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TESTIMONY TO US HOUSE OF REPRESENTATIVES ON PRESERVING THE AMAZON (FULL TEXT)

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On Sept. 10 I sat before a special hearing of the U.S. House of Representatives Committee on Foreign Affairs titled, 'Preserving the Amazon: A Shared Moral Imperative.' Below is the full text of the testimony I provided. You can view the full hearing here.

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US House of Representatives
Committee on Foreign Affairs
Subcommittee on the Western Hemisphere, Civilian Security, and Trade

Hearing on
“Preserving the Amazon: A Shared Moral Imperative”

September 10, 2019

1. Introduction:

It is an honor to have this opportunity to provide testimony to the House Subcommittee on the Western Hemisphere, Civilian Security, and Trade, of the Foreign Affairs Committee, on the important topic of the Amazon forest. The Amazon region has been the focus of my career, conducting research on forest fire and recovery, publishing scientific and policy papers, training graduate students, contributing to public policy processes, co-founding new institutions, and providing technical support to local governments, farm organizations and forest communities that are seeking sustainable pathways to social and economic development.

My testimony is divided into three sections: (a) the state of our scientific understanding of the Amazon ecosystem and its linkages to the United States, (b) the state of the Amazon right now as global attention is focused on the region’s fires and (c) some opportunities available to the US to contribute to both short- and long-term solutions to the threats faced by the Amazon.

2. Linkages to the United States:

- The health of the Amazon forest is important for the United States largely because of the roles of the Amazon in maintaining the climate as we know it—as a large stock of carbon and through its cooling effect (see Appendix A), the ca. 200 indigenous peoples who reside there, and because of its extraordinary wealth of plant and animal species.
- The Earth's oxygen supply does not depend upon the Amazon forest.

3. State of the Amazon forest in 2019:

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Figure 1. Annual deforestation in the Brazilian Amazon. The gray and orange lines across the top is the Forest Reference Level used to estimate emissions reductions. The reduction in deforestation beginning in 2005 has kept ~7 billion tons of CO2 out of the atmosphere. (Source: INPE/PRODES)

- Concern about the Amazon forest became the focus of international attention in recent months because of rising rates of deforestation and fire.
- Deforestation is rising in the Amazon relative to 2018, and is currently estimated at roughly 6,000 km2.[2] Despite the increase, deforestation in 2019 is on track to be well below the historical average of 20,000 square kilometers per year, from 1996 through 2005 (Figure 1)
- This uptick in deforestation is one of the causes of the increase in the number of fires detected in the Brazilian Amazon from January through August of 2019, 3 which is greater than the number of fires detected during the same period in any year since 2010.[4]
- Deforestation fires—those fires ignited to burn patches of forest that have been cut down and allowed to dry--burn for many days and release large amounts of smoke,[3] making 2019 particularly dangerous for respiratory ailments among exposed people. These fires occur every year; some of them are ignited for subsistence and semi-subsistence farming systems that sustain low-income farmers and communities.[5]
- Once a forest burns, it becomes more susceptible to future fire.[5] This positive feedback, reinforced by inhibition of regional rainfall associated with forest loss,[11] is the basis of a large-scale Amazon forest dieback scenario.[11],[12] The Amazon forest may be close to a tipping point--the area of forest loss beyond which this forest dieback begins and is self-reinforcing--especially if severe droughts become more common in the region in a warming world.[11]
- There is no evidence, however, of widespread fire in intact Amazon forests today, as many reports have implied or stated. These "cryptic" fires burn below the forest canopy, beyond the detection limits of most conventional satellites, and are the most dangerous type of fire in the

Amazon.[6] Logged and previously burned forests can catch fire more readily than intact forests,[7] [8] although we don't know the areal extent of these fires.[9] After recurrent burning, highly flammable grasses can invade the damaged forest, completing the shift to fire- prone scrub vegetation.[10]

Image available online: view image

Figure 2. Fire count January through August for the Brazilian States of the Amazon. Source data: Global Fire Emissions Database (www.globalfiredata.org; accessed Sept. 05, 2019). Analysis by Earth Innovation Institute.

4. Possible responses of the United States Government to Amazon deforestation and fires:Analysis by Earth Innovation Institute.

