The Contribution of Forests and Land Use to Closing the Gigatonne Emissions Gap by 2020

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1. The Gigatonne gap and the need for urgent action on climate

As hopes converge for a binding post-2020 climate agreement in 2015 at COP21 (in Paris), it is important to recognize that to prevent global temperature increases of more than 1.5°C or even 2°C above pre-industrial levels, greenhouse gas (GHG) emissions need to peak before 2020.[1] Global GHG emissions were at 49 gigatonnes (Gt) of CO_2-equivalent ($GtCO_2$) in 2010, increasing at an average rate of 1 Gt/year.[2] That is already above the 44 GtCO2e benchmark set for 2020 if countries are to pursue the lowest-cost mitigation pathways. Current global mitigation actions will leave us with an annual emissions gap of 8-12 GtCO2e by 2020 – the so-called **gigatonne gap**.[1]

Hence we cannot afford to wait for post-2020 action to be set out in the 2015 agreement. Further reductions in GHG emissions need to start *now*, to close that gap, or they will become increasingly expensive and risk greater, irreversible changes in the global climate and on the Earth's ecosystems. According to the 5th assessment report of the Intergovernmental Panel on Climate Change (IPCC), **without further mitigation actions the global mean surface temperature could increase as much as 2.5-7.8°C by the end of the century**.[2]

[1] UNEP (2013). The Emissions Gap Report 2013: A UNEP Synthesis Report. www.unep.org/emissionsgapreport2013/
[2] IPCC (2014). Climate Change 2014: Mitigation of Climate Change. Intergovernmental Panel on Climate Change, AR 5, Working Group III. http://www.ipcc.ch/report/ar5/wg3/

Forests and land-use sectors present significant opportunities for urgent action to reduce GHG emissions in addition to being critical components of any future climate deal. This brief examines why those sectors are particularly key, what could be achieved through action on them, existing barriers and ways forward.

2. Why action on forests, agriculture and other land uses is crucial

Agriculture, forestry and other land uses (AFOLU) are responsible for **nearly a quarter (24%) of all anthropogenic GHG emissions**. Although their relative share has decreased due to growing emissions from the energy sector, AFOLU activities continue to emit 10-12 GtCO2e annually. About half of that derives from deforestation and forest degradation, the other half from agricultural activities including livestock farming.[2] However, as the latter are major drivers of the former, it is important to understand AFOLU activities as part of the same big picture.

That picture remains largely worrisome: deforestation is the largest emitter of CO_2 after fossil fuel burning; farming, in turn, is responsible for 56% of all GHG emissions other than CO_2, such as methane and nitrous oxide.[2] Growing populations and changing diets (specifically increased meat consumption), together with technological advances that make previously unproductive land productive, mean that agricultural areas and related emissions may continue to increase. There is thus a major need to regard AFOLU activities as integrated systems rather than isolated silos and to reduce emissions through sustainable land-use strategies.

The need for action is particularly clear in some regions of the world where AFOLU activities are the largest source of emissions. This is notably the case in Latin America, Southeast Asia and Central Africa. For instance, despite Brazil's success in significantly reducing deforestation over the past decade, AFOLU activities still accounted for over 61% of the country's total GHG emissions in 2012.[3] In Indonesia, different estimates suggest that AFOLU activities may represent as much as 85% of the country's GHG emissions.[4] As such, there is ample room for targeted action in those regions. As with the energy sector, land-use activities also create institutions, material infrastructure and *lock-ins* that make change increasingly difficult over time.[3] Urgent action is thus necessary to avoid increased costs of emission reductions in the future.

It is important to understand **AFOLU activities are linked to international commodity trade and global value chains**. Growing global demand for land-based commodities (e.g. timber, minerals, beef, and agricultural commodities such as soybean and palm oil) continues to represent one of the biggest threats to the world's forests.[5] Most of those commodities coming out of tropical countries with high deforestation rates find their way to the international market. Therefore, interventions are needed both on the demand and supply sides of these resource flows (see Section 4). In the same way that energy systems need reform in the face of climate change, land-based production systems, too, require policies and incentives to ensure that production does not take place at the expense of forests, the ecosystem services they provide and the global climate.

