The Land Sector in the Second Wave of INDCs

Intended Climate Contributions of China, Canada, Ethiopia, and Morocco

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[EXECUTIVE SUMMARY]

As of July 2015, a total of 48 countries (20 sovereign nations plus the 28-member European Union) have announced how they plan to contribute, during the years 2020 to 2030, to the international effort to reduce global warming emissions. They are releasing their plans through "intended nationally determined contributions" (INDC) documents, as requested by the United Nations Framework Convention on Climate Change (UNFCCC). In March 2015, as part of the first wave of submissions, seven INDCs were made public. In its report published shortly thereafter, *The Land Sector in the First INDCs*, the Union of Concerned Scientists (UCS) analyzed these INDCs in terms of their commitment to emissions-reducing actions in the land sector (Boucher and Ferretti-Gallon 2015). We noted an ironic contrast—that the INDCs of smaller developing countries were actually more specific about their plans for land-sector actions than those of large developed countries.

Since the release of that first report, the UNFCCC received 14 more INDC submissions (through July), and in this present report the UCS analyzes four of them—the INDCs from China, Canada, Ethiopia, and Morocco. We selected these countries either because of their inclusion in our growing database on land-sector emissions-mitigation potential (China and Canada) or because their intended mitigation efforts prioritize land use efforts (Ethiopia and Morocco). In our analysis below, we compare the quality of the countries' planned land-sector actions, as presented in their respective INDCs, with respect to the submissions' transparency, level of ambition, information about accounting, and degree of specificity. As with the first wave of INDCs, in this new set the smaller developing countries provide more detail on their intended land-sector actions.

The INDCs both of China and Canada are disappointing, though in different ways. China falls short by not presenting a detailed framework on how to account for forest emissions and sequestration, though it is transparent and specific on actions relating to agriculture, forestry, and other land use (AFOLU). Conversely, discussion of the land sector in Canada's INDC is limited to accounting. The document's absence of land-sector emissions-mitigation efforts and of detailed actions makes it impossible to say whether Canada's ambitions adequately reflect its capacities and responsibilities.

The INDCs of both Ethiopia and Morocco, on the other hand, address the land sector in considerable detail, and these documents' transparency and ambition reflect the roles that AFOLU plays in the two countries' respective global warming emissions trends. While Morocco exceeds Ethiopia in its greater attention to agricultural emissions, as well as in its identification of actions that aren't conditional on external financing, both of them surpass China and Canada in the role they expect the land sector to play in their climate change mitigation efforts.

Land use and land use change remain substantial sources of global warming emissions. As the world moves toward an international agreement on climate change in Paris next December, it is crucial that countries present their land sector commitments with transparency and that these commitments are commensurate with countries' mitigation potentials. Within this second wave of INDC submissions, Morocco's INDC stands out—in its acknowledgment of the role of the land sector as a source and sink for emissions, and in its thorough presentation of mitigation efforts.

[INTRODUCTION]

Since March 2015, 48 countries—20 sovereign nations plus the 28-member European Union, which together account for more than half of the world's global warming emissions—publicly released their "intended nationally determined contributions" (INDCs), documents that ostensibly outline the countries' anticipated efforts to reduce their emissions during the 2020 through 2030 period. Since the Union of Concerned Scientists' (UCS's) analysis of the "first wave" of INDCs earlier this year (Boucher and Ferretti-Gallon 2015), 12 "second wave" countries—including China, the world's top-emitting country (WRI 2015)—have released their own. As with the previous submissions, these recent INDCs were written in response to the request of the United Nations Framework Convention on Climate Change (UNFCCC) 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).

In this white paper, the UCS analyzes four of the most recent INDCs—those of China, Canada, Ethiopia, and Morocco. We select these four countries for one of two different reasons: either because of their substantial contributions to global warming emissions in general and to land-use emissions in particular (the cases of China and Canada); or because of the significance of the countries' land sector as a national source, and national solution, for global warming emissions (Ethiopia and Morocco). The inclusion of the latter two nations is especially important; countries whose emissions reductions depend mostly on land use management strategies may well provide other (often, developing) countries with insights into various ways of reducing their own national land sector emissions.

