Peer-reviewed version available at *Forests* **2020**, *11*, 959; doi:10.3390/f11090959

Who Owns REDD+?
Carbon Markets, Carbon Rights and Entitlements to REDD+ Finance

Prof. Dr. Charlotte Streck, Climate Focus, Schwedter Strasse 253, Berlin, Germany; University of Potsdam, Am neuen Palais 10, 14496 Potsdam, Germany

Abstract

The questions on who is entitled to benefit from REDD+ transactions remains one of the most controversially debated issues around cooperative efforts to reduce deforestation in developing countries. REDD+ has been conceived as international framework for voluntary efforts of developing countries to reduce greenhouse gas emissions and enhance carbon removals from forest activities. Designed as international framework under the UNFCCC that calculates emission reductions and removals (ERRs) at the national -and as an interim step on the subnational level – REDD+ is primarily a creature of international law. However, in defining forest-carbon ERRs the international framework competes with national emission trading systems and domestic REDD+ legislation as well as private standards that define units traded on the voluntary carbon market. The definition of various carbon units is closely linked to the question on who is entitled to participate in REDD+ and benefit from the sale of ERRs under results-based payment schemes or carbon market transactions. This paper applies a legal lens to the various claims to participate in REDD+ transactions. It tries to disentangle the various rights to ERRs, various carbon credits, and payments that come with REDD+ and that almost always create confusion and not seldom conflict around REDD+ implementation. The definition of carbon rights and the legal nature of carbon credits depends on local law and differs between countries. However, there are a number of legal considerations that apply and certain underlying concepts are relevant for the understanding of REDD+ transactions and the allocation of benefits and burdens of conservation activities.

Key words: REDD+; carbon markets; carbon rights; benefit-sharing

1. Introduction: markets and entitlement to REDD+ benefits

From its inception, the focus on REDD+[1] 'benefit-sharing' stood in notable difference to the 'burden-sharing' debates that characterizes the policy discussion around climate measures in other sectors.[2] The focus on a fair sharing of benefits can be traced back to the early days of REDD+ and concerns that poor and vulnerable communities including indigenous peoples would be bypassed in a carbon-driven REDD+ mechanism or, worse, that they would lose access to resources and taken advantage of by market interests.[3] The fear that vulnerable groups would pay the price of REDD+ by losing access to resources without fair compensation has led authors to propose sending climate negotiators back to the drawing board to re-design a REDD+ framework based on 'deep equity' to ensure that forest carbon activities disproportionately benefit poor people, communities, and nations.[4] While there is little interest to reopen REDD+ negotiations under the UN Framework Convention on Climate Change (UNFCCC)[5] or the Paris Agreement[6], the question on who is entitled benefit from international and national REDD+ transactions and who holds the corresponding 'carbon rights' remains salient and hotly debated.[7] The notion of carbon rights suggests a claim to REDD+ payments backed by a normative argument. This argument can be based on a statutory legal right, a contract, or a (formal or informal) title to land, forests and associated ecosystem services. It often includes a moral next to a legal claim.

Discussions on benefit-sharing and carbon rights intersect with the efforts to link REDD+ to voluntary and statutory carbon markets, either by embedding "avoided deforestation" (AD)

[1] REDD+ refers 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".

[2] Böhringer, C., Rivers, N., Rutherford, T., & Wigle, R. (2015). Sharing the burden for climate change mitigation in the Canadian federation. *Canadian Journal of Economics/Revue Canadienne d'économique*, *48*(4), 1350–1380.; Skovgaard, J. (2014). EU climate policy after the crisis. *Environmental Politics*, *23*(1), 1–17.; Wang, K., Zhang, X., Wei, Y.-M., & Yu, S. (2013). Regional allocation of CO2 emissions allowance over provinces in China by 2020. *Energy Policy*, *54*, 214–229.; Rose, A., & Zhang, Z. (2004). Interregional burden-sharing of greenhouse gas mitigation in the United States. *Mitigation and Adaptation Strategies for Global Change*, *9*, 477–500.

