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Co – creation Approaches to Improve Conservation Efforts of African Elephant Populations in Nigeria

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ABSTRACT
Scientific sources and the IUCN reveal the decline in African Elephant populations, and new Redlist status for both the Forest and Savannah African Elephants. Efforts are ongoing to improve conservation of Forest and Savannah Elephants in Nigeria through engagement of local communities adjoining Protected Areas. This study investigates the willingness of local communities to co-create approaches that support elephants' conservation efforts. The study was carried out in Omo Forest Reserve, South – western, Nigeria and Yankari Game Reserve, North-eastern part of the country, for forest and savannah Elephants respectively. Mixed methods of questionnaires, outreaches, and youth engagement were used to collect data. The data was analyzed using simple averages, chi-square, and ANOVA tests. The study's findings reveal that 95.0% of participants agree that elephants should be protected. About 88.0% of the participants also agree that communities will benefit from elephant protection and 60.0% attribute the value of elephants to eco- tourism, while 45.0% for revenue generation. In addition, 41.0% of the participants have experience in co-creation approaches for wildlife conservation. Participants showed willingness and support to participate in elephant conservation efforts. Therefore, concerted efforts of co – creation approaches need to be further explored for sustainable elephant conservation efforts in Nigeria.

Key words: co-creation, elephant conservation, sustainability, local communities, biodiversity

1. Introduction

African elephants (*Loxodonta africana* and *Loxodonta cyclotis*), the iconic giants of the wild, are facing unprecedented threats to their survival, with dramatic population declines reported in recent studies (Lindays et al., 2017; Chase et al., 2016; Hauenstein et al., 2019; Schlossberg et al., 2020; EPI, 2024). The latest African Elephant Status reports reveal a concerning drop from over 1.3 million elephants in 1979 to approximately 415,000 today (Wetzel, 2022). In 2021, the International Union for Conservation of Nature (IUCN) reassessed the conservation status of African elephants, listing forest elephants as critically endangered and savanna elephants as endangered, highlighting an 86% decline in forest elephants and a 60% decline in savanna elephants over the last few decades (IUCN press release, 2021).

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Nigeria, renowned for rich biodiversity and large number of elephants, is also in shock of a plummeting elephant population due to poaching and habitat loss (Mutsaka and Magome, 2021; Elephant Protection Initiative, 2024). Only about 400 elephants remain, with critical declines noted in areas like Omo Forest Reserve and Okomu National Park, each housing around 30 elephants (Fada, 2021). The Elephant Protection Initiative recently raised alarm over the rapidly decreasing numbers, especially after the killing of several elephants by local hunters.

Recent research has focused on the impacts of human-elephant conflicts and the pressures of human-dominated landscapes on elephants. Studies such as Ahlering et al. (2018) examined the interaction between human-dominated landscape and activities on stress hormones in savanna elephants, while Chiyo et al. (2012) explored how elephant densities affect forest structure. Maisels et al. (2013) reported on the steep decline of forest elephants in Central Africa, stressing the urgent need for effective conservation measures. Human-elephant conflicts have escalated, with elephants increasingly competing with humans for land and resources. without resolving these conflicts and addressing poaching, elephant populations could face eradication within the next decade (Hugo Jachmann *Pers.com*). Efforts to mitigate these conflicts and enhance elephant survival prospects focus on engaging local communities near protected areas. Studies have shown that co-creation approaches, which involve communities in conservation, are essential for sustainable outcomes. For instance, Omondi et al. (2020) highlighted the role of community engagement in reducing human-elephant conflicts, while Riggio et al. (2013) provided insights into elephant spatial distribution, informing targeted conservation strategies. Smith and Jones (2021) demonstrated the success of co-creation in East Africa through community collaboration, leading to effective conservation plans.

Integrating indigenous knowledge into conservation efforts has also shown promise. Mbatha and Ndlovu (2022) emphasized the benefits of co-management in Southern Africa, while Kamara and Smith (2023) explored community-based ecotourism in West Africa, revealing that local involvement in tourism fosters stewardship and sustainable development.

Conservation efforts by the Nigerian Government and Non - Governmental organizations have been increasingly focused on strengthening anti-poaching measures, engaging local communities in conservation, and restoring critical habitats. For example, the Yankari Game Reserve's ranger program of the WCS has improved anti-poaching efforts by providing better training and resources to rangers, resulting in a noticeable reduction in poaching incidents. In addition, the Endangered Species Conservation and Protection Bill was passed by the legislators earlier in 2024. If adopted into law, it offers stronger protection for endangered wildlife and tougher penalties for wildlife traffickers.

The Elephant Protection Initiative (EPI), which partners with Nigeria, focuses on securing long-term funding for elephant conservation and closing domestic ivory markets. EPI in collaboration with the Nigerian National Parks Services have sponsored the development of the Nigerian Elephant Action Plan in Nigeria as well as in many other countries. In addition, transboundary efforts in places like the W-Arly-Pendjari Beyond (WAP) Complex, show promise in conserving elephant populations by promoting cross-border collaboration and coordinated conservation strategies.

