

African savanna antelopes need space to survive climate changes

March 1 2024, by Derek Lee



Kirk's dik-dik in the Tarangire Ecosystem, Tanzania. Credit: Derek Lee, Wild Nature Institute

Human-caused environmental changes threaten natural ecosystems.

These ecosystems are essential to creating and maintaining a rich, resilient, and adaptable biosphere. In East Africa's savanna, antelope populations are vital for a healthy and functioning ecosystem.

They shape the vegetation, disperse seeds, cycle nutrients, and provide food for predators and scavengers. A natural dynamic mosaic of vegetation types, [water sources](#), and weather forms a delicate balance with the antelopes that are increasingly disrupted by human influences and [climatic changes](#). It is vital to maintain healthy antelope populations to protect these hotspots of biodiversity and enable the ecosystem to work properly.

Previous studies have shown that the densities of savanna antelopes vary based on location, season, and year, but no [empirical studies](#) have ever examined all these effects together. Simultaneously, studying how environmental variation over space and time affects the local densities of antelope species could resolve whether location, seasonal, or annual variation is the most important factor driving the local densities of these wildlife.



Common eland in the Tarangire Ecosystem, Tanzania. Credit: Derek Lee, Wild Nature Institute

Using seven years of antelope monitoring data from the Tarangire Ecosystem in Tanzania, an [international collaboration](#) between the University of Zurich and the Wild Nature Institute examined this question. They found spatial factors explained the largest proportion of variation in [density](#) for four of the five [antelope](#) species they studied.

These spatial covariates included proximity to water and human activities as well as vegetation community—suggestive of both bottom-

up (resources) and top-down influences (avoiding [natural predators](#)) on local densities. The research was [published](#) in the journal *Population Ecology*.

In the Tarangire Ecosystem, antelopes respond to changing climatic conditions and the fluctuating availability of resources by moving across space. Lead author Lukas Bierhoff, a graduate student in the Department of Evolutionary Biology and Environmental Studies at the University of Zurich, said, "These results demonstrate that antelopes depend upon water and forage availability but are flexible in their responses to climatic variation when they have the option to move and seek out the necessary resources for the current conditions."



Impala in the Tarangire Ecosystem, Tanzania. Credit: Derek Lee, Wild Nature Institute

Helping antelopes move across space to adapt to climate and habitat changes

As natural savanna habitats and climate are rapidly being altered by human activities, effective conservation strategies are needed to ensure the persistence of antelopes and all the services they provide to maintain healthy ecosystems.

"This study provides further evidence that the protection of large, connected areas of different habitat types and permanent water sources is the best way to maintain high biodiversity and a functioning biosphere. Providing habitat options for the antelopes enables them to respond to a temporally changing world by moving across space," Bierhoff said.



Grant's gazelle in the Tarangire Ecosystem, Tanzania. Credit: Derek Lee, Wild Nature Institute



Common waterbuck in the Tarangire Ecosystem, Tanzania. Credit: Derek Lee, Wild Nature Institute

The research team also identified guilds of antelopes whose densities co-varied and that might respond similarly to targeted and coordinated conservation strategies, thus increasing the efficiency of management actions.

"Effective conservation actions include protecting rivers and other water sources from diversion and pollution; reducing bushmeat poaching; keeping and restoring movement corridors; and maintaining the diversity of natural vegetation types," said Derek Lee, Wild Nature Institute principal scientist and senior author of the paper.

"Antelopes are critically important to Tanzania's economy as well as its ecology, so sustaining thriving populations of these animals is a win-win for people and wildlife."

More information: Lukas Bierhoff et al, Anthropogenic and climatic drivers of population densities in an African savanna ungulate community, *Population Ecology* (2024). [DOI: 10.1002/1438-390X.12182](https://doi.org/10.1002/1438-390X.12182)

Provided by Wild Nature Institute

Citation: African savanna antelopes need space to survive climate changes (2024, March 1) retrieved 27 April 2024 from <https://phys.org/news/2024-03-african-savanna-antelopes-space-survive.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.