Q& A on Deforestation

FOREST CARBON AND CLIMATE PROTECTION

Key messages:

- Significant emissions reductions will be needed from many sectors and forests alone cannot solve the problem of climate change.
- Forests must play a meaningful role in any effort to stabilize the atmosphere at a level sufficient to avoid dangerous climate change.
- Deforestation and degradation emissions can be reliably measured with a very high degree of accuracy and with technology available today.
- The bulk of emissions from deforestation take place in developing countries. Allowing forest reductions into a US and international regime will provide incentives for these countries to reduce their emissions in a comparable manner, and with significant benefits.
- Tropical forest protection offers opportunities for win-win solutions, where climate, biodiversity and poverty alleviation can all benefit from one action.

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Q: How significant are emissions from forest destruction?

Clearing and burning tropical forests causes approximately 20% of global greenhouse gas emissions every year[i] – the second largest source of all greenhouse gas emissions after burning fossil fuels, and more than all the cars, trucks, buses and trains in the world.

Q: What role do forests play in reducing emissions and absorbing carbon from the atmosphere?

In dry years, such as the 1997 – 1998 El Niño, forest and peat fires in the Amazon and Southeast Asia can raise the 20% of emissions from deforestation to as much as 1/3 of global emissions[ii]. Stopping or substantially reducing tropical deforestation is the largest source of potential emissions reductions from forests. As the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report makes clear, there is "high agreement and much evidence" that "forest-related mitigation activities can considerably reduce emissions from sources and increase CO_2 removals by sinks at low costs, and can be designed to create synergies with adaptation and sustainable development."[iii]

Q: Can we avert dangerous climate change by only focusing on fossil fuel emission reductions?

Based on the best estimate of climate sensitivity in the most recent IPCC report, limiting warming to no more than 2 degrees C will require stabilizing concentrations of CO2e at 450 ppmv (parts per million per volume) or less by the end of the century. This is a very ambitious goal, requiring that global emissions peak before 2015 and decline to at least 50% of current levels by 2050.[iv] Given that deforestation accounts for approximately 20% of total anthropogenic greenhouse gas emissions, there is simply no way that a climate stabilization target of 450ppm can be reached without including this sector in climate policy in a manner that delivers significant reductions in emissions from deforestation. As the IPCC recently stated, these forest carbon activities "are key mitigation technologies and practices currently commercially available."[v]

MEASUREMENT

Q: Can forest carbon in the U.S. and internationally be measured and monitored reliably? Isn't it too difficult to measure deforestation and carbon? There's so much uncertainty.

A: There have been huge improvements in satellite monitoring of deforestation in the past decade. The world's top remote sensing scientists and a flurry of recent scientific papers have confirmed that :

- Deforestation and degradation emissions can be reliably measured with a very high degree of accuracy and with technology available today, including a

combination of satellite-based imagery and on-the-ground sampling, according to a recent assessment by leading US and international remote sensing scientists[vi].

- Changes in forest area that has occurred since the early 1990s can now be measured from space with confidence.
- Third-party verification can ensure that appropriate techniques were used. Scientists generally accept the IPCC's good practice guidelines as the international standard in forest carbon accounting[vii].

Real life example-Brazil

Today, for example, you can find real-time data on deforestation in Brazil posted to the web via Brazil's national climate data center. To improve that even further, recently Brazil & China announced they are launching a new platform that will deliver global wall-to-wall mapping of the world's tropical forests, and they are going to make the software available for free. Brazil's National Space Research Institute's (INPE)'s launch of a new satellite and construction of new antennae to increase coverage to virtually all of the world's tropical forests. INPE, the acknowledged global leader in remote sensing measurement of deforestation, is proposing to make global deforestation data available free on the Internet, along with the software needed to interpret it, and to train tropical country scientists in using it. We'd be happy to provide the committee with more detail.

PERMANENCE

Q: How do you ensure that forest carbon benefits are permanent?

A: "Permanence" or ensuring that emissions reductions that trade in the carbon market are not reversed by emissions at a later point by the party that sold the carbon credit, is an issue for all types of emissions reductions in a cap-and-trade system, not only forests. Companies and individuals in the US and other developed countries purchase assets in developing countries every day, and enter into contracts that stipulate liability in case of damage or failure to deliver. The new asset class "forest carbon emissions reductions" should work the same way.

Some simple ways to hedge against the risk that national emissions reductions are reversed would be to:

- require the seller (or the buyer, or some combination of the two) to hold some part of the reductions below the baseline in reserve when credits are sold (or retired).
- The phasing of compensation payments for reduced national level deforestation can also help ensure permanence. Phasing of compensation creates an incentive to maintain standing forest over the long term.

