Policing Styles and Environmental Governance of Biodiversity Resources in Zugurma Sector of Kainji Lake National Park, Niger State, Nigeria

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Abstract

The Zugurma sub-region of Kainji Lake National Park (KLNP) in Niger State, Nigeria, is a vital habitat for biodiversity that currently faces serious conservation challenges. This paper investigates the policing modalities used in the sector and assesses their effectiveness in carrying out management functions, with particular attention to park rangers, community engagement, and partnerships. Using a combination of qualitative analysis through in-depth interviews and quantitative survey analysis, the results reveal that preventative, repressive, and collaborative policing modalities are primarily used to control resources in the sector. The findings indicate that resource limitations, along with socio-economic and cultural factors, constrain the effectiveness of management regulation. While community engagement is associated with success in both preventative and collaborative modalities, successful management regulation is linked to repressive modalities, though this often comes with community conflict. The study recommends resource allocation, community engagement, collaboration, and flexibility as key management regulation modalities. Ultimately, it suggests that integrating all modalities, particularly in relation to resource allocation and community engagement, is essential for effective biodiversity management in the Zugurma sub-region.

Keywords: Zugurma sector, Kainji Lake National Park, biodiversity conservation, policing styles, environmental governance, community participation

Introduction

The Kainji Lake National Park (KLNP), Nigeria's first national park, was established in 1978 and spans approximately 5,340.82 square kilometers across Niger and Kwara States (Fasona et al., 2022). The park is divided into three main sectors: Borgu, Zugurma, and Kainji Lake (Onihunwa et al., 2023; Tang & Adesina, 2022). Among these, the Zugurma sector, located in the Mashegu Local Government Area of Niger State, holds conservation significance, housing a diverse range of botanical and zoological species, including elephants, lions, antelopes, and various bird species (Onihunwa et al., 2023). Despite its ecological importance, the sector faces numerous conservation challenges linked to human activities such as hunting, logging, land conversion for agriculture, and overfishing (Mamman et al., 2025).

Effective biodiversity management in protected areas like Zugurma depends heavily on the application of environmental laws and practices. Park policing extends beyond mere legal compliance to encompass all aspects of environmental and conservation management (Gbadegesin & Gbadamosi San, 2024). At the Zugurma Protected Area, game rangers are responsible for protecting and conserving wildlife and ensuring adherence to all rules and regulations governing the protected area, though they operate under significant constraints related to resources, culture, and economic conditions (Digun-Aweto et al., 2022).

A review of the policing strategies employed in Zugurma is essential for understanding how effective such measures are in fostering environmental governance. Previous studies indicate that protected area policing typically incorporates preventive, repressive, and collaborative approaches aimed at maintaining

environmental integrity while addressing community needs and concerns (Pulido-Chadid et al., 2023). Preventive approaches emphasize awareness and community engagement, whereas repressive measures involve enforcement and punishment (Bamidele, 2026).

This research seeks to analyze the impact of these policing approaches in the Zugurma area. It considers the challenges posed to park management as well as to the community, particularly in relation to resource availability within the park. The study further acknowledges the community's sociocultural attitudes toward park regulations and its dependence on the park's resources (Adenle et al., 2022).

The implications and outcomes of this research hold significance for the conservation and administration of national parks in Nigeria and other comparable biophysical settings. This is because the study highlights that, beyond enforcement, conservation can also benefit from other approaches such as public engagement and awareness creation (William, 2025). This is well illustrated by the recognition that appropriate and sustainable conservation requires acceptance and shared responsibility, derived from both physical and social contexts, rather than reliance on enforcement alone (Kidane et al., 2024; Okyere-Manu et al., 2022).

Methodology

This study employed mixed-methods research design, combining both qualitative and quantitative approaches, to evaluate policing activities and environmental governance in the Zugurma Sector of Kainji Lake National Park. Qualitative data were gathered through semi-structured interviews with 30 stakeholders, including park rangers, administrative personnel, community officials, and NGO delegates. These interviews explored the strategies employed by rangers, the challenges they face, and their interactions with local communities. In addition, participant observation during ranger patrols was conducted to document enforcement processes firsthand.