However, these efforts alone are not sufficient. There is a need for more robust policy implementation, stronger international cooperation, and sustained anti-poaching efforts. By building on existing successes and addressing the gaps in current strategies, it is possible to work towards stabilizing and ultimately increasing African elephant populations
This study investigates the willingness of local communities in Nigeria to co-create approaches supporting elephant conservation. Conducted in Omo Forest Reserve and Yankari Game Reserve, it aims to understand community attitudes, perceptions, and experiences regarding elephant conservation and in addition, identify opportunities for collaborative efforts that leverage local knowledge and cultural values.

2. Methods

The study was carried out in two locations Omo Forest Reserve (6.8583° N, 4.3565° E), South–western Nigeria and the Yankari Game Reserve (9.7567° N, 10.5094° E), North-eastern Nigeria (Fig. 1) for forest and savannah Elephants respectively.

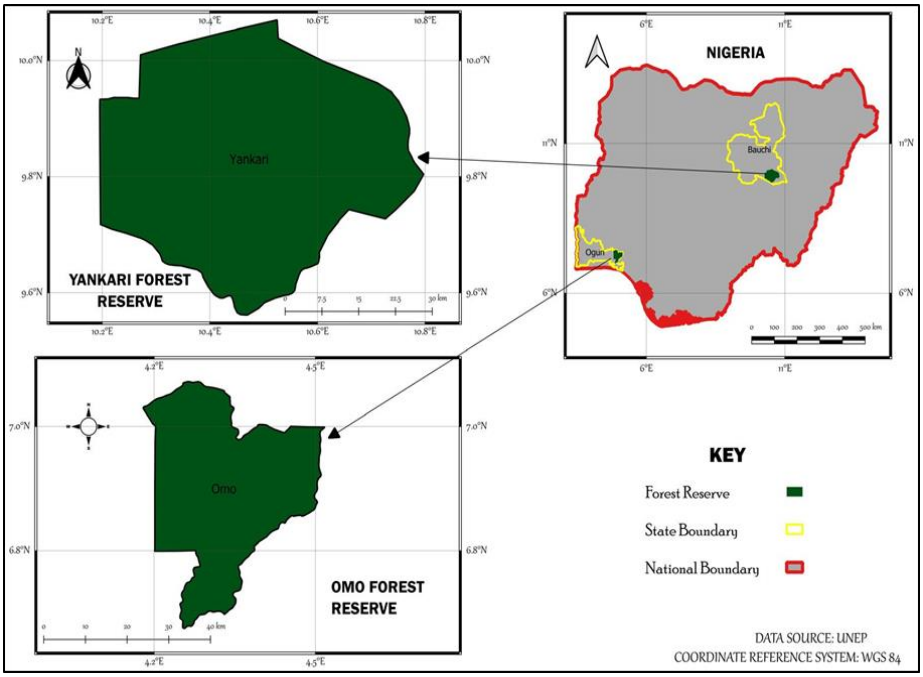

Figure 1: The Map of Nigeria indicating Yankari Game Reserve and Omo Forest Reserve the sites of the study.

Mixed methods of questionnaires, outreaches, community and youth engagement were used to collect data. The questionnaires were designed and collected using the kobotool app. The questionnaire contained four key sections that addressed the following: Locational information of respondents, respondent's demographic details, knowledge and perception of elephants in the study area and the respondent's attitude towards elephants' conservation. The likert scale (agreed, disagreed, strongly agreed, strongly disagreed and undecided) was used to determine the level of agreement or disagreement with the

statements. A total of 219 respondents were sampled from the two reserves across different communities. Of this total, 166 respondents were selected from Kargo, Kwala. Pali, and Shafa communities around the Yankari Game Reserve. Whereas, 53 respondents were drawn from the communities around Omo Forest Reserve.
The data was analyzed using ANOVA tests and Chi-Square. The ANOVA tests aimed to identify any significant differences in respondents' opinions based on their location, gender, age, residency, religion, marital status, education, and occupation. Appropriate charts were used to summarize the results.

3. Results

In the Yankari Game Reserve and Omo Forest Reserve, 219 respondents' attitudes towards elephant conservation showed significant differences based on age, residence, and religion ($P<0.05$) but not by gender, location, marital status, education, or occupation ($P>0.05$). See summary of demographic information of respondents in Fig. 2.

