

Agriculture emissions surge above those from deforestation for the first time, U.N. report warns

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Global emissions from agriculture appear to have surpassed those from deforestation for the first time, based on a new data analysis by researchers from the Food and Agriculture Organization of the United Nations.

According to the FAO report, agriculture accounted for 11.2 percent of total global greenhouse gas emissions in 2010, while deforestation was responsible for 8 percent.

The findings highlight ongoing reductions in emissions from deforestation and land use, as well as an increase in the proportion of emissions coming from agriculture, according to the report's lead author, Francesco Tubiello, a natural resources officer and project coordinator at the FAO.

Tubiello became interested in reviewing the existing global emissions estimates back in 2011 when he helped to prepare the chapter on agriculture, forestry and other land use (AFOLU) for the latest report by the Intergovernmental Panel on Climate Change (IPCC).

"It quickly became clear that there were no regular updates for agriculture," he said.

In order to calculate the emissions levels for AFOLU in its latest report, the IPCC used three global data sets, each with somewhat different emissions estimates. Tubiello and his colleagues at the FAO analyzed the varying approaches and used the data to make their own estimates. In the process, they created a new data set that can now be updated every year.

"The numbers are more or less following the trend in the IPCC report," Tubiello said.

Instead of 24 percent of total greenhouse gas emissions coming from agriculture, forestry and other land use as reported by the IPCC, Tubiello and his colleagues placed the figure somewhat lower, at 21 percent.

The difference of a few percentage points might not sound like much to those outside the field, but the revised estimates show a clearer breakdown of where AFOLU emissions are coming from, Tubiello said.

Though agricultural emissions may now exceed those from forestry and other land use, overall emissions from the combined sectors declined between 1990 to 2012, according to the FAO report. In 1990, global emissions for AFOLU totaled 28.7 percent. By the 2000s, that figure had dropped to 23.6 percent, and in 2010, AFOLU emissions were 21.2 percent of the global total.

Soils, fertilizer and livestock drive emissions

Over the past two decades, emissions from agriculture went down at a slower rate than those from deforestation and other land use.

The researchers also extended emissions estimates into 2012. Agricultural emissions grew by roughly 1 percent per year to 5.4 gigatons of carbon dioxide equivalent. Land use estimates stayed stable at 4.8 gigatons of carbon dioxide equivalent.

The report did not break down emission sources from the different sectors, but according to the latest IPCC report, 70 percent of emissions from agriculture comes from methane-producing livestock and from agricultural soils. The IPCC includes methane and nitrous oxide as part of agricultural emissions but considers carbon dioxide emissions as neutral because of carbon fixation and oxidation from crop photosynthesis.

Significant increases in synthetic fertilizer use, particularly in Asia, could be helping to drive higher overall agricultural emissions.

"Synthetic fertilizer by far has been the biggest growth sector," Tubiello said. Between 2011 and 2012, total emissions from the fertilizer went up 8 percent.

Meanwhile, reductions in deforestation emissions are likely related to government policies and growing industry action. In Brazil, implementation of Reducing Emissions From Deforestation and Forest Degradation, or REDD+, has made a dent, according to Tubiello, but elsewhere in the world, REDD projects aimed at reducing deforestation are just beginning to be put in place.

The report's analysis did not take into account Brazil's 60 to 70 percent reduction in deforestation over the past few years, because official national data are released every five years and were not yet available. Brazil is responsible for the second highest rates of deforestation in the world, after Indonesia, suggesting that overall emissions from deforestation could be significantly lower.

Because the emissions represent global averages, the report does not reflect the variability in emissions levels between regions. Developing countries had agricultural emissions that were closer to half of their national emissions totals.

A messy GHG accounting process

According to Tubiello, the data show that there needs to be more focus on agriculture. However, that suggestion concerns Bronson Griscom, the director of forest carbon science at the Nature Conservancy.

"What they indicate is the need to address agricultural emissions. I don't think they intend to suggest a reduction in efforts to stop deforestation, but that's a conclusion that policymakers could come to," he said.

Prioritizing forest protection is paramount because of co-benefits of preserving forests, like flood control and maintaining biodiversity. Once trees are cut down, it's much harder for a forest to recover, Griscom said.

He also raised concerns about the reliability of the national forestry data used as the foundation for the research.

Tubiello said he was aware that some people may view the report's findings as a reason to not put as much effort into reducing deforestation globally.

"Part of the reason we do this is to stimulate conversation," he said. "You can look at the numbers in both ways."

While the scientific community had known for a long time that agricultural emissions were growing, the message is only now starting to reach the general public, said Peter Smith, chairman of plant and soil science at the University of Aberdeen in Scotland and a contributor to the IPCC's latest report.

This is partly because emissions from agriculture are more difficult to quantify than those from the energy sector.

"I've heard it said, it's not rocket science, it's much harder," Smith said.

Although researchers have data on how much the agricultural sector is producing in terms of numbers of animals and bushels of grains, they lack "activity data" defining what production or cultivation systems are being used, how much fertilizer farmers are applying, the quality of the soil, and where livestock animals are located, according to Smith.

To make greenhouse gas estimates, Tubiello and other researchers depend on accurate agricultural commodity reporting from government agencies. Not all countries have equal ability to report these figures consistently.

Because of the gaps in knowledge, estimates for both agricultural and forestry emissions include a great deal of uncertainty.

"We try to communicate transparently how we calculate [emissions]. We go and work with countries on their reference levels. Having said that, in agriculture and especially in the forest sector, uncertainty is going to be high. We have to live with it," Tubiello said. "These are the best available estimates."