Quantitative data were collected through a survey of 150 households from surrounding communities, using stratified random sampling. The survey aimed to assess community perceptions of policing activities, community engagement, and the prevalence of illicit activities such as hunting and tree cutting. Data analysis involved thematic analysis for the qualitative component and descriptive statistics for the quantitative component. Ethical principles were applied throughout to ensure informed consent and confidentiality, particularly regarding sensitive information.

Policing Styles in the Zugurma Sector

Biodiversity management in the Zugurma sector operates through an integrated approach combining preventive, repressive, and collaborative policing styles, each targeting a specific challenge associated with managing biodiversity.

Preventive policing focuses on education and awareness creation, with park rangers engaging local communities to educate them about wildlife management and the laws governing conservation. As one ranger explained, 'Preventive policing seeks to educate the local people about the reasons why it's not appropriate to hunt elephants or cut down trees. Sometimes we meet to enlighten them, and it seems like the message is understood.' Such conversations demonstrate the aims of preventive policing, which targets voluntary compliance through social persuasion and awareness creation.

Repressive policing involves tough enforcement strategies, such as arrest, fines, and seizure of contraband equipment, intended to discourage offenders. Rangers explained the need for these strategies when encountering poachers: 'When we meet the poachers, repressive strategies must be employed. Arrests and fines work best in discouraging the community from poaching, but sometimes the community seems to see us as too tough.' Community members, however, felt threatened by these tough enforcement measures, stating, 'We feel threatened if the strategies in enforcement become too tough, particularly the fines. It may cause us to have problems with the park management.'

Collaborative policing, collective efforts by

rangers, communities, and other external agencies, has been hailed as sustainable. As the rangers commented, 'Doing joint patrols with local citizens is more effective. The locals know where illegal activities take place; therefore, involving them enhances our surveillance efforts.' The local community was grateful for this approach, with one member stating, 'Taking part in patrols makes us feel like we are taking responsibility in defending the sources our children will benefit from.' Collaboration thus increases social legitimacy, as community members shift from being mere spectators to key players in conservation efforts.

For this reason, the success of policing in Zugurma depends on the synergy of these approaches. Preventive measures create awareness, repressive measures deter serious offences, and collaborative efforts foster cohesion and shared ownership. Combining all three makes it possible to address ecological challenges without ignoring the attendant societal ethics, implying that good governance in Zugurma demands not only effective policing but also ethical engagement.

Effectiveness of Policing Strategies

The effectiveness of policing strategies in Zugurma depends on their ability to limit illicit behaviour and foster support from local communities. Preventive policing has shown significant success in promoting awareness and support. One ranger indicated that educational programmes have led to a reduction in less severe offences such as illicit fishing, although they cannot guarantee that these programmes deter continued poachers. Local communities also confirmed that, despite initial costs in time and money for workshops and training, they can convey lessons of significance for conserving the forests to children, meaning that they follow all set rules.

In contrast, coercive enforcement policies produce speedy outcomes through direct enforcement efforts. A ranger explained how enforcement efforts such as arrests quickly deliver the message that illegal behaviour carries consequences, with the result that most people are deterred from violating the set rules. Neighbours confirmed this view, noting that places with frequent ranger patrols have fewer poaching cases and are regarded as well-managed. However, coercive methods may strain relationships with the community, as most people dislike being singled out by rangers without clear warnings. A witness explained that rangers tend to arrest people without prior warnings, an approach that, although reducing illegal behaviour, increases community anger and a lack of cooperativeness.

Collaborative policing, which involves partnership-building within the community and civil society, emerges as the most sustainable strategy. Rangers believed that working collaboratively with the community is the most sustainable approach because it builds trust and facilitates voluntary reporting of crimes, thereby improving resource management. Community members involved in the programme reported an increased sense of responsibility, noting that being part of patrols builds a commitment to protect resources for future generations.

