

Northumbria Research Link

Citation: Kopnina, Helen, Muhammad, Naziru Zakari and Olaleru, Fatsuma (2022) Exploring attitudes to biodiversity conservation and Half-Earth vision in Nigeria: A preliminary study of community attitudes to conservation in Yankari Game Reserve. *Biological Conservation*, 272. p. 109645. ISSN 0006-3207

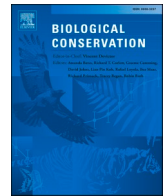
Published by: Elsevier

URL: <https://doi.org/10.1016/j.biocon.2022.109645>
<<https://doi.org/10.1016/j.biocon.2022.109645>>

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/id/eprint/49407/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)



Exploring attitudes to biodiversity conservation and Half-Earth vision in Nigeria: A preliminary study of community attitudes to conservation in Yankari Game Reserve

Helen Kopnina^{a,b,*}, Naziru Zakari Muhammad^c, Fatsuma Olaleru^d

^a Northumbria University, UK

^b The Hague University of Applied Sciences, Netherlands

^c Yankari Game Reserve, Bauchi State, Nigeria

^d University of Lagos, Nigeria

ARTICLE INFO

Keywords:

Biodiversity conservation
Community
Half-earth vision
Nigeria
Yankari game reserve

ABSTRACT

In the Half-Earth vision, conservationists, scientists, and policymakers work together with local communities without compromising the interests of wildlife and ecosystems. The vision requires decolonizing nonhuman species through marshaling ecocentric philosophy, animal sentience science, and, crucially, local communities' support. While the studies of community attitudes to wildlife are accumulating, in the context of human-wildlife conflicts, there is a shortage of data on attitudes to the Half-Earth vision in countries with growing human populations and rapidly declining biodiversity, such as Nigeria. This paper aims to address this gap by exploring community attitudes to the Half-Earth vision through a pilot study of Yalwan Bongo and Kafi, the local communities living around Yankari Game Reserve, Bauchi State in Nigeria. This paper is a review of the main issues surrounding Half-Earth, with a preliminary case study that addresses some of these issues. This case study found that community representatives stand open to dialogue with local conservationists based on the mutual benefit of wildlife protection. The surveyed villagers had a greater understanding of particular species than of contributing factors in biodiversity declines, such as growing human populations, climate change, and bushmeat hunting. Educational programs that we recommend are targeted at the empowerment of individual community members to speak against poaching, but also at the development of basic literacy, numeracy, and professional skills to counter poverty and promote family planning.

1. Introduction: Half-Earth vision

Interdisciplinary scientists have analyzed the consequences of overreach in the ecosphere (Steffen et al., 2018), warning about a “planetary recession” marked by the loss of biodiversity, climate breakdown, pollution, and global “human and nonhuman displacements” caused by an ecological decline (Ripple et al., 2017). To address this ecological degradation, the Half-Earth vision suggests generous protection for terrestrial, freshwater, and marine biodiversity (Steffen et al., 2018) by setting aside at least half the planet for non-human species (Wilson, 2016). Proponents of the Half-Earth offer a global eco-social prospect that marries realism and vision and necessitates rethinking sharing of geographical space and expanding and connecting Protected Areas (PA) around the world (Pressey et al., 2003; Noss et al., 2012). The outcomes

of this proposal are intended to chart a course toward a sustainable and equitable human coexistence alongside wildlife (Noss et al., 2012; Wilson, 2016; Dinerstein et al., 2017; Kopnina, 2016a; Kopnina et al., 2018; Ellis, 2019; Crist et al., 2021).

While proponents of the Half-Earth vision have stressed that anything less than “half Earth” is acquiescing to mass extinction, currently, only around 15 % of the Earth's land surface and 5.3 % of the global ocean are protected with designations ranging from strict protection to sustainable use and management (UNEP, 2018; MPAtlas (Marine Protection Atlas), 2021). While conservation biologists need to be realistic, continuing with only modest increases in protected area acreage is unlikely to prevent mass extinction (Noss et al., 2012; Dinerstein et al., 2017; Kopnina et al., 2020). Half-Earth might be considered radical as a political proposal, but it is necessary if the extinction of the world's

* Corresponding author.

E-mail addresses: alenka1973@yahoo.com, helen.kopnina@northumbria.ac.uk (H. Kopnina).

<https://doi.org/10.1016/j.biocon.2022.109645>

Received 7 November 2021; Received in revised form 6 June 2022; Accepted 21 June 2022

0006-3207/© 2022 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

biodiversity is to be recognized as a great catastrophe, both in pragmatic and ethical terms (Cafaro et al., 2017), not just unfortunate collateral damage of economic development and demographic change.

Yet, this vision of radical transformation in conservation is not universally shared. While developed countries are economic leaders, and simultaneously the pioneers of massive environmental destruction, many developing countries seem to imitate Western unsustainable economic development models, with biodiversity serving as a mere economic resource (Crist, 2012). Certain benefits of economic development in the short term are generally said to be obvious, ranging from better medical care to increasing literacy worldwide. As global health technology improves, many communities are witnessing a welcome decline in infant and maternal mortality (Bremner et al., 2009), and a transition from low to higher consumption lifestyles. What seems less recognized is that simultaneously, as wild habitats are converted into human-controlled landscapes, multiple species are threatened with extinction. While the development benefits are touted, the costs of environmental decline seem less important (Lidskog and Elander, 2010). For example, the United Nations' Sustainable Development Goals (SDGs) highlight inclusive economic growth, without considering the adverse effects of population growth and increased consumption for future generations of both humans and nonhumans (Kopnina, 2020). The SDGs tend to prioritize utilitarian human interests above ecosystems and nonhuman individuals, thus exhibiting robust anthropocentric bias (Kopnina, 2016b).

This anthropocentric bias is reflected in debates on the ethics and pragmatics of conservation (for review see Kopnina et al., 2018). A few alternatives have been put forth, such as the so-called “new conservation”, promoted by researchers supporting economic development and corporate partnerships, and “convivial conservation” promoted by neoMarxist social scientists (for review see Luque-Lora, 2021). Both promote economic development, the former being focused on capitalist mechanisms, the latter focused ostensibly on benefitting the poor and vulnerable communities. In both approaches, considerations of justice and wellbeing apply solely to humans; they fail to mention the right of other species to exist independent of human utility (Chapron et al., 2019).

By contrast, indigenous ecocentric views perceived humans as part of nature and not above it (Shoreman-Ouimet and Kopnina, 2015; Taylor et al., 2020) and newer interdisciplinary insights into animal sentience and personhood (Wallach et al., 2020), and the emergence of the animal rights and welfare movement (Bisgould, 2008), all reveal the importance of considering the intrinsic value of nature. Aside from the “Rights of Nature” concept that derives from indigenous cosmologies, there are many emerging legal instruments and initiatives, such as the “ecocide law” (Higgins, 2010; <https://ecocidelaw.com/>), animal welfare (sentience) legislation (The Economist, 2018), and animal rights law (Bisgould, 2008; Borràs, 2016). These developments have major moral implications like the historic movements to abolish colonialism and slavery. There is increasing recognition that consciousness or cognition in (some) animals could mean, for example, “that giving great apes rights could hamper medical research; that giving some animals limited rights might open the door to giving farm animals the right not to be eaten” (The Economist, 2018:86).

In the context of conservation, the advent of ecocide leads to reframing the issue of human-wildlife conflict in terms of both human and nature rights, and not as a matter of “managing pests” (Cryer, 2021). Concretely, this implies that human-wildlife conflicts are consequences of anthropogenic activity, such as the expansion of agricultural areas, resulting in the shrinking of wild habitats, deforestation, worsening climate change, more wildlife raids, and consequently an increase in poverty (Peterson et al., 2010; Larson et al., 2016; Frank and Glikman, 2019).

While the studies of community attitudes to wildlife, especially in the context of human-wildlife conflict, are accumulating (Peterson et al., 2010), there is a shortage of data on attitudes to the Half-Earth vision in

developing countries. The Half-Earth Project requires marshaling science, technology, and education, yet the local communities' involvement is poorly understood in terms of attitudes and participation.

