International Journal of Ecology and Environmental Sciences
www.ecologyjournal.in
Online ISSN: 2664-7133
Received: 15-05-2026, Accepted: 15-06-2026, Published: 30-06-2026
Volume 8, Issue 2, 2026, Page No. 122-127

Participation of community in wildlife management and biodiversity conservation in Edo State, Nigeria

Okonta B O[1], Iloba C I[1], Emaziye P O[2]
[1] Department of Forestry and Wildlife, Delta State University Abraka, Delta State, Nigeria
[2] Department of Agricultural Economics, Delta State University Abraka, Delta State, Nigeria
Correspondence Author: Emaziye P O

Abstract
The main aim of this was to examine the participation of community in wildlife management and biodiversity in Edo state Nigeria. Multistage sampling technique was employed in the selection of 480 respondents. Data was collected with the aid of questionnaire and trained assistants and enumerators which was analysed using descriptive and inferential statistics. The study reveals that community-based programmes reduce illegal hunting, improve biodiversity conservation, habitat restoration promotion, increase environmental awareness and strengthen collaboration among stakeholders were the key community-based wildlife conservation programmes used in promoting biodiversity. The study also showed the challenges limit effective community participation in wildlife conservation and management. The major challenges were poverty that limits participation, lack of incentives reduces participation, human wildlife conflict that discourages participation, weak institutional support which affects participation and inadequate funding that hinders conservation. Lastly the study exposed strategies that can enhance community participation in wildlife conservation and management in Nigeria. The major strategies can enhance community participation in wildlife conservation and management in Nigeria were increase environmental education, improve benefit-sharing, strengthen stakeholder collaboration, increase government funding and promote alternative livelihoods. All the null hypotheses were rejected since there were strong positive relationship among the variables with the p-value < 0.005 and r > 0.50. The study recommends that conservation agencies should intensify environmental education and awareness campaigns to improve public understanding of biodiversity conservation and sustainable wildlife management. Government should increase financial and technical support for wildlife conservation, including improved infrastructure, personnel training, research, and monitoring.

Keywords: Biodiversity, community, participation, management, Edo state

Introduction

The concept of wildlife extends beyond charismatic mammals such as elephants, lions, gorillas, leopards, rhinoceroses, and antelopes to include less conspicuous organisms such as insects, amphibians, fungi, microorganisms, and native plant species that collectively maintain ecosystem integrity. These organisms interact within complex ecological systems that regulate nutrient cycling, pollination, seed dispersal, decomposition, pest control, soil formation, and climate regulation (IPBES, 2019). Historically, wildlife was viewed primarily as a source of food, medicine, clothing, recreation, and economic wealth. However, contemporary perspectives recognize wildlife as a critical component of natural capital that supports sustainable development and human well-being. Wildlife contributes directly and indirectly to ecosystem services that provide clean water, fertile soils, carbon sequestration, flood regulation, disease control, and resilience against environmental change (UNEP, 2021) [12]. Economically, wildlife contributes substantially to national economies through ecotourism, wildlife-based recreation, research, employment generation, and sustainable utilization of natural resources. Wildlife tourism generates billions of dollars annually and supports millions of jobs worldwide, particularly in biodiversity-rich developing countries. Rural communities also derive livelihood benefits from wildlife through regulated tourism enterprises, non-timber forest products, cultural heritage, and environmental education. Thus, wildlife represents an irreplaceable component of biodiversity whose conservation is essential for ecological sustainability, socioeconomic development, scientific advancement, and intergenerational equity. The concept of wildlife conservation has evolved considerably over time. Early conservation efforts emphasized strict preservation through the establishment of protected areas where human activities were prohibited. This "fortress conservation" approach relied heavily on government control and law enforcement. Although protected areas contributed to conserving many ecosystems, they often excluded local communities from natural resource use and generated conflicts between conservation authorities and surrounding populations (Berkes, 2018) [1]. Wildlife conservation seeks to achieve several objectives. These include protecting endangered species from extinction, conserving genetic diversity, maintaining ecosystem services, restoring degraded habitats, mitigating climate change, promoting sustainable resource use, reducing human–wildlife conflict, and supporting sustainable rural development. Conservation activities include anti-poaching operations, habitat restoration, biodiversity monitoring, captive breeding programmes, ecological research, environmental education, ecotourism development, and community-based conservation initiatives (Madaki, 2022) [7]. In Nigeria, wildlife conservation is implemented through national parks, forest reserves, game reserves, wildlife sanctuaries, biosphere reserves, and community-managed forests. Despite these efforts, conservation outcomes remain constrained by habitat degradation, illegal wildlife trade,