In conclusion, the best course of action is a combination of preventive, repressive, and collaborative approaches. Preventive measures are effective in combating violations of the law; repressive methods address violations in the short term; and collaborative efforts help ensure long-term observance of the law. Ultimately, success in the Zugurma sector should not be measured in terms of arrests and penalties alone.

Challenges to Environmental Governance

Although the sector employs several policing techniques, governing it remains a considerable challenge. Among the major difficulties encountered are resource limitations, as expressed by the rangers: 'We lack enough vehicles and radios to cover the entire area; therefore, some of the illegals escape undetected.'

Economic and social factors further complicate enforcement. Locals in the region depend on forest and water resources for daily survival. As one community member explained: 'We know about these regulations. Sometimes we need firewood and bush meat for survival. It is not easy for us to stick by the regulations when our

survival depends on that forest.' The rangers confirmed this view, stating, 'Villagers are using resources from this forest for food and for making money. Sometimes, even if they are aware of the illegality, they have no choice but to make use of resources in that manner.'

Cultural factors also affect compliance, as traditional beliefs can contradict park rules. A ranger noted, 'Some species are hunted for cultural ceremonies. This affects enforcement because it is sensitive.' Community members further explained that a lack of cultural understanding during enforcement may undermine cooperation: 'Some park rangers are very strict without explaining why some things are not allowed. This leads to a lack of cooperation.'

External factors, such as the expansion of settlements, agricultural encroachment, and market demand for bush meat or timber, add to the governance challenge. A village respondent observed, 'The expansion of farms and the growing population make it difficult for us to resist the use of park resources. There must be alternative sources for us to survive.'

Considering these insights, the major factors hindering environmental and natural resource governance in Zugurma are resource limitations, community dependence on natural resources, cultural behaviours, the quality of community-ranger interactions, and development pressures. Addressing these factors will require environmentally responsible and resource-responsive practices and investments.

General Discussion

Observations from the Zugurma sector of Kainji Lake National Park highlight the complex interaction between law enforcement, community involvement, and natural resource conservation in biodiversity management. Policing in protected areas is a dynamic and heterogeneous practice encompassing prevention, punishment, and cooperation, each playing a distinct role in natural resource management and together requiring a tailored approach.

Preventive approaches have proven essential in creating awareness and ensuring voluntary compliance. Activities such as workshops and community outreach programmes empower communities with awareness of ecological and legal perspectives on resource use. Feedback from such activities, for example, 'Workshops and training help us understand why protecting the forest is important', shows that they foster long-term responsibility towards the environment. However, this strategy has limitations, since education does not always address persistent offenders or the deeper socioeconomic factors behind illegitimate resource use.

Repressive measures such as arrests, fines, and seizures are highly effective in ensuring immediate compliance and discouraging illegal behaviour. Remarks by game rangers, such as 'If someone is arrested, others will see what happens and think twice before acting illegally', illustrate how effective a warning or threat can be. Excessive reliance on this approach, however, may lead to a loss of community cooperation and even social conflict.

Collaborative enforcement is often considered the most sustainable and acceptable modality. Community volunteers, joint patrols, and collaboration with non-governmental organizations can all increase the legitimacy and acceptance of conservation efforts. Quotes such as 'It gives us a sense of responsibility and help protect the resources that our children will depend on' reflect the positive effect of co-management on participants and the wider community. These models also benefit from local knowledge in monitoring and adaptation, resulting in better environmental outcomes and greater social cohesion.

In addition, the study identifies several governance challenges. These include resource constraints such as a lack of transport, equipment, and human resources, as well as the socio-economic context that forces communities to depend on natural resources. There is also a mismatch between cultural practices and legislation, alongside pressures from settlement expansion, agriculture, and commercial hunting of bush meat. These findings align with existing literature proposing a convergence of ecological,

social, and economic factors.

The complementarity of various community policing engagements, and the challenges they face, indicates that effective biodiversity management in the Zugurma ecosystem requires an encompassing and flexible approach. Adopting preventive, punitive, and collaborative policing practices, supported by appropriate human and physical resource inputs, may foster early-stage compliance and, ultimately, ecological and social sustainability. In sum, the results confirm the importance of well-rounded approaches to environmental management that incorporate law enforcement, education, community engagement, and socio-economic measures.