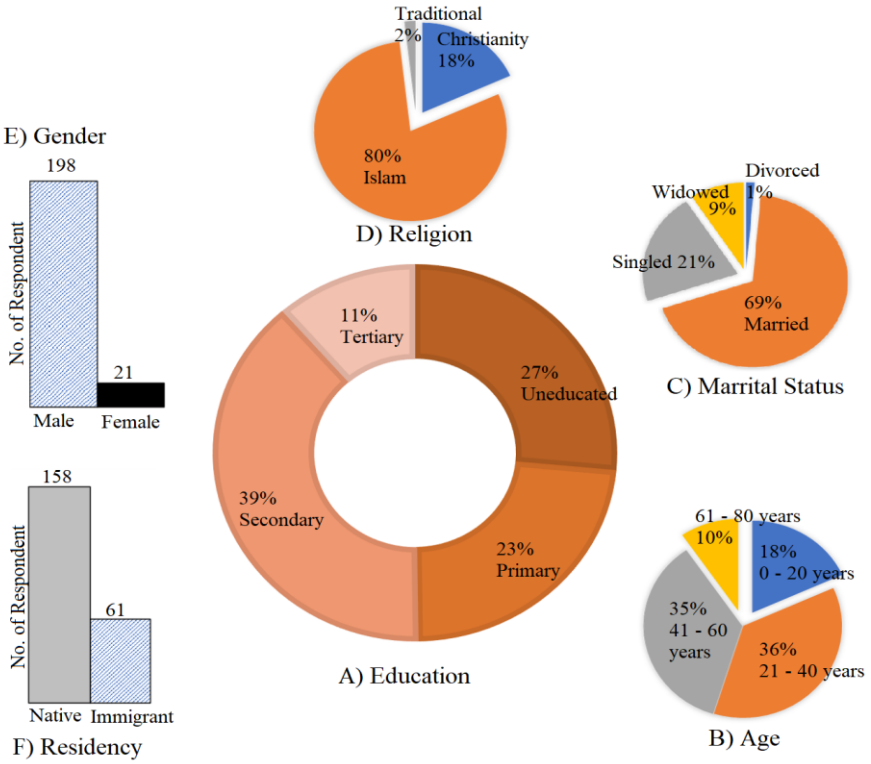

Figure 2. Summary of respondents by A) level of education, B) age group, C) marital status, D) religion, E) gender and F) residency who participated in the study in Yankari and Omo Forest Reserves.

Responses varied significantly on whether laws to protect elephants were necessary (ANOVA: F4,5 = 3.97; P= 0.004; Fig. 3). Most respondents supported the need for such laws. Additionally, opinions on the economic and non-economic importance of elephant conservation showed significant variation (ANOVA: F4,5 = 4.820; P=0.001; Fig. 4), with many strongly agreeing on its importance. However, no significant differences were found in attitudes towards protecting elephants for future generations, eco-tourism, or punishing those who harm them (ANOVA: F4,3 = 0.29; P= 0.88; Fig. 5).

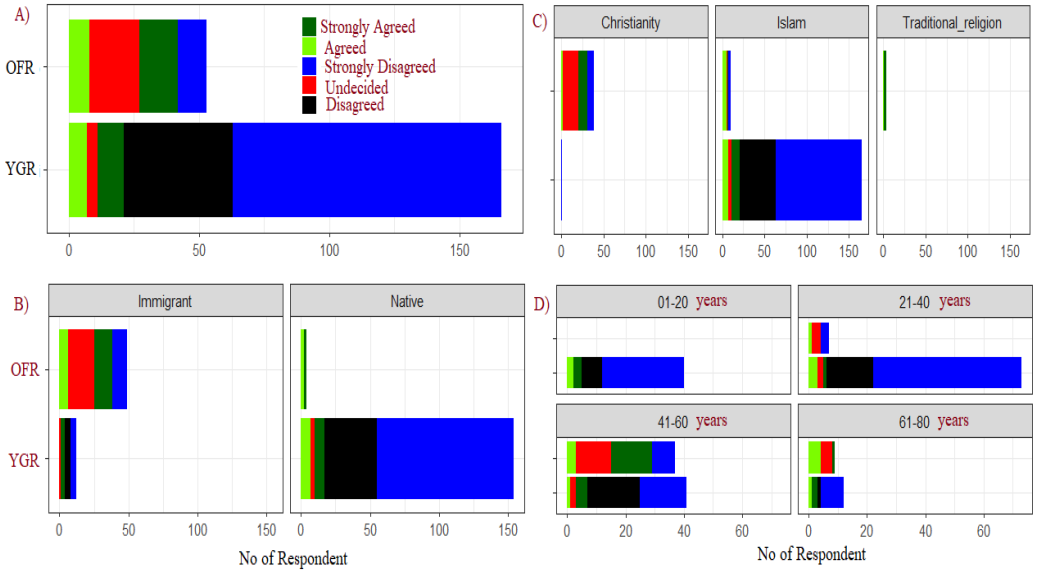

Figure 3: -Difference in opinions of respondents A) location, B) residency, C) religion, D) age to whether the laws to protect elephants are no longer necessary (ANOVA F4,5 =3.97; P= 0.004)

Human-elephant conflicts were reported by 60% of respondents in Yankari and 38% in Omo. Personal encounters with elephants occurred in 47% of Omo respondents and 36% in Yankari. Key conflict causes included encroachment (53% in Yankari, 23% in Omo) and elephants searching for food and water. Strategies to address conflicts showed strong associations ($\chi^2 = 206.39$, $p < 0.01$; Fig. 6), with habitat protection preferred in Omo (92%) and a variety of measures suggested in Yankari, including ranger monitoring and non-lethal techniques.

