

**MAKING STANDING FORESTS FUNGIBLE:
OVERCOMING THE DEFINITIONAL PROBLEMS IN
DEVELOPING A REDD+ MECHANISM**

KASSANDRA M. LANG¹

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INTRODUCTION

Climate change has been called the “defining human development issue of our generation.”² The Intergovernmental Panel on Climate Change’s (“IPCC”) Fourth Assessment Report concluded that climate change is “unequivocal” and very likely human induced.³ Human activities release greenhouse gases into the atmosphere, where they are

¹ J.D., expected 2014, University of Wisconsin Law School; M.S., expected 2014, University of Wisconsin – Madison Nelson Institute for Environmental Studies. The author would like to thank her friends and family for their continuous support and the staff of the Wisconsin International Law Journal for their hard work. The author can be reached at kmlang2@wisc.edu.

² U.N. Dev. Programme, *Human Development Report 2007/2008, Fighting Climate Change: Human Solidarity in a Divided World*, ¶ 1, (2007), available at http://hdr.undp.org/en/media/HDR_20072008_EN_Overview.pdf.

³ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT, SUMMARY FOR POLICYMAKERS 2, 5 (2007), available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf [hereinafter *4th Assessment Report*].

expected to contribute to an increase in mean global temperature by around two degrees Celsius by 2100,⁴ with dangerous consequences.⁵

Atmospheric carbon levels are at an all-time high.⁶ Carbon cycles naturally between terrestrial ecosystems and the atmosphere—taken up by vegetation and soils and released through decomposition and combustion—but human activities have thrown off the natural balance.⁷ In fact, recent years rank as the warmest on record⁸ and the rate of warming is increasing.⁹ Scientists and environmentalists have called for an immediate balancing of the global carbon budget.¹⁰ Emissions from the land use, land-use change, and forestry sector contribute substantial amounts of carbon to the atmosphere each year¹¹ and have directly added an estimated 35 percent of all global anthropogenic carbon dioxide (CO₂) emissions since 1850.¹²

Conspicuously and decidedly absent from the text of the Kyoto Protocol,¹³ the importance of sustainable forest management as a way to protect important carbon sinks has become a major discussion topic in international climate change negotiations. As we enter the second commitment period of the Kyoto Protocol, it is time for international actors to come together to decide the future of the global environment.

⁴ IPCC, *Summary for Policymakers*, in CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE fig. SPM.5 (Susan Solomon et al eds., 2007), available at http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4_wg1_full_report.pdf.

⁵ E.g., Rising sea levels, decrease in extent of ice and snow cover, stronger storm events, displacement and extinction of species, etc. See *4th Assessment Report*, *supra* note 3, at 2–3.

⁶ *Id.* at 5.

⁷ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SPECIAL REPORT: LAND USE, LAND-USE CHANGE, AND FORESTRY, SUMMARY FOR POLICYMAKERS 3 (2000), available at <http://www.ipcc.ch/pdf/special-reports/spm/srl-en.pdf> <http://www.ipcc.ch/pdf/special-reports/spm/srl-en.pdf> [hereinafter *Special Report*].

⁸ *4th Assessment Report*, *supra* note 3, at 2.

⁹ The present rate of increasing temperatures is larger than the anticipated trend put forth in the Third Assessment Report. See *id.*

¹⁰ See generally *4th Assessment Report*, *supra* note 3.

¹¹ An estimated 17.4% of global anthropogenic greenhouse gas emissions are from the forestry sector. This is just behind the energy (25.9%) and industry (19.4%) sectors, and just ahead of agriculture (13.5%) and transportation (13.1%). See *4th Assessment Report*, *supra* note 3, at 5.

¹² RICHARD A. HOUGHTON & JOSEPH L. HACKLER, CARBON FLUX TO THE ATMOSPHERE FROM LAND-USE CHANGES: 1850 TO 1990 (2001), available at <http://cdiac.ornl.gov/ftp/ndp050/ndp050.pdf>.

¹³ See United Nations Framework Convention on Climate Change, Marrakesh, Morocco, Oct. 29–Nov. 10, 2001,

Report of the Conference of the Parties on its Seventh Session, Held at Marrakesh from 29 October to 10 November 2001, U.N. Doc. FCCC/CP/2001/13/Add.1 (Jan. 21, 2002), available at <http://unfccc.int/resource/docs/cop7/13.pdf>.

The Reducing Emissions from Deforestation and forest Degradation (“REDD”) mechanism provides a novel way for developed and developing nations to work together to protect precious carbon sinks while providing other co-benefits like increased intra-generational equity; increased biodiversity; watershed protection; reduced runoff, erosion, and flooding; and the protection of income for local communities.¹⁴

The idea behind REDD is simple. REDD promotes forest protection by establishing economic incentives so that forests are worth more money standing than they are when cut down and sold as timber or when land is cleared for agriculture or other land uses.¹⁵ In doing so, nations can earn carbon offset credits in return for the protection of their forests, which serve as a valuable carbon sink.¹⁶ The offset credits can then be sold to other nations. In theory, the monetary transfer will allow the developing nations to promote development in a sustainable way and compensate them for the opportunity lost by protecting the forestland, while providing a comparatively cheap way for developed nations to meet their emission reduction targets.¹⁷ In other words, it provides the potential for a win-win-win situation, providing benefits for developing nations, developed nations, and the global environment.¹⁸

Though the impact of land use changes on global climate change has been on the international climate change radar for decades,¹⁹ it has taken awhile for scientists, policymakers, and international lawyers to get on the same page. REDD developed recently out of a proposal in 2005

¹⁴ See ERIN C. MYERS MADEIRA, POLICIES TO REDUCE EMISSIONS FROM DEFORESTATION AND DEGRADATION (REDD) IN DEVELOPING COUNTRIES 8 (Adrienne Foerster ed., Resource for the Future, 2008), available at http://www.rff.org/rff/documents/rff-rpt-redd_final.2.20.09.pdf.

¹⁵ See, e.g., Daniel Schramm & Akiva Fishman, *Legal Frameworks for Adaptive Natural Resource Management in a Changing Climate*, 22 GEO. INT’L ENVTL. L. REV. 491, 518 (2010).

¹⁶ Usually the heavily forested nations are “developing” while the nations looking to purchase comparatively cheap offset credits are “developed.” Because of this, REDD has been heavily incorporated into the intragenerational equity debate and may be a key tool in minimizing the North-South divide. This is the subject of many other papers and book chapters and is not in the scope of this paper. For an analysis of the potential of REDD to minimize the North-South equity gap, see Frances Seymour, *Forests, climate change and human rights: managing risks and trade-offs*, in HUMAN RIGHTS AND CLIMATE CHANGE (Stephen Humphreys ed., 2010).

¹⁷ See, e.g., William Boyd, *Ways of Seeing in Environmental Law: How Deforestation Became an Object of Climate Governance*, 37 ECOLOGY L. Q. 843, 843 (2010).

¹⁸ CTR. FOR INT’L. FORESTRY RES., MOVING AHEAD WITH REDD: ISSUES, OPTIONS AND IMPLICATIONS 1 (Arild Angelsen ed., 2008), available at http://www.cifor.org/publications/pdf_files/Books/BAngelsen0801.pdf.

