LAND USE

Greener pastures for oil

Sci. Adv. https://doi.org/10.1126/sciadv.aaw4418 (2019)

Credit: Atmotu Images / Alamy Stock Photo

Tropical deforestation for oil palm production is linked to habitat loss and carbon emissions. In Asia (one of the main regions producing oil palm), CO_2 emissions related to oil palm were the second largest source of GHG emissions attributable to deforestation and land-use change (beef being the largest). Expanding plantations onto pasture, rather than in forested areas, might reduce net carbon emissions, but this remains unclear.

To quantify the impact on ecosystem carbon storage, Juan Carlos Quezada from the École Polytechnique Fédérale de Lausanne, Switzerland, and colleagues determined soil and biomass carbon dynamics in oil palm plantations grown on former pastureland during 56 years in Colombia. Although soil organic carbon decreased during the first 36 years, it eventually began to stabilize and recover. The additional carbon stored in biomass in the plantations, as compared to the former grassland, made the system carbon neutral. These results indicate a potential way to reduce or perhaps avoid emissions related to new oil palm production. *AF*

https://doi.org/10.1038/s41558-019-0671-x

TROPOSPHERIC OZONE

Increases from above

Atmos. Chem. Phys. https://doi.org/10.5194/acp-19-14387-2019 (2019)

The impact of ozone depends on where it is. In the lowest atmospheric layer (the troposphere), ozone is a pollutant and greenhouse gas. But in the overlying stratosphere, it is naturally abundant and absorbs harmful solar radiation.

Tropospheric ozone concentrations are governed by precursor emissions at the surface and by delivery from above, which occurs when the stratosphere 'folds' and dips into the underlying troposphere. How climate change will affect the frequency of this folding — and in turn stratosphere-to-troposphere transport — is important for projecting lower-atmosphere ozone abundance, as this mechanism is independent of ground-level pollution.

Dimitris Akritidis at Aristotle University of Thessaloniki, Greece, and co-authors in Greece and Germany used a global climate model to project robust changes in folding frequency under climate warming, particularly in the mid-latitudes. They find that stratospheric ozone recovery and regional increases in folding frequency enhance stratosphere-to-troposphere ozone transport, especially for hotspots such as the summertime Mediterranean and Middle East. Importantly, tropospheric ozone concentrations are slated to grow despite near-surface decreases in precursor emissions. *BL*

https://doi.org/10.1038/s41558-019-0672-9

CLIMATE POLICY

Resilient industry narratives

Glob. Environ. Politics https://doi.org/10.1162/glep_a_00526 (2019)

As a key component of international climate governance, the Paris Agreement sends strong signals about what is required to achieve necessary transformations of sociotechnical systems. But there is little empirical analysis of whether and how these signals have affected the fossil fuel industry, where transformation is most urgently required.

Lukas Hermwille and Lisa Sanderink from Vrije Universiteit Amsterdam, the Netherlands, examine how the official communications of the US fossil fuel industry evolved from late 2014 until the announcement of US withdrawal from the Agreement in 2017. The coal industry shifted its narrative following the election of President Trump from one of victimization and decline to one of heroism and resurgence. In contrast, the oil and gas industry remained consistent in a narrative aligned with the Paris Agreement — that they are a key solution to the climate problem — even after US climate policy reversal. The authors interpret this to suggest that the Agreement institutionalized a narrative paradigm that is resilient to opposing domestic policy changes. *JR*

https://doi.org/10.1038/s41558-019-0673-8

INVASIVE PLANTS

Warmth disfavours natives

Ecology https://doi.org/10.1002/ecy.2913 (2019)

Credit: Julian Elliott Photography / Photolibrary / Getty Images Plus / Getty

Climate warming and the invasion of foreign species are two major factors driving ecosystem change. For plants, the timing (phenology) of flowering can shift under warming conditions, with the ability to change generally greater for invasive species than natives. Interaction between climate change and invasive species may thus heighten the pressure on threatened natives, but this remains poorly studied.

Justyna Giejsztowt, at the Victoria University of Wellington, NZ, and US and NZ colleagues, investigated the impact of warming on flower phenology and reproductive success for invasive heather (*Calluna vulgaris*) and endemic monoao (*Dracophyllum subulatum*). Under experimental warming (+1.7 °C), heather had earlier first flowering and peak flower production. Monoao flowers were then more likely to appear concurrent with particularly high heather flower density. The negative impact of heather on monoao seed weight observed in areas of high floral density suggests that warming-induced increases in phenological overlap between invasive and native species may increase competition for pollination — of particular pertinence in the context of global pollinator declines. *TAM*

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