[3] Böhringer, C., Rivers, N., Rutherford, T., & Wigle, R. (2015). Sharing the burden for climate change mitigation in the Canadian federation. *Canadian Journal of Economics/Revue Canadienne d'économique*, *48*(4), 1350–1380.; Skovgaard, J. (2014). EU climate policy after the crisis. *Environmental Politics*, *23*(1), 1–17.; Wang, K., Zhang, X., Wei, Y.-M., & Yu, S. (2013). Regional allocation of CO2 emissions allowance over provinces in China by 2020. *Energy Policy*, *54*, 214–229.; Rose, A., & Zhang, Z. (2004). Interregional burden-sharing of greenhouse gas mitigation in the United States. *Mitigation and Adaptation Strategies for Global Change*, *9*, 477–500.

[4] Takacs, D. (2009). Forest Carbon Offsets and International Law: A Deep Equity Legal Analysis. *Georgetown International Environmental Law Review*, *22*(3), 521–574.

[5] The United Nations Framework Convention on Climate Change (Rio de Janeiro, 9 May 1992, in force 21 March 1994) 1771 *UNTS* 107.

[6] The Paris Agreement (Le Bourget, France, 12 December 2015, in force 4 November 2016) *UNTS* C.N.63.2016.TREATIES-XXVII.7.d.

[7] For some general literature and synthesis, the following sources, in addition to a wealth of non-academic literature. Wong, G. Y. et al. (2019). Luttrell, C., Loft, L., Fernanda Gebara, M., Kweka, D., Brockhaus, M., Angelsen, A., et al. (2013). Who Should Benefit from REDD+? Rationales and Realities. *Ecology and Society*, *18*(4). Retrieved June 24, 2020, from https://www.ecologyandsociety.org/vol18/iss4/art52/. Rakatama, A., Pandit, R., Ma, C., & Iftekhar, S. (2017). The costs and benefits of REDD+: A review of the literature. *Forest Policy and Economics*, *75*, 103–111. Setyowati, A. (2012). Ensuring that women benefit from REDD+. *Unasylva*, *63*(239,), 6.

projects into public -national or subnational- REDD+ programs, or by making said programs themselves meeting the standards of carbon markets by creating a fungible currency based on forest-related emission reductions and removals (ERRs). While such programs remain scarce, an increasing number of tropical forest countries develops REDD+ strategies. In the meanwhile, a vibrant voluntary market dominated by private interests has seen a sharp increase in demand for AD offset credits over the last years.[8]

The interlinkages between benefit-sharing, carbon rights, and tradable carbon credits in different market-based systems has led to a great deal of insecurity and confusion around the ownership of ERRs, a legitimate claim to REDD+ payments, and the respective underlying legal, political or ethical basis of such claim. Public and private investors and market-participants also see themselves confronted with identifying the holders of 'carbon rights' which often involves dissecting several layers of overlapping claims.

The objective of this paper is to disentangle the various claims to ERRs, carbon units, and entitlements that come with REDD+. Ultimately, the definition of carbon rights and the legal nature of carbon credits depends on local law and differs between countries, However, there are a number of legal considerations that apply more generally and certain underlying concepts are relevant for the understanding of REDD+ across different geographies. By clarifying these concepts, this paper seeks to facilitate the implementation REDD+ activities by public as well as private actors.

The paper is structured as follows. Section 2 gives a brief introduction into the international context in which forest carbon transactions take place, introducing REDD+ and how the international framework may be linked to voluntary carbon markets. Section 3 discusses the basic methodological requirements for creating a tradable forest carbon credit; and section 4 puts the creation of tradable carbon units into some legal context by debating the legal characteristics and nature of carbon units. Section 5 looks at the notion of carbon rights and land- or activity-based claims to REDD+ payments, and section discusses the implications of carbon rights to benefit-sharing. The final section 7 seeks to summarize the different considerations and in doing so provide some insight to REDD+ policy makers.