This paper opens a discussion about (im)possibilities of peaceful co-existence of human and nonhuman communities in Nigeria, one of the most populous countries in Africa with rapidly declining biodiversity. It also uses insights from environmental ethics (Washington et al., 2018), nature rights (Chapron et al., 2019), animal ethics literature (Bisgould, 2008; Borràs, 2016; Wallach et al., 2020), and humanist anthropology, which explicitly focuses on criticism of colonization, racism, and sexism, combining community-level interactions with involvement of, or on behalf of, marginalized or poor people in the developing world (Lewis, 2005). The insights from these disciplines suggest a need for decolonized, ethically inclusive conservation because it is good for both local communities and biodiversity conservation (Piccolo et al., 2018; Taylor et al., 2020).

The research in this paper is guided by the question of how the Half-Earth vision for peaceful cohabitation is understood by local communities. We tackled this through a preliminary (pilot) study of the attitudes of local communities living near the protected areas. Such efforts are aimed at preventing ecological collapse and restoring the balance between local communities in proximity to protected areas and thriving biodiversity.

2. From colonialism to ecocide

The term “indigenous” or “autochthon” is derived from the Greek “ΑΥΤΟΧΘΟΝ”, referring to the process of “originating from and inhabiting the place”. “Indigenous” can be seen as fluid, dynamic, manipulated, and mutated in different political and legal contexts.

The concept and practice of colonialism refer to the oppression and exploitation of vulnerable human communities and other species. Tarik Bodasing (2019) notes that while the label of colonialism is presently directed against many conservationists in Africa, colonizing entire habitats and discriminating (to the point of exterminating) against all other species by humans is not usually framed in colonialist terms. Aside from the conventional use of the term colonialism as a political regime applying exclusively to human groups, emerging ethical and legal framings of nonhuman rights and nature rights add the long-overdue dimension of terms like oppression, domination, and supremacy applied to the treatment and extermination of nonhumans and their habitats (Crist, 2019; Johns, 2021). In “Colonialism and Animality: Anti-Colonial Perspectives in Critical Animal Studies”, Kelly Montford and Chloe Taylor (2020) show the connections between the oppression of indigenous human communities and animals. Human colonialization of the Earth leads to ecocide, the destruction of ecosystems, natural entities, flora, and fauna, which is increasingly recognized as a crime against the Earth itself (Higgins, 2010). This crime calls for “Earth jurisprudence” or “wild law” (Burdon, 2011). One way to advocate for international law along these lines is to reform the Rome Statute by adding “ecocide” to the list of crimes (Mwanza, 2018). Currently, there is a debate as to whether this legislation can get us beyond anthropocentrism. Legislature that highlights crimes against nature is still in a nascent stage.

Yet these emerging developments have implications for understanding human-wildlife conflicts that are caused by the expansion of human settlements and activities in formerly wild areas (Peterson et al., 2010; Frank and Glikman, 2019). If colonial oppression of nonhumans is recognized, wildlife pushed from their habitat and to the margins of human settlements can be seen as victims of unjust treatment. The framing of peaceful co-existence then shifts from eliminating “pests” and “managing” the wildlife population by killing or contraception (as commonly practiced in Africa in conflict areas (Cryer, 2021), to a balanced effort to reconcile human and nonhuman interests that include changes to human behavior and systems (e.g., Hoare, 2015). This requires an understanding of the anthropogenic drivers of conflict, such as

the expansion of the human population, demand for timber, and other resource forces driving poaching, as well as local communities' attitudes toward wildlife.

3. Nigerian context

Population growth, especially in Sub-Saharan Africa, is linked to increasing poverty, unemployment, and conflict (World Bank, 2021). If current population growth rates in Africa persist, the population will double in 33 years, raising serious concerns about African countries' food security, with concerns being especially stark for Nigeria, Ethiopia, and Egypt (Holechek et al., 2017). World Bank (2021) puts Nigeria's estimated population in 2020 at 206.139,587). With an annual population growth rate of 3.2%, as reported by Ejike Orji, a Nigerian Medical Consultant, and Reproductive Health Specialist, "the number of people we are producing every year is faster than our developmental rate" (<http://www.voanews.com/africa/nigerias-population-projected-doubling-2050>). The U.S. Census Bureau estimates that there will be about 400 million people in Nigeria in 2050 (<https://www.statista.com/statistics/1122955/forecasted-population-in-nigeria/>).

Unsurprisingly, Nigerian biodiversity is rapidly declining, and the IUCN Red List of threatened species is rapidly expanding (Hamadina et al., 2007; Borokini, 2014; IUCN, 2020). Nigeria's biodiversity is severely threatened by extractive industries such as oil (Ugochukwu and Ertel, 2008), mining (Lameed and Ayodele, 2010), and timber/logging (Alamu and Agbeja, 2011). The ill effects on wild nature are compounded by bushmeat hunting by local communities (Fa et al., 2006; Ripple et al., 2016). The Cross River rainforest of southeastern Nigeria, a relic pristine forest has its ecological integrity greatly threatened by a "myriad of human activities, such as unsustainable agricultural practices, illegal logging, population explosion/expansion of human settlements, construction of highways, mining activities, and high unemployment/pressure on natural resources" (Enuoh and Ogogo, 2018). Although there is some pristine forest in the delta areas between the Niger and Cross Rivers left despite human settlements, artisans' tree harvest, and installations by oil industries (Oates et al., 2004), and FAO (2010) estimated 2.9% of Nigeria's forest being primary and relatively intact; change is rapid, especially in Cross River State (Enuoh and Ogogo, 2018). The destruction of Nigerian biodiversity also triggers a "decline in human socio-economic activities with a resultant amplification in unemployment, poverty and crime rate" (Zungum et al., 2019:1847). As Bodasing (2019) wrote regarding African conservation, significant developments in African history have profoundly altered traditional ways of life:

"Firstly, the population has increased dramatically, exerting immense pressure on the landscape and ecosystems. Secondly, a concurrent change from a more sustainable existence to a high-resource consumption lifestyle has occurred. These factors are currently not considered in conservation planning. Many African communities now reside in burgeoning sedentary settlements, keep large herds and subsist on a predominantly meat-based diet. Trade and monetary profit have become more important than subsistence. This has led to demand on resources outstripping supply, with devastating consequences for wildlife and broader ecosystems." (p. 202).

While many indigenous societies were limited in numbers and used to hunt sustainably, today "indigenous" designations can be used as a legal tool to claim rights (e.g., the "indigenous right to hunt") that can potentially harm other species whose populations are plummeting. Also, there is evidence that early human groups have driven local extinctions and some indigenous peoples today fail to recognize the extinction crisis (Krantz, 1970; Fennell, 2008). Moreover, many indigenous groups, under the influence of Western industrial ideology, have (partially) transitioned to the monetary economy and the use of modern technology, transport, and weaponry (Kuhnlein and Receveur, 1996; Koot, 2016), as well as settled farming lifestyles. Given that livestock farming is heftily contributing to climate change (as well as often being ethically

questionable), there is an urgent need to re-evaluate our diet toward more plant-based eating (Garnett et al., 2013). As populations grow to expand, meat diets, which are dependent on both cattle grazing (that colonizes wild habitats) and bushmeat hunting (that threatens species with extinction) become more prominent (Ripple et al., 2016; Bodasing, 2019). In this context, local or indigenous communities transition to higher consumption lifestyle patterns: thus, the unqualified presentation of indigenous or local "stewardship" displaying a superior environmental ethic is incorrect (Fennell, 2008).

In implementing Half-Earth, conservationists, scientists, and policymakers should work in concert with indigenous people and local populations (Goodall, 2015). Such efforts are aimed at healing the relationship between local community and biodiversity, so that ideally, wide-scale nature protection will not adversely affect people in proximity to these natural areas (Goodall, 2015; Naidoo et al., 2019). Conservation outputs will hopefully involve, to put it bluntly, less hunting and more coexistence (Frank and Glikman, 2019). Other outputs might include something similar to the Roots and Shoots program, focused on building educational programs for local community members (Goodall, 2015; <https://orgs.tigweb.org/grass-roots-shoots-nigeria>).

