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A call to embrace adaptive management for effective elephant conservation in Zimbabwe

Wildlife conservation is at a critical juncture across Africa, hamstrung by bureaucratic incompetence and the erosion of ethical principles, while wildlife populations are predominantly threatened by habitat fragmentation and indiscriminate killings.[1,2] The Zimbabwe Parks and Wildlife Management Authority (ZimParks) was once quintessential in Africa, among pioneers of the wildlife management front, inter alia, with effective protected area management, even authorising wildlife conservancies outside protected areas.[1] ZimParks is expected to generate its own income from both non-consumptive and consumptive activities, such as ecotourism and sport hunting.[1] However, a perennially lean budget, use of obsolete equipment, low morale among the staff, and a high staff turnover because of a low skills retention capacity constrain the activities of the department. Although ZimParks patrol teams are augmented by state police in major protected areas, rangers are sometimes injured or killed during contact with armed poachers with sophisticated weapons. The situation is continually made more dire by fraudulent tendencies, where ZimParks officers, state police and politicians are incessantly implicated as accomplices in wildlife poaching syndicates. On the other hand, the techniques used by poachers are dynamic, with recent elephant *Loxodonta africana* poaching tactics involving lacing water sources and salt licks with cyanide poison, which also kills secondary targets such as scavenging vulture species.[3]

There is neither a 'silver bullet' nor a 'straight jacket' solution to indiscriminate wildlife killings. While consolidated initiatives are necessary, there seems to be a tragedy of policy inconsistency and duplication of efforts in wildlife conservation. First, there is a misguided tendency to draw contest between the old 'tried and tested' methods against the new innovative conservation initiatives. The old conservation paradigm is constructed on a fortress model, where a largely unfenced protected area is the epicentre of conservation activity.[1] The new conservation model is pragmatic, with emphasis on the management of protected areas based on the ecological requirements of wildlife and the socio-economic aspirations of surrounding communities.[1,4] Second, the emergence of conflicting spheres of influence is now characteristic of wildlife conservation, where non-governmental organisations (NGOs) safeguard their institutional niche by criticising ZimParks initiatives, fortified by unscrupulous media coverage. Such NGOs negate the ethos of their very existence, by duplicating state organs and assuming competitor roles, rather than complementing ZimParks. Such an approach ensures that NGOs hoodwink donors, while in reality goodwill funds are eroded by overhead expenses and sustaining lavish lifestyles for senior management, far away from conservation areas. Nonetheless, it is imperative to acknowledge that some NGOs promote wildlife conservation and capacity building among Africans, serving as vital conduits for skills and technology transfer between Africa and the rest of the world. The Kavango–Zambezi Transfrontier Conservation Area (KAZA TFCA) biosphere, encompassing IUCN conservation area Category II–VII, is therefore ideal for examining the human–elephant coexistence paradigm.

The conservation status of the African elephant, a flagship species

The African elephant has coexisted with humans, in fluxes, driven by both ecological and socio-economic cruxes.[5] Historically, elephants occupied niches most suitable for human agriculture, and now access approximately 5 million km², 10–25% of their historical range in southern Africa.[5,6] The KAZA TFCA, 440 000 km², comprising parts of Angola, Botswana, Namibia, Zambia and Zimbabwe, is a multinational initiative for promoting human–elephant coexistence.[6] Approximately 60% of the 230 000 elephants within KAZA TFCA share space with humans.[6,7] Large herbivore populations across Africa have experienced population declines in the past four decades, even in protected areas.[8] However, the elephant has been increasing, with fluctuations, at 1.5–5% of the annual population growth rates, within the KAZA TFCA biosphere, mainly in response to the suspension of culling in 1986 and the regulation of international trade.[6] In 1989, the African elephant was classified under the Convention on International Trade on Endangered Species of Fauna and Flora (CITES) Appendix I, and reclassified in 1997 to CITES Appendix II, only in Botswana, South Africa, Zambia and Zimbabwe, where international trade is regulated through a quota system, and a moratorium on ivory stock pile auctions.[6,9]