2. REDD+ building blocks

The framework for an incentive mechanism to conserve tropical forest, REDD+, was adopted by the 19th session of the Conference of the Parties to the UNFCCC (COP) in November 2013 in Warsaw, Poland.[9] The so-called Warsaw Framework for REDD+ (WFR) defines the international criteria for countries to reduce greenhouse gas (GHG) emissions from deforestation and forest degradation, and the role of conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stock (together REDD+ or REDD-plus).

[8] Verified Carbon Standard, https://verra.org/datainsights/april-2020/, accessed 1 July 2020.
[9] UNFCCC decisions 9-15/CP19.

Setting incentives for developing countries to reduce emissions and enhance forest carbon stocks, the WFR enables the provision of results-based climate finance payments in return for measured GHG reductions and removals. The WFR does not formulate rules for a market in ERRs but suggests that REDD+ could be a linked to market-based or other cooperation mechanisms, including market rules defined under Article 6 of the Paris Agreement.[10] The WFR decision explicitly raises the possibility of "*any further specific modalities for verification consistent with any relevant decision of the Conference of the Parties*."[11]

Significant funding has been pledged for results-based payments for REDD+ in recent years on the basis of the WFR. This approach has been piloted by the Forest Carbon Partnership Facility (FCPF) and the BioCarbon Fund / Initiative for Sustainable Forest Landscapes administered by the World Bank, as well as bilateral programs such as Norway's International Climate and Forest Initiative and Germany's REDD Early Movers Program. These programs do not apply market standards and most of them do not require the transfer of title to ERRs. They require a tracking of ERRs and assurances that no double counting or double selling has taken place; only the FCPF requires the transfer of title to aquired emission reductions.[12]

While current REDD+ transactions do not yet meat carbon-market standards, additional criteria (such as the establishment of registries, verification rules, but also more stringent rules for ERR measurement and accounting) could generate REDD+ credits less vulnerable to political inteference and of a quality required by carbon markets. Legislative action could reflect the acceptance of ERRs for compliance purposes under, for instance, a domestic trading or carbon tax system. ERRs would become legally-defined certificates – which are familiar from Kyoto Protocol[13]'s Clean Development Mechanism (CDM)[14] – with characteristics that facilitate their transfer and tracking, as well as decisions regarding their acceptance as compliance instruments for offset.

Links between REDD+ and private carbon transactions exist already today through a vibrant market in voluntary offset credits. These credits are generated under private standards, such as Verra's Verified Carbon Standard (VCS)[15] or the new ART/Trees standard.[16] The VCS registers projects and larger jurisdictional programs; ART/Trees focusses on verifying ERRs at a

[10] See for a detailed discussion of the link between REDD+ and Article 6 Paris Agreement: Streck, C., Howard, A., & Rajão, R. (2017). *Options for Enhancing REDD+ Collaboration in the Context of Article 6 of the Paris Agreement* (p. 22). Retrieved from https://climatefocus.com/sites/default/files/REDDOptionsfinalreport.pdf., accessed 1 July 2020.

[11] Decision 14/CP.19, para. 15

[12] The ERPA General Conditions specify that "any ER Transfer shall include the transfer of all rights, titles and interests attached to such transferred ERs" (ERPA General Conditions). Title to ERs in the General Conditions is defined as: …*the full legal and beneficial title and exclusive right to any Contract ERs and/or Additional ERs generated under the ER Program within the ER Program Accounting Area and contracted for under the ERPA*. https://www.forestcarbonpartnership.org/erpa-general-conditions accessed 1 July 2020.

[13] The Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto, Japan 11 December 1997, in force 16 February 2005) 2303 UNTS 162.

[14] Emission reductions are issued under the CDM as certified emission reductions (CERs), which is one of six unit types defined by the Kyoto Protocol. Art. 12 Kyoto Protocol.

[15] Verified Carbon Standard, https://verra.org/project/vcs-program/, accessed 1 July 2020.