- The current focus on the deforestation and fires of the Brazilian Amazon, provoked by the inflammatory statements and actions of the Bolsonaro Administration, is an opportunity to establish durable, systemic solutions to these chronic challenges.
- Responses to the 2019 increase in deforestation and fires should take into consideration the region's historical context, or run the risk of making the situation worse.
- That context is as follows. Brazil has made enormous strides in conserving the Amazon forest. Through a massive, inter-ministerial strategy launched in 2004, Brazil succeeded in reducing deforestation 77% below the 10-year average--in 2012 (Figure 1).[13]
- This reduction in deforestation was achieved by expanding the network of protected forests, demarcating new indigenous territories, increasing law enforcement, and suspending agricultural credit programs in high-deforestation counties.[13]
- Annual deforestation has been rising slowly ever since 2012, however. One reason it is rising is that the "carrots" to reward this progress have been small. In terms of finance, only 3% of the ~7 billion tons of carbon dioxide emissions that were avoided through this herculean effort have been compensated through performance-based payments from Norway and Germany to the Amazon Fund.[14] Little if any of this climate finance reached medium- and large-scale producers.
- An effective mechanism for recognizing and, eventually, rewarding farmers who comply with the nation's extraordinary Forest Code, which requires farmers to maintain 80% of their property under forest cover, is not in place. The Brazilian Soy Moratorium appears to have exacerbated this issue with farmers, since it closed the market to soybeans grown on land cleared after a cut-off date, with no exception provided to farmers who still retain the legal right to clear more

forest on their land.[15] There is widespread concern among farmers that this type of moratorium will be extended to the Cerrado, the biome that neighbors the Amazon and where far more soybean production takes place (personal communication).

- Given the current lack of market recognition or valuation of legal compliance with the Forest Code, momentum is building to dismantle it, potentially leading to far greater deforestation rates.[16]
- Carrots have also been in short supply for state governments, who have made important strides in implementing programs and laws in the Amazon that promote forest conservation that contributed to the massive decline in deforestation rates.[14]
- In light of this historical context, it is urgent to create mechanisms for recognizing and rewarding farmers who are striving to comply with the law and state governments that are building the policies and programs for low-emission rural development.
- Dialogues on a possible US-Brazil trade agreement should continue, incorporating measures to recognize and eventually reward legally-compliant farmers; recognizing state governments that are making progress in addressing deforestation through new partnerships. Increasing access to markets is an important carrot for these farmers. New public-private partnerships fostered through USAID's Global Development Alliance program could send a very positive signal to Amazon states.
- Approval of the California Tropical Forest Standard, which has been developed over the last 11 years with input from Brazilian state governments, would also send the signal to these state governments that their efforts in slowing deforestation are recognized internationally and could eventually be rewarded. The California Air Resources Board will vote on the TFS on September 19th, 2019.
- In the long term, new mechanisms will be needed to reward the large contributions Brazil is making to climate change solutions. A mechanism for monetizing these emissions reductions passed the US House a decade ago, but did not pass the Senate; such a provision for international offsets for emissions reductions from tropical forests would revolutionize Amazon conservation if it were to become US policy.
- More immediately, there is a rich history of collaboration between the US Forest Service and Brazil on fire prevention and control that provides a strong foundation to work from to establish an early warning system and response strategy should the dry season grow severe enough for fires to enter intact forests.

Appendix A. Dependence of the US on the health of the Amazon forest.

The Amazon is globally significant for its cultural and biological diversity. It is home to more than 200 indigenous groups, each with its own language and culture and it is the most biodiverse ecosystem in

the world.

The climate of the United States is also dependent upon the Amazon forest for two main reasons. First, the Amazon forest is a giant global cooling system, capturing roughly half of the solar energy that bathes the region in the evaporation of water-- evapotranspiration. The amount of water vapor created and energy converted by the Amazon forest is large enough to influence global circulation patterns and climate in far off places. Impacts of a large-scale loss of Amazon forest upon rainfall patterns in the US are likely, albeit uncertain.[17] When Amazon forest is replaced by cattle pasture—the most common use of cleared land in the region—evapotranspiration declines, albedo rises, and the surface temperature of the land increases.

A large-scale displacement of the Amazon forest by cattle pasture and fire-prone scrub vegetation could influence climate patterns around the world just as heating of the surface waters of the eastern tropical Pacific that takes places during El Niño events changes rainfall patterns and air temperatures around the world.

