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**Elephants essential for sustainable management African savanna
VUB research shows that elephants prevent soil depletion caused by livestock**

**In African savanna wild herbivores are increasingly displaced by cattle and that is not without consequences. Where many cows graze, the soil becomes poorer because the cows do not sufficiently fertilise the soil where they graze. They mainly drop their dung at night when they are kept fenced-in to protect them from lions. This impoverishes the soil, which reduces the productivity and quality of the grass. However, when elephants are present, this soil depletion does not occur; the soil is even enriched. This is the conclusion of new research by the Vrije Universiteit Brussel in collaboration with the Mpala Research Centre in Kenya. The results were published in the leading journal *Nature Sustainability*. Dr. Sitters: "*The preservation of these 'megaherbivores' is therefore not only essential for the maintenance of the ecosystem, but also for the food supply of the local population. As a consequence of soil depletion, less livestock can be kept in the long term".***

To examine the impact of cattle and wild herbivores on the soil, Dr. Judith Sitters, under the supervision of Prof. Harry Olde Venterink of the VUB Biology Department, collected soil and vegetation samples in the Kenyan savanna and analysed these for carbon, nitrogen and phosphorus concentrations. She did this in collaboration with Prof. Philippe Claeys of the VUB AMGC Analytical, Environmental and Geo-Chemistry Department and in association with American and Kenyan colleagues.

The soil and vegetation samples were collected in the Kenya Long-term Exclosure Experiment (KLEE), which was established in 1995 to examine the effects of various combinations of livestock and wildlife on the ecosystem. Cows and wild herbivores such as elephants and giraffes are included or excluded from experimental plots. This allows us to measure the impact of livestock on the native biodiversity and the ecosystem functions (such as the carbon cycle) of the savanna.

The research of Dr. Sitters now indicates that in areas where cattle and elephants graze together, soil depletion is not only prevented but the soil is even enriched. Elephants bring down trees in the savanna, which accelerates the return of nutrients to the soil. But more importantly, elephants compete with cattle for the same available food, which results in less grazing by cattle. This also means that cows export less dung away from the place where they graze, while dung deposition of wild herbivores is stimulated, which in turn feeds the soil.

The combination of domestic cattle and elephants can therefore be a form of sustainable management for African savanna Dr. Sitters explains: *“The largest herbivores of the African savanna, such as elephants and rhino, are threatened with extinction. That would first of all be a major loss for diversity in the animal kingdom, but it also has large implications for different ecosystem functions.* *Our research shows that elephants prevent soil depletion caused by livestock. That is good news, because soil impoverishment has a long-term negative impact on livestock itself and therefore on the food supply of the local population. Consequently, it is in the best interest of the local population to protect the large herbivores that are threatened with extinction.”*

This research is part of the postdoctoral fellowship project from the Research Foundation Flanders (FWO) of Dr. Judith Sitters who works at the VUB Department of Biology in the group of Prof. Harry Olde Venterink. For her research Dr. Sitters performed fieldwork at the Mpala Research Centre in Kenya in collaboration with Prof. Truman Young (University of California, Davis, USA) and Dr. Duncan Kimuyu (Karatina University, Karatina, Kenya).

**For more information, contact:**

Dr. Judith Sitters

judith.sitters@vub.be

+32 (0)2 629 34 96 (office)

+32 (0)483 47 48 66 (mobile)