inadequate funding, weak institutional capacity, poor law enforcement, and insufficient community participation. Consequently, strengthening community involvement has become a central strategy for achieving sustainable wildlife conservation. Wildlife management encompasses a wide range of activities, including habitat conservation and restoration, wildlife population monitoring, species recovery programmes, disease surveillance, anti-poaching patrols, law enforcement, ecological research, environmental education, community engagement, human–wildlife conflict mitigation, and regulation of hunting and wildlife trade. Effective wildlife management requires continuous monitoring of species populations, habitat conditions, ecological interactions, and human activities affecting biodiversity. One of the primary objectives of wildlife management is to maintain viable populations of native species while preserving ecosystem integrity. This involves protecting endangered species, restoring degraded habitats, maintaining genetic diversity, controlling invasive species, and ensuring sustainable use of renewable wildlife resources (Oladeji & Fatukasi, 2017) [8]. Wildlife management also seeks to balance conservation objectives with the livelihood needs of communities that depend on natural resources. Community participation has become an integral component of modern wildlife management (Wilkie & Mascia, 2021) [11]. Governments and conservation organizations increasingly recognize that successful wildlife management depends on the active involvement of local communities in planning, implementation, monitoring, conflict resolution, and benefit-sharing. Indigenous ecological knowledge often complements scientific research by providing detailed understanding of local ecosystems, wildlife behavior, seasonal changes, and traditional conservation practices (Gambo, *et al*. 2025) [3]. Contemporary wildlife management therefore emphasizes collaborative governance, ecosystem-based management, scientific innovation, community participation, sustainable financing, and adaptive policy implementation as essential strategies for ensuring long-term biodiversity conservation and sustainable development. Within this framework, local communities are increasingly regarded as partners whose participation enhances conservation effectiveness, improves compliance with regulations, and promotes equitable sharing of conservation benefits.

The concept of community participation emerged from the recognition that conservation initiatives imposed without local support often fail to achieve long-term sustainability. Earlier conservation models relied heavily on centralized government control and exclusionary policies that restricted local access to forests and wildlife (Offiong *et al*, 2020). These approaches frequently generated conflicts between conservation authorities and communities, resulting in illegal hunting, encroachment into protected areas, and poor compliance with conservation regulations (Berkes, 2018) [1]. Community participation is founded on the principle that local people possess valuable indigenous ecological knowledge acquired through generations of interaction with their environment. Such knowledge includes understanding wildlife behaviour, seasonal migration patterns, traditional resource-use practices, medicinal plants, habitat conditions, and ecological changes. Integrating indigenous knowledge with scientific conservation practices enhances adaptive management and improves conservation outcomes (IPBES, 2019). Community participation can occur at different levels. According to Pretty (1995) [10], participation ranges from passive participation, where communities merely receive information, to self-mobilization, where communities independently initiate and manage conservation activities. Between these extremes are consultation, functional participation, interactive participation, and collaborative decision-making. Higher levels of participation generally produce stronger local ownership, greater compliance with conservation regulations, and more sustainable biodiversity management. Biodiversity conservation refers to the protection, restoration, sustainable use, and management of the diversity of living organisms, including genetic diversity, species diversity, and ecosystem diversity, to ensure their long-term survival and continued provision of ecosystem services. The Convention on Biological Diversity (CBD, 2022) defines biodiversity as the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems, together with the ecological complexes of which they are part. Biodiversity exists at three interconnected levels. Genetic diversity refers to variation within species, enabling populations to adapt to changing environmental conditions. Species diversity refers to the variety of plant, animal, fungal, and microbial species within ecosystems. Ecosystem diversity encompasses the variety of habitats, ecological processes, and biological communities occurring across landscapes. The importance of biodiversity conservation extends beyond ecological considerations. Biodiversity supports food security, agriculture, medicine, climate regulation, pollination, nutrient cycling, water purification, disaster risk reduction, and economic development (Yahaya, 2026). Healthy ecosystems also enhance resilience to climate change by maintaining ecological stability and supporting adaptive capacity. Despite its importance, biodiversity continues to decline globally due to habitat destruction, overexploitation, invasive species, pollution, and climate change. According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) [4], approximately one million species face extinction because of human activities. In Nigeria, biodiversity loss has been accelerated by deforestation, agricultural expansion, illegal logging, mining, urbanization, oil exploration, bush burning, and unsustainable wildlife exploitation. Conserving biodiversity requires integrated approaches that combine protected area management, habitat restoration, species recovery programmes, environmental legislation, scientific research, environmental education, community participation, sustainable land-use planning, and international cooperation. Increasingly, conservation practitioners recognize that biodiversity conservation cannot succeed without addressing the socioeconomic needs of communities that depend directly on natural resources for their livelihoods.

