

Study shows protected tropical forests are threatened by the bounty of adjacent oil palm plantations

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Oil palm harvest at Pasoh. Credit: Nanyang Technological University

A new study led by Nanyang Technological University, Singapore (NTU Singapore) has warned of the threat that oil palm production poses to

tropical forests.

Over two decades, the international team of scientists found that [oil palm](#) production in Malaysia has an impact beyond the direct loss of habitat. It also provides a rich source of food for nearby wildlife such as [wild boars](#), which then multiply in big numbers and damage forest trees and prevent them from regenerating.

Published in *Nature Communications* on 20 Dec, the research paper reports that the wild boar population grew a hundred-fold in forests that were adjacent to oil [palm](#) plantations, even when the forest and plantations were over a kilometre apart.

The wild boars reduced the number of small trees and saplings by more than half, compared with experimentally fenced-in areas of the forest that did not have wild boars. This reduction is primarily driven by wild boar mothers harvesting small trees to build nests for their young.

Dr. Matthew Luskin, a research fellow at NTU Singapore's Asian School of the Environment, conducted this study in partnership with the Center for Tropical Forest Science—Forest Global Earth Observatory (CTFS-ForestGEO) at the Smithsonian Tropical Research Institute and researchers at the University of California, Berkeley.

"For 10 years, we saw that plants and small trees on the forest floor were disappearing but we didn't understand why," said Dr. Luskin. "Once we started looking outside the forest to the surrounding oil palms, the story became clear.

"When oil palms start fruiting, wild boars quickly aggregate to feed in the plantations. The abundant food allows them to reproduce, causing a massive surge in their population in the nearby forest. The biggest subsequent effect this leads to is when pregnant wild boars build nests, as

this clears vegetation from the forest floor."

Dr. Stuart Davies, Director of CTFS-ForestGEO programme that facilitated the study, said, "This important new study uses intensive long-term field research to illustrate that the effect of agriculture is not necessarily restricted to the land under production.

"Further experiments and observations are critical for understanding interactions between production and protection lands, thereby improving the management of the world's hyper-diverse ecosystems."



Matthew Luskin building fenced wildlife exclosures in Pasoh . Credit: Nanyang Technological University

The researchers said that with many oil palm plantations found near Southeast Asia's remaining forested lowlands, it could have a similar knock-on effect on the ecology in those areas, but its long-term impact warrants more in-depth studies.

"I've personally seen population eruptions of pigs and macaque monkeys in forests near oil palms across Peninsular Malaysia, Borneo, and Sumatra. This may become a huge conservation issue for the entire region," said Dr. Luskin.

The researchers urged oil palm growers as well as the countries and regulatory bodies that govern them to consider ways to limit negative impacts.

One solution suggested by Dr. Luskin could be for forest reserves to be surrounded by larger 'buffer' areas to limit wildlife access to oil palm fruits. With many tropical forests lying within a kilometre of a non-forested area, such as a plantation, the scientists said well-protected forest reserves may be insufficient to conserve tropical biodiversity in the face of ongoing agricultural expansion.

Efforts to control the wild boar or feral pig population is also culturally sensitive in some parts of Southeast Asia where pigs are regarded as unclean and consumption of pork is taboo.

The study focused on native wild boars (*Sus scrofa*), which are well-known to farmers as crop-raiding pests. The wild [boar](#) population was estimated to grow 100-times larger than natural levels, resulting in dramatic impacts on an intact [forest](#).

Other animals such as macaque monkeys are also known to forage on oil

palm and become common in forests found near plantations. These animals eat birds' eggs and a variety of other species and also alter the food webs in forests found near [oil palm plantations](#).

Associate Professor Fidel Costa, Acting Chair of NTU's Asian School of the Environment, said this paper is yet another project that showcases the strengths of the partnership NTU Singapore has with the Smithsonian Institution in the United States.

"Together with the Smithsonian, NTU Singapore hopes to groom the next generation of scientific research expertise, which will help Asian countries effectively conserve their environment and to embark on more sustainable business practices," Prof Costa explained.

"Through impactful studies on the effect of agricultural expansion and wildlife population, we hope to provide insights for countries and policymakers who seek to better protect our environment for future generations."

More information: Matthew Scott Luskin et al. Cross-boundary subsidy cascades from oil palm degrade distant tropical forests, *Nature Communications* (2017). [DOI: 10.1038/s41467-017-01920-7](https://doi.org/10.1038/s41467-017-01920-7)

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