conditions affect the hydrological dynamics of the wetland and the livelihoods of local populations.

Several agricultural communities are located around the park and rely heavily on the natural resources of the park for their daily livelihood. The five municipalities selected for the study - Kadera, Abunabo, Musari, Batia and Chachamnau - all lie within a 25 km belt of the perimeter of the park. These communities are engaged in a wide range of activities, including cultivation, fishing, livestock rearing and logging. Their proximity to the park created both opportunities for conservation partnerships and difficulties in accessing resources. The socio-economic profile of these communities reflects a predominantly rural environment with limited infrastructure, low literacy rates and a high reliance on subsistence farming. Seasonal flooding from wetlands improves the soil but also creates risks of displacement and resource conflict. Communities have a deep cultural and historical link with their land and natural resources, which shapes their attitudes and behaviour. The park is administered administratively by the Nigerian Parks Service under the auspices of the Ministry of Environment. However, cooperation with local councils and community organisations is limited and often sporadic. This underlines the need for structured mechanisms of community engagement that recognise local knowledge, build confidence and ensure that conservation objectives are in line with local development needs.

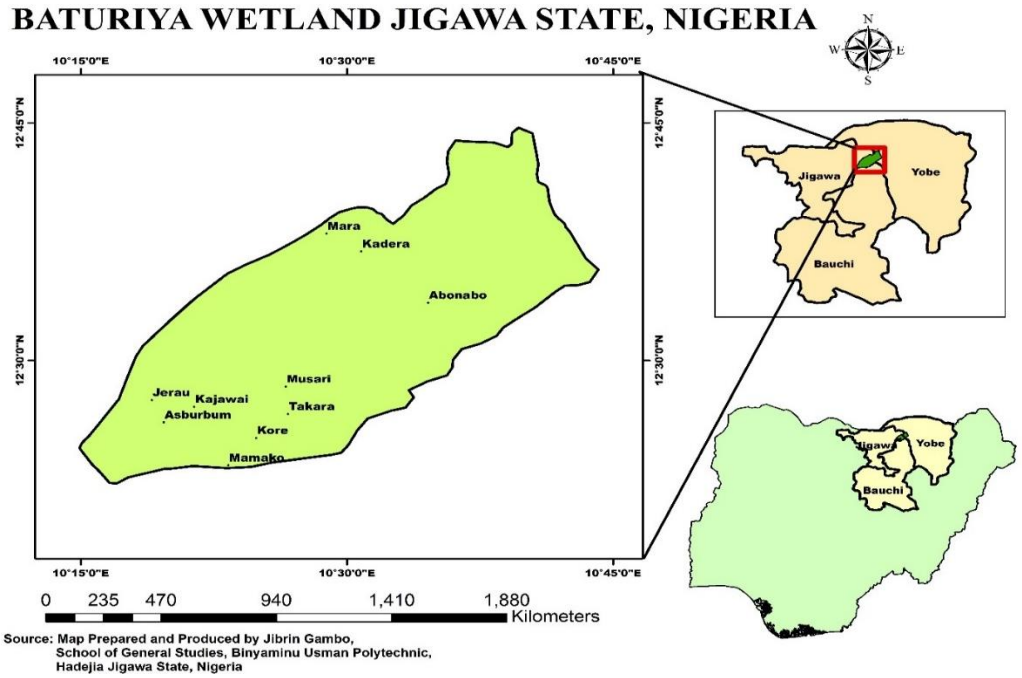

Figure 1: Study Area Map

Research Design, Population and Sampling Technique

The study utilized a cross-sectional survey design involving five communities within a 25-kilometer radius of the park Kadera, Abunabo, Musari, Baturiya, and Chachamnau. This design facilitated the collection of data at a single point in time from a diverse pool of respondents. A total of 100 respondents were carefully selected on the basis of their residence, gender and active participation or awareness in forest-related activities in the region. The sample consisted of 75 men (75%) and 25 women (25) aged 24 to 65 years old. A targeted sampling approach was used to ensure that knowledgeable individuals such as farmers, fishermen, local leaders and community elders were included.

