

# Seeking better guidelines for inventorying greenhouse gas emissions

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In the face of a changing climate, the process of accounting greenhouse gas emissions is becoming ever more critical. Governments around the world are striving to hit reduction targets using Intergovernmental Panel on Climate Change (IPCC) guidelines to limit global warming. To have a chance of hitting these targets, they need to know how to accurately

calculate and report emissions and removals.

The IPCC guidelines are essential but woefully out of date, say researchers from the Yale School of Forestry & Environmental Studies (F&ES), and in need of improvement as countries prepare inventory reports as part of Paris Agreement commitments over the next year.

"Global society could be doing a better job in producing [greenhouse](#) gas inventories," said Leehi Yona '18 M.E.Sc., the lead author of a paper recently published in the academic journal *Ambio*. "It is paramount that we get greenhouse gas inventories right, so that the emissions we report are equal to the emissions in the atmosphere. Closing this gap between actual and reported emissions is a prerequisite to successful [climate change](#) mitigation."

Yona was joined on the paper by Mark Bradford, professor of soils and ecosystem ecology at F&ES, and former F&ES faculty member Ben Cashore.

In the paper, the researchers outline the limitations of the current IPCC guidelines. Firstly, the process through which the guidelines are produced has not been updated since their inception in 1996. The guidelines currently require a cumbersome, multi-step review process where government-nominated experts write and revise drafted reports. Aside from the fact the experts are then not independent of national interests, the guidelines fail to take advantage of the tremendous advances made in "synthesis approaches" that can more accurately and expeditiously be used to inventory national-level greenhouse gas emissions.

The methodology for reporting greenhouse gas emissions presents another challenge. A multi-tiered system of methodologies was initially created by the IPCC to properly address the economic statuses of the

different signatory countries involved in the agreement. Larger, wealthier countries were expected to apply more rigorous methodologies, while developing nations used the default methods of reporting. However, nearly all of the nations are still using the default methods in part due to a lack of resources.

It is these default methods then that the researchers say must be improved. Though challenges exist, the researchers lay out technological advances that can properly address them. They suggest such things as using [satellite imagery](#) to fill data gaps coupled with machine-learning tools that expedite quantitative synthesis, as well as account for emissions associated with [land use](#) and management. They also recommend a dynamic and transparent review process modeled after "the Cochrane Collaboration," used in medicine and [health science](#) to expertly synthesize the most recent scientific data to inform medical policy and practice that directly benefits the public.

"Evidence synthesis has revolutionized in the past 25 years, since the first greenhouse gas inventories were developed," said Bradford.

"Medicine has availed of these advances, providing relevant, up-to-date, high-quality information to save and improve the quality of millions of lives. Our planetary health surely demands that we use such advances in synthesis to similarly inform the accounting and management of greenhouse gas emissions."

**More information:** Leehi Yona et al, Refining national greenhouse gas inventories, *Ambio* (2020). [DOI: 10.1007/s13280-019-01312-9](https://doi.org/10.1007/s13280-019-01312-9)

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