For Zugurma and other similar protected regions in Nigeria and West Africa, this implies that merely having law enforcement on the ground is not enough. To succeed in these regions, it is important to engage and work with local communities, provide for their needs, and adopt context-specific approaches that support both the environment and the people who surround it.

Conclusion

Biodiversity resource management in the Zugurma region of Kainji Lake National Park clearly demonstrates the intricate relationships between law enforcement strategies, community engagement, and sustainable environmental practices. This study shows that each type of policing practice, preventive, repressive, and collaborative, plays a distinct role in environmental management, with their combination proving most effective. Preventive practices increase environmental knowledge and responsible management; repressive practices deter major criminal activities; and collaborative practices build trust, legitimacy, and collective ownership with the community.

The study also reveals numerous challenges hindering effective governance. These include resource limitations, as park rangers lack the capacity to monitor the vast Zugurma landscape. Socio-economic factors also force inhabitants of surrounding regions to depend on the park for their livelihood, making it difficult to develop a relevant management approach. These circumstances, characteristic of the biodiversity problem in the Zugurma landscape, are highlighted throughout this article.

To ensure effective management in Zugurma, an overall and integrated strategy is needed. Improved resource management would enable conservation organizations to be fully equipped for prevention and enforcement. Networking with the local community would help instill a sense of responsibility and promote compliance. Partnerships with non-governmental organizations, institutions, and other stakeholders would allow the project to benefit from expertise, resources, and innovations for solving ecological challenges. Adopting an adaptive management approach, based on continuous monitoring and feedback, would enable management frameworks to adapt and remain relevant in the face of new challenges. Additionally, sustainable livelihood projects can help address the socio-economic dimensions of illegality.

These observations carry broader implications. Lessons from the Zugurma experience can be applied to the management of protected sites not only in Nigeria but worldwide. These lessons concern the need for a harmonious combination of the three approaches to natural resource management highlighted above, as well as the importance of cultural sensitivity, ensuring that local traditions are not undermined by conservation imperatives.

In conclusion, sustainably managing biodiversity in Zugurma requires an approach that balances various policing strategies, resource utilization, community interactions, and local dynamics. By identifying issues related to environmental enforcement, socio-economic influences, and cultural conditions, policymakers can ensure environmental integrity while building a more cohesive and environmentally sustainable community. These findings support the view in existing literature that good environmental management practice can successfully integrate biodiversity preservation, community participation, and resource sustainability.

Recommendations

To strengthen environmental governance and effective enforcement in the Zugurma region of Kainji Lake National Park, a holistic approach is needed. The challenges related to resource limitations, socio-economic influences, and cultural beliefs can be addressed through a balanced strategy that incorporates the following components of effective enforcement:

1. Adequate Resourcing: Sufficient resources are critical for providing vehicles, communication equipment, surveillance equipment, and ranger training. Advanced monitoring technologies, such as GPS, drones, and cameras, would greatly boost patrol efficiency and minimize enforcement gaps. Resource allocation should also prioritize ranger welfare to enhance motivation and reduce turnover through incentives, healthcare, and ongoing training. Greater resourcing will ensure the effectiveness of both prevention and enforcement efforts across Zugurma's vast terrain.

2. Community Engagement: Engaging local communities in environmental management not only improves compliance but is also vital for sustainable conservation. Mechanisms such as community monitoring, community patrols, and shared decision-making help instill a sense of ownership over biodiversity. Awareness campaigns, sensitive to local culture, should address both the economic and environmental advantages of conservation. Incentives such as eco-tourism or resource-sharing can help communities abandon illegal practices in favour of sustainable livelihoods.

3. Strategic Partnerships: Partnerships with non-governmental agencies, research bodies, and global conservation organizations can be an important source of technical expertise, funding, and capacity building. Such arrangements facilitate knowledge exchange, innovation in conservation techniques, and community empowerment. Collective efforts across the full spectrum of stakeholders help ensure a smooth flow of information and prompt community responses to environmental threats.

