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The case for the reintroduction of cheetahs to India

In a recent Correspondence to *Nature Ecology & Evolution*, Gopalaswamy et al.[1] are critical of the reintroduction of cheetahs into India, referring broadly to ecological, genetic and disease risks that they feel have not been considered in replacing Asiatic cheetahs with the southern African subspecies. They further assert that three claims made in India's planned reintroduction are unsubstantiated: that cheetahs have run out of space in Africa; that there is currently sufficient and suitable space in India to accommodate them; and that conservation translocations of cheetahs have demonstrated success in range restoration efforts. They also argue that cheetahs naturally occur at low population densities, making them sensitive to the removal of individuals from source populations.

We have been involved in scientifically advising on the Indian reintroduction project, and we respectfully disagree. Herein, we address each of Gopalaswamy and colleagues' arguments and offer scientific evidence in support of this ongoing, restorative conservation effort.

Cheetahs historically occupied an ecological niche within Indian savannahs and open forest systems that is now vacant. Filling this void would contribute to the restoration of the functional ecology of these systems through top-down processes. Restoring species and their roles in ecosystems is essential for effective and comprehensive rewilding[2]; carnivore reintroduction is particularly important for ecosystem restoration[3]. The primary threats, including poaching and human–wildlife conflict, that caused cheetah extinction in India have abated through effective legislation and enforcement. Furthermore, reintroduction was proposed within protected sites in the historical range after habitat and prey availability and anthropogenic pressures were assessed[4]. There is currently about 100,000 km^2 of legally protected wildlife reserve within the historical range[5] of the cheetah in India that can potentially accommodate breeding cheetah populations and, according to our assessment, 700,000 km^2 of total habitat that can potentially sustain cheetah occupancy.

Fig. 1 | A successful hunt. A reintroduced cheetah from Namibia, killing and eating a chital deer in India.

The IUCN developed explicit guidelines on population reintroduction: specifically, selected founders should provide adequate genetic diversity, and their removal should not negatively affect source populations. The guidelines also support justifiable taxon substitution, where a "similar, related species or sub-species can be substituted as an ecological replacement"[6]. In January 2022, the Iranian Department of Environment reported that only 12 free-ranging Asiatic cheetahs were confirmed to still be alive. The low numbers and level of inbreeding in the Iranian cheetah population exclude them as a potential source population for the Indian reintroduction. All extant cheetah subspecies have a similar genetic distance from the Asiatic cheetah[7]. The southern African cheetah population has the greatest documented genetic diversity and is suitably large to provide sufficient founders without being negatively affected by removal of those individuals[7,8]. According to our own unpublished data (V.v.d.M. and Y.V.J.), the managed cheetah metapopulation in southern Africa (about 500 individuals) is increasing at 8.8% per annum; a population viability analysis suggests that the South African component of this population can sustain the removal of 29 cheetahs annually without detrimental effect. On the basis of this information the Scientific Authority of South Africa has permitted export of 10% of the males and 4% of the females per annum[9]. Seventy cheetah reintroductions have been coordinated in southern Africa over the past two decades[8]. Although these reintroductions were mostly into fenced reserves, 22 cheetahs have been released into the unfenced Zambezi Delta in Mozambique since August 2021. In a different project in Namibia, 36 cheetahs were successfully released onto farmlands, or unfenced or fenced reserves, with 75–96% of individuals achieving independence after release and a high annual survival rate[10].

As prescribed by the World Organisation for Animal Health and IUCN, we (A.S.W.T., Y.V.J. and R.A.K.) and others have conducted a comprehensive disease risk analysis for the Indian reintroduction project[11]. Most identified disease risks were judged to be low or very low.

The transmission of diseases considered to be of medium risk is being mitigated through disease screening and the administration of vaccines and antiparasitic treatments during the pre- and post-export quarantine periods.

Although we agree that potential ecologically suitable space exists for the reintroduction of cheetahs in many parts of Africa, the reality is that few sites in Africa can provide an adequate level of protection for the animals to ensure reintroduction success[12]. The cultural, religious and socioeconomic contributors to different tolerances of large carnivores in Africa as compared to India are too lengthy to debate here, but we believe it is clear that cheetahs are less likely to suffer persecution in India where other large carnivore conservation efforts have been notably successful[13,14].

We disagree with Gopalaswamy and coauthors' approach to base the estimated carrying capacity of India's release sites on cheetah population densities from East African reserves (around 1 per 100 km^2), as densities are largely determined by the biomass of suitable prey[15] – which in turn is a product of vegetation conditions. Historical cheetah population densities in East Africa were likely to have been higher before marked declines in their prey base[16] and cheetahs are likely to have been more abundant in more productive areas of their historical range that have now been taken over by livestock farming. In a reserve in southern Botswana, with fences that are permeable to predators, a mean true density of 5.23 cheetahs per 100 km^2 has been reported, indicating that higher densities are possible[17].

The general recommendations made by Gopalaswamy et al. regarding how India should redirect their efforts in global cheetah conservation are intriguing, but we suggest that they are unlikely to be feasible in the current political climate. With some notable exceptions, governments, particularly of developing countries, tend to prioritize investment into their own jurisdictions rather than into conservation projects in other countries.

In our view, the available data and arguments that we have laid out above sufficiently support the experimental reintroduction of cheetahs into India, and we look forward to assessing the outcome of the project over time (Fig. 1). Recent media headlines show that the cheetahs have already positively captured the attention of the Indian public and politicians, a critical component for the project's success. Their role as an umbrella species, benefiting broader biodiversity conservation and livelihood goals in India – although supported by theory – will need to be evaluated after the cheetah is reintroduced and established in India.

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Competing interests

The authors declare no competing interests.