ADDITIONALITY

Q: How do you ensure that the forest carbon credits are additional to what would have happened anyway?

A: Ensuring additionality from avoided deforestation at the national level in large developing countries is not a significant concern, given the robust drivers for deforestation currently in place. The most recent and thorough deforestation studies[viii] offer no suggestion that deforestation is decreasing, either of its own accord or as a consequence of policy interventions. To the contrary, increasing global integration of markets and demand for agricultural commodities appear to be driving substantial increases in deforestation rates. Hence, there is no need to show that sustained reductions in deforestation rates would only have occurred with government action, even though deforestation rates will eventually decline as forests disappear. Deforestation in all major tropical forest regions can certainly be expected to continue for the 20 years following 2008.

LEAKAGE

Q: How do you ensure that activities to reduce emissions from deforestation or increase carbon storage in forests don't simply shift deforestation or other land-use practices to another (i.e., how to you prevent leakage)?

A: Detecting and preventing market leakage is a challenging issue for all sectors, not just forests. A simple example of a project that faces leakage risk is one that reforests an area of poor-quality grazing land, but leads to the owners of the displaced livestock to clear land outside the project boundaries to establish new pastures. The types of activities that might result in leakage vary by project type, but both forest- and energy-based projects are subject to leakage. Countries can also work to establish a national reference scenario and make emissions reduction commitments that would be carried out through a national forestry sector program, which carefully measures and monitors emissions reductions of the entire country. Commitments can be fulfilled based on emissions reductions measured against this quantified reference level. This method offers a viable structure that eliminates leakage within any given country. .

ECONOMICS OF FOREST PROTECTION

Q: Is forest protection a cost-effective mitigation option?

A: In the words of the Stern Review:

- "Curbing deforestation is a highly cost-effective way of reducing greenhouse gas emissions and has the potential to offer significant reductions fairly quickly. It also helps preserve biodiversity and protect soil and water quality. Encouraging new forests, and enhancing the potential of soils to store carbon, offers further opportunities to reverse emissions from land use change."[ix]

Q: How much will forest protection cost?

Researchers from the Federal University of Minas Gerais, Woods Hole Research Center and Amazon Institute for Environmental Research (IPAM), using a bottom-up approach and more detailed and accurate data on deforestation and land use than have been

available to top-down modelers, have estimated that costs of reducing deforestation may be much lower than previously thought. The new, more data-driven carbon supply curves for the Amazon suggest that about 94% of Amazon deforestation could be prevented at a cost of under $5/ton C (~$1.30/ton CO_2), far less than indicated by the top-down, aggregate studies[x]. Carbon prices will depend not only on the cost of emissions reductions, but principally on supply and demand and consequently will hinge on the stringency of emissions caps in developed countries.

Q: Will there be enough supply of affordable forest credits outside the US?

A: Outside the U.S., opportunities for forest carbon credits are abundant The Stern Review, commissioned by the UK Treasury, estimates that the opportunity cost of forest protection in the eight countries that account for seventy percent of emissions from land use could be around $5 billion per year, and that:

- "the direct yields from land converted to farming, including proceeds from the sale of timber, are equivalent to less than $1 per tonne of CO2 in many areas currently losing forest, and usually well below $5 per tonne.[xi] The opportunity costs to national GDP would be somewhat higher, as these would include value added activities in country and export tariffs. Other modelling studies, using alternative methodologies, have suggested that, whilst there are significant opportunities to protect forests in some regions at low costs, the marginal abatement cost curve could rise from low values up to around $30 per tonne of CO_2[xii] were deforestation to be eliminated completely."

QUANTITATIVE LIMITS ON CREDITS

Q: Under a cap and trade program, would it be better to limit trading of forest carbon credits to the U.S.?

No. Domestic and international forest carbon activities should be part of any U.S. cap-and-trade system, and limits should depend on the quality of emissions reductions, not their quantity. That is, if emissions reductions are real, verifiable and transacted transparently, they should in principle be admitted to the market. It would be a serious policy mistake to exclude credits sourced from international forest carbon activities. Allowing such credits to be traded in a U.S. cap-and-trade system will help to ensure that emission reductions in the U.S. are obtained at the lowest possible cost, providing much needed flexibility for particularly vulnerable industry sectors and companies as they seek to meet emissions reduction targets. Simply put, the U.S. can achieve ambitious GHG emission targets in a manner that minimizes economic harm if it recognizes the simple fact that well-functioning carbon markets must be open to low-cost emissions reductions. Indeed, the chief advantage of market-based approaches to emissions reduction lies in the flexibility that these markets provide in achieving the lowest cost emissions reductions possible. Rather than impose geographic or quantitative restrictions on such credits,

rigorous quality standards should be applied, which would allow the full benefits associated with such credits to be realized without compromising environmental integrity.

