The Land Sector in the First INDCs

Intended Climate Contributions of the United States, the European Union, and Mexico

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This report is available online (in PDF format) at *www.ucsusa.org/halfwaythere.*

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[EXECUTIVE SUMMARY]

Countries have begun announcing how they plan to contribute to the global warming reduction effort during the 2020s decade. They are doing so through the release of "intended nationally determined contributions" (INDCs), as requested by the United Nations Framework Convention on Climate Change. Seven INDCs were made public during March 2015, the initial deadline. The Union of Concerned Scientists (UCS) analyzed three of them—those of the United States, the European Union (which currently comprises 28 countries), and Mexico—specifically reviewing proposed efforts in the land sector, often referred to as "agriculture, forestry, and other land use" (AFOLU). Based on the estimates of AFOLU-related mitigation potentials presented in the UCS's recent review *Halfway There?* (Boucher and Ferretti-Gallo 2015), we compared these three INDCs in terms of transparency, level of ambition, information about accounting, and degree of specificity on any proposed actions.

Both the United States and the European Union explain their accounting standards at length, and these standards conform by and large to international scientific principles. However, both fall short on transparency, and there is practically no mention of specific actions that they plan to take in the land sector. Thus it is impossible to say whether these nations' ambitions are commensurate with their capacities and responsibilities.

Mexico's INDC, on the other hand, goes into considerable detail, putting forth plans to reduce deforestation to zero by 2030, restore forests and other biomes, increase carbon capture, and give greater protection to coastal ecosystems. Mexico also intends for its overall emissions to peak and then begin declining by 2026. The level of the country's ambition is quite impressive, given its national circumstances; and its transparency, particularly compared with the developed countries, virtually sets a standard.

As other countries release their own INDCs and move toward negotiating an international agreement in Paris next December, greater transparency about land-use actions will be needed. Mexico, with its peak-and-decline, and Norway, with its goal of carbon-neutrality, provide examples that other countries will need to follow if the world's peoples are to avoid dangerous climate change.

[INTRODUCTION]

The March 2015 INDC Submissions

Thirty-four countries (six sovereign nations plus the 28-member European Union) submitted this past March their "intended nationally determined contributions" (INDCs), for the decade of the 2020s, to the United Nations Framework Convention on Climate Change (UNFCCC). These submissions were in response to the UNFCCC request that countries "communicate their intended nationally determined contributions well in advance of the 21st session of the Conference of the Parties … in a manner that facilitates … clarity, transparency, and understanding" (UNFCCC 2014).

This first group of INDCs, which includes some of the world's largest countries and most prolific emitters of global warming pollution, sets the stage for INDC releases by other countries over the next several months – leading up to the U.N. Climate Change Conference (COP21) in Paris during December 2015. Taken together, the INDCs will show the collective commitment of the world's governments to act to avoid dangerous climate change. These documents are therefore critical not only to the success of the Paris negotiations and but also to the state of the Earth's climate in the 21st century.

In this white paper, the Union of Concerned Scientists (UCS) analyzes three of these initial INDCs: those of the United States, the European Union, and Mexico. We also offer brief commentary on the other INDCs released to date—by Gabon, Norway, Russia, and Switzerland.

In each case our focus is on the land sector—called "agriculture, forestry, and other land use" (AFOLU) by the most recent Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR5)—which is estimated to account for just under one-fourth of the world's emissions of global warming pollution (Smith et al. 2014). AFOLU is important not only because of its substantial net emissions but also for its potential to reduce them.

The Mitigation Potential of the Land Sector

In recent years, the AFOLU sector's production of global warming gases has totaled about 21 percent of all anthropogenic emissions, according to a recent review by Tubiello et al. (2015) based on three different global data sets. The two main components of the sector's annual global warming emissions have been trending in opposite directions, with those from **forests** (mainly because of decreased tropical deforestation and forest degradation) declining to about 4.8 billion tons of CO_2equivalent (Gt CO_2eq/year). By contrast, emissions from **agriculture** have been growing, and they now account for about 5.4 Gt CO_2eq/year. The removal of CO_2 from the atmosphere ("sequestration," mainly from the regrowth of forests) is about 1.6 Gt CO_2eq/year, leaving net forest emissions at approximately 3.2 Gt CO_2eq/year.