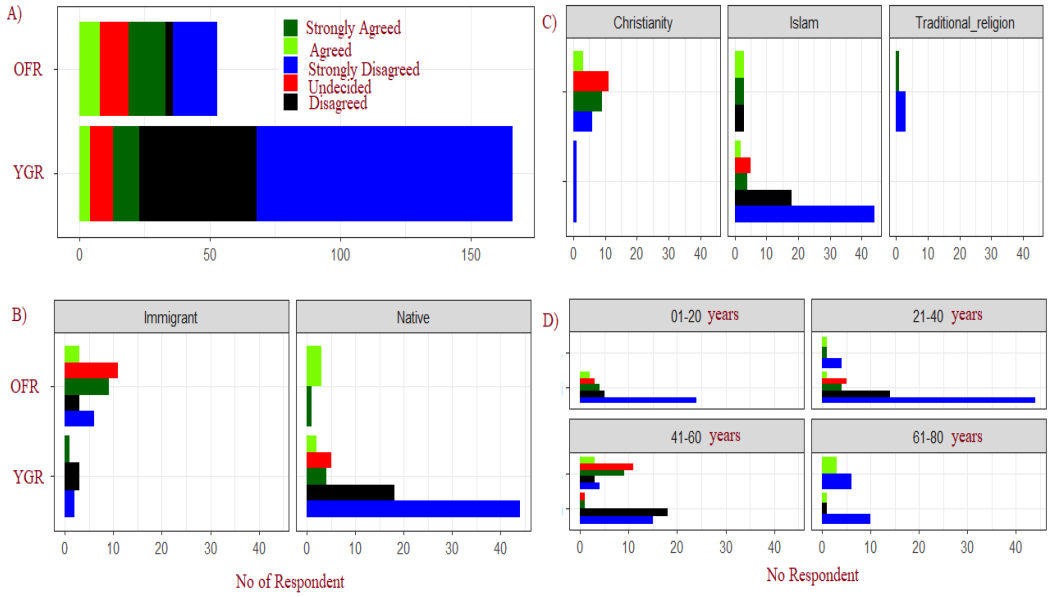

Figure 4: Opinion of respondent A) location, B) residency, C) religion, D) age to whether the conservation of elephants is not important for any economic and non-economic reasons (ANOVA: F4,5 =4.82; P= 0.0009)

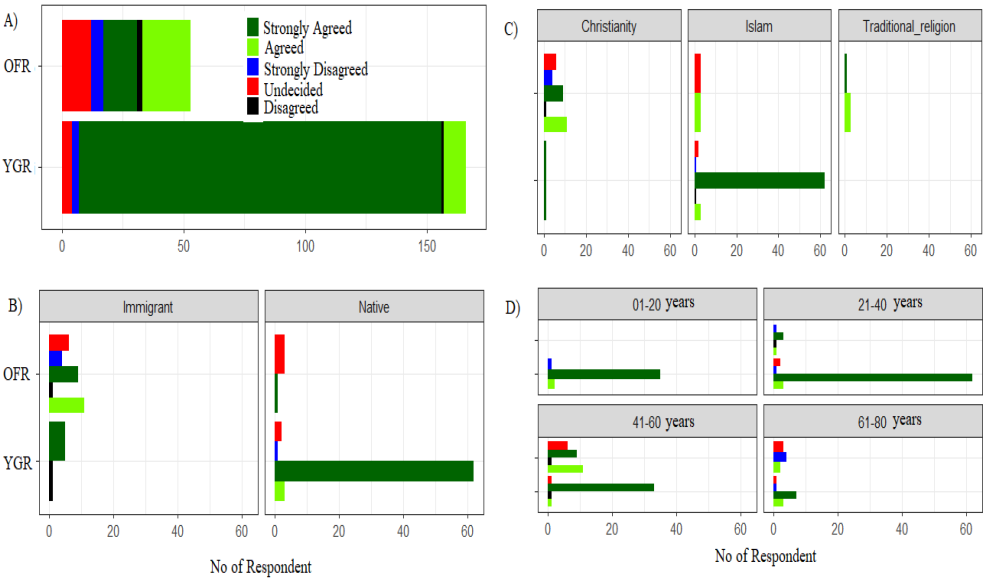

Figure 5: Difference in the opinion of respondents A) location, B) residency, C) religion, D) age to If elephants are protected, communities would receive benefits (ANOVA: F4,5 =3.55; P= 0.008)

Suggestions included increased ranger activities (57% in Omo, 24% in Yankari), government intervention (30% in Yankari, 21% in Omo), and habitat preservation (23%

in Omo, 13% in Yankari). Additional ideas exclusive to Yankari included re-introduction and community initiatives. Conservation education programs that respect and incorporate local knowledge and traditions can be effective. For instance, incorporating traditional ecological knowledge into conservation education can bridge cultural gaps and foster support (Nakashima et al., 2000). Indigenous Knowledge (IK) systems are important in conservation efforts.

Most respondents expressed satisfaction with current conservation efforts (57% in Omo, 81% in Yankari), with significant differences noted ($\chi^2 = 16.34$, $p < 0.001$). Forest management involvement was higher in Yankari (41%) compared to Omo (30%), with significant differences in engagement ($\chi^2 = 8.32$, $p < 0.001$).