Data Collection Instruments and Analysis Techniques

Data were obtained using structured questionnaires and semi-structured interview templates. The questionnaire included both closed and open-ended questions on socio-demographic information, awareness of the conservation effort, the frequency and types of participation, and the perceived barriers to participation. Selected community leaders, park officials and representatives of local conservation initiatives were interviewed. The quantitative data from the questionnaires were coded and analysed using descriptive statistics such as frequency and percentages to establish the patterns of participation. The chi-square (x^2) test was used to assess the relationship between location and level of participation. The following formula shall be used:

$$x^2 = \sum \frac{(E-O)^2}{E} \ldots \quad (1)$$

Where:

O = Observed frequency

E = Expected frequency

$\sum$ = Summation over all categories

The calculated Chi-square value was compared with critical values of 0.05 to determine whether the variation in the level of participation across the cohorts was statistically significant (Karkarna & Danjuma, 2020). The qualitative data from the interviews were re-recorded, thematically coded and analysed using content analysis. This has helped to identify recurring themes, perceptions and narratives around forest management, community roles and conservation challenges.

Table 1: Socio-demographic Characteristics of Participants

SN	Study Location	Total Participants	No. of Males	No. of Females
1	Kadera	20	15	5
2	Abunabo	20	15	5
3	Musari	25	18	7
4	Baturiya	20	15	5
5	Chachamnau	15	12	3
	Total	100	75	25

RESULTS AND DISCUSSION

Local Perception on Status of Wetlands Forest

Participants were asked to describe their perception of the current status of the wetland forest in Hadejia National Park. Most (58 percent) reported that forests were degrading, citing falling tree density, declining fish stocks and increased encroachment. Approximately 22 percent considered the forest to be moderately healthy, while only 12 percent considered it to be prosperous. The remaining 8 percent were not sure or did not express an opinion.

Table 2: Perception of Wetlands Forest Condition by Community

Community	Degrading (%)	Moderately Healthy (%)	Thriving (%)	No Opinion (%)
Kadera	60	25	10	5
Abunabo	55	30	10	5
Musari	52	25	15	8
Baturiya	62	20	10	8
Chachamnau	50	15	15	20

Level of Community Participation in Forest Conservation and Management

Community involvement was categorized into low, moderate, and high participation based on the frequency and type of engagement in conservation activities such as joint patrols, tree planting, reporting of illegal logging, and attending community meetings.

Table 3: Level of Participation in Conservation Activities

Community	Low (%)	Moderate (%)	High (%)
Kadera	40	45	15
Abunabo	35	50	15
Musari	25	50	25
Baturiya	20	45	35
Chachamnau	50	35	15

The table shows that Baturiya recorded the highest level of active participation (35 percent) in forest protection activities. This is due to its proximity to the park headquarters and the presence of non-governmental organisations involved in awareness-raising and education. The Musari community group also showed a relatively high participation rate of 25 percent and a low participation rate of 25 percent, suggesting a relatively balanced and active community structure. Conversely, Chachamnau had the lowest participation rate, with 50 percent of its respondents classified as low participators. This points to possible problems such as limited access to park programmes, lack of awareness or historical conflicts with park management. Similarly, Kadera and Abunaba showed a dominant trend in the moderate category (45 and 50 percent respectively), but less significant participation in the higher category. The data reveal a general trend of moderate participation in all communities, which may indicate that communities are willing to participate but constrained by capacity, resources or incentives. These results highlight the need for targeted strategies to increase participation from the low to high levels, such as: strengthening community forest management groups, providing incentives for forest monitoring, promoting inclusive decision-making platforms, and enhancing trust and communication between park authorities and local communities. Ultimately, a higher level of participation is necessary to ensure sustainable forest management and to ensure that protection policies are both inclusive and efficient.