These figures show the large scale of the sector, but just how much could its net emissions be reduced? In particular, what is its mitigation potential in the post-2020 period (to which the INDCs correspond)? Earlier this year, the UCS analyzed the land-sector mitigation potential of eight of the world's largest emitters: the United States, the European Union, Mexico, China, India, Brazil, Indonesia, and the Democratic Republic of the Congo. Our results, based on estimates in the scientific literature, were published in the report *Halfway There? What the Land Sector Can Contribute to Closing the Emissions Gap* (Boucher and Ferretti-Gallon 2015). The title reflected the report's main finding—that over half of the gap between what countries intend to do and what is needed to avoid dangerous climate change (UNEP 2014) could be closed by stronger action in the land sector.*

* The complete database and the methodology we used in the report are available online at *www.ucsusa.org/halfwaythere*.

How We Analyze the INDCs

Our analyses in this white paper (and in subsequent reports on the INDCs to come) are based on several important criteria.

First, we ask how **transparent** a country has been with respect to the land sector. How much information does it give out about its plans? Are its estimates quantitative? Does it make clear the percentage of its land that is included, the time period covered, and the baseline from which reductions are to be made? In other words, does it give other countries enough detail to understand what it intends to do?

Second, we distinguish between information on **accounting** and information on **action.** Accounting for land-use emissions has been addressed in depth in the UNFCCC negotiations for nearly two decades. In particular, the discussions on "reducing emissions from deforestation and forest degradation" (REDD+)—mostly concerning tropical developing nations—and on "land use, land use change, and forestry" (LULUCF)—pertaining mostly to temperate and boreal developed nations—have produced detailed frameworks on how to account for forest emissions and sequestration.

But although accounting is important to the scientific integrity of the system, accounting is not the same thing as action. Thus we ask whether an INDC reveals not only how the country plans to calculate its net emissions but also what it intends to do to reduce them.

Finally, to the degree that the data in the INDC allow, we ask how much **ambition** the country has with respect to its land sector. Does the country plan to realize its potential for AFOLU-related reductions, as estimated in the literature and summarized in *Halfway There?* Or is it falling short?

In assessing ambition, we take two things into account: the quantitative estimates of mitigation potential; and "common but differentiated responsibilities" (a fundamental principle of the UNFCCC). This principle implies that the socioeconomic reality of the country, as well as its past contributions to global warming, should be considered. It also means that developed countries are generally expected to do more than developing ones, relative to their mitigation potentials, both because they can and because they should.

Our analyses of the INDCs of United States, the European Union, and Mexico are presented in turn below.

The United States

In *Halfway There?* we found that the country with the largest potential for land sector-related reductions in the 2020s is the United States. Taking both agriculture and forests into account, and including reduced emissions as well as increased sequestration, the U.S. land sector could contribute about 2.5 Gt CO_2eq/year to the mitigation of global warming (Boucher and Ferretti-Gallon 2015).

Does its INDC (U.S. government 2015) show that the United States plans to realize this potential? Unfortunately, no. It is not that the nation's aims for the AFOLU sector lack ambition but rather that its INDC offers no plan for action at all. While there is discussion of actions on emissions reductions from a variety of sources, such as electric power, motor vehicles, and landfills (with a total goal of 26–28 percent below the 2005 level by 2025), agriculture and forests are left out.

Discussion of the land sector in the U.S. INDC deals only with accounting, and overall the proposed accounting principles are reasonable. The baseline year (2005) and the year for calculating reductions (2025) are clearly stated, the United States will include its land sector emissions and sequestration in its target, and it will follow accepted scientific principles (as established by the IPCC) on how to do the land-use accounting. Emissions reductions made by other countries with U.S. financing (e.g., REDD+ reductions in tropical forests) will not be counted against the U.S. target.

However, there is one sentence on accounting that is of concern to us: "The United States may also exclude emissions from natural disturbances, consistent with available IPCC guidance." This exclusion is certainly allowed by IPCC and UNFCCC rules, but only if it is applied to emissions that are truly beyond human control—e.g., those attributable to forest damage from hurricanes (Zeng et al. 2009). The potential problem is that the exclusion might pertain to emissions that are closely connected to the vagaries of human management, such as forest fires and beetle outbreaks. Such a policy would create a perverse incentive against improving forest management so as to reduce emissions.