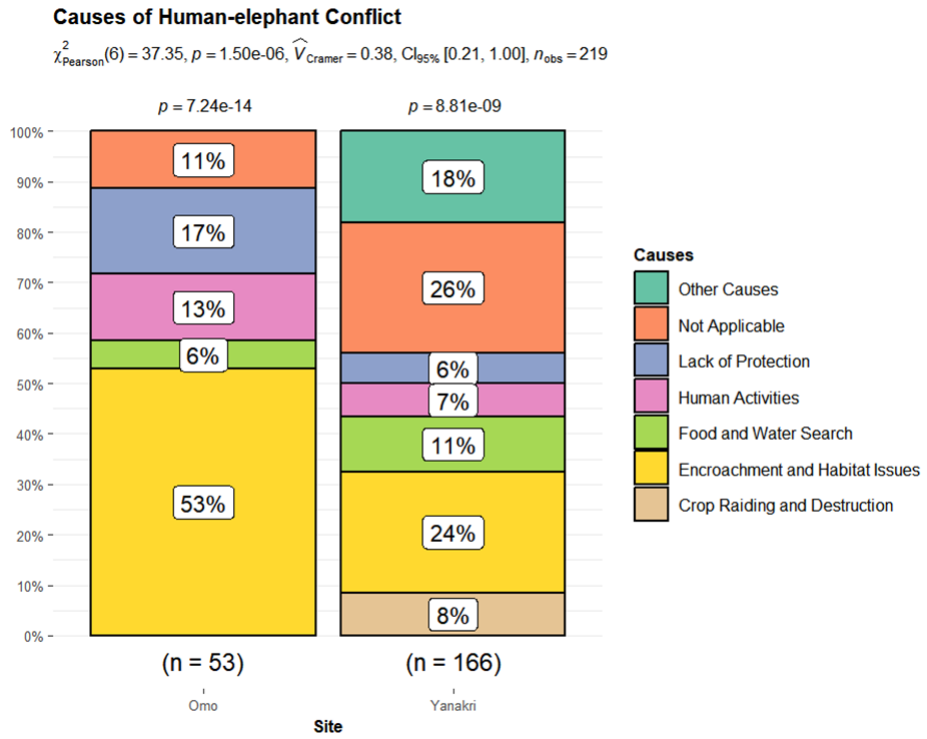

Figure 6: Prevalence of human-elephant conflict between Yankari Game Reserve and Omo Forest Reserve

4. Discussion

Perception of Respondents Towards Elephant Conservation

In Yankari Game Reserve and Omo Forest Reserve, the study analyzed socio-demographic factors affecting community responses to elephant conservation. Significant differences in conservation attitudes were observed based on age, residency, and religion ($P<0.05$), suggesting that younger individuals, possibly more influenced by education and modern media, were more open to conservation messages. Conversely, older individuals, influenced by traditional practices, might see elephants as threats due to past experiences (Bandara & Tisdell, 2002; Giachino et al., 2021). Native residents who face direct interactions with elephants often view them negatively due to conflicts like crop raiding,

while those less affected are more supportive of conservation (Naughton-Treves, 1998). Additionally, religious beliefs impact attitudes towards wildlife, with Christianity and Islam promoting different interactions with elephants (Dickman, 2010). Socio-cultural, economic, and environmental factors influencing community attitudes toward elephant conservation significantly enhance the effectiveness of conservation strategies. These factors can be leveraged to increase community participation in conservation efforts. Elephants often have deep cultural and spiritual significance in various communities. For example, in India and Thailand, elephants are revered in religious and cultural practices (Sukumar, 2006; Schofield, 2003). Similarly, local leaders and community influencers can play a pivotal role in shaping attitudes towards conservation (Berkes, 2004). By involving critical community stakeholders in conservation initiatives can gain legitimacy and support (Bakti, Zubair & Sjoraida, 2024).

No significant differences in conservation attitudes were found based on gender, location, marital status, education, and occupation ($P>0.05$). This suggests a uniform perception across various groups, possibly due to shared experiences or similar exposure to conservation messages. The consistency across locations indicates similar influencing factors for human-elephant conflicts throughout the reserves (Hoare, 2000). Surprisingly, education level did not significantly affect attitudes, suggesting that awareness programs have reached people uniformly (Allendorf, 2022). Occupations also showed uniform perceptions, indicating that various professional groups are equally impacted by human-elephant conflict (HEC).

Opinions on Rationale for Elephant Conservation

Respondents expressed varied opinions on whether laws protecting elephants are necessary, with some feeling these laws impede livelihoods, while others acknowledge their importance for conservation (Gillingham & Lee, 1999; Bhatia et al., 2020). The lack of consensus on the economic and non-economic importance of elephant conservation highlights the need to demonstrate tangible benefits through community-based projects (Barua et al., 2013). There was also variation in perceptions of community benefits from elephant protection, suggesting the need for effective communication of potential eco-tourism revenue, ecosystem services, and compensation for damages (Athreya et al., 2016). A shared recognition of the importance of conserving elephants for future generations reflects a cultural or ethical consensus on intergenerational equity (Tisdell et al., 2006). The agreement on protecting elephants for their intrinsic value and eco-tourism potential suggests broad acceptance of the economic and ethical benefits of conservation. There was also widespread support for punishing those who harm elephants, indicating a general consensus on the need for strict enforcement of conservation laws.