[16] ART, Architecture for REDD+ Transactions, https://www.artredd.org, accessed 1 July 2020.

jurisdictional and national scale. While the ART/Tree standards yet to has issue credits, by end of March 2020, the VCS had issued more than 188 million units for land use ERRs.[17] Ever since 2016, the issuance of Verified Carbon Units for agriculture, forestry and other land uses (AFOLU) has outpaced other project classes registered under the VCS. In 2019, AFOLU issuances represented 72 percent of all VCS issuances.[18] Credits issued under private standards are separate and independent from the WFR or results-based payments, unless domestic law regulates or links voluntary carbon projects to domestic schemes or national REDD+ programs. In Colombia, for example, VCS REDD+ offset credits are eligible to meet compliance obligations under the country's carbon tax system.[19] While voluntary projects as an expression of non-state climate efforts are independent from national climate efforts, private 'avoided deforestation' (AD) projects support country's REDD+ efforts and contribute to a country's 'nationally determined contribution' (NDC) under the Paris Agreement.[20] They often run in parallel to national conservation programs, but they can also, provided that project national GHG accounting are harmonized, be recognized 'REDD+ projects' and part of the country's official REDD+ efforts. Such "nested" REDD+ systems ensure the environmental robustness of AD projects through coordinated rules for the establishment of reference emissions levels, but they also allow REDD+ projects be potential beneficiaries of results-based payments under the WFR.[21] Nesting has legal consequences since ERRs of different measurement and nature are converted to linked and eventually potentially fungible units: ERRs measured against project baselines established under voluntary standards, and ERRs measured in the context of the WFR and, if market-linkage is desired, additional rules that make ERRs generated at the national level market-compliant.

3. Carbon markets: creating currency

To the extent that REDD+ will be linked to carbon markets, it has to create a uniform 'currency' that can be used to meet regulatory or voluntary mitigation obligations. Carbon markets' defining principle is the conversion of either a right to pollute or, as in the case of AD and REDD+, a measured ERR into a uniform, tradable unit. The allocation of a right to pollute defines the functioning of a regulated cap-and-trade system; the generation of 'offset' credits, refers to baseline-and-credit systems which convert ERRs into currency that then can be transferred to a polluter that uses it to meet an emission reduction obligation. Such obligations can relate to voluntary climate commitments of companies or countries, or relate to cap-and-trade systems. Where a cap-and-trade system recognizes offset credits, such credits become rights to pollutes

[17] Verified Carbon Standard, https://verra.org/datainsights/april-2020/, accessed 1 July 2020.
[18] Ibid.
[19] Colombian Climate Change Law, Law N. 1.931 from 27 July 2018. Offset credits have to be generated in Colombia after January 1, 2010, and certified under an accredited carbon standard.
[20] There is a discussion on whether the transfer of credits under voluntary standards and the accounting of reduced deforestation in the context of national climate goals leads to double counting though.
[21] Pedroni, L., Dutschke, M., Streck, C., & Porrua, M. E. (2009). Creating incentives for avoiding further deforestation: the nested approach. *Climate Policy*, *9*(2), 207–220.; Chagas, T., Streck, C., Olander, J., Seifert-Granzin, J., & Robert O'Sullivan. (2011). *Nested Approached to REDD+: An Overview of Issues and Options* (p. 50).; Cortez, R., Saines, R., Griscom, B., Martin, M., Deo, D. de, Fishbein, G., et al. (2010). *A nested approach to REDD+: structuring effective and transparent incentive mechanisms for REDD+ implementation at multiple scales.*

equivalent to those allocated by governments. Examples for cap-and-trade systems are the European Emissions Trading System (EU ETS)[22] or the California Cap and Trade System[23]; examples for mechanisms and programs that generate offset credits, the CDM or the VCS.

