Preparing land for palm oil causes most climate damage

January 21 2020

Peat swamp deforestation and drainage for new oil palm plantations in North Selangor Peat Swamp Forest, Malaysia. Credit: Photo taken by researcher Stephanie Evers

New research has found preparing land for palm oil plantations and the growth of young plants causes significantly more damage to the environment, emitting double the amount of greenhouse gases than mature plantations.

This is the first study to examine the three main greenhouse gas emissions across the different age stages of palm oil plantations. It was carried out by plant scientists from the University of Nottingham in the North Selangor peat swamp forest in Malaysia with support from the Salangor State Forestry Department. It has been published today in *Nature Communications*.

Palm oil is the most consumed and widely traded vegetable oil in the world. Global demand has more than tripled in the last eighteen years, from around 20 million tonnes in 2000 to over 70 million in 2018 and Malaysia is the world's second largest producer. The University of Nottingham researchers analysed five sites at four different stages of land use: secondary forest, recently drained but uncleared forest, cleared and recently planted young oil palm plantation and mature oil palm plantation.

Laboratory analysis of soil and gas from these sites showed that the greatest fluxes of CO_2 occurred during the drainage and young oil palm stages with 50% more greenhouse gas emissions than the mature oil palms. These emissions also account for almost a quarter of the total greenhouse emissions for the region.

Intensive drainage

Tropical peat swamp forests hold around 20% of global peatland carbon. However, the contribution of peat swamp forests to carbon storage is currently under threat from large-scale expansion of drainage-based agriculture including oil palm and pulp wood production on peatlands.

Draining peatlands increases the oxygen levels in the soil, which in turn increases the rate of decomposition of organic material, resulting in high CO_2 emissions from drained peatlands. In addition to CO_2, peatlands also emit the powerful greenhouse gases (CH_4 and N_2O_8).

Dr. Sofie Sjogersten from the University of Nottingham's School of Biosciences led the research and said: "Tropical peat swamps have historically been avoided by palm oil growers due to the amount of preparation and drainage the land needs, but as land becomes more scarce there has been an increased demand to convert sites and the periphery of North Selangor is being heavily encroached upon by palm oil plantations. Our research shows that this conversion comes at a heavy cost to the environment with greater carbon and greenhouse gas emissions being caused by the early stages of the growth of palm oil."

More information: *Nature Communications* (2020). DOI: 10.1038/s41467-020-14298-w

Provided by University of Nottingham