Specific Objectives

The specific objectives of the study are to:

1. Evaluate the influence of community participation on wildlife conservation outcomes and biodiversity management;
2. Identify the major challenges limiting effective community participation in wildlife conservation and management in Nigeria; and
3. Propose appropriate strategies for strengthening community participation to enhance sustainable wildlife conservation and management in Nigeria.

Research Questions

1. How effective are community-based wildlife conservation programmes in promoting biodiversity conservation?
2. What challenges limit effective community participation in wildlife conservation and management?
3. What strategies can enhance community participation in wildlife conservation and management in Nigeria?

Hypotheses Testing

1. **H_{01}:** Community participation has no significant effect on biodiversity conservation and sustainable wildlife management in Nigeria.
2. **H_{02}:** Communities challenges have no significant influence on wildlife conservation and management in Nigeria.
3. **H_{03}:** There is no significant relationship between community participation strengthening strategies and sustainable wildlife conservation and management in Nigeria.

Significance of the Study

The study will contribute to academic scholarship by expanding existing literature on community-based wildlife conservation, participatory natural resource management, and biodiversity conservation in Nigeria. It will provide empirical evidence on the extent to which community participation influences wildlife conservation outcomes and identify the socioeconomic, institutional, and governance factors that facilitate or constrain effective participation. The study will also serve as a valuable reference for future researchers, postgraduate students, and scholars interested in wildlife conservation, environmental management, natural resource economics, forestry, biodiversity conservation, rural development, and sustainable development.

The study will be valuable to wildlife management institutions, including the National Park Service, state forestry departments, wildlife management agencies, and environmental protection agencies. By identifying the strengths and weaknesses of existing community participation mechanisms, the findings will assist these institutions in improving conservation planning, strengthening stakeholder engagement, enhancing law enforcement strategies, and promoting collaborative wildlife management approaches that are both socially acceptable and ecologically sustainable.

Conservation organizations, including national and international non-governmental organizations, community-based organizations, and development partners, will also benefit from the findings of this study. The study will provide practical information that can assist these organizations in designing, implementing, monitoring, and evaluating community-based conservation programmes. Furthermore, the identification of barriers to effective community participation will enable conservation practitioners to develop interventions that improve local ownership, transparency, accountability, and long-term sustainability of conservation projects.

The study will also contribute to achieving national and international environmental objectives by providing evidence that supports the implementation of Nigeria's National Biodiversity Strategy and Action Plan and the country's commitments under international environmental agreements such as the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Ramsar Convention on Wetlands, and the United Nations Sustainable Development Goals (SDGs), particularly Goal 15 (Life on Land), Goal 13 (Climate Action), and Goal 17 (Partnerships for the Goals).