¹⁹ See, e.g., Boyd, *supra* note 17, at 844–45.

from the Coalition for Rainforest Nations.²⁰ Lead by Costa Rica and Papua New Guinea,²¹ the proposal “call[ed] upon the Parties to the UNFCCC and to the Kyoto Protocol to take note of present rates of deforestation within developing nations, acknowledge the resulting carbon emissions, and consequently open dialogue to develop scientific, technical, policy and capacity responses to address such emissions resulting from tropical deforestation.”²² Two years later, in 2007, it gained traction at the Conference of the Parties to the United Nations Framework Convention on Climate Change (“UNFCCC”) in Bali and was even mentioned as a key element of the Bali Road Map.²³ In 2009, REDD was expanded to include the role of conservation of existing carbon stocks and the enhancement of carbon stocks, and was renamed REDD+.²⁴ REDD+ played another important role in discussions during the sixteenth meeting of the Conference of the Parties (“COP”) in December 2010 and was an important part of the resulting Cancun Agreements.²⁵ The seventeenth Conference of the Parties in Durban in December 2011, helped propel REDD+ closer to worldwide implementation by setting guidelines for the setting of baseline emissions levels for REDD+ implementation.²⁶

²⁰ REDD-MONITOR, *REDD: An Introduction* (Feb. 2001), <http://www.redd-monitor.org/redd-an-introduction/>.

²¹ SEYMOUR, *supra* note 16, at 211.

²² U.N. Framework Convention on Climate Change, Nov. 28th–Dec. 9th, 2005, *Reducing emissions from deforestation in developing countries: approaches to stimulate action*, ¶ 2, FCCC/CP/2005/L.2 (Dec. 6, 2005), available at <http://www.rainforestcoalition.org/documents/COP-11Misc01-AgendaItem6.pdf>.

²³ United Nations Framework Convention on Climate Change, Bali, Indon., Dec. 3-5, 2007, *Report of the Conference of the Parties on its Thirteenth Session*, ¶ 3, U.N. Doc. FCCC/CP/2007/6 (Mar. 14, 2008), available at <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf> (noting that “The Conference of the Parties...[d]ecides to launch a comprehensive process...by addressing...[p]olicy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.”).

²⁴ See, e.g., ROMAIN PIRARD & SÉBASTIEN TREYER, INST. FOR SUSTAINABLE DEVEL. AND INT’L RELATIONS, *AGRICULTURE AND DEFORESTATION: WHAT ROLE SHOULD REDD+ AND PUBLIC SUPPORT POLICIES PLAY?* 4 (2010), available at http://www.iddri.org/Publications/Collections/Idees-pour-le-debat/ID_1010_pirard%20treyer_agri-deforestation-EN.pdf

²⁵ United Nations Framework Convention on Climate Change, Cancun, Mex., Nov. 29–Dec. 10, 2010, *Report of the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol on its Sixth Session*, U.N. Doc. FCCC/KP/CMP/2010/12/Add.1 (Mar. 15 2011), available at <http://unfccc.int/resource/docs/2010/cmp6/eng/12a01.pdf>

²⁶ United Nations Framework Convention on Climate Change, Durban, S. Afr, Nov. 28- Dec. 3, 2011, *Methodological Guidance for Activities Relating to Reducing Emissions from*

REDD+ now plays a major role in most climate change talks because of its potential to make an enormous difference²⁷ in a relatively cheap²⁸ and quick way.²⁹ According to the revolutionary study by Sir Nicolas Stern, *The Economics of Climate Change*, which helped to bring worldwide attention to the promises of REDD+, carbon prices for avoided deforestation would be around \$5 USD per ton.³⁰ This is significantly less than the current carbon stock prices in some international trading schemes.³¹ The changes and reforms to national policies needed to implement REDD+ could also be implemented comparatively quickly since no restructuring of economies is needed and REDD+ is not reliant on new technologies.³²

Despite the benefits of a REDD+ program, there are a number of challenges that must be overcome. In developing the Clean Development Mechanism (“CDM”) under the Kyoto Protocol, the land use, land-use change, and forestry sector was purposely excluded³³ for a few methodological reasons, as well as because of concerns about state sovereignty over forest resources.³⁴

Deforestation and Forest Degradation and the Role of Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks in Developing Countries, ¶ 3, U.N. Doc. FCCC/SBSTA/2011/L.25/Add.1 1-3 (Dec. 3, 2011), available at <http://daccess-dds-ny.un.org/doc/UNDOC/LTD/G11/713/33/PDF/G1171333.pdf?OpenElement>.

²⁷ The forestry sector is responsible for 17.4 percent of global emissions. See *4th Assessment Report*, *supra* note 3, at 5.

²⁸ NICHOLAS STERN, STERN REVIEW ON THE ECONOMICS OF CLIMATE CHANGE, THE ECONOMICS OF CLIMATE CHANGE 217 (2006).

²⁹ Sheila Wertz-Kanounnikoff, Center for International Forestry Research, *REDD: An example of a key tool for capturing biodiversity and ecosystem values*, Biodiversity Protection – Beyond 2010: Priorities and options for future EU Policy, Athens, Apr. 26–28, 2009, available at <http://ec.europa.eu/environment/nature/biodiversity/conference/pdf/block2b/5-S%20Wertz.pdf>.

³⁰ STERN, *supra* note 28, at 216.

³¹ For example, the European Carbon Exchange price hovers around \$30 USD per metric ton.

³² Wertz-Kanounnikoff, *supra* note 29.

³³ It should be noted that afforestation and reforestation are acceptable bases for projects under the CDM however the issue of emissions from deforestation and the decrease in emission removal from land degradation were not included. See United Nations Framework Convention on Climate Change, Marrakesh, Morocco, Oct. 29–Nov.10, *Report of the Conference of the Parties on its Seventh Session*, ¶ 56, U.N. Doc. FCCC/CP/2001/13/Add.1, 60 (Jan. 21, 2002), available at <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G02/602/22/PDF/G0260222.pdf?OpenElement> (excluding avoided deforestation activities from the CDM). Afforestation and reforestation under the CDM has not been successful. Only 8 CDM projects addressing either of the areas are currently in force. See Blake Hudson, *Climate Change, Forests, and Federalism: Seeing the Treaty for the Trees*, 82 U. COLO. L. REV. 363, n.50 (2011).

³⁴ The primary four methodological problems that are repeatedly brought up in REDD+ discussions are: leakage, additionality, permanence, and measurement. See *e.g.*, [Redd-monitor.org](http://redd-monitor.org), *supra* note 20.

The potential of REDD+ and the importance of addressing the emissions from the land use and forestry sector ensure that REDD+ will continue to play a major role in climate change negotiations. With the beginning of the second commitment period of the Kyoto Protocol coming in 2013, it is increasingly important that the international community continue working through the problems associated with REDD+. Many scientists and political and legal scholars have evaluated the scope of the large systematic issues that REDD+ faces, while very few have looked at smaller, threshold problems like the one covered in this note.

Before REDD+ can be successful in the international arena, it is important to define “forest,” “deforestation,” and “forest degradation.” There are dozens of different definitions used by international bodies in international agreements³⁵ and it is crucial that these definitions are standardized, as providing consistent terminology is vital for international legal negotiations; efficient scientific research and analysis; implementation; and future monitoring and reporting.³⁶

Part I of this note addresses the current status of the various definitions that are being used by international bodies and in international agreements. It focuses on the need for a standardized set of definitions that are based on the purpose of carbon stock preservation and maintenance and briefly discusses the interplay between law and science when it comes to REDD+. Part II evaluates the most commonly used definitions and carefully considers their similarities and differences as well as the pros and cons of the language used. Part III will provide suggestions to allow the definitions to remain well-suited to the purpose of natural carbon stock preservation.