In any case, the main problem with the U.S. INDC, as noted above, is that it that it fails to specify any mitigation action in the land sector. The United States does have great potential, from options such as reducing consumption of high-emissions foods—e.g., beef (Ripple et al. 2014)— decreasing over-fertilization of crops (West et al. 2014), and increasing reforestation (WRI 2014). But its INDC does not indicate any plans to make that potential a reality.

The European Union

The European Union's INDC is similar to that of the United States in several ways. Unfortunately, most of them are negative.

In both cases, the focus is on the accounting, in accordance with international standards. But while the potential for AFOLU-related mitigation in the European Union is substantial (though not nearly as large as that of the United States) and well within the capacities of the member developed nations, the E.U. INDC contains no plans for actions to fulfill that potential.

As with the United States, the European Union's net AFOLU-related emissions represent the sources of agriculture and forestry combined. The literature we reviewed in *Halfway There?* yielded a median estimate of about 0.4 Gt CO_2eq/year for E.U. land-sector mitigation potential in the 2020s (Boucher and Ferretti-Gallon 2015).

A recent study by the European Union's own institute, the Joint Research Centre, confirmed the large potential for mitigation in European agriculture in particular (van Doorslaer et al. 2015). The research showed that the region, with relatively small decreases in consumption for most foods, could cut Europe's agricultural emissions by 28 percent below 2005 levels by 2030.

However, there is no consideration of this or any other alternative in the European Union's INDC. With respect to actions to reduce AFOLU emissions, the INDC only states: "Policy on how to include land use, land use change, and forestry into the 2030 [global warming] gas mitigation framework will be established as soon as technical conditions allow and in any case before 2020" (Latvia and the European Commission 2015). There is no explanation of what these "technical conditions" are or why they prevent the European Union from proposing an explicit policy.

Thus, as with the United States, the European Union has no plan as yet to actually realize its potential for land-sector mitigation.

Mexico

The contrast between Mexico's INDC (Government of Mexico 2015) and those of the United States and the European Union is striking. Despite being a developing country in which the land is very important to its economy, Mexico has put forward detailed plans to reduce its AFOLU-related emissions.

The four estimates of Mexico's land-sector reduction potential reviewed in *Halfway There?* gave a median (0.2 Gt CO_2eq/year for the 2020s) of about half that of the European Union. The most important actions in this regard included reducing deforestation, increasing reforestation, restoring other ecosystems, and improving the productivity and sustainability of agriculture.

Mexico's INDC puts forth its intention to reduce its overall global warming pollution by 25 percent from business as usual—unconditionally—and by 40 percent if provided with international financing and other support. The baselines, years, and other accounting criteria are made clear. Coverage of global warming gases, sectors, and activities is expected to be thorough, and methodologies for estimating emissions reductions are to follow IPCC guidelines.

Notably for a developing country, Mexico proposes to have its net emissions reach a peak by 2026 and then begin to decline. Thus by the end of the 2020s it expects to be mitigating climate change not only in relative terms but also absolutely.

In a section of its INDC's appendix on ecosystem-based adaptation, Mexico presents in detail the "Actions to be implemented for the period 2020–2030." They are:

- Reach a rate of 0 percent deforestation by the year 2030.
- Reforest high, medium, and low watersheds, with special attention to riparian zones and taking into account native species in the area.
- Conserve and restore ecosystems, through biological corridors and sustainable productive activities, in order to increase ecological connectivity of all Natural Protected Areas and other conservation schemes. This approach will take into account the equitable participation of the population and will have a territorial component.
- Substantially increase the Programs of Action and Conservation of Species in order to strengthen the protection of priority species from the negative impacts of climate change.
- Increase carbon capture and strengthen coastal protection by implementing a scheme of conservation and through recovery of coastal and marine ecosystems such as coral reefs, mangroves, sea grass, and dunes.
- Guarantee the integrated management of water for its different uses (agriculture, ecological, urban, industrial, and domestic).

While these actions are enumerated as part of the INDC's adaptation section, they clearly have mitigation impacts, which the document points out. This is particularly the case for the first three items above as well as the fifth. Elsewhere in the INDC there are several mentions of agriculture and food security, though without similar details about activities to be implemented.

In comparison with the land use discussions of the U.S. and E.U. INDCs, Mexico's has the same degree of rigor as concerns accounting—a level of ambition that is appropriate for a developing country and commensurate with this nation's potential—but considerably greater transparency about the actual actions it plans to take.