4. Nigeria case study

This study was conducted in two communities that were very close to Yankari Game Reserve (YGR) in Nigeria's Bauchi State. These were Yalwan Bongo and Kafi (Fig. 1). YGR is part of West Africa's Premier Game Reserve Protected Area and harbors three of Africa's "big five" animals (buffalos, elephants, and lions). It features Nigeria's last viable population of savannah elephants (*Loxodonta africana*) and lions (*Panthera leo*), two species often implicated in human-wildlife conflict (Magama et al., 2018) but listed as vulnerable in the IUCN Red List (IUCN, 2020). Other animals present in the area include warthogs, baboons, Patas monkeys, Tantalus monkeys, African buffalo, hippopotamus, Western hartebeest, and waterbuck (Fig. 2), bushbuck, and many others (Bouché et al., 2011).

YGR includes two other protected areas in Bauchi State. Community members have benefitted from a Global Environment Facility (GEF) Project, conducted between 2005 and 2009, a collaboration between the National Park Service (NPS) and the State's Local Empowerment and Environmental Management Project (LEEMP), presently known as Community Social and Development Project (CSDP). The project included a component known as Protected Areas and Biodiversity Management. During the implementation of this project, the local communities around the YGR, also referred to as Support Zone Communities (SZCs), benefitted from skills acquisition training, loans (with no interest) for businesses, and social amenities to improve livelihoods. The SZCs gave much support to the park management in conserving biodiversity because of the perceived benefits they derived.

Yankari's community members, such as farmers, herders, and hunters, access and utilize the natural resources for their sustenance (Tende et al., 2011). The increase in human and livestock populations over the years has resulted in increased pressures on the park and surrounding resources, including encroachment of human activities at the boundaries of the protected area and the logging of fodder trees by Fulani herders for their livestock (Fada, 2015). These activities run contrary to the goals of the Half-Earth vision, calling for the exploration of community attitudes to biodiversity.

The two communities approached, Yalwan Bongo and Kafi, consisted of mainly farmers and herdsmen. They are involved/affected (both as victims and perpetrators) in human-wildlife conflicts and encroachment on the Protected Area. Yalwan Bongo is situated in the northern part of the reserve under the Pali district of Alkaleri Local Government Area.

5. Methodology

Participant observation in combination with in-depth interviews in

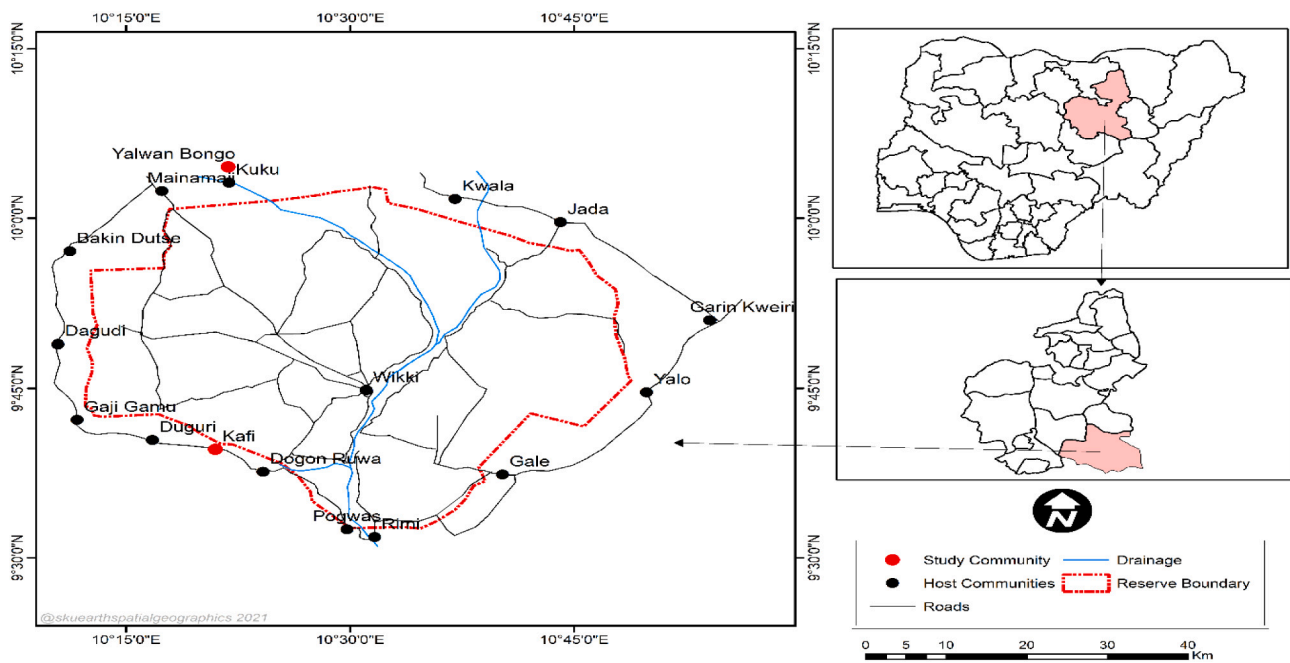


Fig. 1. Map of study areas near Yankari Game Reserve.



Fig. 2. A herd of waterbuck, *Kobus ellipsipymus* on Ahmadu Bello Way, Yankari Game Reserve.

developing countries is particularly relevant to culturally specific or sensitive contexts (Anderson, 2011). Participant observation can be used at two stages - both at the start to determine the suitable sample (typical participants) and at a later stage, to observe the surroundings and circumstances, such as signs of community standing/status and influence, and interaction with family and friends (Tedlock, 1991). This information could help determine an individual's social and political standing and influence on conservation questions.

The pilot study reported in this paper was conducted in Yalwan Bongo and Kafi, two communities close to YGR. It involved surveys conducted by a local conservationist (Naziru) and verified by a Nigerian biologist (Fatsuma) working in the field of monkey conservation. The language used for the interview was Hausa, which is widely used in northern Nigeria. The questions were written in English and interpreted into Hausa by Naziru. Fig. 3 shows Naziru filling questionnaires in Yalwan Bongo village. The pilot was conducted to explore the reception



Fig. 3. Naziru filling the questionnaires as respondents in Yalwan Bongo provide answers to the statements.

of the Half-Earth vision in the local culture. It probed how, at least on a small scale, members of local communities relate to biodiversity and understand the concept of sharing or coexistence (Frank and Glikman, 2019) with wildlife.

Since the objective of this project's outcomes/impacts is its focus on The Half-Earth initiative, which was assumed to be unknown to local people, the subject was translated into locally understandable terms, using the language comprehensible to local communities, by Naziru. Because of his knowledge of the local communities, he identified and designated the most appropriate (representative) individuals within villages, which were the village heads for the interviews. Talking to these elders was meant to win community trust and legitimacy, as in this cultural context the village heads, who are usually men, are respected and followed by others. Only village heads and men close to them were interviewed or responded to the questionnaire due to the ease of access due to cultural restrictions since the interviewer was male. The sample consisted of 9 men (including one elder) in Yalwan Bongo and 2 men (including the elder) in Kafi. It needs to be noted that research suggests that there might be large differences in gender attitudes in rural African communities to wildlife conservation (Mir et al., 2015). This study does not assume that village heads are a good representation of the entire community, especially as one may hypothesize that younger people in rural communities no longer hold strictly to the tribal system or respect the village heads and tribal leaders. Many of this younger generation is also more likely to be actively involved in illegal activities such as hunting or mining inside PAs due to poverty and desperation. Therefore, we hope that this preliminary study will be complemented by a larger more inclusive research. The questions asked in the survey were the following:

1. What do you think “wildlife” or “biodiversity” refers to?
2. Which local animals (and plants or other living organisms) do you know in the area?
3. Choose the “top three” of the ones you like from the ones you named above. Why are they your favorites?
4. Choose the “top three” of the ones you do not like (“pests”) from the ones you named above. Why do you consider them to be “pests”?
5. Imagine: you want to co-exist (live) peacefully with all animals and plants. How do you see this?
6. How do you think the “pests” can be lived without killing them? What is needed (possible options: compensation payment, profit from

eco-tourism, connection with all living beings, etc.)

7. Have you heard about the Half-Earth vision? If yes: what have you heard? (If not, the surveyor can briefly introduce the concept and ask the participant what they think about it).