I. GENERAL DEFINITIONAL ISSUES

While seemingly elementary, the definitions that are absolutely vital to development of a REDD+ mechanism have yet to be acceptably defined. The terms “forest,” “deforestation,” and “forest degradation”

³⁵ Erika Lepers et al., *A Synthesis of Information on Rapid Land-Cover Change for the Period 1981-2000*, 55 BIOSCI. 115, 116-17 (2005), available at <http://www.sage.wisc.edu/pubs/articles/F-L/Lepers/Lepers2005Bioscience.pdf>.

³⁶ Dieter Schoene et al., *Food and Agric. Org. of the United Nations, Forest and Climate Change: Definitional Issues Related to Deducing Emissions from Deforestation in Developing Countries* (Food and Agric. Org. of the United Nations, Working Paper No. 5) 1 (2007), available at <ftp://ftp.fao.org/docrep/fao/009/j9345e/j9345e00.pdf>.

have been used in an ad hoc fashion in the various documents that have come out of the UNFCCC and in many instances, have complicated negotiations.³⁷ Diverging interpretations of these definitions have constituted dozens of pages in various IPCC reports and weeks of negotiators' time, and yet ambiguities linger on.³⁸ Several expert workshops—the *First and Second Expert Consultation on Harmonizing Forest-related Definitions by Various Stakeholders*—have also been organized and were held in Rome in 2002.³⁹ 2005 brought the *Third Expert Meeting on Harmonizing Forest-related Definitions for use by Various Stakeholders*⁴⁰ but there is still no consensus on a series of standardized definitions.

There are dozens of forest-related definitions that are currently used at the national and international level. The variety of definitions represents the huge array of forest types, locations, uses, and management techniques.⁴¹ In many cases, these definitions are developed at a national or sub-national scale to reflect the particular uniqueness of the forests in a nation or sub-national region.⁴² Further, these national definitions are often anchored in national history and law and are reflected in forestry management practices.⁴³ In addition, it is commonplace for national definitions to use different parameters, which are themselves defined in a variety of ways, and to have different thresholds and ranges for those parameters.⁴⁴ Some national definitions closely mirror the style of major international definitions by using characteristics like tree height, crown cover percentage, size, and land-use type, while others use broad definitions, incorporating such phrases as “tree . . . which fulfill[s] forest functions”⁴⁵ or even in some cases,

³⁷ MARKKU SIMULA, FOOD AND AGRIC. ORG. OF THE UNITED NATIONS, TOWARDS DEFINING FOREST DEGRADATION: COMPARATIVE ANALYSIS OF EXISTING DEFINITION 8 (2009).

³⁸ Schoene et al., *supra* note 36, at 1.

³⁹ *Id.*

⁴⁰ FOOD AND AGRIC. ORG. OF THE UNITED NATIONS, THIRD EXPERT MEETING ON HARMONIZING FOREST-RELATED DEFINITIONS FOR USE BY VARIOUS STAKEHOLDERS iii (2005), available at <ftp://ftp.fao.org/docrep/fao/008/j4959e/j4959e.pdf>.

⁴¹ ESA PUUTSJÄRVI & MARKKU SIMULA, FOREST-RELATED DEFINITIONS – ISSUES AND DEVELOPMENT NEEDS 23–24, Expert Meeting on Harmonizing Forest-Related Definitions for Use by Various Stakeholders, Rome, Jan. 23–25, 2002 (2002).

⁴² *Id.*

⁴³ Schoene et al., *supra* note 36.

⁴⁴ *Id.*

⁴⁵ H. Gyde Lund, *Definitions of forest, deforestation, afforestation, and reforestation*, (last updated Mar. 5, 2012), available at <http://home.comcast.net/~gyde/DEFpaper.htm>.

“lands including grassland or rangeland that is protected”⁴⁶ and those areas which “have ever contained forests.”⁴⁷ At the international level, these national definitions can complicate the negotiation process by causing difficulties in communication and increased misunderstandings.⁴⁸

International environmental lawyers and policymakers have been attempting to combat global climate change in recent years and, in doing so, are heavily reliant on input from scientific studies that serve the important function of providing quantifiable and analyzable data. Different definitions have made it difficult for scientists from different nations to collaborate and therefore make it more difficult for lawyers and policymakers to properly gather the information they need to base their decisions on the best scientific consensus. Dozens of scientific studies that aim to measure the impact of forests on the global carbon budget cannot be compared because they use different methodologies based on different forest-related definitions.⁴⁹

Further, definitions often dictate what sorts of monitoring procedures are used and the type of data that is reported. The United Nations Food and Agriculture Organization’s (“FAO”) Forest Resources Assessment attempts to harmonize the various definitions used on the national level, but this presents a challenge when nations have definitions that are not as restrictive as the FAO definitions.⁵⁰ Some of the data required for the FAO definitions may not have been collected and therefore cannot be properly considered.⁵¹

How important are definitions? Even seemingly slight differences can have an enormous impact. The Discussion Paper used in the *First Expert Meeting on Harmonizing Forest-Related Definitions for Use by Various Stakeholders* looked at the impact that differences in the range of forest-related definitions (afforestation, deforestation, reforestation, etc.) had on the classification of Finland’s forests.⁵² The results were shocking. Because one of the sets of definitions evaluated

⁴⁶ *Id.* Pakistan.

⁴⁷ *Id.* Cambodia.

⁴⁸ SIMULA, *supra* note 37, at ii.

⁴⁹ Navin Ramankutty et al., *Challenges to Estimating Carbon Emissions from Tropical Deforestation*, 13 GLOBAL CHANGE BIOLOGY 51, 53–54 (2007), available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2006.01272.x/full>.

⁵⁰ See, e.g., FOOD AND AGRIC. ORG. OF THE UNITED NATIONS, GLOBAL FOREST RESOURCES ASSESSMENT 2010, 7–8 (2010), available at <http://foris.fao.org/static/data/fra2010/KeyFindings-en.pdf>.

⁵¹ PUUTSJÄRVI & SIMULA, *supra* note 41, at 23.

⁵² *Id.*

required that changes to forest areas be human-induced and the other set of definitions did not, Finland's forests could be viewed as a large carbon sink or as a large source of emissions.⁵³ Using one definition that accounts for all forest changes,⁵⁴ Finland's naturally expanding forests remove 25 million tons of CO₂ each year.⁵⁵ Using another definition that only counts human-induced changes in forest cover,⁵⁶ the naturally expanding nature of Finland's forest are not counted, but the clearing of forest land by humans is—leading to net emissions of 100–200 million tons of CO₂ each year.⁵⁷ On a larger, international scale, these discrepancies will increase exponentially and will cause much debate, as forest-related definitions have major economic, social, and environmental consequences.⁵⁸ As standing forests become fungible on global markets, such definitions will likely end up determining financial flows to forest conservation projects.⁵⁹ Further, definitions will significantly impact the implementation of policies and programs to conserve and maintain forest resources.⁶⁰

A. THE CALL FOR A STANDARDIZED DEFINITION

A standardized definition will provide many benefits. First, it will help standardize the monitoring and reporting of forest stocks, which will create a better global picture of the land use, land-use change, and forestry sector. As a related benefit, it will be easier to compare changes between countries for purposes of determining the success of national laws and policies that implement REDD+. Second, it will provide more comparable data that can be used to locate priority areas and issues.⁶¹ Third, it will make international negotiations easier by eliminating confusion.