4. Adaptive Management: Continuous evaluation and adjustment of policing strategies are required to handle evolving difficulties. Adaptive management involves examining patrol efficacy, gathering social feedback, and conducting ecosystem assessments. Such processes ensure that strategies evolve dynamically with ecosystem conditions. By relying on data-driven decision-making, adaptive management optimizes resource deployment, patrol schedules, and enforcement strategies.

5. Sustainable Livelihoods: The socio-economic factors that contribute to illegal natural resource use must be addressed. Skills training and micro-financing can diversify sustainable livelihoods, including eco-tourism, with the goal of creating alternative income streams and reducing community reliance on park resources.

Overall, achieving effective environmental governance in Zugurma requires a combination of resource investment and participatory, sustainable approaches to development. Together, these measures would substantially improve enforcement and ensure a sufficiently robust resource regime to protect biodiversity and foster community cooperation.

References

Adenle, A.A., Boillat, S., & Speranza, C. I. (2022). Key dimensions of land users' perceptions of land degradation and sustainable land management in Niger State, Nigeria. *Environmental Challenges*, 8, 100544.

Bamidele, S. (2026). Community-Led Forest Management and Conservation: Insights from Nigeria's Obudu and Mambilla Mountain Forests. *Environmental Policy and Governance*, *36*(1), 81-94.

Digun-Aweto, O., Van Der Merwe, P., & Saayman, M. (2022). Tolerance factors in human-wildlife conflicts in protected areas: the case of Cross River National Park, Cross River State Nigeria. *GeoJournal*, *87*(1), 349-361.

Fasona, M.J., Akintuyi, A.O., Adeonipekun, P.A., Akoso, T.M., Udofia, S.K., Agboola, O.O., Ogunsanwo, G.E., Ariori, A.N., Omojola, A.S., Soneye, A.S. & Ogundipe, O.T., 2022.

Recent trends in land-use and cover change and deforestation in south-west Nigeria. *GeoJournal*, *87*(3), pp.1411-1437.

Gbadegesin, O. A., & Gbadamosi San, O. A. (2024). Indigenous ecological knowledge: A transformative approach to biodiversity legislation in Nigeria. *Environmental Management*, *74*(2), 317-331.

Kidane, E. E., Kiros, S., Berhe, A., & Girma, Z. (2024). Human-wildlife conflict and community perceptions towards wildlife conservation in and around a biodiverse National Park, northern Ethiopia. *Global Ecology and Conservation*, *54*, e03072.

Mamman, S., Muhammad, M., Aishetu, A., & Odekunle, M. (2025). Anthropogenic impacts on carbon sequestration dynamics in the Borgu and Zugurma sectors of Kainji Lake National Park, Nigeria. *Oppor. Chall. Sustain*, *4*(2), 98-109.

Okyere-Manu, B., Morgan, S.N., & Nwosimiri, O. (2022). Cultural, ethical, and religious perspectives on environment preservation. *Best Practice & Research Clinical Obstetrics & Gynaecology*, *85*, 94-104.

Onihunwa, J.O., Akande, O.A., Irunokhai, E.A., Mohammed, N., & Wealth, A.S. (2023). Challenges Facing National Park Management: A Case Study of Kainji Lake National Park, Nigeria. *Journal of Applied Sciences & Environmental Management*, *27*(11), 2439.

Pulido-Chadid, K., Virtanen, E., & Geldmann, J. (2023). How effective are protected areas for reducing threats to biodiversity? A systematic review protocol. *Environmental Evidence*, *12*(1), 18.

Tang, X., & Adesina, J.A. (2022). Biodiversity conservation of national parks and nature-protected areas in West Africa: The case of Kainji National Park, Nigeria. *Sustainability*, *14*(12), 7322.

William, J. (2025). Assessing Nigeria's efforts in biodiversity conservation. *Scientific Reports in Life Sciences*, *6*(1), 85-98.