In protected areas, such as Hwange National Park, covering 14 651 km² and located between 18°30'–19°50'S and 25°45'–27°30'E, the elephant is a *de facto* keystone species, sometimes reaching densities of 4 elephants/km² and constituting over 90% of mammal biomass during the dry season.[10] In open ecological systems, where elephant population densities exceed 0.5 elephants/km², the 'elephant problem' has been significant, and is evidenced by stripped bark; broken, pushed over and uprooted trees; and the temporal niche shifts of other large herbivores.[10,11] Maintaining the carrying capacity, the dogma of wildlife management, is therefore reactionary and a symptomatic approach to wildlife conservation.[4] Surface water provision is a contentious issue, and is now considered outdated and at the root of the 'elephant problem'.[4,10] In the short to medium term, manipulating the distribution of key resources, such as dry season water provision, could ease pressure on vegetation, without causing mortality of other water-dependent wildlife species. Dispersal opportunities for elephants could also reduce the impact on vegetation around artificial watering points within protected areas.[4] Elephant culling for the protection of vestigial pockets of floristically impoverished reserves is not recommended, considering the relatively high rate of population declines elsewhere in Africa.[2,4,8] Culling is not only objectionable, it also stimulates an increase in the population growth rate, through the elimination of the effects of density-dependent factors.[12] The use of porcine zona pellucida (pZP) vaccines as contraceptives in elephants has been considered in South Africa.[13] However, the method is invasive and requires subsequent boosts, which is expensive and impractical for wild populations.[13] The growing elephant herd should therefore be recognised as an ecological entity – a resource to be conserved and harnessed, or 'something to cherish and to use'[14].

Outside protected areas, elephants compete for space with the human requirements for agricultural land, and there are no prospects for the restoration of prehistoric population levels.[4,15,16] An estimated 55 elephants are illegally killed every day across Africa to meet the demand for ivory, which is used to manufacture artifacts and ornaments.[15] Poaching pressure has been intense in East and Central Africa, and the poaching frontline has been slowly pushed southwards, such that Zambia and Zimbabwe began experiencing poaching pressure after the iconic Kenyan and Tanzanian elephant populations had been decimated.[15] The Sebungwe and Mid-Zambezi valley elephant population clusters are under siege from poachers, with Chizarira National Park experiencing a 75% elephant population decline during the 2001–2014 period.[3] Elephant populations are vulnerable, as is evidenced by the Kenya and Selous Game Reserve (Tanzania) herds that plummeted from 275 000 to 20 000 from 1973 to 1989, and from 109 000 to 13 000 from 1976 to 2013, respectively.[8] The CITES Monitoring Illegal Killings of Elephants (MIKE) and Elephant Trade Information System (ETIS) programmes remain informative, but not preventive.[9] Outside protected areas, sport hunting generates funds for ranchers and communal areas, through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE).[17] CAMPFIRE is a concept for devolution of wildlife conservation, where proceeds from wildlife products are used mainly for community infrastructure development.[17,18] However, illegal trade in wildlife products remains key in sustaining rural livelihoods among communities in close proximity of protected areas.[17,18]

What next? How to mitigate widespread wildlife population declines

Under the backdrop of such unprecedented rates of species depletion, the pertinent question remains poignant – what next? The magnitude of illegal elephant poaching calls for adaptive wildlife management, the re-thinking of wildlife conservation strategies, which responds to previous experiences.[4] Recently, ZimParks authorities have been granting concessions for protected area management to NGOs and eco-tourism establishments. The motive in granting such permits is mainly the lure of the windfall concession fees, misconstrued as 'free money'. Such a model of conservation has no guaranteed success, but presents secondary challenges, such as how to monitor concessionaire activities without seemingly interfering. The future of natural resources is therefore made dissolute, even looted and mortgaged to predominantly foreign influences, with unverified management concepts. There is an urgent need to optimise wildlife conservation, especially in human-dominated landscapes, through promoting human–wildlife coexistence.[1,19] It is irresponsible to entertain any aphorism that indigenous people are ignorant of wildlife conservation practices; they are an integral constituent of a composite human–wildlife biosphere. Active involvement of local communities in mainstream conservation could harness indigenous knowledge systems for effective wildlife conservation.[19] Local community involvement could be extended to quota setting of employment opportunities in mainstream conservation. Community scouts could be promoted, and groomed into professional rangers. A healthy relationship among the ecological and the socio-economic systems is the primary basis for adaptive wildlife management.[1,17] Legalised sport hunting, and its extreme form 'canned hunting', are increasingly becoming a contentious issue.[20] Arguments against the practice encourage non-consumptive use of wildlife resources, such as eco-tourism, as an alternative to cruel 'bloodsports'.[20] However, proponents of preserving sport hunting argue that funds realised are in turn used to reinforce wildlife conservation.[20]