FLOODING THE MARKET

Question: If allowed in a US cap and trade system, will forest carbon credits flood the market and dilute the incentives for emissions reductions in the energy and industrial sectors?

We do not expect forest carbon credits to flood the market, especially in the initial years of the program. If compensation for reduced deforestation is phased to correspond with actual annual emissions reduced (i.e., is no higher than the annual deforestation baseline), the amount of credits available in any given year will be limited. In addition, the cost of assuring credits meet quality standards, companies' concerns with country risk, and constraints on the ability of forest protection efforts to mitigate climate change beyond a certain point (i.e., even if all deforestation could be halted it would only account for 20% of current emissions) place inherent limits on the ability of such credits to flood the market. If anything, recent experience with the CDM suggests that the problem could be too little rather than too much forest carbon (given that no commercial forestry projects have been registered under the CDM to date), especially in the short run, when the detailed program rules are new, allowance prices are relatively low, and project developers are still learning how the market will function. As the program matures and the allowance price rises, a greater supply of forest carbon credits could be brought to market, although this will also depend on the extent to which program rules impose significant barriers to marketing forest and land use carbon.

CROWDING OUT LOW CARBON ENERGY INVESTMENTS

Q: Won't the volume of these tons and their low price crash the US carbon market, crowding out investments in energy efficiency and low-carbon energy?

A: We think these tons won't "crowd out" such investments. Instead, bringing in a supply of lower-cost emission reduction tons into the US market can achieve three critical ends:

1. Opening the US market to these tons can, in an environmentally responsible fashion, help address the concerns of those in the Congress who fear the costs of the program will be too high. These tons can provide an economically and environmentally far more effective assurance on cost than can the so-called "safety valve"
2. By providing that near-term low-cost opportunity, these tons can serve as a vital bridge to the low-carbon energy future, giving the fossil fuel industries vital time to improve and deploy the low-carbon energy technologies that currently aren't competitive, such as geologic carbon capture and storage.

3. By providing that bridge to the future, these tons can help Congress enact strong limits on US greenhouse gas emissions now, so that we are in a better position to demand that our principal trade competitors do likewise in the future. The longer we delay capping our emissions, the longer they will too. The climate can't wait. The window of time for averting dangerous climate change- and for saving the world's remaining tropical forests - is closing.

SENDING US MONEY ABROAD

Q: Isn't this just shipping US money to corrupt dictators in tropical countries? [NOTE THIS IS SOMETHING CONNAUGHTON HAS BEEN TRUMPETING]

A: As currently structured in ACSA, **no** US taxpayer dollars would flow via the carbon market into tropical forest protection. ACSA would simply allow private investors, NGOs, and anyone else who wishes to, to invest in protecting the world's fast-disappearing rainforests with the assurance that tons of emission reductions achieved nation-wide in tropical forest nations could earn credits in the US carbon market. We anticipate that such a program could mobilize far greater amounts of private capital into rainforest protection than all the taxpayer-funded foreign aid programs of all the industrialized countries to date. Moreover, by creating a competitive market for these tons, tropical forest nations will be competing with one another to demonstrate to investors that they can measure and monitor deforestation transparently, enforce strong domestic programs for reducing deforestation, and ensure that funds from such investments flow to the local people in those countries who will be doing the real on-the-ground work of forest protection.

FOREST CARBON & SUSTANABLE DEVELOPMENT

Question: Are there additional environmental and social benefits associated with forest carbon activities?

Yes. Rewarding efforts to maintain and enhance forest conservation and regeneration would produce a host of economic and environmental co-benefits and promote sustainable development.

- Tropical forests are home to half of the world's species.[xiii] Carbon credits for conservation and protection of existing forests threatened by deforestation would protect biodiversity and other critical ecosystem services that these forests provide. In general, high-carbon forests are also high-biodiversity forests.
- Forests also play a vital role in providing environmental goods and services. Forest carbon activities can therefore generate numerous environmental co-benefits, including restoration of degraded lands and watersheds, improved habitat, reduced erosion, clean water, and enhanced ecosystem services.[xiv]

- The highest-biodiversity forests are also largely the territories of indigenous peoples[xv], who typically benefit little if at all from large-scale deforestation. Well-designed incentives to reduce deforestation would lessen threats to indigenous peoples and provide their communities with needed services and economic alternatives.