In each of our INDC analyses, we focus on "agriculture, forestry, and other land use" (AFOLU), the term used by the most recent *Assessment Report of the Intergovernmental Panel on Climate Change* (IPCC) (Smith et al. 2014). AFOLU has high priority not only because of its copious global warming emissions—estimates range from 21 to 24 percent of the world's inventory (Smith et al. 2014; Tubiello et al. 2015)—but also because of the sector's potential to reduce them. For example, because the world's forests act as CO_2 sinks—they remove (or "sequester") carbon from the atmosphere—lowering the rates of deforestation (enhancing forest preservation) is critical to reducing climate change.

Our previous white paper pointed out the ironic contrast between the transparency of small developing countries' INDCs and the ambiguity of those from the developed countries. This trend remains evident in the present analyses. Canada's INDC almost completely ignores potential mitigation actions in the land sector. Much of its discussion is limited to accounting approaches. While China does a better job than Canada at identifying efforts that would result in land sector emissions reductions, it fails to differentiate between new and existing programs.

In 2014, the UCS analyzed the land-sector mitigation potentials of eight of the world's most prolific global warming 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 literature, were presented in the report *Halfway There? What the Land Sector Can Contribute to Closing the Emissions Gap* (Boucher and Ferretti-Gallon 2014). The title reflected the report's main finding—that over half of the gap between what countries intend to do to reduce emissions and what is needed to avoid dangerous climate change (UNEP 2014) could be closed by stronger actions in the land sector.[1] Thus it is critical to discern how much of their respective potentials they each propose to realize.

How We Analyze the INDCs

As in the first white paper, our INDC analyses in the second are based on several key criteria:

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

First, we ask how **transparent** a country has been with respect to the land sector. How much information does the INDC provide about its AFOLU-related plans? Are the estimates quantitative? Does the document make clear whether all of country's land is included, the time period covered, and the baseline from which reductions are to be made? In other words, does the INDC give other countries enough detail to understand what this country intends to do?

Second, we distinguish between information on **accounting** and information on **action.** Accounting criteria for land-use emissions have 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 the discussions on "land use, land use change, and forestry" (LULUCF), which pertain mostly to temperate and boreal developed nations, have produced detailed frameworks on how to account for forest emissions and sequestration.

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 says 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 gauge the country's **ambition** 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 means that the socioeconomic reality of the country, as well as its past contributions to global warming, need to 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 should.

Our analyses of the INDCs of China, Canada, Ethiopia, and Morocco are presented in turn below.

China

In Halfway There?, we found that China has significant potential for land sector-related reductions in the 2020s. Taking both agriculture and forests into account, and including reduced emissions as well as increased sequestration, the scientific literature indicated that China's land sector could contribute about 1.1 Gt CO_2eq per year to the mitigation of global warming (Boucher and Ferretti-Gallon 2014).

China's INDC puts significant emphasis on the land sectors, including both forest and agriculture in its policies and actions. The INDC establishes an increase in forest area as one of four main climate actions, with the goal of a forest stock volume increase of 4.5 billion cubic meters relative to 2005 levels. Regarding agriculture, China plans to mitigate methane emissions through rice field management and reduce nitrous oxide emissions by achieving zero growth in fertilizer utilization by 2020.

Transparency is evident in the INDC because the land sector targets are specific and quantitative, and strategies on land sector emissions mitigation are discussed throughout the text. China's document outlines sound land-management and emissions-mitigation policies that include enhanced forest management (through afforestation, promotion of voluntary tree planting, natural forest protection, and grassland restoration) and improved agricultural strategies (through the promotion of low-carbon development and improved efficiency in farming).

While these actions are indeed impressive in scope and commitment, China's INDC is limited by the lack of any detail on its intended accounting approaches, as well as by the lack of distinction between new and existing actions. The only mention of accounting is China's stated intention to generally improve and strengthen its accounting system, but the INDC doesn't say how the country plans to establish an accounting framework. While this omission adds a degree of opacity to the document, China's clear commitment to reducing agricultural emissions and increasing carbon sequestration capacity suggests that adopting an accounting system for its land sector may simply be a matter of time.

More critically, China's INDC does not distinguish between goals the nation expects to realize through previously implemented programs and those achieved through additional future efforts. In other words, is China committing to do more, or just to maintain previous momentum, with regard to its land sector? For instance, China has been engaged in massive reforestation efforts since the late 1970s (Woetzel, Joerss, and Bradley 2009). Its forest area and resulting sequestration potential have been increasing, and likely will continue to increase, based on these older efforts (Huang and Xu 2012). Therefore it remains unclear as to whether China's intended increase in forest stock would be an outcome of newly implemented policies or simply a result of existing policy.