Benefits of Community Participation in Forest Conservation and Management

The respondents identified several benefits of community participation. These included access to non-timber forest products, improved relations with the authorities of the national parks and training in environmental management. The results show that Baturiya is the community with the highest overall perceived benefit on all three indicators. This is in line with the high participation rates previously recorded in the field of conservation activities (section 4.2), which indicates a strong positive feedback loop, with more participation yielding more benefits and the perceived benefits further encouraging continued involvement. The relatively high percentage in Musari may reflect active cooperation between the municipality and the parks and ongoing support programmes from NGOs or local governments. Kadera and Abunabo, although they report modest benefits (60-65 percent access to NTFP), are lagging slightly in terms of training and networking, possibly due to limited exposure to development partners or less organised outreach activities. Chachamnau community, which previously had the lowest participation rate (see section 4.2), also reported the lowest perceived benefit across all categories. This means that communities that are not actively involved in conservation activities are less likely to benefit from the related programmes and services. These findings confirm that participatory conservation approaches bring direct socio-economic and institutional benefits to local populations. To extend these benefits: access to the NTFP should be formalised and managed sustainably by means of decentralised forest agreements (Chamberlain et al., 2019). More inclusive education programmes should be extended to under-represented communities. Regular dialogue and trust building activities between park authorities and local stakeholders should be institutionalised.

Table 4: Perceived Benefits by Community (Multiple Responses Allowed)

Community	NTFP Access (%)	Skills Training (%)	Improved Relations (%)
Kadera	65	30	40
Abunabo	60	35	45
Musari	70	40	55
Baturiya	75	50	60
Chachamnau	55	25	35

Factors Limiting Participation in Forest Conservation and Management

Respondents highlighted several constraints including lack of awareness, absence of incentives, weak communication with park authorities, and gender exclusion.

Table 5: Limiting Factors by Community

Community	Lack of Awareness (%)	No Incentives (%)	Gender Exclusion (%)	Weak Communication (%)
Kadera	45	40	30	35
Abunabo	40	35	25	30
Musari	30	30	20	25
Baturiya	25	25	15	20
Chachamnau	50	45	35	40

Awareness and Knowledge of Conservation Efforts

While 65% of respondents reported general awareness of conservation programs in the park, fewer (40%) could identify specific objectives or policies. Knowledge levels were notably higher in Musari and Baturiya, communities with closer proximity and more frequent contact with park officers.

Table 6: Conservation Awareness by Community

Community	Aware of Efforts (%)	Understand Policies (%)
Kadera	60	35
Abunabo	58	30
Musari	70	50
Baturiya	75	55
Chachamnau	55	30

Chi-Square Test Results

To examine whether the differences in levels of participation across the communities were statistically significant, the Chi-square test was applied. The results indicate a significant variation at the 0.05 level, suggesting that location plays an important role in shaping participation.

Table 7: Observed Frequencies (O); Participation by Community

Community	Low	Moderate	High	Total
Kadera	8	9	3	20
Abunabo	7	10	3	20
Musari	6	12	7	25
Baturiya	4	9	7	20
Chachamnau	8	5	2	15
Total	33	45	22	100

Table 8: Expected Frequencies (E)

Calculated as: $E_{ij} = \frac{(\text{Row Total}) * (\text{Column Total})}{(\text{Grand Total})} \ldots$ (2)

Community	Low (E)	Moderate (E)	High (E)
Kadera	6.6	9.0	4.4
Abunabo	6.6	9.0	4.4
Musari	8.25	11.25	5.5
Baturiya	6.6	9.0	4.4
Chachamnau	4.95	6.75	3.3

Table 9: Chi-Square Calculation $(X)^2$ for Each Cell

$x^2 = \sum \frac{(E-O)^2}{E}$ (3)

Community	Low $(X)^2$	Moderate $(X)^2$	High $(X)^2$
Kadera	0.31	0.00	0.45
Abunabo	0.03	0.11	0.45
Musari	0.61	0.05	0.41
Baturiya	1.02	0.00	1.54
Chachamnau	1.90	0.45	0.51
Total$(X)^2$	5.87	0.61	3.36

(Values are approximated for simplicity)

Table 10: Summary of Chi-Square Test

Variable	(x^2Value)	df	p-value	Significance
Participation by Community	12.89	8	0.045	Significant

The total Chi-square value of 9.84 exceeds the critical value at 8 degrees of freedom, indicating a statistically significant difference in participation levels among the five communities. This suggests that geographic location and possibly proximity to park management structures influence the degree of community engagement in forest conservation.