8. How do you think about the idea of sharing this area (and indeed the Earth) with other nonhuman beings (animals, plants)? What will be different from the way these are seen/used now? Do you think it will be a positive experience for you?

Other related topics, such as ideas for “peaceful co-existence” were framed and translated in locally comprehensible terms, also for the illiterate members of the community. Instead of using terminology such as “biodiversity conservation”, simpler terms, involving names of locally known animals and plants, were used. Evaluation questions regarding collected data have ensured that the answers received do reflect individual attitudes.

The results reported here serve as a pilot project for expanding the study to the 22 communities close to YGR, and where the rangers' patrol posts were situated.

6. Results

The responses from Yalwan Bongo and Kafi are shown respectively in Tables 1 and 2. Although there were nine respondents in Yalwan Bongo, the village head was interviewed first. The community members interfered (with the permission of the village head) because they feel the answer the village head provided was not satisfactory. Others provided similar responses to that of the village head. The village head said the responses to this questionnaire constituted “their views on the questions”. Table 1 represents the views on wildlife or biodiversity of the respondents in Yalwan Bongo. It seemed they poached buffaloes, roan antelopes, and waterbucks. Elephants, buffaloes, monkeys, and ungulates were the major pests raiding their crops. The community members have just learned about the Half-Earth vision and expressed willingness to co-exist with wildlife if the government would support them.

Table 2 shows the outcome of the interview of two respondents in Kafi, with the first interviewee being an elder in the community. This community is known for engaging in illegal activities, e.g., poaching. Their responses were similar to those of respondents in Yalwan Bongo.

During the discussions on the Half-Earth vision, members of the two

Table 1
Responses from the Yalwan Bongo community.

S/ No.	Questions	Responses from Yalwan Bongo
1	What do you think “wildlife” or “biodiversity” refers to?	Wild animals and their home
2	Which local animals (and plants or other living organisms) do you know in the area?	Elephants, patas monkey, tantalus monkey, and fox.
3	Choose the “top three” of the ones you like from the ones you named above. Why are they your favorites?	Roan antelope, buffalo, Waterbuck (“we like to see them,” they said, and there was laughter).
4	Choose the “top three” of the ones you do not like (“pests”) from the ones you named above. Why do you consider them to be “pests”?	Elephants, patas monkey, tantalus. “They raid our crops”, they replied.
5	Imagine: you want to co-exist (live) peacefully with all animals and plants. How do you see this?	It is possible if the government provides the right support to help us manage the co-existence.
6	How do you think the “pests” can be lived without killing them? What is needed (possible options: compensation payment, profit from eco-tourism, connection with all living beings, etc.)	“We have not heard about it”. After an explanation by the interviewer, they said it will be nice if the government and professionals take the right step in the implementation.
7	Have you heard about the Half-Earth vision? If yes: what have you heard? (If not, the surveyor can briefly introduce the concept and ask the participant what they think about it).	The answer was the same as the 6 above.
8	What do you think about the idea of sharing this area (and indeed the Earth) with other nonhuman beings (animals, plants)? What will be different from the way these are seen/used now? Do you think it will be a positive experience for you?	It will be positive.

support zone communities (SZCs) kept referring to the benefits derived from the 2005–2009 GEF project and emphasized that sustaining such projects required receiving benefits from them and extending benefits to other SZCs.

The researcher found that the villagers were repeating what the elder has said. While some individuals talked freely about the animals they liked, instrumental attitudes were also apparent. Translating “animals into money” was common, with ideas about fairness and rights for non-human animals, and balance between human and non-human needs hardly expressed. Informally, however, the interviewer noted that many respondents cared for animals and were interested in the Half-Earth vision. This reflects the time and funding limitations of the researcher, but also suggests several possible explanations and ways forward, discussed below.

7. Discussion: larger implications

Surveying local attitudes to wildlife served as a starting point for reflecting on how biodiversity and human communities can co-exist and mutually flourish. Half-Earth practitioners must work with communities to achieve ecological integrity and people's well-being in tandem. The pilot survey revealed that the Half-Earth is a new concept in Nigeria and not well understood in the two SZCs. While local people were unaware of the Half-Earth vision, after the introduction to the concept they felt generally positive about its implementation if certain conditions were met.

One of the observations from the above survey is that people need more information and want empowerment. The local villagers who participated in the survey either fully agreed or did not want to contradict the elder. It was hard to gauge the attitudes of those in the community who did not speak but perhaps participated in poaching or felt sympathetic toward wildlife.

Table 2
Responses from the Kafi community.

S/ No.	Questions	Responses from Kafi, Elder	Responses from Kafi, a young man
1	What do you think “wildlife” or “biodiversity” refers to?	Wild animals and plants.	A protected area for benefits.
2	Which local animals (and plants or other living organisms) do you know in the area?	Elephants, warthog, buffalo, patas monkey, crocodile, Roan antelope, <i>Khaya senegalensis</i> tree, Baobab tree, <i>Tamarindus indica</i> tree.	Duiker, bushbuck, waterbuck, hare, baboons, patas monkey, tantalus monkey.
3	Choose the “top three” of the ones you like from the ones you named above. Why are they your favorites?	Buffalo, roan antelope, crocodile.	Duiker, waterbuck and hare.
4	Choose the “top three” of the ones you do not like (“pests”) from the ones you named above. Why do you consider them to be “pests”?	Warthog, elephant, patas monkey. They raid my crops.	Tantulus Monkey, patas monkey, and baboons. They raid our crops a lot.
5	Imagine: you want to co-exist (live) peacefully with all animals and plants. How do you see this?	This is good and possible if we get alternative means of livelihood to co-exist with wildlife.	It is possible if there are alternative means of livelihood.
6	How do you think the “pests” can be lived without killing them? What is needed (possible options: compensation payment, profit from eco-tourism, connection with all living beings, etc.)	Payment of compensation and profit from eco-tourism.	Payment of compensation. Provision of jobs for youths
7	Have you heard about the Half-Earth vision? If yes: what have you heard? (If not, the surveyor can briefly introduce the concept and ask the participant what they think about it).	No, I just heard it now from you (the interviewer).	No, I heard it today.
8	What do you think about the idea of sharing this area (and indeed the Earth) with other nonhuman beings (animals, plants)?	It will be positive and beneficial	I think it will be positive and helpful.

It also appears that community members surveyed were broadly positive about conservation conditional on the availability of government money. Since the GEF project resulted in financial benefits to community members, it is possible to propose that such benefits will go a long way in realizing proper wildlife management in the reserve and achieving the Half-Earth vision. However, the surveys also indicate that at present, anthropocentric, neocolonial thinking of “nature as a commodity” (Kopnina, 2017) namely, monetizing wildlife through the expectation of compensation (Digun-Aweto and Van Der Merwe, 2019), trumps ecocentric motivation. Besides the fact that “paying for not killing” is by no means traditional, ecocentric, or considerate of animal personhood or sentience. Research shows that financial compensation might harm wildlife as providing a financial incentive “not to kill” creates a very dangerous precedent that is economically unsustainable and does not tackle the root cause (Oates et al., 2004; Bulte and Rondeau, 2005). Compensation programs can be viewed as a subsidy

toward crop and livestock production that trigger agricultural expansion and habitat conversion (Bulte and Rondeau, 2005), and thus have potentially adverse effects on the wildlife population that compensation intends to favor (Oates, 1999). Poor farmers should be compensated for the crop damage, but this process should be simultaneous with the development of longer-term solutions, for example (as suggested in one of the survey answers above), ecotourism. Follow-up research needs to explore whether ecotourism is possible in all places, and what the larger costs and tradeoffs are, e.g., air travel and infrastructure expansion, as some aspects of ecotourism can be problematic concerning social and ecological objectives (Kopnina, 2021). Since the resources needed for tourism must come from somewhere, these alternatives need to be clearly articulated.

It is imperative to address the root causes of poaching. These include the lack of alternative livelihoods, the demand from Asian countries for animal parts (for example for Chinese “traditional” medicine), and the demand for tropical wood from Western countries. In each case of human-wildlife conflict, the root causes and most effective solutions need to be considered, and these solutions need to involve the simultaneous provision of justice for both humans and nonhumans.