Human-Elephant Conflict (HEC)

The study found higher HEC prevalence in Yankari than Omo, likely due to larger elephant populations and closer proximity to human settlements. There is indication of uneven distribution of encounters, with certain hotspots of conflict where elephants and humans frequently interact (Hoare, 1999; Mukeka et al., 2019). In Omo, despite fewer overall incidents, higher personal encounter rates suggest localized conflict areas. HEC is primarily driven by encroachment into elephant habitats for agriculture, settlement, and

resource extraction, leading to disrupted movement patterns. Crop raiding, a significant issue, results from elephants seeking food during scarcity periods within the reserves. Habitat degradation and seasonal variations force elephants to find food and water outside their natural habitats, increasing conflict likelihood. Activities like logging and mining exacerbate HEC by disturbing habitats and increasing human-elephant interactions. Strengthening protection measures and regulating human activities around reserves is crucial (Fernando et al., 2005). Agriculture is the primary livelihood source for communities surrounding the reserves, particularly the Yankari Reserve. Elephant crop raids are rampant in these landscapes, often leaving farmers with little to no income. Providing alternative livelihood sources, such as eco-tourism or community-based wildlife enterprises, can alleviate human-elephant conflict and support conservation efforts (Zanamwe et al., 2018). Furthermore, Sillero-Zubiri et al. (2007), noted that these alternatives can offer economic benefits while furthering conservation goals and integrating climate considerations. The IPCC (2021) emphasizes that understanding how climate and climate change impact both elephant habitats and local communities can inform adaptive management strategies. In the Shafa community at Yankari, for example, elephants raid farms while searching for water and African fan palms. By understanding the seasonal patterns of these searches, farmers can adjust their activities to avoid or reduce conflict. with the elephants

A strong association between HEC strategies in Omo and Yankari suggests similar approaches can be effective. In Omo, habitat protection is the preferred strategy, emphasizing preserving natural habitats to reduce conflicts (Western & Waithaka, 2005). In Yankari, a multifaceted approach including noise and distraction techniques, ranger monitoring, and government intervention is necessary (Fernando et al., 2008).

Conservation Efforts: Satisfaction and involvement

Higher satisfaction with conservation efforts in Yankari compared to Omo may be due to more effective programs in Yankari, such as anti-poaching patrols and community outreach (Blanc et al., 2010 & 2013). Lower satisfaction in Omo highlights a need for improved strategies, including better funding, enforcement, and community involvement (Ogada et al., 2003; Amusa et al., 2021).

Higher participation in forest management in Yankari compared to Omo suggests a more inclusive approach in Yankari. Lower participation in Omo indicates a need for better engagement of local communities in forest management to enhance conservation effectiveness and satisfaction (Roe et al., 2009; Fada et al., 2021). For conservation efforts to be effective, there is a need for the integration of indigenous ecological knowledge (IEK) into Nigeria's biodiversity legislation (Gbadegesin et al., 2024). Indigenous communities have a profound understanding of biodiversity conservation rooted in their traditional socio-ecological knowledge. Policies need to prioritize the rights and agency of indigenous peoples in their design, implementation, and enforcement.

Conservation Implications

While this study focused on the Yankari Game and Omo Forest Reserves, the findings from this study can be adopted for similar reserves. Furthermore, future studies can consider the unique ecological, cultural, and socio-economic conditions of each region.

Different regions have varying landscapes, climates, and biodiversity, which can affect elephant populations and their conservation needs. For instance, forest elephants in southern Nigeria face threats from habitat fragmentation and human activity (Osodi, 2024). Further studies can also be designed to assess the impact of ecological factors on elephant behavior and survival while conservation strategies should be tailored to address these specific environmental challenges. Engaging with communities to understand their perspectives and incorporating traditional knowledge into conservation strategies can foster better coexistence and support for elephant protection (ACF, 2024). Future research can explore how local communities play a vital role in conservation efforts. Their beliefs, practices, and interactions with wildlife can significantly influence the success of conservation initiatives.

Key recommendations from this study include:

1. Enhanced Habitat Protection: Prioritize habitat protection to ensure elephants have sufficient resources within reserves.
2. Community Engagement and Education: Continuously engage local communities and educate them on the benefits of elephant conservation.
3. Integrated Conflict Mitigation Measures: Use a combination of deterrent techniques, compensation schemes, and land-use planning to address HEC.
4. Policy Support and Enforcement: Strengthen policies related to land use and wildlife protection and ensure robust enforcement mechanisms.

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References

African Conservation Foundation (ACF) (2024). Protecting the Forest Elephants. Protecting African forest Elephants - African Conservation Foundation.

Ahlering, M. A., Maldonado, J. E., Eggert, L. S., Fleischer, R. C., & Western, D. (2018). Conservation outside protected areas and the effect of human-dominated landscapes on stress hormones in Savannah elephants. *Conservation Biology, 32*(3), 706-716.

Allendorf, T. D. (2022). A global summary of local residents' perceptions of benefits and problems of protected areas. *Biodiversity and Conservation*, *31*(2), 379-396.

Amusa, T. O., Azeez, K. K., & Olabode, E. A. (2021). Use of Geotracker and Kobocollect in monitoring patrol effort and illegal activities in Omo Forest reserve, Nigeria. *PARKS*, *27*, 37.

Athreya, V., Odden, M., Linnell, J. D., Krishnaswamy, J., & Karanth, K. U. (2016). A cat among the dogs: leopard Panthera pardus diet in a human-dominated landscape in western Maharashtra, India. *Oryx*, *50*(1), 156-162.