Mechanisms such as **REDD+ (Reducing Emissions from Deforestation and Forest Degradation)** are well placed to help reduce emissions immediately. REDD+ provides direct financial payments for

[3] SEEG (2013). Estimativa de Emissões de Gases de Efeito Estufa no Brasil. http://seeg.observatoriodoclima.eco.br/index.php/cms/biblio/see/iddocumento/499

[4] Ministry of Environment, Republic of Indonesia (2010). Indonesia Second National Communication under the United Nations Framework Convention on Climate Change. http://unfccc.int/files/national_reports/non-annex_i_natcom/submitted_natcom/application/pdf/indonesia_snc.pdf

[5] Lambin, E.F., Meyfroidt, P. (2011). Global Land Use Change, Economic Globalization, and the Looming Land Scarcity. *PNAS* 108(9), 3465-3472; and UNEP (2009). Vital Forest Graphics. Chapter 6: Forests under threat as agricultural commodities take over. http://www.unep.org/vitalforest/

emissions reductions, and there are already advanced subnational pilots (e.g. Acre State in Brazil) that could deliver such annual emission reductions for results-based payments before 2020.

As agriculture is a driver of the majority (~73%) of deforestation [6] and also a source of emissions in itself, interventions within REDD+ programmes are also being implemented in the agricultural sector.[7] For instance, intensifying livestock production through better pasture management is a form of avoiding forest conversion, reducing emissions and increasing productivity. However, it is essential that initiatives like this are implemented at scale and are paired with policy measures to effectively transform land-use patterns while avoiding leakage to nearby areas.

Finally, reducing emissions from forests and other land sectors could unlock added benefits of carbon sequestration and more. If well managed, forests and other landscapes can work as **carbon sinks** and help mitigate and adapt to climate change in the long run (e.g. through reforestation and afforestation and agroforestry in agricultural landscapes). Beyond sequestering carbon, forests also provide key ecosystem services to agriculture, such as provisioning water and stabilizing soils. Without these services, negative feedbacks can occur; for example, degradation of agricultural land drives the need to expand agriculture – often into forests.

Action to reduce emissions from agriculture, forests and other land use should not prevent reform in other sectors such as energy. Instead, AFOLU activities should be recognized as an opportunity to shift a sector with a negative emissions impact into one that has a positive effect on global climate by sequestering carbon from the atmosphere.

3. What could be achieved in the AFOLU sector and what are the main barriers

Around **10-12 GtCO2e** are emitted each year from human activities in forests, agriculture and other land uses.[1] Targeted actions in key regions can deliver immediate emissions reductions for the interim 2015-2020 period while necessary reforms in other sectors (e.g. energy) are under way. In order to limit global warming to well below 2°C and to keep a 1.5°C limit viable, countries should commit to a target of **Zero Net Deforestation and Degradation (ZNDD) by 2020**. This means a gradual reduction of emissions from forests, eventually eliminating the ~5 GtCO2e/year that come from their destruction. Although this alone would not close the gigatonne gap, it would provide a meaningful contribution to be combined with emissions reductions from energy, agriculture and other sectors. Delaying that ZNDD target until 2030 would mean at least an additional 24 $GtCO_2$ into the atmosphere, with very serious consequences to the global climate.[8]

To achieve an objective of ZNDD by 2020, roughly **US$30-53 billion per year** will be required.[8] This number is far above the US$6.8 billion pledged to REDD+ up to 2018 so far.[9] But it is far less than the total **US$544 billion** spent worldwide on fossil fuel subsidies in 2012.[10] Governments and private investors also spend about **US$328 billion** every year in agriculture in low- and middle-income countries, where tropical forests are found.[11] That offers a major opportunity to build synergies between food production, rural development and forest conservation *if those investments*

[6] Hosonuma, N. et al. (2012). An assessment of deforestation and forest degradation drivers in developing countries. *Environmental Research Letters*, 7(4).
[7] Kissinger, G., Herold, M., De Sy, V. (2012). Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers. Vancouver, Canada.
[8] WWF (2011). Forests and Climate: REDD+ at a Crossroads. WWF Living Forests Report: Chapter 3. http://awsassets.panda.org/downloads/living_forests_chapter_3_2.pdf
[9] UN-REDD (2013). How much finance for REDD+? Go-REDD+, Issue 26, November 2013.
[10] International Energy Agency (2013). World Energy Outlook 2013 Factsheet. http://www.worldenergyoutlook.org/media/weowebsite/factsheets/WEO2013_Factsheets.pdf
[11] Lowery, S., Tepper, D., Edwards, R. (2014). Bridging Financing Gaps for Low-Emissions Rural Development through Integrated Finance Strategies. http://forest-trends.org/financing_LEDR.php

are guided by sustainable land-use strategies and if they are planned in an integrated, coordinated manner. Therefore, in many cases there has been not a lack but rather a misplacement of finance and poor policy coherence.