The FAO has been putting together the Forest Resources Assessment ("FRA") since 1947⁶² and obtains forest cover data from 233

⁵³ *Id.*

⁵⁴ The FAO definition, *see* discussion *infra* Part II.A.

⁵⁵ PUUSTJÄRVI & SIMULA, *supra* note 41.

⁵⁶ The UNFCCC definition, discussed *infra* Part II.A.

⁵⁷ PUUSTJÄRVI & SIMULA, *supra* note 41.

⁵⁸ SIMULA, *supra* note 37, at 5.

⁵⁹ *See, id.*

⁶⁰ *Id.* at 2.

⁶¹ PUUSTJÄRVI & SIMULA, *supra* note 41, at 19.

⁶² FAO/ITTO, *Expert consultation on Criteria and Indicators for Sustainable Forest Management* 49 (2004), available at <ftp://ftp.fao.org/docrep/fao/meeting/008/j2123e/j2123e00.pdf>.

countries and territories, which is then synthesized into a single report that is published every five to ten years.⁶³ The FRA attempts to harmonize the various definitions used on the national level, but this presents a challenge when nations have definitions that are not as restrictive as the FAO definitions.⁶⁴ Some of the data required for the FAO definitions may not have been collected and therefore cannot be properly considered.⁶⁵

Some have argued that a single, standardized definition for “forest,” “deforestation,” and “forest degradation” is too idealistic.⁶⁶ Instead, they call for harmonization. Harmonization would focus more on improving “consistency, compatibility, and comparability” among existing definitions.⁶⁷ However, if we are to learn anything from the challenges that the FAO has encountered in compiling its FRA reports, harmonization poses an equally large challenge.

Definitions have considered the value of forests in many different ways, which has created a disjointed and non-standardized way of considering forests. For example, the most widely-used definition by the United Nations⁶⁸ controversially defines forests in a way that allows for the inclusion of agro-fuel plantations.⁶⁹ These monoculture plantations store about 20 percent of the amount of carbon of a natural forest.⁷⁰ Such a definition will have catastrophic results, which may fuel national-level governance that allows for, and even promotes via subsidies, the clear-cutting of forests for timber and their replacement with artificially valuable agro-fuel plantations.⁷¹

Notably, and likely as a result of the intense debate over elementary definitions, no definition of “forest” has been universally

⁶³ FAO, *Global Forest Resources Assessment 2010 News* (2011), available at <http://www.fao.org/forestry/fra/fra2010/en/>.

⁶⁴ FOOD AND AGRIC. ORG. OF THE UNITED NATIONS, *GLOBAL FOREST RESOURCES ASSESSMENT 2010*, at 7–8 (2010).

⁶⁵ PUUTSJÄRVI & SIMULA, *supra* note 41, at 23.

⁶⁶ SIMULA, *supra* note 37, at 8.

⁶⁷ *Id.*

⁶⁸ See discussion *infra* Part II.A.

⁶⁹ *Id.*

⁷⁰ FRIENDS OF THE EARTH INTERNATIONAL, *REDD MYTHS: A CRITICAL REVIEW OF PROPOSED MECHANISMS TO REDUCE EMISSIONS FROM DEFORESTATION AND DEGRADATION IN DEVELOPING COUNTRIES* 5 (2008), available at <http://www.foei.org/en/resources/publications/pdfs/2008/redd-myths>.

⁷¹ This is already a point of contention in Indonesia where the clearing of tropical forestland for replacement with palm oil plantations has become common.

approved to be used in REDD+ negotiations.⁷² In order to give REDD+ the fighting chance that it deserves, these definitional problems need to be smoothed out so that some of the other potential REDD+ complications can be addressed.

In choosing a set of definitions, the FAO has created a list of recommended criteria, including making sure the definitions (1) are unambiguous and serve their proper purpose, (2) are measurable during assessments, and (3) permit synergies and cost-effective assessments and reporting.⁷³

B. THE PURPOSE OF STANDARDIZED DEFINITIONS IN THE REDD+ MECHANISM: CARBON STOCK PRESERVATION AND MAINTENANCE

In some ways, the various definitions of these terms have come as a result of different desired outcomes and a focus on the different purposes of REDD+.⁷⁴ Some international organizations and scientists have focused on the implications of biodiversity loss due to habitat loss, modification, and fragmentation, while others have focused on the importance of forests as providing ecosystem services like preventing erosion and maintaining freshwater supplies.⁷⁵ Yet others have considered the issue on a more regional or local level, resulting in the evaluation of concerns that are not shared by the wider international community.⁷⁶

These are organizations that carry clout in the international arena, and their ideas have been impervious in efforts to create definitions. The first step, as recognized by the FAO, is to determine what the purposes of the definitions should be. Since REDD+ is focused on reducing emissions from the forestry sector to slow global climate change, I argue that the focus should be specifically on forests as carbon sinks. The standardized definitions that are ultimately created should

⁷² See generally Nophea Sasaki & Francis E. Putz, *Critical need for new definitions of "forest" and "forest degradation" in global climate change agreements*, 2 CONSERVATION LETTERS 226 (2009).

⁷³ Schoene et al., *supra* note 36, at 1.

⁷⁴ SIMULA, *supra* note 37, at 8.

⁷⁵ Stuart L. Pimm & Peter Raven, *Extinction by Numbers*, 403 NATURE 843 (2000).

⁷⁶ See e.g., Rodger A. Pielke Sr. et al., *The influence of land-use change and landscape dynamics on the climate system: relevance to climate-change policy beyond the radiative effect of greenhouse gases*, 360 PHILOS. TRANS. R. SOC. LONDON A 1705 (2002) (discussing land-use change impacts on the surface-energy budget as opposed to impacts on atmospheric composition).

keep this same purpose in mind and should be created and worded in a way that best serves this purpose. But others have also suggested taking a carbon stock-minded focus in creating standardized REDD+ definitions.⁷⁷

There have also been organizations and individuals who are very critical of such an approach because it necessarily discounts the other benefits that forests provide, such as erosion control, water filtration, and habitats for a wealth of diverse organisms. While each of these forest-related services is clearly important and worthy of consideration, it is important to focus REDD+ definitions on the very purpose of REDD+, which is reducing forest emissions, not conserving forests. In taking such an approach, though admittedly imperfect, REDD+ can be successfully implemented and the other forest-related ecosystem services will be preserved, in many cases, as a resulting co-benefit. In keeping with this idea, the FAO definitions, which were initially intended for use in forest management, have shifted and been revised to better serve carbon monitoring.⁷⁸

However, choosing carbon stocks as the focus of definitions of forests under a REDD+ regime is not without its own challenges. Definitions that focus on carbon stocks will be extremely reliant on quantitative stock data gathered from scientific studies. These studies are likely to come to a number of different conclusions as different types of forests are considered. Some have suggested using different, biome-specific definitions to effectively recognize and account for the differences in carbon sequestration capabilities of a sparse open-forest savanna and a dense closed-forest in the tropics.⁷⁹ Here again, we are faced with the possibility of multiple definitions that may be difficult to apply in practice and may pose challenges when it comes to figuring out overall reductions or improvements in carbon stock at a national or global scale.

