

Experts lead research into impact of climate change on rainforest elephants

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Family of forest elephants. Credit: Malcolm Starkey

Experts from the University of Stirling, working closely with the Government of Gabon, have led an international study into the impact of climate change on Central Africa's rainforests and the threat posed to elephant populations in the region.

Dr. Emma Bush and Dr. Robin Whytock, of the Faculty of Natural Sciences, along with Professors Kate Abernethy and Lee White, are lead authors of "Long-term collapse in fruit availability threatens Central African [forest](#) megafauna" published in renowned journal *Science*. It reveals that a significant reduction in [fruit production](#) by trees in Lopé National Park, Gabon, has coincided with a decline in the physical condition of fruit-eating forest elephants.

The study found an 81% decline in fruit production between 1986 and 2018, alongside an 11% drop in the physical condition of fruit-dependent forest elephants since 2008.

This means that, on average, elephants and other animals would have encountered ripe fruit on one in every 10 trees in the 1980s, but need to search

more than 50 trees today.

The region's climate has changed since the 1980s, becoming warmer and drier, and it is believed this may be behind the decline in rainforest fruit production. Mean temperature has increased by almost 1°C during the course of the study. Some tree species in Lopé National Park are dependent on a dip in temperature to trigger flowering but warmer temperatures may mean that this vital cue to producing fruit is being missed.

Dr. Emma Bush said: "The massive collapse in fruiting among more than 70 [tree species](#) studied at Lopé National Park, Gabon may be due to species missing the environmental cue to bear fruit, because of increased temperatures and less rainfall. Less fruit in the ecosystem will have huge impacts on forest dynamics such as seed dispersal, plant reproduction and food availability for wildlife such as forest elephants, chimpanzees, and gorillas."

The University of Stirling is a pioneer in tropical ecology research, having established the world-renowned Station d'Etudes des Gorilles et Chimpanzées (SEGC—The Gorilla and Chimpanzee Research Station) with the Centre International de Recherches Médicales de Franceville (CIRMF, The International Medical Research Centre in Franceville) in Lopé National Park, central Gabon, in 1983.

This 37-year, on-going collaboration between the University and the Government of Gabon has generated a unique data set that allows researchers to monitor how the rainforests and wildlife of the Congo Basin are responding to climate change.

Dr. Robin Whytock said: "Large animals like forest elephants are already under severe pressure in Central Africa due to hunting, habitat loss and habitat degradation. If important protected areas

like Lopé National Park in Gabon can no longer support them because there is not enough food, then we may see further population declines, jeopardizing their survival in the long-term.

"We know that large bodied animals, like elephants, are disproportionately important for the healthy functioning of ecosystems and their loss could result in broad changes to forest systems and even reduce the amount of carbon stored there."

Functioning tropical ecosystems are important for global climate regulation and global health. This research highlights how global climate change might be affecting plants and animals locally, through decreased forest food production. It also adds to the global body of evidence highlighting the ongoing biodiversity crisis and the consequences of rapid climatic change.

Professor Lee White, Gabon's Minister of Water, Forest, Sea and Environment, and an Honorary Professor at the University of Stirling, said: "Long-term ecological research such as ours is unfortunately extremely rare in the tropics, and it is possible that similar processes are underway, but undetected, throughout the tropical rainforests of our planet.

"It is alarming that climate change may be resulting in [forest elephants](#) going hungry, and we need to seriously consider whether this is forcing [elephants](#) out of the forests to approach rural villages in search of food, resulting in an increase in crop raiding.

More information: Emma R. Bush et al, Long-term collapse in fruit availability threatens Central African forest megafauna, *Science* 24 Sep 2020: eabc7791, [science.sciencemag.org/cgi/doi ... 1126/science.abc7791](https://science.sciencemag.org/cgi/doi/10.1126/science.abc7791)

Provided by University of Stirling

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