Bandara, R., & Tisdell, C. (2002). Asian elephants as agricultural pests: Damages, economics of control and compensation in Sri Lanka. Natural Resources Journal, 42, 491-519.

Bakti, I., Zubair, F., & Sjoraida, D. F. (2024). The role of opinion leaders in building public participation for forest conservation. *Kriez academy: Journal of development and community service*, *1*(7), 15-30.

Barua, M., Bhagwat, S. A., & Jadhav, S. (2013). The hidden dimensions of human-wildlife conflict: Health impacts, opportunity and transaction costs. Biological Conservation, 157, 309-316.

Berkes, F. (2004). Rethinking Community-Based Conservation. *Conservation Biology, 18*(3), 621-630.

Bhatia, S., Redpath, S. M., Suryawanshi, K., & Mishra, C. (2020). Beyond conflict: exploring the spectrum of human–wildlife interactions and their underlying mechanisms. *Oryx*, *54*(5), 621-628.

Blanc, J. J., Thouless, C. R., Hart, J. A., Dublin, H. T., Douglas-Hamilton, I., Craig, C. G., & Dickman, A. J. (2010). Complexities of conflict: The importance of considering social factors for effectively resolving human-wildlife conflict. Animal Conservation, 13, 458-466.

Blanc, L., Marboutin, E., Gatti, S., & Gimenez, O. (2013). Abundance of rare and elusive species: empirical investigation of closed versus spatially explicit capture–recapture models with lynx as a case study. *The Journal of Wildlife Management*, *77*(2), 372-378.

Chase, M. J., Schlossberg, S., Griffin, C. R., Bouché, P. J., Djene, S. W., Elkan, P. W., ... & Sutcliffe, R. (2016). Continent-wide survey reveals massive decline in African savannah elephants. *PeerJ, 4*, e2354.

Chiyo, P. I., Moss, C. J., Alberts, S. C., & Archie, E. A. (2012). Elephant and habitat density affect forest structure and composition in an African savanna forest. *Biotropica, 44*(6), 754-762.

Dickman, A. J. (2010). Complexities of conflict: The importance of considering social factors for effectively resolving human-wildlife conflict. Animal Conservation, 13, 458-466.

Ens, E., Reyes-García, V., Asselin, H., Hsu, M., Reimerson, E., Reihana, K., & Adams, M. (2021). Recognition of indigenous ecological knowledge systems in conservation and their role to narrow the knowledge-implementation gap. *Closing the knowledge-implementation gap in conservation science: Interdisciplinary evidence transfer across sectors and spatiotemporal scales*, 109-139.

Fada, S.J, Akintunde, E.A**.,** Binbol, N.L, Bombom, L.S., Dabi, D.D., Baklit, G., and Oche, C.Y. (2022) An Appraisal of Nigeria's Progress in Achieving the SDG-13 Climate Action Goal. *Journal of Sustainable Development,* 15(2) 66-77.

Farai, M., & Mogmotsi, M. (2021). Africa's elephants are now endangered by poaching, habitat loss. *Phys.org*. Retrieved from https://phys.org/news/2021-03-africa-elephants-endangered-poaching-habitat.html

Fernando, P., Kumar, M. A., Williams, A. C., Wikramanayake, E., Aziz, T., & Singh, S. M. (2008). Review of human-elephant conflict mitigation measures practiced in South Asia. World Bank, Washington, DC.

Fernando, P., Wikramanayake, E. D., Weerakoon, D., Jayasinghe, L. K. A., Gunawardene, M., & Janaka, H. K. (2005). Perceptions and patterns of human-elephant conflict in old and new settlements in Sri Lanka: Insights for mitigation and management. Biodiversity and Conservation, 14, 2465-2481.

Gbadegesin, O.A., Gbadamosi SAN, O.A. (2024). Indigenous Ecological Knowledge: a Transformative Approach to Biodiversity Legislation in Nigeria. *Environmental Management* **74**, 317–331 https://doi.org/10.1007/s00267-024-01994-2.

Giachino, C., Pattanaro, G., Bertoldi, B., Bollani, L., & Bonadonna, A. (2021). Nature-based solutions and their potential to attract the young generations. *Land Use Policy*, *101*, 105176.

Gillingham, S., & Lee, P. C. (1999). The impact of wildlife-related benefits on the conservation attitudes of local people around the Selous Game Reserve, Tanzania. Environmental Conservation, 26, 218-228.

Hauenstein, S., Kshatriya, M., Blanc, J., Dormann, C. F., & Beale, C. M. (2019). African elephant poaching rates correlate with local poverty, national corruption and global ivory price. *Nature Communications, 10*(1), 2242.

Hoare, R. (1999). Determinants of human-elephant conflict in a land-use mosaic. Journal of Applied Ecology, 36, 689-700.

Hoare, R. E. (2000). African elephants and humans in conflict: The outlook for co-existence. *Oryx*, 34, 34-38.

IPCC. (2021). *Climate Change 2021: The Physical Science Basis*. Cambridge University Press.

IUCN Press release. (2021). African elephant species now Endangered and Critically Endangered - IUCN Red List. Retrieved from https://www.iucnredlist.org.