In any case, global warming emissions reductions in the land sector remain a basic objective of anticipated efforts listed in China's INDC. And given the country's significant mitigation potential, its ambition and expected actions in agriculture and forestry to fulfill that potential will be important contributions to worldwide endeavors for decreasing emissions.

Canada

In contrast with the submission from China, Canada's INDC is weak in terms of its transparency, specificity, and ambition for the land sector.

The literature indicates that changes in Canada's land use policy could reduce emissions by a total of 0.6 Gt CO_2e in 2020 and 0.8 Gt CO_2e in 2030 (Bajželj et al. 2014; Chen et al. 2000). But while the potential for AFOLU-related mitigation in Canada is substantial and well within the country's capacity, Canada's INDC contains no specific policies for reducing related emissions.

Much of Canada's INDC text addresses its transportation and energy sectors, but discussion on analogous land sector emissions is absent. For instance, the INDC declares that Canada will address methane emissions from the oil and gas sector, but it makes no mention of reducing methane emissions from the country's agricultural sector in general or from livestock in particular. Although the energy sector does account for about 50 percent of total methane emissions (8 percent of all-sector emissions), agricultural methane emissions are also significant, accounting for 30 percent of the methane total (5 percent of all-sector emissions) (World Bank 2015).

The only reference in the INDC to Canada's land sector is its mention of an AFOLU accounting approach. Here, the INDC specifies a scientifically recognized "net-net" method for land sector emissions accounting, and it states Canada's intention to account for harvested wood products.

While Canada doesn't specify land use-related actions, it does stipulate an exception to their scope. Of considerable concern to us is the fact Canada's INDC asserts that the country will omit naturally occurring emissions from its land use accounting. As we noted in our previous white paper, *The Land Sector in the First INDCs*, this exclusion is allowed by UNFCCC and IPCCC rules, but it only makes sense if the natural contribution to emissions is truly beyond human control (Boucher and Ferretti-Gallon 2015). Much of Canada's forest-related emissions at present are the results of fire outbreaks and beetle infestations, both of which are amenable to human intervention through adaptive forest management.

Forest fires in the boreal region add substantially to Canadian global warming emissions, and these fires have been increasing in duration and extent over the last decade due to changes in management practices and to climate change (Canadell et al. 2007.) Moreover, these emissions will likely continue to climb, as studies project that forest fire incidence in Canada will have increased 25 percent by 2030 (Wotton, Nock, and Flannigan 2010).

Further, a warming climate in Canada has contributed to an outbreak of the mountain pine beetle, resulting in widespread tree mortality, reduced carbon uptake in forests, and increased release of emissions from decay (Kurz et al. 2008). The concern is that Canada's stated exclusion of emissions related to natural disturbances might apply to forest fires and beetle outbreaks. Instead, improvements in boreal forest management to help reduce the frequency and severity of these occurrences ought to be included in Canada's national strategy.

The INDC's lack of any specific mitigation actions in the land use sector, together with exclusion of natural disturbances, significantly impairs Canada's potential emissions reduction. These omissions render Canada's INDC problematic with regard to transparency, action, and ambition.

Ethiopia

Because we lacked estimates of Ethiopia and Morocco's land sector mitigation potentials as a basis for comparison, our analysis of their INDCs isn't as detailed as the above discussions. However, the strength of these two countries' commitments is worth noting.

Ethiopia's focus on the land sector in its INDC is substantial, likely because the sector is the primary source of the country's global warming emissions. The INDC notes that 88 percent (132 Mt CO_2e) of Ethiopia's total emissions (151 Mt CO_2e) in 2010 came from its land sector (including livestock, crop cultivation, and deforestation). It is therefore expected that the majority of the country's emissions mitigations will come from agriculture- and forest-related actions.

Ethiopia's goals for land sector emissions reductions are specific. The INDC indicates that the country's planned emissions reductions are 130 Mt CO_2e from forests and 90 Mt CO_2e from agriculture by 2030. Together, these two emissions

reductions constitute 86 percent of the country's all-sector mitigation scenario (255 Mt CO_2e). The INDC doesn't specify accounting measures, but it vaguely suggests that Ethiopia supports the development of robust rules to ensure accuracy and transparency.