“Convivial conservation” presents itself as post-capitalist and suggests the transition from traditional protected areas to “promoted areas” where “people’s livelihoods would be based not on capitalist enterprises like eco-tourism”, but on supposedly non-capitalist activities including the “sustainable use of natural resources” to be “funded through the state, promoted area entrance fees and crowdsourcing” (Luque-Lora, 2021). Between the lines, a form of the socialist or communist regime seems implied, as the capitalist system is criticized, and no other socio-political alternative is offered. However, it is doubtful whether such a presumably socialist state or “crowd-sourcing” public will be willing to donate. While capitalism is rightly criticized by convivial conservation proponents, a stark anthropocentric bias remains, evident in the lack of discussion about expanding human numbers and shrinking habitats for wildlife, as well as in the lack of opposition to bushmeat hunting or conversion of wildlife habitats to agricultural areas. Biodiversity remains a prop for human development. Ironically, conviviality commodifies biodiversity in the same way that is promoted in capitalist discourse (Kopnina, 2017), avoiding the question of how “sustainable use” of critically endangered species can avoid extinction or gross diminishment. In the “conviviality” platform, as in the “new conservation” movement, nonhuman beings are given no voice and no moral consideration (see Kopnina et al., 2018; Washington et al., 2018). One could also argue that if a young person in a local community has the natural skills to find and identify birds, and takes it upon themselves to train a couple of others and sell their skills as local bird guides to ecotourists, this is not a capitalist enterprise but a case of benign positive activity that does not harm wildlife but garners an appreciation for it and has the additional advantage of creating jobs in local communities. We outline non-anthropocentric alternatives below.

8. Ways forward in decolonizing conservation

One of the ways forward is spearheaded by the Roots and Shoots program offered in Nigeria (<https://orgs.tigweb.org/grass-roots-shoot-s-nigeria>), an organization that educates young people about the larger issues at play in the relations between humans and other species. For example, Roots and Shoots teach that hit-and-run self-enrichment practices, such as (illegal) hunting and logging, are ethically dubious and unsustainable in the longer term. Such educational programs empower young people to express their concern for the future and take a stand against detrimental practices, ranging from poaching to extractive industries. Another non-governmental organization, the Nigerian Conservation Foundation (NCF), the institutional symbol of natural resources management in Nigeria envisions “a Nigeria where people prosper while living in harmony with nature” and focuses on environmental education, biodiversity conservation, and policy advocacy

among others (<https://www.ncfnigeria.org/about-ncf/ncf-in-brief>). Given the vastness of Nigeria and its teeming population, other programs need to complement what Roots and Shoots, which is based in Lagos, and NCF (also based in Lagos, but operates in all the six geopolitical zones of the country) are doing. Project Educator Ambassador provides a platform for teachers to engage each other and their students with the Half-Earth vision. This is to inspire and connect the local community with the natural world. Communities like the ones studied could connect with the Half-Earth vision if conservation education programs are introduced in YGR to increase awareness.

To ensure that nonhuman and human worlds thrive together in the long term and that people see advantages to their communities, the Half-Earth movement must be complemented by downscaling the human enterprise (Crist, 2019). In the case of Africa, as Bodasing (2019) reflects, ideally governments should be subsidizing local companies and enforcing conservation legislation that puts “people and nature before greed” (p. 205). Are poor, often dysfunctional governments likely to do this? To achieve this, economic reforms are needed to address poverty sustainably, for example, through a proper wage for organic, diverse, and regenerative agriculture, integration of wildlife habitats within small-scale farming (Yigitcanlar et al., 2019), and embracing mostly plant-based diets (Bodasing, 2019). Another reform could concern foreign funding organizations (often affiliated with central governments in a country) such as USAID, GEF, World Bank, EU, etc. to make it explicitly clear to African governments and supporting partners that if the evidence does not show any change in several years (e.g. trend in chimpanzee populations stops decreasing or several arrests for hunting increases) that project funding will be pulled and diverted elsewhere. These initiatives have to be evidence/performance driven, legitimizing sanctions against governments for continuing to allow ecocide, or for non-compliance regarding conservation outcomes (using evidence as to the measure).

All this is easier said than done, which means it would be good to get a discussion about what needs to be done underway expeditiously. Non-ecocentric approaches seem unaware of animal welfare and rights concerns and ignore alternative dietary choices, such as a substantial reduction of animal products that would be beneficial both in combating climate change and protecting biodiversity loss. The lack of reciprocity between human communities and other species is morally and pragmatically problematic, as witnessed by emerging literature on ecocentrism, animal ethics, and nonhuman/nature rights, especially concerning wild and domestic animals in developing countries, such as Nigeria (Ugochukwu and Ertel, 2008; Lameed and Ayodele, 2010; Alamu and Agbeja, 2011; Alabi, 2018). Summarizing recommendations for a sustainable future in Africa, Holeček and colleagues urge “improved and equal education opportunities for both genders, family planning assistance, renewable energy development, empowerment of women, improvement of soil and water resources, and wildlife conservation should be areas of development focus” (Holeček et al., 2017:273).

There are ways in which existing and proposed visions of conservation can meet. In agreement with “convivial conservation”, the Half-Earth vision recognizes the culpability of the capitalist enterprise in environmental destruction but simultaneously highlights the fact that socialist alternatives will not save biodiversity, if industrial and agricultural development, serve the needs of a large and growing human population, are not reined in. The level of protection proposed by Half-Earth could challenge mining, logging, and industrial agriculture (Vettese et al., 2022). Besides regulating the rapacious industry, however, the local community also must understand the need to scale down, especially in terms of population and an ecologically costly diet (Bodasing, 2019).

The example of tiger conservation in India teaches how to balance the need for local people’s access to nature areas with wildlife protection (The Economist, 2017:69). One novel idea is to foster “satellite habitats” around the primary reserves, or interconnected wilderness corridors

(Noss et al., 2012). In the African context of animals identified as pests, such as elephants, many non-lethal solutions to minimize conflict are proposed (Hoare, 2015). For example, the declining population of mona monkeys, due to depleted habitat, requires designating protected urban forests for the species' recovery and conservation (Olaeru et al., 2020). The mountain gorillas in Rwanda may be another good example. Rwanda is a densely populated country, with extensive agriculture but the gorilla reserves compensate locals through ecotourism (Weber et al., 2002). However, despite the success story, mountain gorillas are still ecologically marooned on a few remaining "islands" of natural habitat that remain to them. There is nowhere else for them to go and they remain a fragment of what they used to be.

Larson and colleagues' research of retaliatory killing for crop-raiding, and bushmeat killing and consumption by communities living close to the protected areas, indicates that pro-conservation attitudes were less prevalent among younger people and immigrants and suggested that enhanced appreciation of wildlife needs to be tackled among these groups (Larson et al., 2016). Their findings emphasized the benefits of promoting local knowledge, and "citizen science" to empower local people and enhance positive outcomes of wildlife conservation (Larson et al., 2016). However, local knowledge works only when coupled with enforcement, sound management, and key skills that can create an inclusive package to fight back against the ransacking of the natural world.

These improved education opportunities in conjunction with basic literacy would help members of local communities to gain autonomy and employment. Education in Nigeria suffers from several challenges, including poor funding, inadequate classrooms, and teaching aids, a "paucity of quality teachers, and a poor/polluted learning environment" (Odia and Omofonmwan, 2007). These shortcomings yield poor educational achievement and limited employability choices. As OECD's Program for International Student Assessment (PISA) indicates, Nigeria can gain from ambitious investment in education, especially the education of girls and young women (<https://www.oecd.org/pisa/publications/pisa-2018-results.htm>). The terrorist group Boko Haram complicates an already difficult situation by targeting schools for attacks and abductions (Bertoni et al., 2019). It would help if Nigerian authorities, perhaps with the assistance of international peacekeeping organizations and development aid donors, would support and protect schools (sometimes literally, during the Boko Haram attacks and abductions).

