

Halfway There? What the Land Sector Can Contribute to Closing the Emissions Gap

Half or more of emissions reductions needed to reach 2-degree goal could come from land sectors of major emitting countries.

International talks on climate change will reach a critical stage at the end of 2015, when an agreement on large reductions in global warming emissions is to be negotiated in Paris. In order to avoid the worst consequences of climate change, the sum of countries' further emissions reductions will need to close the "emissions gap"—the difference between what they have already committed themselves to doing and what will be necessary to keep global temperature rise below 2 degrees above pre-industrial levels. The United Nations Environment Programme, in its most recent Emissions Gap report (2014), has estimated that in the absence of sufficient reductions beforehand, this gap will be 8–10 billion tons of CO₂ equivalent (Gt CO₂eq) in 2020 and 14–17 Gt CO₂eq in 2030. At present, total global emissions are about 54 Gt CO₂eq/year.

Closing the emissions gap is thus a huge challenge for the global community, and we will begin to see in early 2015 whether countries are likely to meet it. This is when they start announcing their Intended Nationally Determined Contributions—the mitigations they plan to achieve in the 2020s. The large-scale deployment of available and highly effective land use options could increase that likelihood substantially.

The median estimates of AFOLU mitigation potentials for these countries add up to nearly 7 Gt CO₂eq/year for 2020 and 2030, equaling about three-fourths of the 2020 gap and half of the 2030 gap.

Based on scientific estimates from the Intergovernmental Panel on Climate Change (IPCC) and other more-recent studies, the UCS report *Halfway There? What the Land Sector Can Contribute to Closing the Emissions Gap Post-2020* shows the potentials for reducing the gap from the land sector, commonly referred to as AFOLU (Agriculture, Forestry, and Other Land Use). There are three major kinds of AFOLU-based

mitigation activities: reducing carbon emissions from deforestation, forest degradation, and the clearing of peat lands; decreasing emissions from agricultural sources such as methane from cattle and rice paddies, nitrous oxide from fertilizer and manure, and carbon from the soil; and taking carbon dioxide out of the atmosphere (sequestration) through reforestation and other kinds of ecosystem restoration.

Additionally, there are approaches to each activity both on the supply side (production—e.g., how livestock, rice paddies, or forests are managed) and on the demand side (consumption—e.g., how much beef is consumed or how much food is wasted). The IPCC has reviewed various estimates of the total global mitigation potential from AFOLU, which range from less than 1 Gt CO₂eq to more than 13, depending on methodology, time period, assumed carbon price, subsectors (types of land use changes) included, and whether both demand- and supply-side actions are considered (Smith et al. 2013, Figure 11.14).

Halfway There? compiles and presents previously published estimates of AFOLU mitigation potential for eight of the world's major emitters: Brazil, China, the Democratic Republic of the Congo (DRC), the European Union (EU—28 countries), India, Indonesia, Mexico, and the United States. These countries together account for 57 percent of global AFOLU emissions. Both for 2020 and 2030,

- the largest potential is in the United States (2–3 Gt CO₂eq);
- Indonesia, China, and India also have substantial potentials (0.75–1.75 Gt); followed by
- Brazil and the EU (about 0.5 Gt); finally
- Mexico and the DRC have fairly low levels (less than 0.2 Gt).

However, the subsectors and approaches with the largest emissions-reduction potentials are quite different by country, as summarized qualitatively in the following table on the next page.

The median estimates of AFOLU mitigation potentials for these countries add up to nearly 7 Gt CO₂eq/year both for 2020 and 2030, amounting to about three-fourths of the 2020 gap

TABLE. Climate Mitigation Potentials of AFOLU Subsectors, Globally and by Country

	Ruminant methane	Rice methane	Soil N ₂ O and CO ₂	Deforestation and degradation	Peat	Sequestration from regrowth
Global	**	*	**	**	**	**
United States	**		**			**
Indonesia		*		**	**	*
China	**	*	**			*
India	**	*	*			*
European Union (28 countries)	**		*		*	*
Brazil	**		*	**		**
Mexico	*		*	*		*
Democratic Republic of the Congo				*		

** = High potential, generally 100s of Mt to Gt CO₂eq/year

* = Moderate potential, generally 10s of Mt to 100s of Mt CO₂eq/year.

Notes: Because these estimates are for the post-2020 period, they take into account both actions to date and those expected before 2020. The ruminant methane subsector includes enteric fermentation and manure as well as both supply- and demand-side approaches. The soil N₂O and CO₂ subsector includes synthetic fertilizer, manure, and other soil management options both on cropland and pasture—but only on mineral soils (not peat). The peat subsector includes reduced clearing and restoration. The sequestration from regrowth subsector includes reforestation, afforestation, and restoration in nonforest ecosystems.

and nearly half of the gap in 2030. Moreover, AFOLU mitigation by other countries not included in the report would further reduce the emissions gap.

As countries begin presenting their Intended Nationally Determined Contributions in early 2015, this report's estimates of AFOLU mitigation potentials could help the world gauge how committed these nations are to meeting those potentials—that is, to tackling the most critical challenge of our time.

The complete database of the studies considered in the review; a detailed description of the measures used (including inclusion criteria, interpolation, conversion factors, and quantitative summaries); and, as of late January 2015, the full report are all available online at www.ucsusa.org/halfwaythere. The database also provides citations, links to the original studies, and descriptions of the assumptions made by the original researchers.



FIND THIS DOCUMENT ONLINE: www.ucsusa.org/halfwaythere

The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with citizens across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

NATIONAL HEADQUARTERS

Two Brattle Square
Cambridge, MA 02138-3780
Phone: (617) 547-5552
Fax: (617) 864-9405

WASHINGTON, DC, OFFICE

1825 K St. NW, Suite 800
Washington, DC 20006-1232
Phone: (202) 223-6133
Fax: (202) 223-6162

WEST COAST OFFICE

500 12th St., Suite 340
Oakland, CA 94607-4087
Phone: (510) 843-1872
Fax: (510) 843-3785

MIDWEST OFFICE

One N. LaSalle St., Suite 1904
Chicago, IL 60602-4064
Phone: (312) 578-1750
Fax: (312) 578-1751