Kamara, I., & Smith, L. (2023). Community-Based Ecotourism as a Co-Creation Approach for Elephant Conservation in West Africa. *Journal of Sustainable Tourism, 29*(4), 589-605.

Lindsay, K., Chase, M., Landen, K., & Nowak, K. (2017). The shared nature of Africa's elephants. *Biological Conservation, 215*, 260-267.

Lindsey, P. A., Roulet, P. A., & Romanach, S. S. (2007). Economic and conservation significance of the trophy hunting industry in sub-Saharan Africa. Biological Conservation, 134, 455-469.

Nsonsi, F., Heymans, J. C., Diamouangana, J., & Breuer, T. (2017). Attitudes towards forest elephant conservation around a protected area in northern Congo. *Conservation and Society*, *15*(1), 59-73.

Maisels, F., Strindberg, S., Blake, S., Wittemyer, G., Hart, J., Williamson, E. A., & Fischer, M. (2013). Devastating decline of forest elephants in Central Africa. *PLoS One, 8*(3), e59469.

Mbatha, N., & Ndlovu, T. (2022). Integrating Indigenous Knowledge in Co-Management of Elephant Habitats: A Case Study from Southern Africa. *Conservation Perspectives Journal, 8*(1), 87-102.

Mukeka, J. M., Ogutu, J. O., Kanga, E., & Røskaft, E. (2019). Human-wildlife conflicts and their correlates in Narok County, Kenya. *Global Ecology and Conservation*, *18*, e00620.

Naughton-Treves, L. (1998). Predicting patterns of crop damage by wildlife around Kibale National Park, Uganda. *Conservation Biology*, 12, 156-168.

Ogada, M. O., Woodroffe, R., Oguge, N. O., & Frank, L. G. (2003). Limiting depredation by African carnivores: the role of livestock husbandry. *Conservation Biology*, 17, 1521-1530.

Omondi, P., Ganswindt, A., & Rasmussen, H. B. (2020). Human–elephant conflict: A review of current trends and mitigation methods. *Oryx, 54*(1), 8-17.

Osborn, F. V., & Parker, G. E. (2003). Towards an integrated approach for reducing the conflict between elephants and people: A review of current research. *Oryx,* 37, 80-84.

Osodi, E. (2024) Nigeria risks losing all its forest elephants – what we found when we went looking for them. *The conservation.* https://www.awf.org/sites/default/files/2022-08/2022%20Elephant%20Conservation%20Progress%20Report.pdf

Riggio, J., Jacobson, A., Dollar, L., Bauer, H., Becker, M., Dickman, A., ... & Mweetwa, T. (2013). The size of savannah Africa: a lion's (Panthera leo) view. *Biodiversity and Conservation, 22*(1), 17-35.

Roe, D., Nelson, F., & Sandbrook, C. (Eds.). (2009). Community management of natural resources in Africa: Impacts, experiences, and future directions. *Natural Resource Issues*, No. 18. IIED.

Salamatu J. Fada (2021): Nigeria's Elephants and the Dwindling Populations - Any Hope for Recovery. *Save the Elephants*. Retrieved from https://www.savetheelephants.org/news/nigerias-elephants-and-the-dwindling-populations-any-hope-for-recovery/.

Salamatu J. Fada (2021): Nigeria's Elephants and the Dwindling Populations: Any Hope for Recovery. *THISDAYLIVE*. Retrieved from https://www.thisdaylive.com/index.php/2021/04/20/nigerias-elephants-and-the-dwindling-populations-any-hope-for-recovery/.

Schlossberg, S., Chase, M. J., Gobush, K. S., Wasser, S. K., & Lindsay, K. (2020). State-space models reveal a continuing elephant poaching problem in most of Africa. *Scientific Reports, 10*(1), 10166.

Smith, J., & Jones, A. (2021). Co-Creation of Conservation Strategies for African Elephants in Community Areas. *Conservation Science Journal, 15*(2), 45-58.

Sukumar, R. (2006). *The Living Elephants: Evolutionary Ecology, Behavior, and Conservation*. Oxford University Press.

Tisdell, C., Swarna Nantha, H., & Wilson, C. (2006). Public choice of species for the 'Ark': Phylogenetic similarity and preferred wildlife species for reintroduction in Australia. *Journal of Nature Conservation*, 14, 97-105.

Western, D., & Waithaka, J. (2005). Policies for reducing human-wildlife conflict: A Kenya case study. *Conservation Biology*, 19, 728-738.

Wetzel, C. (2022). Elephant Tusk DNA Exposes Illegal Poaching Networks. *Smithsonian Magazine*. Retrieved from https://www.smithsonianmag.com/smart-news/tracing-elephant-tusk-dna-can-expose-illegal-poaching-networks-180979639/.

Zanamwe, C., Gandiwa, E., Muboko, N., Kupika, O. L., & Mukamuri, B. B. (2018). Ecotourism and wildlife conservation-related enterprise development by local communities within Southern Africa: Perspectives from the greater Limpopo Transfrontier Conservation, South-Eastern Lowveld, Zimbabwe. *Cogent Environmental Science*, *4*(1), 1531463.