Additionally, although Nigeria does not lead in this trend, in a world rapidly converging toward a middle-class standard of living (with Nigeria also having its fair share of middle-class urbanites), stabilizing and gradually reducing the global population is essential (Pimentel et al., 2010; Crist, 2019). This aim can be addressed through voluntary family planning prioritizing human and reproductive rights, countering unwanted pregnancies through the abolition of child marriage, education through at least secondary school, and comprehensive sex education in every school (Crist et al., 2017). One can reflect that those impacted by human reproduction, billions of members of nonhuman species, also need to have a say in the matter through eco-democratic representation (Gray et al., 2020). Family-planning education programs to counter teenage pregnancies have been shown to have a positive effect on alleviating poverty, and, indirectly but significantly, population growth (Gragnolati, 2016; World Bank, 2021). As The United Nations' Development Fund states when couples are empowered to plan whether and when to have children, women are better enabled to complete their education. This, in turn, helps to improve their earning power and "strengthen their economic security and well-being and that of their families", as well as contribute to "development progress and poverty reduction" (UNFPA United Nations Development Fund, 2014). This is especially important in Nigeria, where cultural and religious oppressive norms against contraception, and relatedly deeply ingrained patriarchy, make changing men's views and attitudes imperative (Duze and Mohammed, 2006). Also in Nigeria, when clerics extol the benefits of family planning, couples were more likely to adopt modern contraceptive methods, highlighting the importance of engaging religious

leaders in such education to help increase the country's present low uptake of family planning services (Adedini et al., 2018). Fortunately, such initiatives are becoming more prominent in Nigeria (<https://www.familyplanning2020.org/nigeria>).

As Bosah (2013) has pointed out, Nigerian schools could potentially become "key to environmental adequacy and knowledge in students as future influential decision-makers" (p. 159). As seen from the sample of surveys above, both awareness of the challenges of conservation and people's sense of empowerment to think and act without "authorities" seem lacking. Thus, education is "key to empowerment and participation in decision making, with regards to solving some of the world's vital environmental issues and challenges" (Bosah, 2013:159). Educational programs that focus on conservation combined with other learning – and not just from a utilitarian point of view – could be very helpful (Goodall, 2015).

Another direction is educational programs addressing animal rights and welfare, as a Nigerian scholar Olufemi Alabi (2018) has noted:

"Even though the livestock sector carries the highest percentage among agricultural facets commercially in Nigeria, the level of welfare of the domestic animals and those in the wild are still below standard. This paper is however suggesting that even with the level of economic developments in most low- and middle-income nations, researchers can be motivated into animal welfare science, and the curricula of colleges and universities can be expanded to include subjects of applied ethology, professional bodies, and associations on animal welfare can be formed with international affiliations. All these may change the orientation of the people and governments in developing countries positively towards animal welfare" (p. 1).

The economic and cultural aspects of cattle need to be addressed as it is a significant issue in many parts of Africa, and throughout Asia and the Americas, resulting in reduced range for many native species. These cultural aspects can also be tackled through an understanding of changing worldviews, from traditionally more ecocentric to a more monetized one. Reviving pre-existing indigenous expressions of ecocentrism (Shoreman-Ouimet and Kopnina, 2015) would be an enormous contribution toward moving in an ecologically sustainable direction. The colonialism of the mind is evident in emulations of the Western obsession with money as the main measure of progress. Indeed, China is following this path with a vengeance, and has great influence in many parts of Africa, abandoning the greatest treasure of all—the realization that nature and humans are interconnected. Our follow-up research in Nigeria explores such ideas of how decolonization can liberate both vulnerable human communities and millions of other living beings in the service of peaceful coexistence.

In this pilot study, talking to the elders seemed like a logical choice to begin this research and gain legitimacy, to win community trust and legitimacy, but further research, providing a rich contextual understanding through ethnographic data, will need to engage with a larger sample of community members. Methodologically, the ways forward include the deeper exploration of the potential to develop educational or other initiatives that would help to activate communities in realizing the Half-Earth vision. In-depth interviews involving the community's understanding and attitudes toward biodiversity, adaptable to challenging field conditions, and suitable for generating questions, understanding, and dialogue can be useful in the follow-up research. Attitudes to biodiversity and wildlife can then be better contextualized by the researchers so that both the researchers and the community participants can co-design the visions of a "viable future" for both community members and wildlife. These could involve suggested alternatives to financial compensation by conservation authorities, opportunities, or eco-tourism, but also not-instrumental benefits, such as being able to live, once again, in a balanced relationship with surrounding nature.

The challenges of planetary-scale ecological degradation demand a global ambition, including from marginalized communities, and foresight from "diverse societies and cultures to shape a terrestrial biosphere

in which the non-human world can thrive together with us across the Anthropocene” (Ellis, 2019:166). Nigeria, one of the countries with a large and growing human population and an equally large promise of becoming a significant contributor to the global sustainability efforts, can already illustrate how social and economic needs can be balanced with the needs of thriving biodiversity. The heritage of colonial oppression and subordination of nonhumans can only be addressed when community attitudes shift toward an ecocentric appreciation of the diversity of life, drawing both on indigenous cultural values and new scientific and ethical perspectives.

9. Conclusion

Certain general lessons can be drawn from a small survey administered within local communities living near a protected area in Nigeria. First, community representatives are open to dialogue with local conservationists about how successful conservation can be accomplished with mutual benefit. However, community members seem to lack a larger world picture in which ideological Western colonialism of “money as progress” overshadows the deteriorating plight of both local people and biodiversity. Second, while surveyed villagers could enumerate impacts on some animals, they seemed unaware of, or unconcerned about, big underlying drivers of biodiversity loss. Larger factors responsible for biodiversity loss, such as growing human numbers, climate change, and meat diets remain the “unknowns” of community attitudes and need to be explored in the follow-up research.

Also, little in the way of empowerment through education can be observed, as villagers tend to defer to elders or policymakers for guidance. Some pragmatic solutions that mutually benefit the community and other species include compensation for ceasing hunting bushmeat and promoting eco-tourism. However, aside from financial motivation, comprehension of both ethical and pragmatic implications of biodiversity decline, are necessary. Thus, we recommend educational programs that teach peaceful co-existence and empower individuals to speak out against environmentally damaging practices.

Half-Earth is impossible without radical action to scale back humanity's demands on the natural world. That necessarily means both reducing human numbers and radically reforming economies, switching from the pursuit of “more” to the pursuit of “sufficient”. Such a stance is ultimately more realistic than the endless growth economy, the ideology which has colonized hearts and minds across the world, including Africa. But it is also more realistic than various “green deal” proposals that imagine some version of the current growth economy, just more rationally managed. Nigeria and the world need a decolonized alternative future, for both oppressed humanity and nonhuman communities.

Declaration of competing interest

On behalf of all co-authors, corresponding author, Helen Kopnina, states that there is no conflict of interest and that this article has not been published elsewhere.