Other elements that need to be incorporated into the definitions or accounted for in some other way include: natural processes in the forest ecosystem (including, most notably, natural mortality, forest fires, and other disturbances), sustainable forest management practices

⁷⁷ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 7, at 5–6.

⁷⁸ PUUSTIJÄRVI & SIMULA, *supra* note 41, at 24.

⁷⁹ Boyd, *supra* note 17, at 843.

(including tending and harvesting in forests), and the conversion of forests to other forest types.⁸⁰

C. THE INTERPLAY OF SCIENCE AND LAW

Science plays a vital role in evaluating the current status of forests, the rate of deforestation, and the implications on the global carbon cycle. Having an inconsistent definition makes it difficult for scientists to study important details like how much carbon is actually stored in forests.⁸¹ Various definitions contribute to differences in data sources, assumptions, and methodologies, which produce a variety of different results that are limited in their applications.⁸² In order for scientists to collaborate and build off of each other, we need to streamline the research process by smoothing out the definitional discrepancies. This will provide international decision makers and lawyers with more consistent data on which to rely in formulating new international environmental laws as they pertain to forests.

II. CURRENT DEFINITIONS IN OPERATION

A. FOREST

The FAO and IPCC put on the *First, Second, and Third Expert Meetings on Harmonizing Forest-Related Definitions for Use by Various Stakeholders* in efforts to come to a consensus on a proper definition of “forest.” They were unable to come to agreement on a single definition.⁸³ This inability to hone in on a single definition lead to the current use of over ninety different international definitions for the word “forest” and over one thousand definitions in total on national, sub-national, and theoretical levels.⁸⁴

⁸⁰ For a full analysis of the pros and cons of a biome-specific approach, see ZOLTÁN RAKONCZAY BIOME-SPECIFIC FOREST DEFINITIONS, FCCC/TP/2002/1 (Apr. 21, 2002).

⁸¹ Ramankutty et al., *supra* note 49.

⁸² *Id.*

⁸³ See e.g., United Nations Framework Convention on Climate Change, Reducing emissions from deforestation in developing countries, ¶ 3(a), U.N. Doc. FCCC/SBSTA/2006/L.8 (May 23, 2006) (calling for further discussion of “definitional issues, including those relating to links between deforestation and degradation”)

⁸⁴ Lepers et al., *supra* note 35, at 116; See Lund, *supra* note 45 for an excellent comprehensive list of a variety of legal and dictionary definitions in use.

The two major global definitions currently in use are that of the UNFCCC and the FAO. The UNFCCC definitions were put forth in 2001 in the Marrakesh Accord.⁸⁵ The purpose of the definitions was implementing Articles 3.3 and 3.4 of the Kyoto Protocol.⁸⁶ As it pertains to “forest,” the definition reads:

“Forest” is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 metres at maturity *in situ*. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 metres are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest.⁸⁷

The other major international definition that is commonly used was developed by the FAO in conjunction with their FRA process. The FRA evaluates forest status and coverage around the globe in a series of reports that are published every five years. The FAO tries to harmonize the various definitions that are used at the national level to meet the standards of the FAO definition.⁸⁸ The FAO defines “forests” as:

Forests are lands of more than 0.5 hectares, with a tree canopy cover of more than 10 percent, which are not primarily under agricultural or urban land use.

Explanatory note: Forests are determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters *in situ*. Areas under reforestation which have yet to reach a

⁸⁵ UNFCCC Conf. of the Parties., Marrakesh, Morocco, Oct 29.–Nov. 10, 2001, Rep. of the 7th. Sess., FCCC/CP/2001/13/Add.1 (Jan. 21, 2002), available at <http://unfccc.int/resource/docs/cop7/13a01.pdf#page=54>.

⁸⁶ PUUTSJÄRVI & SIMULA, *supra* note 41, at 22.

⁸⁷ *Id.*

⁸⁸ Food and Agric. Org. of the United Nations, *Global Forest Resources Assessment 2010: Terms and Definitions* 6 (Forestry Dept., Working Paper No. 144/E, 2010), available at <http://www.fao.org/docrep/014/am665e/am665e00.pdf>.

crown density of 10 percent or tree height of 5m are included, as are temporarily unstocked areas, resulting from human intervention or natural causes, that are expected to regenerate. The term specifically includes: forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area or more than 0.5 ha and width of more than 20m; plantations primarily used for forestry purposes, including rubberwood plantations and cork oak stands. The term specifically excludes trees planted primarily for agricultural production, for example in fruit plantations and agroforestry systems.

While these definitions are slightly different, they agree on the general notion of a certain area of land covered by trees of a certain height that have reached a certain percent of crown cover.⁸⁹ They similarly discuss treatment of temporarily deforested areas. However, the differences between the numbers used are extremely significant and deserve careful evaluation if we are to accept or reject certain parts of these definitions in creating a definition of “forest” to be used in a REDD+ mechanism. Many of these differences deal with the quantitative thresholds for crown cover, height, and minimum area and for the treatment of non-forest land uses and temporarily unstocked areas.⁹⁰

The first major difference is in the percentage of crown cover. The UNFCCC definition allows for a range of crown cover from 10–30 percent to allow national and local variations. The FAO definition on the other hand, uses a 10 percent threshold. Though these percentages seem similar, the differences have huge implications, and it is important to consider this in creating a single global definition. If the threshold is high, then areas that do not meet the threshold but still contain significant amount of carbon stocks could be cleared without the losses being counted.⁹¹ Conversely, if the threshold is low, then forests that are considerably above the threshold could be degraded and partially

⁸⁹ Crown cover has been defined in the IPCC 2006 guidelines as “the percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage. Cannot exceed 100%.” IPCC, *2006 IPCC Guidelines for National Greenhouse Gas Inventories* 4.73 (2006).

⁹⁰ Schoene et al., *supra* note 36, at tbl. 2.

⁹¹ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 7, at 5.

deforested down to the threshold without consequence.⁹² For example, assuming a 10 percent crown cover threshold, an area that has 90 percent crown cover and meets all other qualities of the forest definition could be degraded down to a 10 percent crown cover without any adverse effects on carbon emission counting. Or an area that has 9 percent crown cover but significant carbon stock resources could be deforested with no consequences for carbon emission counting. Either of these scenarios would play an enormous role in limiting the effectiveness of a REDD+ mechanism in controlling and reducing emissions from the land use change and forestry sector.