- Many of the world's poorest people depend on forests for their livelihood. Credits for forest carbon activities could provide much-needed income to the rural poor, while at the same time providing them with an incentive to sustainably manage their landscape.

Q: How do we now how much emissions from deforestation actually are? And how can we measure reductions in emissions?

A: Satellites can tell us where forests were lost and how much area was lost. As many of you probably know, using MapQuest or Google earth allows you to get very good driving directions. The newer versions of these software programs use satellite images and you can see individual trees, cars, houses without any problems! Once you know how much area was lost, you need to know how much carbon was in those trees. There are a variety of good sources that have this information (the average carbon content of types of forests). Many countries including the US send foresters to measure the carbon in trees, soils and forests. The IPCC has average values for many different types of forests. The easiest way (though with higher uncertainty) to calculate emissions is to use the IPCC tables, find the type of forest(s) that was lost and see what the average carbon content is. You then multiple this value (given in carbon per hectare or acre) times the number of hectares/acres lost and you have a rough estimate of emissions.

In order to do this simple calculation, you need to know two things:

- Area of forest that has been lost (EG.-100,000 hectares)
- The amount of carbon in the trees where the loss took place (100 tons of carbon per hectare)
- Multiplying these values will give you total emissions from forest loss (10 million ton of carbon lost)

- SOURCES

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[i] The IPCC estimates that emissions from deforestation in the 1990s were 5.8 GtCO2/year. See IPCC 4th Assessment, Working Group III Report (2007) at 543 (noting "medium agreement and medium evidence" for this conclusion).

[ii] Page S E, Sigert F, Riley J O, Boehm H-DV, Jaya, A, Limin S (2002). The amount of carbon released during peat and forest fires in Indonesia during 1997. *Nature* 420:61-65.

[iii] Intergovernmental Panel on Climate Change, *Climate Change 2007: Mitigation of Climate Change, Summary for Policymakers* (4 May 2007), page 21. Published on the Internet at: (http://www.ipcc.ch/SPM040507.pdf).

[iv] See IPCC 4th Assessment Report, WG III at 173 ("Using the 'best estimate' assumption of climate sensitivity, the most stringent scenarios (stabilizing at 445-490 ppmv CO2-equivalent) could limit global mean temperature to increases to 2-2.4°C above the pre-industrial level, at equilibrium, requiring emission to peak before 2015 and to be around 50% of current levels by 2050."). The report emphasizes, however, that "[f]or any given stabilization pathway, a higher climate sensitivity raises the probability of exceeding temperature thresholds for key vulnerabilities." Id.

[v] IPCC, *Climate Change 2007: Mitigation of Climate Change, Summary for Policymakers* (4 May 2007), page 14.

[vi] Global Observation of Forest Cover-Global Observation of Land Dynamics (GOFC-GOLD), of the Global Terrestrial Observing System, UNEP, UNESCO, WMO, FAO http://www.gofc-gold.uni-jena.de/sites/redd .

[vii] IPCC, 2006. Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use (AFOLU), http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm . 2003. Good Practice Guidance for Land Use, Land Use Change and Forestry, http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm

[viii] Soares Filho *et al*. 2006. *Nature*. Stickler *et al*., (whrc.org/BaliReports/) DeFries *et al*. 2002, PNAS. Curran *et al*. 2003.

[ix] Nicholas Stern, *The Economics of Climate Change: The Stern Review* (October 2006), page 537 ("The Stern Review: The Economics of Climate Change").

[x] Nepstad, D., B. Soares Filho *et al*., 2007. The Costs and Benefits of Reducing Carbon Emissions from Deforestation and Forest Degradation in the Brazilian Amazon. (www.whrc.org/BaliReports/).

[xi] Grieg-Gran (2006), calculation assumes CO_2 levels per hectare of tropical forest preserved is 500-750 t per hectare.

[xii] Sohngen (2006), Obersteiner (2006)

[xiii] Myers, Norman, "Tropical forests and their species," in *Biodiversity,* E.O.Wilson (ed.) National Academy Press (1988).

[xiv] Swingland, Ian (ed.), *Capturing Carbon and Conserving Biodiversity: The Market Approach*, The Royal Society, (2002)

[xv] Sutherland, W., 2003. Parallel risk of and global distribution of languages and species. *Nature*, 423: 276-279.