

COMMENTARY

The elephant in the farm: long-term solutions are the key to coexistence

L. N. Tiller^{1,2}  & H. F. Williams^{1,3} 

1 Save The Elephants, Nairobi, Kenya

2 Durrell Institute of Conservation and Ecology, University of Kent, Canterbury, UK

3 Interdisciplinary Centre for Conservation Science, Department of Zoology, University of Oxford, Oxford, UK

Correspondence

Lydia N. Tiller and Harry F. Williams,

Save the Elephants, Marula Manor, Marula Lane, Karen, P.O. Box 54667, Nairobi 00200, Kenya.

Emails: lydiatiller@gmail.com (Lydia N. Tiller); harry@savetheelephants.org (Harry F. Williams)

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In this current state of exponential human population growth, natural spaces are being eroded more than ever before. Human activities have modified and transformed over half of the global land surface (Chapin *et al.*, 2000), causing extensive habitat loss and fragmentation, and leading to a global decline in species. The rapid conversion of forest to agriculture puts farmers on the frontline of conflict with wildlife, and nowhere is this more pronounced than in the tropics, where development is rapidly catching up with the West. In the tropics communities are forced to survive alongside the megaherbivores that are predominantly under control or extinguished from much of the developed world.

The most problematic animals for humans to live alongside are, arguably, elephants. Throughout much of elephant range in Asia and Africa, remaining elephant habitat is in the process of significant encroachment by humans, often with a front of edible crops that are highly preferred by such herbivores. These agricultural lands, on the edge of primary elephant habitat, can make for easily accessible resources for wildlife, and little is put in place to dissuade resident elephant herds from utilizing this resource. As a result, human-wildlife conflict is becoming a serious issue, and threatens the livelihoods of many of those living alongside megafauna, not to mention the threats to local elephant populations from retaliatory killings. Mitigating such situations often relies on translocating 'problem animals'. In their paper, de la Torre *et al.* (2021) clearly show that such techniques are flawed. The overlap with elephants, in the peripheral agricultural landscapes, makes highly nutritious and abundant crops a readily available resource for elephants. Therefore, unless a constant stream of elephant translocations is a financially viable and sustainable solution, smarter methodologies need to be employed to create a model of coexistence where humans and elephants can live harmoniously together over the long term.

The problem with translocation is that it instils an attitude in local communities that human-elephant conflict (HEC) can simply be addressed by removing elephants from the affected areas. However, such a strategy can move the problem elsewhere (Fernando *et al.*, 2012). Effective management of HEC should instead focus on promoting tolerance of elephants. De la Torre *et al.* (2021) demonstrate that these

habitats are not just occasional anomalies from an otherwise natural diet, but that farmland is positioned perfectly to become a staple part of the elephant diet. *Ad hoc* methodologies for dealing with HEC, therefore, need to be replaced with more social and ecological approaches that provide long-term solutions for these at-risk farmlands. The magnitude of this issue is likely to continue to worsen as human populations increase and the need for food pushes farmers ever deeper into elephant habitat.

As with any conflict mitigation strategy, it is important to understand the intricacies of elephant translocation before it is used widely as a solution. However, few studies exist that examine the success of these operations. There is little documented insight into behavioural responses or information to establish guidelines to increase the chances of success. De la Torre *et al.* (2021) have a unique dataset from over 32 collared translocated individuals, which could play a key role in filling these elephant translocation knowledge gaps. Instead, these data were combined with resident elephant data and not used for comparison to analyse the success of the translocations and the fate of the individuals (e.g. survival rate, homing and post crop raiding behaviour). In our opinion, this is a lost opportunity.

Another impressive dataset that the authors use is HEC data spanning 10 years. However, their analysis of this conflict incidence data assumes that all the large groups (>6 individuals) involved in incidents are just female family groups and do not include bulls. Incidents with bull elephants were only classified as incidents with just one individual. This classification could impede the model results, as even though there is less knowledge about Asian elephant social systems, bull elephants do loosely associate with females and other bulls, which could include crop raiding (Sukumar, 1990; Keerthipriya, Nandini & Vidya, 2021). Mixed groups have been observed crop raiding together, and in some cases are the predominant group type involved in incidents (Tiller *et al.*, 2021).

The study of de la Torre *et al.* (2021) gives solid evidence that peripheral agricultural lands are prime for HEC, but this is not exactly new (Shaffer *et al.*, 2019). The idea that people living within these habitats are under any misconceptions

regarding how susceptible to elephants their livelihoods are, is questionable (Ahmad Zafir & Magintan, 2016). Some gaps remain and it would be interesting to know how these communities are dealing with HEC; are subsistence crops, such as rice, also part of the problem? It is also vital to know how degraded the forest is and whether the low carrying capacity of the forest habitat is forcing the elephants into farmland.

For future conflict amelioration, the authors conclude their study with five different strategies that should be implemented. It would have been helpful to see more detail in these descriptions, as these are very important directions for future policy implementation. Land-use planning is a key strategy to reduce conflict and protect crucial resources for elephants and wider biodiversity, as well as ensuring areas for human development. Such planning could involve developing wildlife corridors, management zoning systems and the creation of hard or soft barriers. People's tolerance of wildlife is also key for any mitigation strategy to work. If communities participate in, and benefit from, conservation and management of wildlife on their land, then this may help to increase tolerance towards wildlife and reduce human-elephant conflict (Biggs *et al.*, 2016; Cooney *et al.*, 2016). Thus, strategies to promote tolerance could involve providing revenue to farmers from sources other than agriculture, such as tourism and ecosystem payments.

This study by de la Torre *et al.* (2021) highlights that short-term solutions and efforts to try and reduce HEC often treat the symptoms of conflict and do not address the underlying causes, which are habitat loss and land-use change. With increasing human populations and a projected increase in agricultural land, especially in the tropics (Laurance, Sayer & Cassman, 2014), human-elephant conflict will continue to escalate unless we think more holistically and at a landscape level.

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