Finally, the study will provide practical recommendations for strengthening community participation in wildlife conservation and management in Nigeria. By identifying the key determinants of effective participation and proposing strategies for improving institutional support, community engagement, benefit-sharing, environmental education, and policy implementation, the study is expected to contribute to the long-term conservation of wildlife resources, the protection of biodiversity, and the sustainable management of Nigeria's natural heritage for present and future generations.

Methodolgy

Study Area

Edo State is located in the South-South geopolitical zone of Nigeria. It lies approximately between latitudes 5°44′N and 7°34′N and longitudes 5°04′E and 6°45′E, covering a land area of about 19,800 km². The state is bordered by Kogi State to the north, Ondo State to the west, Delta State to the south, and Kogi and Anambra States to the east. The state comprises 18 Local Government Areas, with Benin City serving as the capital. Edo State experiences a tropical climate characterized by two distinct seasons: the rainy season (March/April to October) and the dry season (November to March). Annual rainfall ranges from about 1,500 mm to over 2,500 mm, while temperatures generally vary between 25°C and 32°C. Vegetation ranges from tropical rainforest in the southern part to derived savanna in the northern areas, supporting diverse flora and fauna. The state is endowed with extensive forest reserves, fertile agricultural land, and rich biodiversity, making it suitable for studies on wildlife conservation, biodiversity, agriculture, and environmental management.

Population of the Study

The population of this study comprises all relevant stakeholders involved in wildlife conservation and management within the selected protected areas and their adjoining host communities. Specifically, the target population includes community members residing in communities surrounding the selected national parks and protected areas, officials of the National Park Service, officers of state forestry and wildlife departments, staff of conservation-oriented non-governmental organizations (NGOs), community leaders, members of Community-Based Organizations (CBOs), hunters' associations, farmers' associations, women's groups, youth organizations, and other stakeholders directly involved in wildlife conservation activities. The population sample size for the study was 480 respondents

Sampling Technique and Sample Size

This study adopted **a** multistage sampling technique involving purposive, stratified, proportionate, and simple random sampling procedures. The first stage was the purposive selection of protected areas that have active wildlife conservation programmes and significant interaction with surrounding communities in Cross River State. Protected areas in Cross River State was Cross River National Park that was selected because it supplies a

suitable environment for evaluation community participation in wildlife conservation in Cross River State. Stage Two: Selection of Host Communities, the second stage, six (6) host communities surrounding park was purposively selected. Stage three was the stratification of relevant stakeholder categories, including Community members, Traditional rulers, Community-Based Organization (CBO) members, Farmers, Hunters, Women group, Youth groups, National Park Service personnel, State forestry officials and Conservation NGOs. Proportionate sampling was used to allocate the sample size to each community and stakeholder category according to their population size giving a total of 48 stakeholders. Finally,10 respondents within each stratum was selected using simple random sampling techniques amounting to 480 respondents.

Methods of Data Collection

Data for this study was collected primarily through the administration of the questionnaire to the selected respondents.

Methods of Data Analysis

Both descriptive and inferential statistical techniques will be employed to analyze the data Responses will be measured using a four-point Likert rating scale as follows Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. The Likert scale is considered appropriate because it allows respondents to indicate the degree of their agreement or disagreement with each statement and facilitates quantitative analysis of attitudes, perceptions, and opinions. The decision rule for questionnaire items measured on a five-point Likert scale will be based on a criterion mean of 2.50 was regarded as Agreed response while less than 2.50 was regarded as Disagreed response

Results and Discussion

Effective are community-based wildlife conservation programmes in promoting biodiversity conservation

Table 1: Mean and Standard Deviation on Effectiveness of Community-Based Conservation Programmes

S/n	Parameter	Mean	SD	Decision
1	Community-based programmes reduce illegal hunting.	3.10	0.85	Agreed
2	improve biodiversity conservation.	2.76	0.84	Agreed
3	habitat restoration promotion.	2.69	0.79	Agreed
4	increase environmental awareness.	2.83	0.81	Agreed
5	strengthen collaboration among stakeholders.	2.77	0.76	Agreed
Grand Mean		2.83	0.81	Agreed