At community level, poaching is poverty driven, especially where formal employment opportunities are limited. At a higher level, poaching is a high capital undertaking by international syndicates, and often finances political instability and terrorism, and thrives on corruption.[21] It is also a colossal task to attempt to change the socio-cultural consumption patterns for wildlife products at the main market, the Asian nations. Poaching is therefore more than a mere issue of enforcement, as is evidenced by sustained poaching rates, even when punitive fines and sentences are imposed.[21] The 'green military' approach, as practised in

Kenya, revokes a philosophical debate skirting on how much humanity is prepared to sacrifice to save wildlife. In Zimbabwe, public sentiment remains polarised on the endorsement of the shoot-to-kill policy with regard to wildlife poachers. Messer et al.[22] assert that the shoot-to-kill policy is the only viable solution in poor nations, where substantial economic gains are realised from wildlife poaching. However, there is a moral obligation for preserving basic human rights under International Law, where there are no provisions for extrajudiciary killings, except in self-defence.[22,23] It can also be argued that, at its best, the shoot-to-kill policy risks obstruction of justice, by killing suspects, while at its worst, it increases the wager for poaching, as it speculates a risk.[23] In most conservation areas, wildlife benefits accrue at community level, while human–wildlife conflicts are experienced at household level, seldom with direct compensation.[1,17] The shoot-to-kill policy therefore stands to further alienate protected area management from local communities.

It is envisaged that a successful re-alignment of the human–wildlife coexistence conservation paradigm can be attained through the establishment of Community Share Trusts, funded through levies on local ecotourism, sport hunting and the extractive industries, such as mining. Such devolution could finance compensation schemes and capital development projects such as value addition to non-timber forest products, livestock and crop insurance, and mitigatory initiatives such as the 'fencing people in, fencing elephants out' concept.[1,4,17] Zonation of land could delineate conservation networks, catering for conservation even where humans dominate, without detracting from sustainable livelihoods.[24]

Acknowledgements

References

1. Child G, Child B. The conservation movement in Zimbabwe: An early experiment in devolved community based regulation. Afr J Wildl Res 2015;45:1–16. https://doi.org/10.3957/056.045.0103

2. Chase MJ, Schlossberg S, Griffi CR, Bouche PJC, Djene SW, Elkan PW, et al. Continent-wide survey reveals massive decline in African savanna elephants. Peer J. 2016;4, e2354, 24 pages. https://doi.org/10.7717/peerj.2354

3. Muboko N, Muposhi V, Tarakini T, Gandiwa E, Vengesayi S, Makuwe E. Cyanide poisoning and African elephant mortality in Hwange National Park, Zimbabwe: A preliminary assessment. Pachyderm. 2014;55:92–94.

4. Van Aarde RJ. Elephants: A way forward. Pretoria: University of Pretoria; 2013.

5. Van Aarde RJ, Jackson TP. Megaparks for metapopulations: Addressing the causes of locally high elephant numbers in southern Africa. Biol Conserv. 2007;134:289–297. https://doi.org/10.1016/j.biocon.2006.08.027

6. Blanc JJ, Barnes RFW, Craig GC, Dublin HT, Thouless CR, Douglas-Hamilton I, et al. African elephant status report 2007: An update from the African elephant database. Occasional paper series of the IUCN species survival commission, No. 33. IUCN/SSC African elephant specialist group. Gland: IUCN; 2007.

