

# LIVESTOCK AND WILDLIFE IN PASTORAL SYSTEMS OF EAST AFRICA: INEVITABLE CONFLICT OR UNEXPECTED SYNERGY?

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## The inevitable conflict

Savannas in East Africa support the richest variety of wildlife on earth. However, recent research suggests that over half of this wildlife disappeared in the last 20 years, caused by habitat destruction, population growth, poaching, and insecurity. In many areas, we think that wildlife are extinct. Wildlife disappear where human use is too high: in urban centers and where farmers grow crops. In rangelands where pastoral people graze their livestock, wildlife avoid areas that livestock graze heavily (around water points and villages), which cover about 10% of the land area. In the remaining and extensive lands with fewer people and livestock, wildlife and livestock graze together. More wildlife live in these widespread pastoral lands than in less extensive national parks and reserves. Thus, pastoral people are key to the survival of wildlife in East Africa.

Many pastoral peoples today appreciate wildlife and want to continue to co-exist with them, as long as they can still support their families. But, pastoralists and wildlife are being pushed onto marginal lands by farmers, and thus have more conflicts and fewer options than in the past. Pastoral families have half as many livestock per person today as they did 20 years ago because they have poorer pastures and more mouths to feed. Today, most pastoral families must feed their children and pay for health care and school fees on less than \$1/day/person. With fewer livestock and little income, most pastoralists have no choice but to go into other types of livelihoods that are incompatible with wildlife: crop agriculture, mining, urban business. Given a choice, many pastoral peoples would prefer to herd livestock and live side-by-side with wildlife, even though life with wildlife can carry some heavy costs for them (loss of livestock to predators, competition with wildlife for pasture). This is particularly true if pastoralists can benefit from wildlife. Unfortunately, most of the benefits from wildlife currently flow to non-pastoral people, the rich, or the government.

## The unexpected synergies

Unlike anywhere else in the world, our hominid ancestors walked side-by-side with wildlife million of years ago in East Africa. About 3000 years ago, pastoralism was born in East Africa when people brought livestock to the region for the first time. Given this history, our research team thought the East African region was the ideal place to better understand the positive and negative interactions among people, livestock and wildlife. Thus, more than a decade ago, we began tackling this research area with a diverse group of partners: pastoral communities, researchers, development agencies, government officials and eco-tourism operators. Together, we attempted to bring the best of science to bear on the problems that communities and policy makers face in trying to resolve the troublesome conflicts between conservation and development in these rich and valuable savanna lands (see partners at end of this article).

What we found surprised us. While people and their livestock can and do destroy wildlife habitat and populations, our work is also showing the opposite: unexpected synergies. For example, when pastoral people, livestock and wildlife live together in savannas, the resulting mixture of species is often more productive and diverse than that found in nearby parks where we choose to 'protect wildlife' by prohibiting pastoral people and their livestock. Where people, livestock and wildlife mingle, our field teams have found more species of wildlife, butterflies and plants than in nearby parks with only wildlife. We think that pastoral people and their livestock can create landscapes more attractive to



Training pastoral field team how to sample soil DNA in the Mara ecosystem, Kenya  
Photo by Deb Bossio

wildlife, as long as pastoral use is low to moderate. Livestock graze the coarser, older grass and promote new and nutritious grass growth. Pastoral people set fire to savannas regularly, which has a similar effect on grass quality as grazing does. Perhaps more important than creating new, nutritious grass, people and livestock make the grass short: low grass in grazed or burned areas cannot hide predators like lion or hyena nearly as well as ungrazed, tall grass far from settlements or in little used parts of parks. Our research shows that this nutrition-protection effect occurs on the border of parks and also about 2-3 km from pastoral settlements, beyond the heavily grazed pastures right next to settlements. This effect is more pronounced in wetter savannas than in drier ones.



Soils below old pastoral settlements that are still high in phosphorus decades after settlement abandonment. Photo by Deb Bossio.