Table 1 shows how effective are community-based wildlife conservation programmes in promoting biodiversity conservation. The Table 1 reveals that community-based programmes reduce illegal hunting with a mean of 3.10 and SD of 0.85, improve biodiversity conservation with a mean of 2.76 and SD of, 0.84habitat restoration promotion with a mean of 2.69 and SD of 0.79, increase environmental awareness with a mean of 2.83 and SD of 0.81 and strengthen collaboration among stakeholder with a mean of 2.77 and SD of 0.76 were the key community-based wildlife conservation programmes used in promoting biodiversity conservation. The overall grand mean of 2.83 further confirm agreement of respondents. This collaborated Isiugo & Obioha (2015) [6] that protection of wildlife park was a key to wildlife conservation and management in Cross River state

Challenges limit effective community participation in wildlife conservation and management

Table 2: Mean and Standard Deviation on Challenges

S/n	Parameter	Mean	SD	Decision
1	Poverty limits participation.	2.89	0.76	Agreed
2	Lack of incentives reduces participation.	2.92	0.78	Agreed
3	Human wildlife conflict discourages participation.	2.76	0.81	Agreed
4	Weak institutional support affects participation.	2.66	0.88	Agreed
5	Inadequate funding hinders conservation.	2.85	0.79	Agreed
Grand Mean		2.82	0.80	Agreed

Table 2 showed the challenges limit effective community participation in wildlife conservation and management. The major challenges were poverty that limits participation with a mean of 2.89 and SD of 0.76, lack of incentives reduces participation with a mean of 2.92 and SD of 0.78, human wildlife conflict that discourages participation with a mean of 2.76 and SD of 0.81, weak institutional support which affects participation with a mean of 2.66 and SD of 0.88 and inadequate funding that hinders conservation with a mean of 2.85 and SD of 0.79. The overall grand mean of 2.82 further confirm agreement of respondents.

Strategies can enhance community participation in wildlife conservation and management in Nigeria

Table 3: Mean and Standard Deviation on Improvement Strategies

S/n	Parameter	Mean	SD	Decision
1	Increase environmental education.	2.86	0.72	Agreed
2	Improve benefit-sharing.	2.91	0.81	Agreed
3	Strengthen stakeholder collaboration.	2.76	0.75	Agreed
4	Increase government funding.	2.97	0.72	Agreed
5	Promote alternative livelihoods.	2.77	0.78	Agreed
Grand Mean		2.85	0.76	Agreed

Table 3 revealed strategies can enhance community participation in wildlife conservation and management in Nigeria. The major strategies can enhance community participation in wildlife conservation and management in Nigeria were increase environmental education with a mean of 2.86 and SD of0.72, improve benefit-sharing with a mean of 2.91 and SD of 0.81, strengthen stakeholder collaboration with a mean of 2.76 and SD of 0.75, increase government funding with a mean of 2.97 and SD of 0.72 and promote alternative livelihoods with a mean of 2.77 and SD of 0.78. The overall grand mean of 2.85 further confirm agreement of respondents.

Hypotheses Testing

H_{01}: Community participation has no significant effect on biodiversity conservation and sustainable wildlife management in Nigeria.

Table 4: Bootstrapping and Bivariate Correlation between the Community Participation and Biodiversity Conservation and Sustainable Wildlife Management in Nigeria

		95% CI	5000	Resample	Bootstrap	with BCa	Estimates
S/N	Pathways	*r*	*p*	*Bias*	*SE*	LL	UL
1.	CP → BCSMO	.721**	.000	.001	.033	.627	.512

Note. **. Correlation is significant at the 0.05 level (2-tailed), Unless otherwise noted, bootstrap results are based on 5000 bootstrap samples, N = 480, p < 0.05, CP = Community Participation, BCSM = Biodiversity Conservation and Sustainable Wildlife Management, CI = Confidence Interval.

