

Conservation key to curbing emissions from palm oil agriculture in Africa

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An aerial photo from Gabon in equatorial Africa shows how a palm oil plantation on the top half of the image abuts an intact forest. Credit: John Poulsen, Duke University

As oil palm production expands from Southeast Asia into Central Africa, a new Duke University-led study warns that converting Africa's tropical forests into monoculture palm plantations will cause a significant spike in climate-warming carbon emissions. The authors urge regional governments to enact mandatory policies regulating which forests can be cleared and how much remaining forest must be set aside for conservation.

"Our case study, which focuses on oil palm farming in the nation of Gabon, finds that converting even previously logged forest into [oil palm](#) plantations will lead to high [carbon](#) emissions," said John R. Poulsen, assistant professor of tropical ecology at Duke's Nicholas School of the Environment.

"Clearing just 11,500 hectares of forest—or roughly 28,400 acres—would release about 1.5 million metric tons of carbon into the atmosphere," Poulsen said. "That's equivalent to the annual emissions of some small developing countries."

However, the new study finds that these emissions could be completely offset over 25 years if

development were centered on forests that store less carbon and if a portion of every development had conservation set-asides.

Poulsen and his colleagues published their peer-reviewed study June 24 in the journal *Conservation Letters*.

They used field measurements and LiDAR satellite data to calculate forest carbon stocks—the amount of carbon stored in trees—and potential [carbon emissions](#) at the site of a 50,000-hectare [palm oil](#) plantation in Gabon. The plantation is being developed jointly by the Gabonese government and the agribusiness firm Olam International Ltd., to test if low-emissions palm oil development is feasible in the equatorial country on the Atlantic Ocean.

"While Gabon has ambitions of becoming a leading producer of palm oil, it also has made pledges to protect its environment and biodiversity," Poulsen said. "If this site is successful, it could open the door to development at other sites, so it's imperative that our work helps the government strike the right balance between economic development and environmental conservation."

In Southeast Asia, large-scale palm oil development has led to persistent, region-wide emissions problems and widespread deforestation and biodiversity loss, he noted. To prevent the same scenario from playing out in Gabon, the new study proposes a two-phase approach to plantation siting and development.

"First, we recommend establishing a nationwide carbon threshold of 108 to 118 metric tons per hectare. Only forests that store less than this density of carbon will be considered suitable for development," Poulsen said. "Second, palm oil companies will also have to set aside enough land within a plantation—roughly one acre for every 2.6 acres developed—to offset emissions.

"The precise set-aside ratio may vary by site, but 2.6 to 1 is generally the point at which carbon storage in the conserved forest will offset carbon loss in the rest of the plantation and achieve net-zero emissions over time," Poulsen explained.

"Although our study considers only forest carbon, and not biodiversity or other ecosystem services, we estimate there is enough low-carbon forest in Gabon to achieve net-zero emissions while still permitting the nation to meet its palm oil production goals," he said.

Allowing industry to voluntarily adhere to these new guidelines or opt out of them is not an option, he stressed. "To succeed, this approach needs to be mandatory and implemented by the government with careful land-use planning and strict enforcement."

More information: Mark E. H. Burton et al, Reducing Carbon Emissions from Forest Conversion for Oil Palm Agriculture in Gabon, *Conservation Letters* (2016). [DOI: 10.1111/conl.12265](https://doi.org/10.1111/conl.12265)

Provided by Duke University

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