7. Wittemyer G, Daballen D, Douglas-Hamilton I. Comparative demography of an at risk African elephant population. PLoS ONE. 2013;8, e53726, 10 pages. https://doi.org/10.1371/journal.pone.0053726

8. Craigie ID, Baillie JEM, Balmford A, Carbone C, Collen B, Green RE, et al. Large mammal population declines in Africa's protected areas. Biol Conserv. 2010;143:2221–2228. https://doi.org/10.1016/j.biocon.2010.06.007

9. Convention on International Trade on Endangered Species of Fauna and Flora [webpage on the Internet]. No date [cited 2018 Jul 16]. Available from: https://www.cites.org

10. Valeix M, Fritz H, Dubois D, Kanengoni K, Alleaume S, Said S. Vegetation structure and ungulate abundance over a period of increasing elephant abundance in Hwange National Park, Zimbabwe. J Tropic Ecol. 2007;23:87–93. https://doi.org/10.1017/S0266467406003609

11. Cumming DHM, Feneton MB, Rautenbach IL, Taylor RD, Cumming GS, Cumming MS, et al. Elephants, woodlands and biodiversity in miombo woodland in southern Africa. S Afr J Sci. 1997;93:231–236.

12. Cumming DHM. The decision-making framework with regard to the culling of large mammals in Zimbabwe. In: Owen-Smith NR, editor. Management of large mammals in African conservation areas. Pretoria: Haum Educational Publishers; 1983.

13. Asa CS, Parton IJ. Wildlife contraceptives: Issues, methods and application. Baltimore, MD: The Johns Hopkins University Press; 2005.

14. Mundy PJ. The African elephant – something to cherish and to use. Int J Environ Stud. 2006;63:587–597. https://doi.org/10.1080/00207230600963171

15. Shaw M, Rademeyer J. A flawed war: Rethinking 'green militarisation' in the Kruger National Park. Politikon. 2016;43(2):173–192. https://doi.org/10.1080/02589346.2016.1201379

16. Douglas-Hamilton I, Krink T, Vollrath F. Movements and corridors of African elephants in relation to protected areas. Naturwissenschaften. 2005;92:158–163. https://doi.org/10.1007/s00114-004-0606-9

17. Muphree MW. Congruent objectives, competing interests, and strategic compromise concepts and process in the evolution of Zimbabwe CAMPFIRE programme, 1984-1996. In: Brosius JP, Tsing LA, Zerner C, editors. Communities and conservation histories and policies of community based natural resources management. Walnut Creek, CA: AltraMira Press; 2005.

18. Frost P, Bond I. The campfire programme in Zimbabwe: Payment for wildlife services. Ecol Econ. 2008;64:776–787. https://doi.org/10.1016/j.ecolecon.2007.09.018

19. Pandey DN. Cultural resources for conservation science. Conserv Biol. 2003;17:633–635. https://doi.org/10.1046/j.1523-1739.2003.01578.x

20. Lindsey PA, Frank LG, Alexander R, Mathieson A, Romanach S. Trophy hunting and conservation in Africa: Problems and one potential solution. Conserv Biol. 2007;21:880–883. https://doi.org/10.1111/j.1523-1739.2006.00594.x

21. Challender DWS, MacMillan DC. Poaching is more than an enforcement problem. Conserv Lett. 2014;7:484–494. https://doi.org/10.1111/conl.12082

22. Messer KD. Protecting endangered species: When are shoot-on-sight policies the only viable option to stop poaching? Ecol Econ. 2010;69(12):2334–2340. https://doi.org/10.1016/j.ecolecon.2010.06.017

23. Mogomotsi GEJ, Madigele PK. Live by the gun, die by the gun: An analysis of Botswana's 'shoot-to-kill' policy as an anti-poaching strategy. S Afr Crime Q. 2017;60(June):51–59. https://doi.org/10.17159/2413-3108/2017/v0n60a1787

24. Roever CL, Van Aarde RJ, Leggett K. Functional connectivity within conservation networks: Delineating corridors for African elephants. Biol Conserv. 2013;157:128–135. https://doi.org/10.1016/j.biocon.2012.06.025