A major barrier thus lies in the dominant strategies that antagonize forest conservation and development and in the institutional frameworks that guide investments and govern land use in developing countries. Currently, local communities are often left to choose between poverty and unsustainable development. This is arguably the case, for instance, in Indonesia, where oil palm farmers frequently notice the environmental drawbacks of plantation expansion (e.g. water contamination by fertilizers and pesticides) but still prefer that over being left without sufficient income or access to modern services (e.g. electricity, transportation).[12] Similarly, agribusinesses frequently lack the policy incentives and regulations to adopt more sustainable practices.

Finally, there is an urgent need for clearer land-tenure regimes and regulations on land-use rights and carbon ownership. These issues are crucial, not only for domestic actions, but also for international mechanisms such as REDD+ to work.[13] They are essential for determining benefit-sharing, avoiding the disfranchisement of local communities and vulnerable groups such as indigenous peoples, and ensuring the sustainability of conservation and permanence of carbon stocks. The challenge is of course not only to clarify those matters on paper, but also to guarantee their enforcement.

4. Some ways forward

Land use and land-use change are driven by complex, integrated systems that currently are largely unsustainable, causing deforestation and biodiversity loss and contributing to climate change. The nature of the problem requires *systemic*, landscape-level solutions. This, in turn, calls for multilevel strategies – including domestic actions, national transformative change in the policy arena and international support.

Here we point to three elements that should be part of strategies to promote sustainable land use and forest conservation.

First, governments, multilateral financing mechanisms and private entities should steer financial support for agriculture activities to be conditional on sustainability performance (including forest conservation). Agriculture and other land-use activities that cause emissions from deforestation, fertilizer use, livestock and other sources rely heavily on private or multilateral financing as well as public credit and other government incentives. Policy incentives should be made conditional on environmental performance, and some investments should be earmarked for innovation or traditional/indigenous farming practices that keep forests standing and reduce emissions. This guidance should apply to *all* countries, not just developing countries.

Second, downstream industries (i.e. those that come later in the value chain) should limit their sourcing of land-based commodities to suppliers that abide by sustainability criteria. The private sector has a key role to play here. For instance, in 2006 the Brazilian Vegetable Oil Industry Association and the Brazilian Grain Exporters Association took the initiative to refrain from trading or financing soybeans cultivated after deforestation. Research has demonstrated that, although not a panacea, such actions do reduce the negative impact of agriculture on forests, making it more

[12] Feintrenie, L., Schwarze, S., Levang, P. (2010). Are local people conservationists? Analysis of Transition Dynamics from Agroforestry to Monoculture Plantations in Indonesia. *Ecology and Society* 15(4), 37; Rist, L., Feintrenie, L., Levang, P. (2010). The Livelihood Impacts of Oil Palm: Smallholders in Indonesia. *Biodiversity Conservation* 19, 1009-1024.

[13] See Sunderlin, W.D. et al. (2014). How are REDD+ proponents addressing tenure problems? Evidence from Brazil, Cameroon, Tanzania, Indonesia, and Vietnam. *World Development* 55, 37-52.

sustainable.[14] Similar approaches should be adopted by other industries, such as the beef, palm oil and other sectors.

Third, international mechanisms such as REDD+ can provide key technical and financial support for the necessary institutional reforms, forest conservation initiatives and sustainable economic activities in the developing world. As such, REDD+ can be used as a catalyst to ignite those structural changes. This may prove essential to less-developed countries, which may have difficulty undertaking all necessary changes without assistance. Productive activities driving deforestation must be integrated into REDD+ strategies and action plans, as this will allow the drivers to be more readily addressed while also generating important development and food security co-benefits.

These measures can substantively help provide the necessary stimulus for change in AFOLU activities. Annual GHG emissions from these activities are as large as the gigatonne gap that separates us from the lowest-cost climate change mitigation scenarios. While certainly all such emissions cannot be avoided, they can surely be minimized and potentially surpassed by carbon sequestration benefits. This gives forests, agriculture and other land uses a unique role not only to reduce emissions, but also to help reverse climate change in the long run (in combination with ambitious action to curb emissions from other sectors). Furthermore, the transformation of land-use activities toward sustainability can create important socio-economic co-benefits in the developing world. Action must start now.

[14] Rudorff, B.F.T. et al. (2011). The Soy Moratorium in the Amazon Biome Monitored by Remote Sensing Images. *Remote Sensing* 3, 185-202.

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