References

- Adedini, S.A., Babalola, S., Ibeawuchi, C., Omotoso, O., Akiode, A., Odeku, M., 2018. Role of religious leaders in promoting contraceptive use in Nigeria: evidence from the Nigerian urban reproductive health initiative. *Glob. Health, Sci. Pract.* 6 (3), 500–514.
- Alabi, O., 2018. Overview of animal welfare and its science in Nigeria. *Res. J. Agric.* 5 (9), 1–9.
- Alamu, L.O., Agbeja, B.O., 2011. Deforestation and endangered indigenous tree species in south-West Nigeria. *Int. J. Biodivers. Conserv.* 3 (7), 291–297.
- Anderson, E.N., 2011. Drawing from traditional and ‘Indigenous’ socioecological theories. In: Kopnina, H., Shoreman-Ouimet, E. (Eds.), *Environmental Anthropology Today*. Routledge, New York, pp. 56–74.
- Bertoni, E., Di Maio, M., Molini, V., Nistico, R., 2019. Education is forbidden: the effect of the boko haram conflict on education in north-East Nigeria. *J. Dev. Econ.* 141, 102249.
- Bisgould, L., 2008. Power and irony: one tortured cat and many twisted angles to our moral schizophrenia about animals. In: *Animal Subjects: An Ethical Reader in a posthuman world*, 8, p. 259.
- Bodasing, T., 2019. Looking beyond the past to give African wildlife a future: a critical review of the big conservation lie. <https://www.ecologicalcitizen.net/pdfs/v02n2-16.pdf>.
- Borokini, T.I., 2014. A systematic compilation of IUCN red-listed threatened plant species in Nigeria. *Int. J. Environ. Sci.* 3 (3), 104–133.
- Borrás, S., 2016. New transitions from human rights to the environment to the rights of nature. *Transnational Environmental Law* 5 (1), 113–143.
- Bosah, V.O., 2013. Environmental education in Nigeria: Issues, challenges, and prospects. *Mediterranean Journal of Social Sciences* 4 (15), 159–159.
- Bouché, P., Douglas-Hamilton, I., Wittmyer, G., Nianogo, A.J., Doucet, J.L., Lejeune, P., Vermeulen, C., 2011. Will elephants soon disappear from west African savannahs? *PLoS One* 6 (6), e20619.
- Bremner, J., Bilsborrow, R., Feldacker, C., Holt, F.L., 2009. Fertility beyond the frontier: indigenous women, fertility, and reproductive practices in the Ecuadorian Amazon. *Popul. Environ.* 30 (3), 93–113.
- Bulte, E.H., Rondeau, D., 2005. Why compensating wildlife damages may be bad for conservation. *J. Wildl. Manag.* 69 (1), 14–19.
- Burdon, P., 2011. *Exploring Wild Law: The Philosophy of Earth Jurisprudence*. Wakefield Press, South Australia.
- Cafaro, P., Butler, T., Crist, E., Cryer, P., Dinerstein, E., Kopnina, H., Noss, R., Piccolo, J., Taylor, B., Vynne, C., Washington, H., 2017. If we want a whole Earth, Nature Needs Half: a response to Büscher et al. *Oryx* 51 (3), 400–400.
- Chapron, G., et al., 2019. A rights revolution for nature. *Science* 363 (6434), 1392–1393.
- Crist, E., 2012. Abundant earth and the population question. In: Cafaro, P., Crist, E. (Eds.), *Life on the Brink: Environmentalists Confront Overpopulation*. University of Georgia Press, Athens, pp. 141–151.
- Crist, E., 2019. *Abundant Earth: Toward an Ecological Civilization*. University of Chicago Press, Chicago.
- Crist, E., et al., 2017. The interaction of human population, food production, and biodiversity protection. *Science* 356 (6335), 260–264.
- Crist, E., Kopnina, H., Cafaro, P., Gray, J., Ripple, W.J., Safina, C., Davis, J., DellaSala, D. A., Noss, R.F., Washington, H., Rolston, H., Taylor, B., Orlikowska, E.H., Heister, A., Lynn, W., Piccolo, J.J., 2021. An ecological and social rationale for nature needs half. [Front. Conserv. Sci.](https://doi.org/10.3389/fcosc.2021.761292) <https://doi.org/10.3389/fcosc.2021.761292>.
- Cryer, P., 2021. Immunicontraception in African elephants. Webinar. <https://www.wildlifefertilitycontrol.org/webinar-9-elephants/>.
- Digun-Awet, O., Van Der Merwe, P., 2019. Community perceptions of the human-wildlife conflict: a case study of old Oyo National Park Nigeria. *Biodiversity* 20 (2–3), 118–131.
- Dinerstein, E., et al., 2017. An ecoregion-based approach to protecting half the terrestrial realm. *Bioscience* 67 (6), 534–545.
- Duze, M.C., Mohammed, I.Z., 2006. Male knowledge, attitude, and family planning practices in northern Nigeria. *Afr. J. Reprod. Health* 10 (3), 53–65.
- Economist, The, 2017. In: *A Tiger's Tale*, pp. 67–70. December 23.
- Economist, The, 2018. In: *Animals in Court: Do They Have Rights?*, December 22, pp. 85–86.
- Ellis, E.C., 2019. To conserve nature in the anthropocene, half-earth is not nearly enough. *One Earth* 1 (2), 163–167.
- Enuoh, O.O., Ogogo, A.U., 2018. Assessing tropical deforestation and biodiversity loss in the cross-river rainforest of Nigeria. *Open J. For.* 8 (3), 393–408.
- Fa, J.E., Seymour, S., Dupain, J.E.F., Amin, R., Albrechtsen, L., Macdonald, D., 2006. Getting to grips with the magnitude of exploitation: bushmeat in the cross-sanaga rivers region Nigeria and Cameroon. *Biological Conservation* 129 (4), 497–510.
- Fada, S.J., 2015. Processes and Drivers of Vegetation Change in African Drylands: A Case Study of Yankari Game Reserve, Nigeria.
- FAO, 2010. *Food and Agriculture Forestry Paper 163: Global Forest Resource Assessment 2010 Main Report*. FAO Publication, Rome.
- Fennell, D.A., 2008. Ecotourism and the myth of indigenous stewardship. *J. Sustain. Tour.* 16 (2), 129–149.
- Frank, B., Glikman, J.A., 2019. Human-wildlife conflicts and the need to include coexistence. *Human-wildlife interactions: turning conflict into coexistence*. Ser. *Conserv. Biol.* 23, 1–19.
- Garnett, T., Appleby, M.C., Balmford, A., Bateman, I.J., Benton, T.G., Bloomer, P., Herrero, M., 2013. Sustainable intensification in agriculture: J. Premises and policies. *Science* 341 (6141), 33–34.
- Goodall, J., 2015. Caring for people and valuing forests in Africa. In: Wuerthner, et al. (Eds.), *Protecting the Wild: Parks and Wilderness, the Foundation for Conservation*. Island Press, Washington D.C., pp. 21–26.
- Gragnotati, M., 2016. Family planning, demographic change, and poverty: a call for action. *World Bank blogs*. <https://blogs.worldbank.org/health/family-planning-demographic-change-and-poverty-call-action>.
- Gray, J., Wienhues, A., Kopnina, H., DeMoss, J., 2020. Ecodemocracy: operationalizing ecocentrism through political representation for non-humans. *Ecol. Citiz.* 3 (20), 166–177.
- Hamadina, M.K., Otobotekere, D., Anyanwu, D.I., 2007. Impact assessment and biodiversity considerations in Nigeria. *Manag. Environ. Qual.* 18 (2), 179–197.
- Higgins, P., 2010. *Eradicating ecocide: Laws and Governance to prevent the destruction of our planet*. Shephard Walwyn Publishers Ltd, London.
- Hoare, R., 2015. Lessons from 20 years of human-elephant conflict mitigation in Africa. *Hum. Dimens. Wildl.* 20 (4), 289–295.