Other Countries

Seven entities submitted their INDCs by the end of March 2015—the three analyzed above (and in *Halfway There?*) and four others: Gabon, Norway, Russia, and Switzerland. Because we lacked estimates of the latter group's land-sector mitigation potentials as a basis for comparison, we did not do a detailed analysis of its INDCs. However, a number of points are worth noting:

- Both Gabon and Russia have large areas of forest that are naturally sequestering large quantities of carbon. However, Gabon will not use this sequestration to offset the country's emissions, according to its INDC. Russia's INDC, though not completely clear on this point, suggests that it wants to do the opposite, using the nation's natural forest growth to offset its global warming emissions.
- Because both Norway and Switzerland plan to coordinate their actions with the rest of Europe, their two INDCs show similar levels of uncertainty—given the absence of specific land-use actions in the European Union's INDC. This uncertainty carries over to some extent for both countries' AFOLU-related accounting as well.
- Switzerland's commitment to a 50 percent reduction in emissions is based on a planned 30 percent domestic reduction plus another 20 percent from the reductions it finances in other countries. These figures will reflect both "clean development mechanism" (CDM) credits, which can include afforestation and reforestation, and credits from new market mechanisms.
- Norway intends to become carbon-neutral by 2050. Further, it expects that the emissions reductions it finances in other countries will balance its domestic emissions by 2030. Norway has been one of the most generous funders of REDD+ (e.g., in Brazil and Guyana), but it has not used these credits as offsets and the INDC does not indicate that this will change.

What's Next?

The Union of Concerned Scientists has now seen the INDCs from 34 countries (including the 28 members of the European Union), whose emissions make up most of the world's total. Over the next several months, we expect to see those from the remaining developed countries (e.g., Australia, Canada, Japan) as well as from most of the developing world. As these documents are released, we will carry out analyses similar to those summarized in this white paper. We and other scientific organizations and institutions will also be considering the big picture—how all of the INDCs, taken together, stack up against what is needed to prevent dangerous climate change. But it is already possible to draw some tentative conclusions based on the INDCs submitted so far.

Ironically, the most striking impression is that the two developing countries (Mexico and Gabon) of our sample have been more transparent about their land sector-related mitigation plans than most of the developed countries, which tend to attribute their total lack of specific plans to unexplained "technical conditions."

As concerns the accounting, most countries do seem to be following internationally agreed-upon scientific principles and to be including most or all of their land, activities, and global warming emissions. And although there are some reasons for concern about statements in some developed countries' INDCs—regarding, for example, certain emissions to be excluded in the country's accounting—the documents' level of rigor is by and large fairly high and worthy of emulation in forthcoming INDCs.

Does the level of AFOLU-related ambition match countries' potential? So far, we simply can't tell, given the lack of transparency about planned actions. This is the area in which the current INDCs fall short most seriously and where improvement in subsequent INDCs is critical.

Finally, to end on a positive note, two countries—one developed and the other developing—have announced their intention to take actions that likely will make them global leaders. Norway (by planning to become carbon-neutral by 2050) and Mexico (by planning to have its emissions peak and decline in the 2020s) have set notable standards for developed and developing countries alike. We hope to see others following Norway and Mexico's examples in the forthcoming INDCs and at COP21 in Paris.

[REFERENCES]

Boucher, D., and K. Ferretti-Gallon. 2015. *Halfway there? What the land sector can contribute to closing the emissions gap*. Cambridge, MA: Union of Concerned Scientists. Online at *www.ucsusa.org/halfwaythere*, accessed on April 14, 2015.

Latvia and the European Commission. 2015. Submission by Latvia and the European Commission on behalf of the European Union and its member states to the United Nations Framework Convention on Climate Change. Online at *http://www4.unfccc.int/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf*, accessed on April 11, 2015.

Government of Mexico. 2015. *Intended Nationally Determined Contribution*. Submission to the United Nations Framework Convention on Climate Change. Online at *http://www4.unfccc.int/submissions/INDC/Published%20Documents/Mexico/1/MEXICO%20INDC%2003.30.2015.pdf*, accessed on April 11, 2015

Ripple, W.J., P. Smith, H. Haberl, S.A. Montzka, C. McAlpine, and D.H. Boucher. 2014. Ruminants, climate change, and climate policy. *Nature Climate Change* 4:2–5. Online at *http://www.nature.com/nclimate/journal/v4/n1/full/nclimate2081.html*, accessed on April 11, 2015.

