

From enormous elephants to tiny shrews: How mammals shape and are shaped by Africa's landscapes

May 3 2023, by Ara Monadjem



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Africa is the world's most diverse continent for large mammals such as antelopes, zebras and elephants. The heaviest of these large mammals

top the scales at over one ton, and are referred to as [megafauna](#). In fact, it's the only continent that has not seen a mass extinction of these megafauna.

The continent's megafauna community includes the world's largest terrestrial [mammal](#), the [African elephant](#). Adult African bush elephants can weigh as much as 6 tons. Other giants across African continent include hippopotamuses, rhinoceroses and giraffes.

So, it is only in Africa that ecological interactions and dynamics can be studied as they would have been before the sudden and profound flourishing of Homo sapiens over the past 12 000 years; before then, megafauna would have dominated all terrestrial landscapes on all continents. A visit to Africa is, in other words, a visit to our planet's past.

In my latest book, [African Ark: Mammals, Landscape and the Ecology of a Continent](#), I tell the story of how Africa's mammal fauna arose.

It's not just a tale of megafauna and other well-known large mammals. I pay particular attention to [small mammals](#), such as mice, bats and shrews. That's partly because I have been [studying these creatures](#) for the past three decades.

These animals are also generally overlooked by both scientists and the public. But without them, and the ways in which they've interacted with each other and with their larger cousins over tens of thousands years, Africa wouldn't have the richly varied landscapes it does today.

Africa's mammals are a global treasure that must be protected. However, the lives of local communities are inextricably linked with these mammals and the remaining natural landscapes that harbor their dwindling populations; conservation solutions will require these communities' active participation and blessing.

In some areas, nature-based tourism may be a viable solution. However, much of the rest of the continent—where no tourists go—will require other, perhaps novel, approaches. What we cannot afford is the extinction of any of these beautiful creatures or the continued loss and reduction of the ecosystem services that they freely provide.

Early mammal history

The history of African mammals begins with an apparently unrelated group of creatures. They're so dissimilar from each other today that taxonomists didn't work out their true relationships until about two decades ago. These are the elephants, manatees, elephant shrews, African golden moles, hyraxes and tenrecs. Collectively they make up the super-order [Afrotheria](#).

Today, this group accounts for only a small fraction of the mammal species on the continent. But that is only because Africa—which formed part of the prehistoric southern supercontinent of [Gondwana](#)—was colonized, in stages and over millions of years, by 'invaders' from the northern supercontinent of [Laurasia](#).

These colonists include nearly all the mammals that we normally associate with Africa, including rhinoceroses, zebras, antelopes, primates, bats and even rodents. In return, some Afrotherians, including elephants, roamed out of Africa to colonize other lands further north.

Other mammals, including monkeys and [caviomorph rodents](#) (such as [guinea pigs](#) and capybaras), used Africa as a stepping stone to colonize South America, as did lemurs to colonize Madagascar.

Shaped by geography

The variables of physical geography have worked hand in hand with the tectonic forces of prehistory.

Africa is not a uniform landscape that enjoys the same climate and habitat throughout. Some parts, such as Madagascar, are not even connected to the mainland but appear as [offshore islands](#). Terrestrial mammals typically reach islands in two ways: they either raft across the intervening sea, or cross by foot during periods of drier weather or lower sea levels that connect the islands to the mainland.

In the continent's interior, other formidable barriers restrict and determine mammal movement. Long, deep, fast-flowing rivers, such as the Congo in central Africa, can be almost as effective a barrier as open oceans. Mountain ranges can form inland 'islands' that are as ecologically isolated as their ocean equivalents.

By providing barriers, geographical features limit the movement of animals across the landscape, thereby affecting the composition of mammal communities in different parts of the continent.

Population shifts

Another element that's crucial to telling the story of Africa's mammals is an understanding of how species and population groups are formed and fluctuate over time.

For example, megafauna play important roles in shaping the landscape and its plant communities. This in turn shapes many smaller animals' habitats. Hippopotamuses in the Okavango Delta [create and maintain open water channels](#), which serve as critical habitat for fishes. And, by defecating in water, hippos also introduce vast amounts of organic fertilizer into this aquatic ecosystem, helping to enrich it.

Smaller animals, too, shape landscapes.

Some species of rats and mice, such as pouched mice in the genus *Saccostomus*, are granivores that feed on seeds, including those of trees responsible for bush encroachment in savannas such as the sicklebush. Colleagues and I have [shown experimentally](#) that various species of mice in Eswatini actually prefer the seeds of this encroaching plant and hence can assist in controlling its spread. But these rodents require good grass cover for persistence, and hence can't provide this ecological service in over-grazed, degraded landscapes.

The numbers of animals naturally fluctuate over time, typically reflecting fluctuations in food supply brought about by, for example, droughts or floods. A key determinant of these population fluctuations is also the inherent life history characteristics of a species: short-lived, fast reproducing species such as rats and mice will, by definition, experience greater fluctuations in their numbers than long-lived, slow reproducing species like elephants.

Conservation

My book concludes by looking at [human interactions](#) with African mammals and the need to conserve these mammals, both for their own sake and for ours. The ecosystem services provided by many mammals are crucial to a healthy environment for all species. Humans evolved in Africa and have interacted with other African mammals for millions of years here.

This is not true on other continents, where humans are—in geological timescales—a recent addition. It may well be that this long relationship between humans and other African mammals is the reason why, despite the losses wrought by humankind, so many [large mammals](#) persist on the continent: they have 'learnt' through natural selection how to survive with

US.

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