Perhaps because of the realization of the consequences of setting a forest canopy cover threshold that is either too low or too high, some have suggested using multiple definitions to appropriately reflect forest differences.⁹³ Such ranges would reflect biome-specific definitions that recognize, for example, the differences between a typically sparse savannah forest and a typically dense tropical rainforest.⁹⁴ As discussed above,⁹⁵ this may help to realistically quantify carbon stocks, note small differences in stock changes, and keep the focus of REDD+ forests on carbon storage. However, this is not without its own challenges and would implicate even more difficulties as each of these forest types would have to be individually defined with its own parameters and thresholds. This would make the REDD+ mechanism more complex—possibly too complex for many developing nations who lack the governance structure and the funds to carry out the land surveying at such small scales that multiple biome-specific definitions would require.⁹⁶

A second major difference involves the land-use type. FAO uses three land classifications: forest, other wooded land, and other land.⁹⁷ Its requirement of the absence of other types of land uses like urban or agricultural in its definition of forest gives it a very different focus than the UNFCCC definition.⁹⁸ The FAO considers forests as a land-use type, whereas the UNFCCC considers forests as a type of ground cover.⁹⁹ This

⁹² *Id.*

⁹³ PUUSTJÄRVI & SIMULA, *supra* note 41, at 24.

⁹⁴ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 7, at 4.

⁹⁵ *See supra* Part II.B and note 79.

⁹⁶ *See* Rakonczay, *supra* note 80.

⁹⁷ PUUSTJÄRVI & SIMULA, *supra* note 41, at 21.

⁹⁸ *See* Food and Agric. Org. of the United Nations, *supra* note 89.

⁹⁹ United Nations Framework Convention on Climate Change, *supra* note 86, at 54.

fundamental difference regarding whether forests are a land-use type or land-use cover is extremely controversial and is at the heart of the definitional debates. Specifically, since the increase in monoculture plantations for agriculture is a primary driver of deforestation in many nations,¹⁰⁰ there has been a push for the UNFCCC to consider changing its definition in a way that recognizes that plantations of non-native trees do not provide the important benefits that forests do, both in terms of atmospheric carbon elimination and in terms of ecosystem services.¹⁰¹

The use of definitions based on land use implies that there is a noteworthy difference between agriculture and forestry.¹⁰² However, making such distinctions can be very difficult, since there are many forms of land use where forestry and agriculture overlap.¹⁰³ Of these related uses, the FAO classifies shifting cultivation, agroforestry, and grazing in non-forest categories.¹⁰⁴ However, the existing definitions are still general, and the borders between different land-use types can be difficult to establish in any sort of standardized way. For example, uses like grazing in forests and cultivating crops under trees are clearly in an uncertain grey zone when it comes to land-use types and should be addressed in an international definition of forest.¹⁰⁵

Most of the debate regarding the inclusion of forests used for agricultural reasons in the UNFCCC definition is centered around the biofuel boom. Many governments provide subsidies that promote the expansion of farms for the production of “climate-friendly” transport fuels.¹⁰⁶ The Association for Tropical Biology and Conservation formalized such concerns in a resolution pushing for the United Nations to change its definition to reflect the implications of the differences between natural forest ecosystems and monoculture plantations.¹⁰⁷ Perhaps the best microcosm of this international debate can be seen in

¹⁰⁰ For example, Indonesia. See Adianto P. Simamora, *Oil Palm Plantation not in Forest Sector: Govt.*, THE JAKARTA POST (Feb. 23, 2010), <http://www.thejakartapost.com/news/2010/02/23/oil-palm-plantation-not-forest%20sector-govt.html>.

¹⁰¹ In fact, agroforestry plantations store 20 percent as much carbon as a normal forest. See FRIENDS OF THE EARTH INT’L, *supra* note 71, at 5.

¹⁰² PUUTSJÄRVI & SIMULA, *supra* note 41, at 22.

¹⁰³ *Id.*

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ Rosamond L. Naylor et al., *The Ripple Effect: Biofuels, Food Security, and the Environment*, ENV’T, Nov. 2007, at 30, 39, 42.

¹⁰⁷ Jeremy Hance, *Rainforest Scientists Urge UN to Correct “Serious Loophole” by Changing its Definition of ‘Forest’*, MONGABAY.COM (June 24, 2010), http://news.mongabay.com/2010/0645-hance_atbc_forests.html.

Indonesia, one of the major forestry and land-use change carbon emitters. In Indonesia, the shift from forest land to forest plantations, especially oil palm plantations, are driving deforestation rates in the country.¹⁰⁸ If REDD+ fails to account for these types of changes in forest type in its definition, then huge amounts of emissions will be unaccounted for, seriously impairing the ability of REDD+'s to improve the global environment.

H. Gyde Lund's ongoing evaluation of forest-related definitions demonstrates the deep international divide between those that consider forests as land cover (and therefore include agroforestry) and those that consider forests as a type of land use (and therefore do not include agroforestry).¹⁰⁹ In fact, there is nearly a fifty-fifty divide.¹¹⁰ It should also be noted that almost no nations have national definitions that would meet the standards of the UNFCCC and FAO definitions.

The UN is promoting a universal definition of forest that includes simple parameters and threshold ranges.¹¹¹ This would allow individual nations to choose their own definitions for REDD+ monitoring and reporting, provided they fall within the allowable ranges. This is one potential solution to address the wide variety of problems that nations face when dealing with research and survey funding, monitoring, reporting, and negotiations.

B. DEFORESTATION

The definition of "deforestation" is necessarily closely related to the definition of "forest." It is often simply defined as when an area of forest is changed so that it no longer meets the standards of the definition of forest.¹¹² The two most commonly used and cited definitions of deforestation in use today once again come from the UNFCCC Marrakesh Accord definitions that are used in the Kyoto Protocol and from the FAO. The Marrakesh Accord definition is simple:

¹⁰⁸ Simamora, *supra* note 101.

¹⁰⁹ Lund, *supra* note 45.

¹¹⁰ *Id.*

¹¹¹ Indonesia, for example, has decided that the conversion of forest land to oil palm plantation will not count as forest cover. See Simamora, *supra* note 101.

¹¹² See *e.g.*, *Deforestation Definition*, MERRIAM-WEBSTER.COM, <http://www.merriam-webster.com/dictionary/deforestation> (last visited Jan. 21, 2013).

Deforestation is the direct human-induced conversion of forested land to non-forested land.

The FAO definition is more specific and defines deforestation as:

The conversion of forest to other land use or the long-term reduction of the tree canopy cover below the minimum 10 percent threshold.

Explanatory notes: Deforestation implies the long-term or permanent loss of forest cover and implies transformation into another land use. Such a loss can only be caused and maintained by a continued human-induced or natural perturbation; the term specifically excludes areas where the trees have been removed as a result of harvesting or logging and where the forest is expected to regenerate naturally or with the aid of silvicultural measures . . . deforestation also includes areas where, for example, the impact of disturbance, over utilization or changing environmental conditions affects the forest to an extent that it cannot sustain a tree cover above the 10 percent threshold.¹¹³

There are a number of notable differences between these two definitions that warrant careful evaluation in creating a standardized definitions. First, and most notably, the UNFCCC definition limits deforestation to only the removal of forest induced by human activities while the FAO definition more broadly considers natural causes of deforestation as well as those that are human-induced.¹¹⁴ As noted in Part II, the decision of whether definitions should include only human-induced changes to forests or whether it should take into account natural causes as well can be very important in calculating the overall contributions from forests.¹¹⁵

In considering the primary focus of REDD+ definitions—carbon stocks in forests—it does not matter how the stocks are reduced. The global carbon cycle does not treat anthropogenic emissions any differently than natural emissions. Therefore, I advocate for a

¹¹³ FAO, Forest Resources Assessment Programme, Working Paper 144/E, *Global Forest Resources Assessment 2010: Terms and Definitions* (2010).

¹¹⁴ Schoene et al., *supra* note 36, at 8.