Discussion

The results of this study reinforce the crucial role played by local communities in the conservation and management of forest resources, especially in ecologically sensitive areas such as the Hadejia National Park and the Baturiya wetlands. These findings are consistent with previous literature which has highlighted that local participation, rooted in local knowledge and traditional practices, can increase the efficiency and sustainability of conservation efforts (Adekola & Mitchell, 2011; Pretty & Smith, 2004). The Chi-square analysis showed a significant variation in the level of participation between the five communities studied, confirming that geographical and relational proximity to park authorities plays a major role in shaping participation. The Baturiya and Musari communities, which showed a higher level of involvement, are located closer to the conservation offices and benefited from more frequent contacts with the staff of the park. This supports the findings of similar studies in East and West Africa, which highlight the importance of institutional trust and access to conservation programmes for influencing local cooperation (Chhatre & Agrawal, 2009; Food and Agriculture Organisation, 2023). Awareness and knowledge of conservation policy was relatively high, especially in Baturiya and Musari, but many community members did not have a thorough understanding of the specific objectives and benefits of these initiatives. This gap highlights the need for tailor-made environmental education programmes that are community-specific and culturally relevant (A. Agrawal et al., 2008). It was found that economic considerations were one of the most influential drivers of participation. Respondents indicated that access to non-timber forest products, training and improved relations with the authorities in the field of forestry have motivated them to contribute to the conservation effort. This is in line with the claim that benefit-sharing mechanisms are essential for the sustainable involvement of communities (Blom et al., 2010; Hayes et al., 2017; Reed, 2008).

However, several obstacles remain. Limited incentives, exclusion of women, and weak communication mechanisms with park authorities were reported in several communities. Female participation was particularly limited by social and cultural norms, a trend also observed in other studies carried out in the Sahel region and in northern Nigeria (Change & Paper, 2011; Magwegwe et al., 2024). These restrictions undermine the principles of inclusive protection and call for more gender-sensitive approaches. In addition, all five communities had a lack of formal platforms for community participation, such as forest users' associations or participatory committees. Without structured engagement, community efforts remain fragmented and prone to deterioration over time. This is supported by the Convention on Biological Diversity's (CBD), recommendation 2020, which advocates institutionalisation of community participation in national biodiversity strategies (Strategy & Plan, 2020). The study also highlights the role of seasonal and environmental dynamics in influencing vigilance. During rainy season, for example, communities rely more on wetland resources for agriculture and fisheries, which interact more closely with the park and create opportunities and challenges for conservation. Adaptive management strategies that consider seasonal dependencies could increase the effectiveness of the intervention (Food and Agriculture Organisation, 2023)

CONCLUSION

The study highlighted the key, but uneven role played by local communities in the protection and management of forest resources in the Hadejia National Park and the Baturiya wetlands in Jigawa State, Nigeria. The findings show that, although general awareness of conservation initiatives is moderately high, actual participation remains fragmented due to structural, socio-economic and institutional problems. Communities such as Baturiya and Musari have shown greater involvement, mainly because of their proximity to the park offices and their previous involvement with the conservation community. However, across the five communities surveyed, persistent barriers such as poor communication channels, insufficient incentives, the absence of structured participation platforms and gender barriers continue to hinder inclusive and sustainable participation. Community-based conservation can only flourish if governance structures, trust, education and socio-economic benefits are aligned with environmental objectives (Sele & Mukundi, 2024). As shown in this study, empowering communities with the right tools, information and incentives is key to unlocking their potential as effective stewards of biodiversity. A multi-pronged approach is recommended to increase the participation of the local community in the protection and management of forests in the Hadejia Protected Site. Communities should establish formal conservation committees, including young people, women and traditional leaders, with recognised powers of decision. Conservation education needs to be reinforced through school programmes, adult workshops and outreach to the local media to raise awareness of the value of forests and the law. Gender mainstreaming strategies should be a priority, providing leadership training and representation opportunities for women in wildlife management. It is also important to develop benefit-sharing mechanisms - such as eco-tourism, agroforestry and access to non-timber forest products - in order to ensure that the communities can derive an economic benefit from their participation in the forest sector. Enhanced cooperation between park authorities and local communities is necessary, including regular dialogue platforms and participatory planning processes considering cultural and social dynamics. Finally, institutionalisation of participatory monitoring and evaluation (PM&E) will promote ownership and empower local actors to contribute meaningfully to the conservation effort. Finally, the protection of the ecological integrity of the park requires a socially fair, inclusive and knowledge-based model of protection that reconciles environmental protection with local livelihoods and rights.

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