Similarly, activities to achieve the reductions are not as specific as the reductions themselves; the INDC goes into more detail on related adaptation efforts. Ethiopia does outline forest-related objectives, including an increase of forest cover (by 7 million hectares) and improved wood-stove efficiency (with an expected reduction rate of 50 Mt CO_2e per year by 2030). However, agricultural activities are more ambiguous. The INDC notes that Ethiopia is currently putting forth an agricultural sector adaptation strategy, but it specifies no agriculture-related plans.

Further, although the INDC states that Ethiopia's impressive ambition is largely tied to "additional support to mobilize finance, infrastructure, technology, and capacity to undertake and oversee implementation," the document doesn't estimate how much of the fulfilling of Ethiopia's potential would require external support and how much could be realized without it.

Overall, Ethiopia's INDC is more ambitious than China's and generally much more forthcoming than Canada's. However, its lack of specific agricultural actions and the imprecision concerning the goals' dependence on international financing weaken Ethiopia's pledge.

Morocco

Morocco's INDC is the strongest yet in addressing land sector emissions; indeed, its commitments to reduce emissions from *all* sectors are very detailed. Unlike Ethiopia's INDC, Morocco differentiates between mitigation goals it can achieve on its own and more ambitious goals that require international support. Unconditionally, Morocco expects to reduce all-sector emissions by 13 percent by 2030, as compared to a business-as-usual scenario; the country would reduce an additional 19 percent (cutting emissions by a total of 32 percent) with international support.

The strength of Morocco's INDC is evident in its land sector focus, detailed methodology, and specified actions. While land sector objectives are not among the four main goals of Morocco's global warming emissions targets, they are directly addressed in the document. The INDC estimates that about 31 percent of the mitigation effort will come from AFOLU; and it explains its methodology for addressing this sector—the INDC stipulates targeted sources of agricultural emissions (livestock, crops, and soil) and forest practices (including reforestation, arboriculture, firewood, and forest fires) that Morocco intends to tackle.

Finally, Morocco's strategies and action plans specific to the land sector are multiple and concrete. Agricultural actions include modernization, incorporation of human development, and the establishment of policies to support sustainable growth and management of natural resources. Expected forest-related actions are a little more specific; they include increased high-quality forest area by around 50,000 hectares per year, clarification of forest areas, and rehabilitation of ecosystems. By 2020, Morocco intends to reconstitute a total of 200,000 hectares of forest.

China and Canada's treatments of the land sector pale in comparison to the prioritization and specificity displayed in Morocco's INDC. Morocco even exceeds Ethiopia's ambitious land sector commitments by assuring us that action is possible (though less potent) without external international financing.

The Second Wave Overall

In our sample of second-wave INDCs, we find that the treatment of accounting approaches is often sketchy. China and Ethiopia both announce their support for high-quality accounting systems in the future, but they do not adopt a specific system. However, this is not especially worrisome, as noted above, because their numerous plans for land sector mitigation suggest an eventual requirement for one. Meanwhile, with Canada there are concerns about how and when it intends to exclude natural disturbances from land use accounting.

Because transparency is evident in Morocco and Ethiopia's INDCs, we can see that their level of AFOLU-related ambition matches what we would expect from the developing countries. Yet given the lack of overall transparency in developed countries' INDCs (somewhat less so for China's), we sense disappointing levels of ambition among the big emitters. This area remains weak, and it is a place where we hope to see major improvements in next wave of INDCs.

These deficiencies in ambition may well explain the two most striking gaps in the four second-wave INDCs we analyzed: (1) When it addresses the land sector, Canada's INDC focuses on accounting approaches and says little about potential mitigation actions; and (2) although China's submission does specify actions for reducing land sector emissions, it does not distinguish new programs from existing ones.

What's Next?

We have yet to see the INDCs of countries that contribute some of the world's largest AFOLU-related global warming emissions. While the countries that have already submitted INDCs contribute around 56 percent of all emissions, their AFOLU sectors account for only 11 percent of global AFOLU emissions. Several countries that are some of the biggest sources of land sector emissions—e.g. Indonesia, Brazil, India, and Nigeria—have not submitted their INDCs. These four, while contributing only about 15 percent to global emissions, have land sectors that are responsible for almost half of all AFOLU emissions (WRI 2015).

Because strategies and actions to mitigate emissions from the land sector are imperative to lowering the risks of dangerous climate change, UCS will continue to analyze forthcoming INDCs from countries such as these. In so doing, we will consider both the local picture (whether the countries intend to do what they have the potential to do) and the big picture (how the accumulation of INDC land sector actions measures up against what is needed to spare the planet from calamity).

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