¹¹⁵ Again, based on this difference alone, Finland's forestry sector can be considered a significant sink or source of carbon emissions. See PUUTSJARVI & SIMULA, *supra* note 41.

standardized international REDD+ definition of deforestation that considers all causes and more closely mirrors the FAO definition by considering perturbation, natural disasters, and temporary or sustainable logging practices.

Second, though we can assume a temporarily unstocked stage is not considered deforestation under either definition, only the FAO definition suggests any sort of duration.¹¹⁶ It is crucial that international definitions provide at least a range of acceptable time frames for temporarily unstocked stages. It is likely that deciding upon such a threshold and range will rely heavily on scientific studies regarding the natural and human-promoted regeneration times of different types of forests. If time durations of temporarily unstocked areas are left undetermined, nations would be left free to decide for themselves and, in the interests of earning more credits, could claim long-deforested areas as “temporarily unstocked.”

Third, threshold differences are again implicated. The UNFCCC definition has a range of 10–30 percent crown cover to be considered a forest while the FAO uses a 10 percent threshold. Again, and for the reasons discussed in Part II.A., this can make a substantial measurable difference in allowable changes to forested land with the end result of significant impacts on emissions from the land-use change and forestry sector.

Also worthy of consideration in a standardized definition is the differences between gross deforestation and net deforestation. A simple way to think about these differences is by looking at different scales of measurement. If deforestation is measured on a local or sub-national scale, there may be large areas of deforestation, but when deforestation is combined with other segments and considered on a national scale, areas of reforestation¹¹⁷ or afforestation¹¹⁸ may sufficiently counteract the losses to provide a net gain of forest land. Since the creators of a REDD+ mechanism are free to determine the structure for which tradable carbon credits are earned, the differences between preventing all deforestation

¹¹⁶ Schoene et al., *supra* note 36, at 9.

¹¹⁷ United Nations Framework Convention on Climate Change, *supra* note 86, at 58 (“[r]eforestation’ is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.”).

¹¹⁸ *Id.* (“[a]fforestation’ is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.”).

(gross) and preventing overall deforestation (net) will have to be considered.

Once again, if reducing the overall amount of emissions that are reaching the atmosphere from the forestry and land-use sector is to be the primary goal of REDD+, then the appropriate deforestation marker would be net deforestation because localized changes do not matter if they can be cancelled out in the aggregate. This concern also addresses one of the main issues with REDD+: leakage. Leakage is the idea that if REDD+ projects are implemented to protect a specific and localized area of forest, deforestation activities will just move to a different, unprotected area.¹¹⁹ This means that carbon emission credits will be earned through the REDD+ project but no real carbon stocks will be saved in the aggregate. Implementing REDD+ on a national or multi-national level will help to eliminate leakage.

C. FOREST DEGRADATION

Forest degradation is the most problematic term to define since it involves internal changes in forests that can be very difficult to measure and monitor.¹²⁰ Some have suggested not including it in REDD+ at all, but in some countries, carbon losses from degradation are higher than those from deforestation.¹²¹ For example, in Indonesia, two-thirds of forest stock reduction is due to forest degradation, and the remaining one-third comes as a result of deforestation.¹²² Similarly, in many African nations, degradation accounts for half of the annual rate of

¹¹⁹ Randall S. Abate & Todd A. Wright, *A Green Solution to Climate Change: The Hybrid Approach to Crediting Reductions in Tropical Deforestation*, 20 DUKE ENVTL. L. & POL'Y F. 87, 103 (2010).

¹²⁰ Intergovernmental Panel on Climate Change, *Definitions and Methodological Options to Inventory Emissions from Direct Human-Induced Degradation of Forests and Devegetation of Other Vegetation Types*, at 13 (2003). [hereinafter *Definitions and Methodological Options*]

¹²¹ Friends of the Earth International, *REDD myths: A critical review of proposed mechanisms to reduce emissions from deforestation and degradation in developing countries* (2008). The position of a nation on the forest transition curve can have a significant influence on whether or not it is interested in investing money and effort into monitoring degradation. Typically, nations with low deforestation and high forest cover are most likely to be interested in the incorporation of degradation as they will not benefit as much if the focus is on deforestation. For a good, brief analysis, see MURDIYARSO ET AL., *MEASURING AND MONITORING FOREST DEGRADATION FOR REDD: IMPLICATIONS OF COUNTRY CIRCUMSTANCES 4-5*, CIFOR INFOBRIEF NO. 16 (2008).

¹²² Lars Gunnar Marklund & Dieter Schoene, *Global Assessment of Growing Stock, Biomass and Carbon Stock 13* (Forest Res. Assessment Programme, Working Paper 106/E, 2006).

deforestation,¹²³ and in Brazil, degradation is responsible for 20 percent of the total emissions.¹²⁴ The primary cause of the degradation in many of these nations is due to selective logging.¹²⁵

Aware of the potential difficulties in defining degradation, the UN Subsidiary Body for Scientific and Technological Advice (“SBSTA”) invited the IPCC to help develop a definition including “methodological options to inventory and report on emissions resulting from these activities.”¹²⁶ However, the United Nations has yet to define forest degradation. The term is relatively new and was not even considered in 2001 when the Marrakesh Accord established the UN definitions to be used in the Kyoto Protocol. The two major international definitions come from the FAO and the IPCC.

The FAO defines forest degradation as:

Changes within the forest which negatively affect the structure or function of the stand or site, and thereby lower the capacity to supply products and/or services.

Explanatory note: This takes different forms particularly in open forest formations deriving mainly from human activities such as overgrazing, overexploitation (for fuelwood or timber), repeated fires, or due to attacks by insects, diseases, plant parasites or other natural sources such as cyclones. In most cases degradation does not show as a decrease in the area of woody vegetation but rather as a gradual reduction of biomass, changes in species composition and soil degradation. Unsuitable logging practices can contribute to degradation if the extraction of mature trees is not accompanied with their regeneration or if the use of heavy machinery causes soil compaction or loss of productive forest area.¹²⁷

The IPCC definition, which can be considered close to the likely definition that the UN would adopt, defines forest degradation as:

¹²³ Eric F. Lambin et al., *Dynamics of Land-Use and Land-Cover Change in Tropical Regions*, ANN. REV. OF ENVTL. RES., 2003, 205, 210, available at <http://www.annualreviews.org/doi/full/10.1146/annurev.energy.28.050302.105459>.

¹²⁴ G.P. Asner et al. *Selective logging in the Brazilian Amazon*, 310 SCIENCE 480, (2005).

¹²⁵ CTR. FOR INT’L FORESTRY RES., MOVING AHEAD WITH REDD: ISSUES, OPTIONS AND IMPLICATIONS 100 (Arild Angelsen ed., 2008).

¹²⁶ Schoene et al., *supra* note 36, at 10.

¹²⁷ *Id.*

A direct-human induced long-term loss (persisting for X years or more) of at least Y% of forest carbon stocks (and forest values) since time T and not qualifying as deforestation or an elected activity under Article 3.4 of the Kyoto Protocol.¹²⁸

Here, even more so than in considering the definition of forest or deforestation, there are many variables that need to be considered in standardizing a definition for use in international treaties and agreements. First, what sort of changes in the forest should be used as indicators of degradation? Some have suggested evaluating forest structure; others have suggested using crown cover changes as an indicator, while still others have recommended evaluating species composition.¹²⁹ None of these options will be perfect, but it is important for lawyers and scientists to come together to decide what type of monitoring is best.

