

# Land use looms as large factor in global warming

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For the world's deteriorating environment, don't blame burning fossil fuels exclusively. Land use and land cover changes contribute about 40 percent to "radiative forcing," a key underlying factor in global warming, according to Cornell environmental scientists writing in the latest *Atmospheric Chemistry and Physics* (Dec. 3).

Radiative forcing measures the change in the balance between the sun's energy warming and planetary emissions of radiation that act to cool the Earth. Forcing can be used to predict changes in Earth's surface temperatures. Burning fossil fuel – often considered to be responsible for 80 percent of warming – has been found to account for about 60 percent of forcing.

"Pressure on land resources is expected to increase as global population continues to climb and the world becomes more affluent, swelling the demand for food. We need much more than a global energy policy. We need land policies, as well, to minimize future increases in radiative forcing and associated climate change," said Dan Ward, Cornell postdoctoral researcher in [earth](#) and atmospheric sciences. Policies that encourage switching to conventional biofuels, which might spur deforestation, could also be detrimental to climate, if not correctly designed, he said.

The new research accounts for land-resource pressures and land cover change, from agriculture and deforestation to shopping malls and urban sprawl that contribute about 40 percent of all radiative forcing. For each

ton of carbon dioxide emitted from burning [fossil fuels](#), the total radiative forcing is half that from land use, said co-author Natalie Mahowald, professor of earth and atmospheric sciences and a fellow at Cornell's Atkinson Center for a Sustainable Future.

Mahowald explains that larger forcing from land use contributes to an increase in other greenhouse gases, like methane and nitrous oxide, and reduces future sinks (a natural repository) of carbon dioxide on natural lands. In contrast, [fossil fuel emissions](#) are usually associated with aerosols, which reflect the incoming solar radiation and thus tend to cool the climate. Through examining models of climate impact, the scientists say that continued deforestation at Earth's temperate and equatorial climes will lead to historic levels of warming by the next century.

By perpetuating today's deforestation activity in the tropics, Earth could risk a three-fold increase in global forcing from land use. The [radiative forcing](#) in the year 2100 would be of a greater magnitude than present-day fossil fuel burning in this possible scenario, Ward said.

Provided by Cornell University

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