Our research shows that another way pastoral people enrich savannas is by moving from place to place. Pastoralists living traditionally move from once a month to once every few years, depending on how dry it is. When they move, they leave behind abandoned houses and livestock corrals, which contain piles of nutrients from household refuse and livestock dung. We can also see these 'hotspots' of soil nutrients on old settlements because they form brilliant green circular dots that stand out from the surrounding brown savanna in the early dry season. We can still 'see' these old settlements, particularly from the high levels of phosphorus in the soil, more than a century later in savannas where the soils are naturally poor and rainfall is low. Where soils are naturally fertile, the soils under old settlements lose nutrients quickly and the visual mark left behind by settlements disappears from the savanna in 20-30 years. As one might guess, cattle, sheep and goats prefer to graze on the

green, old settlement sites where we have found that grasses are more nutritious than those in the surrounding savanna. Many species of wildlife prefer to graze here too, partly for the grass itself, but again, because the grass is short and predators more visible. These old pastoral settlements form open patches in woody landscapes, further increasing the diversity of habitats for all species that use these savannas.

These findings suggest that there are missing pieces to the way we manage savannas for people and for wildlife. Certainly, it is important to conserve parts of landscapes in parks for species that are particularly sensitive to human use. Our research shows that this is true for many of the large species, like elephant and rhino, and many of the carnivores, like lion and cheetah. The importance of parks cannot be understated because these are many of the species that attract tourists to visit East Africa. What we are missing is a fuller appreciation of the role of pastoral peoples and their livestock in enriching savannas outside parks. For example, we may want to exploit and value traditional knowledge systems of pastoral peoples, rather than disregarding the old ways wholesale in the search for the new. More practically, we could think about setting up systems to pay pastoral peoples in these landscapes for the ecosystem goods and services they are maintaining for themselves and the peoples of the world. One method to do this are pastoral system 'trust funds' to improve the value of wildlife-compatible land use practices; another is a system of 'biodiversity credits', similar to the recently launched system of 'carbon credits'. We could also encourage the 'developed' world to learn a lesson from their African elders about how to sustain biodiversity in their own degraded savanna landscapes.

But we must temper this appreciation of pastoral land use with a caution: pastoral people may only enrich savannas when they use them at low to moderate levels because we know that higher use will extinguish biodiversity. Just how high is 'too high' is unclear. Because these pastoral-wildlife systems have many, complex and interacting parts, the answers will require bringing together the best of local knowledge with the best predictive tools (GIS, remote sensing, models) that science has to offer. This is the subject of our current collaborative work among pastoral communities, policy makers, development workers, private enterprise and researchers.

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#### Partners

**Pastoral community organizations/NGO's:** Koyiaki-Lemek Wildlife Trust; Ogulului, Selengai, Mbirikani, Koyiaki, Ol Kinyie, Oloipa Group Ranch Associations, Kitengela Landowners Association, Innuut e Maa

**Governmental organizations:** Kenya Wildlife Service, Tanzanian National Parks, Ugandan Wildlife Authority, Kenya Agricultural Research Institute, Tanzania Ministry of Agriculture, Uganda Ministry of Tourism, Wildlife and Antiquities; Ngorongoro Conservation Area Authority; Kenya Dept of Resource Surveys and Remote Sensing, US Geological Survey, US

Dept. of Interior

**Private enterprise:** Bush Homes of East Africa, Campfire Conservation Ltd, Kerr and Downey, Robinhut Safaris, Kichwa Tembo Lodge, Fig Tree Lodge, Tanzanian Guides, Rove Africa Safaris, Grant-Cameron Safaris, Hopcraft Ranch

**Other non-profits and NGO's:** African Wildlife Foundation, The Genomics Research Institute, World Agroforestry Centre, African Conservation Centre, Friends of Nairobi National Park, Friends of Conservation, Porini Resources, World Wide Fund for Nature, World Bank, FAO

**Universities:** University of Nairobi, Kenyatta University, University of Dar es Salaam, Sokoine University of Agriculture, Makerere University, Colorado State University; Michigan State University; University of Louvain; University College London, University of Edinburgh, Macaulay Land-Use Research Institute, Montana State University, University of Maryland, University of Colorado, Princeton University

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