- Holechek, J.L., Cibils, A.F., Bengaly, K., Kinyamario, J.I., 2017. Human population growth, African pastoralism, and rangelands: a perspective. *Rangel. Ecol. Manag.* 70 (3), 273–280.
- IUCN, 2020. <https://www.iucnredlist.org/resources/media>.
- Johns, D., 2021. Human confusion: why there must be justice for non-humans. *Rewilding Earth*. <https://rewilding.org/human-confusion/>.
- Koot, S., 2016. Cultural ecotourism as indigenous modernity: Namibian bushmen and two contradictions of capitalism. In: Kopnina, H., Shoreman-Ouimet, E. (Eds.), *Handbook of Environmental Anthropology*. Routledge, New York, pp. 315–326.
- Kopnina, H., 2016a. Half the earth for people (or more)? Addressing ethical questions in conservation. *Biol. Conserv.* 203, 176–185.
- Kopnina, H., 2016b. The victims of unsustainability: a challenge to sustainable development goals. *International Journal of Sustainable Development & World Ecology* 23 (2), 113–121.
- Kopnina, H., 2017. Commodification of natural resources and forest ecosystem services: examining implications for forest protection. *Environ. Conserv.* 44 (1), 24–33.
- Kopnina, H., 2020. Education for the future? Critical evaluation of education for sustainable development goals. *J. Environ. Educ.* 51 (4), 280–291.
- Kopnina, H., 2021. The role of ecotourism in nature needs half vision. In: Fennell, B. D. (Ed.), *Routledge Handbook of Ecotourism*. Routledge, New York, pp. 357–371.
- Kopnina, H., Washington, H., Gray, J., Taylor, B., 2018. The ‘future of conservation’ debate: defending ecocentrism and the nature needs half movement. *Biol. Conserv.* 217, 140–148.
- Kopnina, H., Crist, E., Gray, J., Nowak, K., et al., 2020. Toward an equitable future for all species. In: *Sustainability Community*. Springer Nature. <https://sustainabilitycommunity.springernature.com/posts/58468-toward-an-equitable-future-for-all-species>.
- Krantz, G.S., 1970. Human activities and megafaunal extinctions: man's modification of the environment may have caused the demise of some large Pleistocene mammals. *Am. Sci.* 58 (2), 164–170.
- Kuhnlein, H.V., Receveur, O., 1996. Dietary change and traditional food systems of indigenous peoples. *Annu. Rev. Nutr.* 16 (1), 417–442.
- Lameed, G.A., Ayodele, A.E., 2010. Effect of quarrying activity on biodiversity: case study of ogbere site, Ogun state Nigeria. *Afr. J. Environ. Sci. Technol.* 4 (11), 740–750.
- Larson, L.R., Conway, A.L., Hernandez, S.M., Carroll, J.P., 2016. Human-wildlife conflict, conservation attitudes, and a potential role for citizen science in Sierra Leone Africa. *Conservation and Society* 14 (3), 205–217.
- Lewis, D., 2005. Anthropology and development: the uneasy relationship. In: Carrier, James G. (Ed.), *A Handbook of Economic Anthropology*. Edward Elgar, Cheltenham, UK, pp. 472–486.
- Lidskog, R., Elander, I., 2010. Addressing climate change democratically: multi-level governance, transnational networks, and governmental structures. *Sustain. Dev.* 18 (1), 32–41.
- Luque-Lora, R., 2021. Convivial Conservation: Book Review and Authors' Response. <http://politicecologynetwork.org/2021/05/28/convivial-conservation-book-review-and-authors-response/>.
- Magama, Y.A., Babagana, M., Usman, A.U., Gujja, A.A., Adamu, A., Karachi, A.E., 2018. Assessment of wildlife species mostly involved in human-wildlife conflict around Yankari Game Reserve, Bauchi State, Nigeria. *Int. J. Contemp. Res. Rev.* 9 (09), 20262–20277.
- Mir, Z.R., Noor, A., Habib, B., Veeraswami, G.G., 2015. Attitudes of local people toward wildlife conservation: a case study from the Kashmir Valley. *Mt. Res. Dev.* 35 (4), 392–400.
- Montford, K.S., Taylor, C. (Eds.), 2020. *Colonialism and Animality: Anti-colonial Perspectives in Critical Animal Studies*. Routledge.
- MPAtlas (Marine Protection Atlas), 2021. www.mpatlas.org/.
- Mwanza, R., 2018. Enhancing accountability for environmental damage under international law: ecocide as a legal fulfillment of ecological integrity. *Melb. J. Int. Law* 19, 586.
- Naidoo, R., et al., 2019. Evaluating the impacts of protected areas on human well-being across the developing world. *ScienceAdvances* 5 (4), eav3006.
- Noss, R.F., et al., 2012. Bolder thinking for conservation. *Conserv. Biol.* 26, 1–4.
- Oates, J.F., Bergl, R.A., Linder, J.M., 2004. Africa's gulf of guinea forests: biodiversity patterns and conservation priorities. In: *Advances in Applied Biodiversity Sciences Series 6*. Conservation International, Washington, DC., USA, 95 pp.
- Odia, L.O., Omofonmwan, S.I., 2007. Educational system in Nigeria problems and prospects. *J. Soc. Sci.* 14 (1), 6–85.
- Olaleru, F., Ogunfuwa, A.A., Omoregie, Q.O., 2020. An assessment of human-monkey conflict in urban communities in Lagos State, Nigeria. *Unilag Journal of Medicine, Science, and Technology* 8 (1), 160–175.
- Peterson, M.N., Birkhead, J.L., Leong, K., Peterson, M.J., Peterson, T.R., 2010. Rearticulating the myth of human-wildlife conflict. *Conserv. Lett.* 3 (2), 74–82.
- Piccolo, J., Washington, H., Kopnina, H., Taylor, B., 2018. Back to the future: why conservation biologists should re-embrace their ecocentric roots. *Conserv. Biol.* 32 (4), 959–961.
- Pimentel, D., et al., 2010. Will limited land, water, and energy control human population numbers in the Future? *Hum. Ecol.* 38 (5), 599–611.
- Pressey, R.L., Cowling, R.M., Rouget, M., 2003. Formulating conservation targets for biodiversity pattern and process in the cape floristic region, South Africa. *Biol. Conserv.* 112, 99–127.
- Ripple, W.J., Abernethy, K., Betts, M.G., Chapron, G., Newsome, T.M., 2016. Bushmeat hunting and extinction risk to the world's mammals. *R. Soc. Open Sci.* 3 (10), 160498.
- Ripple, W.J., et al., 2017. World scientists' warning to humanity: a second notice. *Bioscience* 67 (12), 1026–1028.
- Shoreman-Ouimet, E., Kopnina, H., 2015. Reconciling ecological and social justice to promote biodiversity conservation. *Biol. Conserv.* 184, 320–326.
- Steffen, W., Rockström, J., Richardson, K., Lenton, T.M., Folke, C., Liverman, D., Summerhayes, C.P., Barnosky, A.D., Cornell, S.E., Crucifix, M., Donges, J.F., 2018. Trajectories of the Earth system in the Anthropocene. *Proc. Natl. Acad. Sci.* 115 (33), 8252–8259.
- Taylor, B., Chapron, G., Kopnina, H., Orlikowska, E., Gray, J., Piccolo, J., 2020. The need for ecocentrism in biodiversity conservation. *Conserv. Biol.* 34 (5), 1089–1096. <https://doi.org/10.1111/cobi.13541>.
- Tedlock, B., 1991. From participant observation to the observation of participation: the emergence of narrative ethnography. *J. Anthropol. Res.* 69–94.
- Tende, T., Onoja, J.D., Ulf, O., Manu, S., 2011. The State of Yankari Game Reserve, Nigeria. <http://www.aplori.org/research/oj1html.html>.
- Ugochukwu, C.N., Ertel, J., 2008. Negative impacts of oil exploration on biodiversity management in the Niger Delta area of Nigeria. *Impact Assess. Proj. Apprais.* 26 (2), 139–147.
- UNEP, 2018. Protected Planet Report 2018. UNEP-WCMC, IUCN, and NGS, Cambridge UK; Gland, Switzerland; and Washington, D.C., USA.
- UNFPA United Nations Development Fund, 2014. *Population and Poverty*. <https://www.unfpa.org/resources/population-and-poverty>.
- Vettesse, T., Pendergrass, D., Mesko, F., 2022. Town, country and wilderness: planning the half-Earth. *Archit. Des.* 92 (1), 112–119.
- Wallach, A., Batavia, C., Bekoff, M., et al., 2020. Compassionate conservation raises a debate on personhood. *Conserv. Biol.* 34 (5), 1097–1106.
- Washington, H., Piccolo, J., Chapron, G., Gray, J., Kopnina, H., Curry, P., 2018. Foregrounding ecojustice in conservation. *Biol. Conserv.* 228, 367–374.
- Weber, B., Weber, W., Vedder, A., 2002. In the Kingdom of Gorillas: The Quest to Save Rwanda's Mountain Gorillas. Simon and Schuster.
- Wilson, E.O., 2016. Half-earth: Our Planet's Fight for Life. WW Norton & Company.
- World Bank, 2021. *Population Growth, %* <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NG>. <https://data.worldbank.org/indicator/SP.POP.GROW>.
- Yigitcanlar, T., et al., 2019. Towards post-anthropocentric cities: reconceptualizing smart cities to evade urban ecocide. *J. Urban Technol.* 26 (2), 147–152.
- Zungum, I.U., Imam, T.S., Ahmad, A.G., Abubakar, T., Benjamin, B., Daya, M.G., 2019. Impact of typha grass on biodiversity loss of hadejia-nguru wetland located between Jigawa and Yobe states of Nigeria: a review. *J. Appl. Sci. Environ. Manag.* 23 (10), 1847–1853.