Table 4 showed the correlation between Community Participation and Biodiversity Conservation and Sustainable Wildlife Management in Nigeria. The Table 4 showed that the correlation between Community Participation and Biodiversity Conservation and Sustainable Wildlife Management in Nigeria. was positively high (r = 721, p < 0.05). Therefore, three null hypothesis was rejected that community participation has no significant effect on biodiversity conservation and sustainable wildlife management in Nigeria.

H_{02}: Communities challenges have no significant influence on wildlife conservation and management in Nigeria.

Table 5: Bootstrapping and Bivariate Correlation between the Community Challenges and Wildlife Conservation and Management in Nigeria

		95% CI	5000	Resample	Bootstrap	with BCa	Estimates
S/N	Pathways	*r*	*p*	*Bias*	*SE*	LL	UL
1.	CC → WCM	.654**	.000	.003	.018	.532	.500

Note. **. Correlation is significant at the 0.05 level (2-tailed), Unless otherwise noted, bootstrap results are based on 5000 bootstrap samples, N = 480, p < 0.05, CC = Community Challenges, WCM = Wildlife Conservation and Management, CI = Confidence Interval.

Table 5 showed the correlation between Community challenges and Wildlife Conservation and Management in Nigeria. The Table 5 showed that the correlation between Community Participation and Biodiversity Conservation and Sustainable Wildlife Management in Nigeria. was positively high (r = 0.654, p < 0.05). Therefore, three null hypothesis was rejected that communities challenges have no significant influence on wildlife conservation and management in Nigeria.

H_{03}: There is no significant relationship between community participation strengthening strategies and sustainable wildlife conservation and management in Nigeria.

Table 6: Bootstrapping and Bivariate Correlation between Community Participation Strengthening Strategies and Sustainable Wildlife Conservation and Management in Nigeria

		95% CI	5000	Resample	Bootstrap	with BCa	Estimates
S/N	Pathways	*r*	*p*	*Bias*	*SE*	LL	UL
1.	CPSS → SWCM	.666**	.000	.001	.012	.542	.500

Note. **. Correlation is significant at the 0.05 level (2-tailed), Unless otherwise noted, bootstrap results are based on 5000 bootstrap samples, N = 480, p < 0.05, CPSS = Community Participation Strengthening Strategies, SWCM = Sustainable Wildlife Conservation and Management, CI = Confidence Interval.

Table 6 showed the correlation between community participation strengthening strategies and sustainable wildlife conservation and management in Nigeria. The Table 6 showed that the correlation between Community Participation and Biodiversity Conservation and Sustainable Wildlife Management in Nigeria. was positively high (r = 0.666, p < 0.05). Therefore, three null hypothesis was rejected that community participation strengthening strategies and sustainable wildlife conservation and management in Nigeria.

Conclusion and Recommendations

The study reveals that community-based programmes reduce illegal hunting, improve biodiversity conservation, habitat restoration promotion, increase environmental awareness and strengthen collaboration among stakeholders were the key community-based wildlife conservation programmes used in promoting biodiversity. The study also showed the challenges limit effective community participation in wildlife conservation and management. The major challenges were poverty that limits participation, lack of incentives reduces participation, human wildlife conflict that discourages participation, weak institutional support

which affects participation and inadequate funding that hinders conservation. Lastly the study exposed strategies that can enhance community participation in wildlife conservation and management in Nigeria. The major strategies can enhance community participation in wildlife conservation and management in Nigeria were increase environmental education, improve benefit-sharing, strengthen stakeholder collaboration, increase government funding and promote alternative livelihoods. All the null hypotheses were rejected since there were strong positive relationship among the variables with the p-value < 0.005 and r > 0.50. The study recommends that conservation agencies should intensify environmental education and awareness campaigns to improve public understanding of biodiversity conservation and sustainable wildlife management. Government should increase financial and technical support for wildlife conservation, including improved infrastructure, personnel training, research, and monitoring.

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