A second dependency of the United States on the Amazon forest is through carbon. The trees of the Amazon contain about 90 billion tons of carbon (GtC)[18], equivalent to seven years worth of total human-driven carbon dioxide emissions at current level. If large areas of that carbon are released to the atmosphere, it becomes correspondingly more difficult to prevent catastrophic climate, which will affect the US and global economies.[19]

One of the frequently reported roles of the Amazon is as a source of oxygen. This is not supported by science. It is true that the Amazon forest releases a very large amount of oxygen to the atmosphere through photosynthesis. The respiration of living tree tissues—leave, bark and roots—and of the animals and microbes that decompose organic matter consumes an amount of oxygen that is roughly equivalent to the amount produced.[20]

References:

- [1] The Conversation (Aug. 26, 2019) Amazon fires are destructive, but they aren’t depleting the Earth’s oxygen supply. Accessed Sept. 10, 2019.
- [2] http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/deter
- [3] NASA Earth Observatory (Aug. 19, 2019) Uptick in Amazon Fire Activity in 2019. Accessed Sept. 10, 2019.
- [4] Global Fire Emissions Database, accessed Sept. 10, 2019.
- [5] Nepstad, D., Carvalho, G., Barros, A.C., Alencar, A., et al. 2001. Road paving, fire regime feedbacks, and the future of Amazon forests. Forest ecology and management, 154(3), pp.395-407.

- [6] Nepstad, Daniel C.; Moreira, Adriana G.; Alencar, Ane A.. 1999. *Flames in the rain forest: origins, impacts and alternatives to Amazonian fires* (English). Conservation and development of Brazil's tropical forest regions. Washington, DC: World Bank.
- [7] Uhl, C. and Kauffman, J.B., 1990. Deforestation, fire susceptibility, and potential tree responses to fire in the eastern Amazon. Ecology, 71(2), pp.437-449.
- [8] Balch, J.K., Brando, P.M., Nepstad, D.C., et al. 2015. The susceptibility of southeastern Amazon forests to fire: insights from a large-scale burn experiment. Bioscience, 65(9), pp.893-905.
- [9] Nepstad, D.C., Verssimo, A., Alencar, A., Nobre, C., Lima, E., Lefebvre, P., Schlesinger, P., Potter, C., Moutinho, P., Mendoza, E. and Cochrane, M., 1999. Large-scale impoverishment of Amazonian forests by logging and fire. Nature, 398(6727), p.505.
- [10] Brando, P.M., Silvério, D., Maracahipes-Santos, L., Oliveira-Santos, C., Levick, S.R., Coe, M.T., Migliavacca, M., Balch, J.K., Macedo, M.N., Nepstad, D.C. and Maracahipes, L., 2019. Prolonged tropical forest degradation due to compounding disturbances: Implications for CO2 and H2O fluxes. Global Change Biology, 25(9), pp.2855-2868.
- [11] Lovejoy, T.E. and Nobre, C., 2018. Amazon tipping point. Science Advances Vol. 4, no. 2 eaat2340
- [12] Nepstad, D.C., Stickler, C.M., Filho, B.S. and Merry, F., 2008. Interactions among Amazon land use, forests and climate: prospects for a near-term forest tipping point. Philosophical Transactions of the Royal Society B: Biological Sciences, 363(1498), pp.1737-1746.
- [13] Nepstad, D., McGrath, D., Stickler, C., Alencar et al. 2014. Slowing Amazon deforestation through public policy and interventions in beef and soy supply chains. science, 344(6188), pp.1118-1123.
- [14] Stickler, CM, AE Duchelle, JP Ardila, DC Nepstad, OR David, et al. 2018. The State of Jurisdictional Sustainability. San Francisco, USA: Earth Innovation Institute/Bogor, Indonesia: Center for International Forestry Research/Boulder, USA: Governors' Climate & Forests Task Force Secretariat.
- [15] Nepstad, DC and J Shimada. 2018. Soybeans in the Brazilian Amazon and the Case of the Brazilian Soy Moratorium. The World Bank, Washington DC, USA
- [16] Amazônia Notícia e informação. September 5, 2019. Governo Bolsonaro e ruralistas tentam implodir Código Florestal, enquanto Amazônia pega fogo. Accessed Sept. 10, 2019.
- [17] Lawrence, D. and Vandecar, K., 2015. Effects of tropical deforestation on climate and agriculture. Nature climate change, 5(1), p.27.
- [18] Saatchi, S.S., Houghton, R.A., Dos Santos Alvala, R.C., Soares, J.V. and Yu, Y., 2007. Distribution of aboveground live biomass in the Amazon basin. Global change biology, 13(4), pp.816-837.

- [19] Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems
- [20] Does the amazon provide 20% of our oxygen? http://www.yadvindermalhi.org/blog/does-the- amazon-provide-20-of-our-oxygen; accessed Sept. 10, 2019.