Second, what sort of forest services should be monitored for signs of degradation? Again, this could include factors such as productivity, forest goods, services, carbon stocks, or other functions.¹³⁰ In keeping with the goals of REDD+, it is vital that the degradation focus on carbon stock potential. Third, what sort of time scale should be used?¹³¹ In other words, how long must the forest changes exist for it to be considered degradation? This closely mirrors the debate regarding allowable time scales when dealing with deforestation, as discussed earlier. Fourth, what role should natural changes play?¹³² This is the same question that must be considered for many forest-related definitions, and has also been evaluated above. Fifth, what reference state should the forest be compared to in order to determine whether degradation has taken place? The suggested reference states include the forest in its natural state, the optimal state of a forest at the site, or the carbon stock at a specific baseline date.¹³³

Though there are many different variables that must be considered to create an internationally acceptable legal definition, many of the definitions currently in play have agreed on the basic notion of a long-term change in a forests structure and ability to provide goods and

¹²⁸ IPCC, *Definitions*, *supra* note 122, at 16.

¹²⁹ Schoene et al., *supra* note 36, at 11.

¹³⁰ *Id.*

¹³¹ *Id.*

¹³² *Id.*

¹³³ *Id.*

services.¹³⁴ In creating a standard definition for such a comparatively ambiguous term, extra effort must be put into clearly defining parameters that meet the objective of reducing carbon emissions while also considering the necessity of creating a definition that is easy to implement and effectively monitor.¹³⁵

While measuring forest area and the extent of deforestation can be comparatively easily monitored using satellite technology and remote sensing, neither of those technologies will work for detecting degradation.¹³⁶ Even under high resolution, the small changes in forests that have been degraded must be monitored almost exclusively by ground surveys, which may be problematic in nations that lack the governance structure and funds to complete such surveys.¹³⁷ Further, especially in parts of the Amazon and Congo Basin, such surveys may be impossible due to lack of infrastructure and sheer forest density.¹³⁸

Definitions of forest degradation need to be careful that they are serving the purpose of preserving and promoting carbon stocks. This means that sustainable forest management practices need to be excluded. These practices include selective harvesting and thinning and often help to increase overall carbon sequestration of the forest by eliminating old growth.

The Second Expert Meeting on Harmonizing Forest-related Definitions recommended that the term “degradation” may also be renamed to something like “stock reduction” in order to reduce confusion, recognize that forests can be degraded in other non-carbon stock reducing ways, and emphasize the focus of REDD+.¹³⁹

The FAO has noted a number of issues that need to be considered and addressed in creating a nationally acceptable definition of forest degradation or stock reduction. This includes:

- (1) which processes leading to carbon stock reductions and greenhouse gas emissions in forests, without qualifying as deforestation, should be covered by an agreement, (2) whether to continue using the term forest degradation, (3) how to

¹³⁴ *Id.* at 11–12.

¹³⁵ PUUTSJÄRVI & SIMULA, *supra* note 41, at 33–34.

¹³⁶ S. Brown & G. Gaston, *Use of Forest Inventories and Geographic Information Systems to Estimate Biomass Density of Tropical Forests: Application to Tropical Africa*, 38 ENVTL. MONITORING & ASSESSMENT 157, 157–68 (1995).

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ Schoene et al., *supra* note 36, at 12.

address forest fragmentation, (4) if there should be quantitative thresholds and spatial assessment units, (5) whether and how to address direct or indirect human impact, (6) whether and how to address and separate human-induced and natural carbon stock changes.¹⁴⁰

One final complication in defining “forest degradation” is the fact that unlike the definitions of “forest” and “deforestation,” forest degradation involves a continuum from 0 percent degraded to 100 percent degraded.¹⁴¹ How should these percentages be dealt with? Should there be categories along the continuum (e.g. from 0–25 percent degraded, from 26–50 percent degraded) with each category treated differently in terms of carbon accounting? Though categories will complicate the emission calculating process, it may serve as an important negotiation tool that nations can use in compromising with one another.

CONCLUSION

It is clear that in order to win the battle against climate change, we must address the 17 percent share of emissions that comes from the land-use and forestry sector by establishing economic incentives so that forests are worth more money standing than they are when cut down and sold as timber.¹⁴² Though this emissions area was decidedly absent from the Kyoto Protocol, increased attention thanks to new scientific research and economic analyses have brought forests to the center of attention in many recent climate discussions.¹⁴³

Reducing Emissions from Deforestation and Forest Degradation (REDD+) is a program aimed at addressing this emissions area. Before REDD+ can be successful in the international arena, it is important to define the words “forest,” “deforestation,” and “forest degradation.” There are dozens of different definitions used by international bodies and in international agreements and it is crucial that these definitions are standardized, as consistent terminology is vital for international legal negotiations, efficient scientific research and analysis, successful implementation, and future global monitoring and reporting.

¹⁴⁰ *Id.* at 12–13.

¹⁴¹ See SIMULA, *supra* note 37, at 9–10.

¹⁴² *4th Assessment Report*, *supra* note 3, at 5.

¹⁴³ STERN, *supra* note 28, at viii–ix.

These definitions have been used at different scales and have been applied in an ad hoc fashion in many of the documents that have come out of the UNFCCC.¹⁴⁴ They often use different parameters, which are themselves defined in different ways, and have a variety of thresholds and ranges for those parameters.¹⁴⁵ A standardized international definition to be used in future treaties and negotiations will help lawyers and policymakers have meaningful conversations and will allow for more comparable data to be used to identify priority areas and issues.

In focusing on definitions from the perspective of the ultimate goal of REDD+—the reduction of emissions from deforestation and the preservation of forest carbon stocks—many of the definitional focus issues can be more easily resolved. “Forest,” “deforestation,” and “forest degradation” are the most fundamental terms in REDD+ and are the first terms that need to be adequately defined before moving forward and addressing the various other potential problems that REDD+ implementation faces. Defining each term has its own specific challenges, but they are all fundamentally related and should be tackled in one meeting of experts.

Though it may initially appear inconsequential to consider the definitional issues of a few forest-related terms in light of the enormity of the larger problem of global climate change, it is a crucial initial step. Forest sector emissions are substantial and have been cited as a necessary step to halt global climate change in a relatively cheap¹⁴⁶ and quick way.¹⁴⁷ REDD+ is just the vehicle that the forest sector needs, and it has been gaining momentum internationally. As applied in international agreements, forest-related definitions will have major economic and social consequences in addition to the obvious environmental consequences.¹⁴⁸ Such definitions will end up determining financial flows to forest conservation projects and will impact the implementation of policies and programs to conserve forest resources.¹⁴⁹

It is clear that the next climate change agreement will include REDD+ concepts in some form so the time to smooth out the definitional issues for easy integration and acceptance is now.

¹⁴⁴ Schoene et al., *supra* note 36, at 15.

¹⁴⁵ See generally Lund, *supra* note 45.

¹⁴⁶ STERN, *supra* note 28, at ix.

¹⁴⁷ Wertz-Kanounnikoff, *supra* note 29.

¹⁴⁸ SIMULA, *supra* note 37, at 8.

¹⁴⁹ *Id.*