Smith, P., M. Bustamante, H. Ahammad, H. Clark, H. Dong, E.A. Elsiddig, H. Haberl, R. Harper, J. House, M. Jafari, O. Masera, C. Mbow, N.H. Ravindranath, C.W. Rice, C. Robledo Abad, A. Romanovskaya, F. Sperling, and F.N. Tubiello. 2014. Chapter 11: Agriculture, forestry, and other land use (AFOLU). In *Contribution of working group III to the fifth assessment report of the Intergovernmental Panel on Climate Change*, edited by O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel, and J.C. Minx. Cambridge, UK, and New York, NY: Cambridge University Press. Online at *www.mitigation2014.org*, accessed on December 9, 2014.

Tubiello, F.N., M. Salvatore, A.F. Ferrara, J. House, S. Federici, S. Rossi, R. Biancalani, R.D. Condor Golec, H. Jacobs, A. Flammini, P. Prosperi, P. Cardenas-Galindo, J. Schmidhuber, M.J. Sanz Sanchez, N. Srivastava, and P. Smith. 2015. The contribution of agriculture, forestry, and other land use activities to global warming, 1990–2012. *Global Change Biology*, in press. Online at *http://onlinelibrary.wiley.com/doi/10.1111/gcb.12865/abstract*, accessed on April 11, 2015.

United Nations Environment Programme (UNEP). 2014. *The emissions gap report 2014.* Nairobi, Kenya. Online at *www.unep.org/publications/ebooks/emissionsgapreport2014/portals/50268/pdf/EGR2014_LOWRES.pdf*, accessed on December 10, 2014.

United Nations Framework Convention on Climate Change (UNFCCC). 2014. UNFCCC decision 1/CP.20, Lima, Peru. December. Online at *http://unfccc.int/resource/docs/2014/cop20/eng/10a01.pdf#page=2*, accessed on April 14, 2015.

U.S. government. 2015. *U.S. cover note, INDC, and accompanying information*. Submission to the United Nations Framework Convention on Climate Change. Online at *http://www4.unfccc.int/submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf*, accessed on April 11, 2015.

Van Doorslaer, B., H.P. Witzke, I. Huck, F. Weiss, T. Fellmann, G. Salputra, T. Jansson, D. Drabik, and A. Leip. 2015. *An economic assessment of GHG mitigation policy options for EU agriculture*. Luxembourg: Joint Research Centre, European Commission. Online at *http://publications.jrc.ec.europa.eu/repository/handle/JRC93434*, accessed on April 11, 2015.

West, P.C., J.S. Gerber, P.M. Engstrom, N.D. Mueller, K.A. Brauman, K.M. Carlson, E.S. Cassidy, M. Johnston, G.K. MacDonald, D.K. Ray, and S. Siebert. 2014. Leverage points for improving global food security and the environment. *Science* 345(6194):324–328.

World Resources Institute (WRI). 2014. Global map of forest landscape restoration opportunities. Online at *www.wri.org/resources/maps/global-map-forest-landscape-restoration-opportunities*, accessed on April 11, 2015.

Zeng, H., J.Q. Chambers, R.I. Negrón-Juárez, G.C. Hurtt, D.B. Baker, and M.D. Powell. 2009. Impacts of tropical cyclones on U.S. forest tree mortality and carbon flux from 1851 to 2000. *Proceedings of the National Academy of Sciences* 106(19):7888–7892. Online at *http://www.pnas.org/content/106/19/7888.full*, accessed on April 11, 2015.

Additional note (June 2015)

After this White Paper was completed in mid-April 2015, but before it was released publicly on June 2 at the Bonn UNFCCC conference, the United States Department of Agriculture (USDA) announced a set of "building blocks" for climate-smart agriculture and forestry. These current and proposed actions help clarify what steps the United States intends to take in the land sector to reduce global warming pollution. The following documents relevant to the USDA Building Blocks announcement can be found online:

News Release: *www.usda.gov/2015/04/0109.xml*

Fact Sheet: *www.usda.gov/documents/climate-smart-fact-sheet.pdf*

Blog post by Doug Boucher, director of the UCS Tropical Forest and Climate Initiative, about the Building Blocks announcement and the land sector in the president's Climate Action Plan (June 2013): *http://blog.ucsusa.org/land-sector-actions-in-u-s-climate-policy-and-at-the-unfccc-756*