The creation of a tradable carbon currency faces ethical, methodological, and accounting barriers. The ethical dimension relates to concerns that public policy, at the international or national level, allocates rights to pollute and assigns "*property interests in the sky*"[24]. The concern is that the 'commoditization' of pollution puts richer countries and communities at an advantage and creates an abuse in a global common that the state is to protect, not to give away. Deeper concern about the ability of market incentives to produce equitable and better ecological outcomes has led and continues to lead those critical of a neoliberal logic within the UNFCCC and national governments to prefer regulatory over market-based measures,[25] even though the number of uncompromising market-critical environmentalists has decreased in the last two decades.[26]

Establishing fungibility of allowances and offset credits means identifying and quantifying the 'sameness' among a wide range of activities.[27] This is comparatively easy in the case of cap-and-trade systems: A regulator defines an emissions cap that is below business-as-usual emissions and splits the total amount of the cap into allowances, each permitting to emit a certain quantity – generally a ton of GHG – emissions. Entities have to match their emissions with allowances, acquiring more where needed and selling surplus where possible. Allowances are transferable rights to pollute that come into existence through an act of legislation that ensures a harmonized and fungible unit. However, only a few cap-and-trade systems cover the land sector, with the New Zealand emission trading system (NZ ETS) being a significant exception.[28] Generally, developing a monitoring system that would subject farms, forest owners and other land holdings to monitoring and reporting processes comparable to those for installations, for example in the

[22] Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.
[23] California Assembly Bill No. 398, California Global Warming Solutions Act of 2006: market-based compliance mechanism from 2017.
[24] Torres, G. (2001). Who Owns the Sky Past Garrison Lecture Reprints & Addenda - Seventh Annual Lloyd K. Garrison Lecture on Environmental Law. *Pace Environmental Law Review*, *19*(2), 515–574.
[25] Blumm, M. C. (1992). Fallacies of Free Market Environmentalism, The Free Market Environmentalism: The Role of the Market in Environmental Protection Northwest School of Law at Lewis and Clark College-1991. *Harvard Journal of Law & Public Policy*, *15*(2), 371–390.; Menell, P. S. (1992). Institutional Fantasylands: From Scientific Management to Free Market Environmentalism Free Market Environmentalism: The Role of the Market in Environmental Protection Northwest School of Law at Lewis and Clark College-1991. *Harvard Journal of Law & Public Policy*, *15*(2), 489–510.; Newell, P., & Paterson, M. (1998). A climate for business: global warming, the state and capital. *Review of International Political Economy*, *5*(4), 679–703.; Newell, P., & Roberts, J. T. (2016). *The Globalization and Environment Reader*.; Ciplet, D., & Roberts, J. T. (2017). Climate change and the transition to neoliberal environmental governance. *Global Environmental Change*, *46*, 148–156.
[26] See for further discussion of the ethical implications of 'rights' to pollute: Wemaere, M., & Streck, C. (2005). Legal Ownership and Nature of Kyoto Units and EU Allowances. In *Legal Aspects of Implementing the Kyoto Protocol Mechanisms* (D. Freestone, C. Streck (eds), pp. 35–53).
[27] MacKenzie, D. (2009). Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, Organizations and Society*, *34*(3–4), 440–455.
[28] Climate Change Response (Emissions Trading) Amendment Act 2008, Article 71 on the Allocation in respect of pre-1990 forest land.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 14 July 2020 doi:10.20944/preprints202007.0288.v1

Peer-reviewed version available at Forests 2020, 11, 959; doi:10.3390/f11090959

context of the EU ETS, is considered impractical.[29] While the currency may be easy to define, the EU Commission argued with respect to the EU ETS, it would be impossible to guarantee the compatibility and consistency of national accounting and reporting systems, and to sustain the related costs.[30] Similarly, land use, land-use change, and forestry (LULUCF) emissions were not included in the emission caps of developed countries under the Kyoto Protocol. Instead, they could be used -as offsets- to meet the emission limitation targets of developed countries.[31]

Creating a fungible currency is a lot more challenging for offset credits that result from very heterogenous land use and forest activities. Each credit is created through an original process which involves setting of a baseline or reference emissions level that establishes a counterfactual emission scenario against which emission reductions (through conservation) and removals (through an increase of carbon sequestration) are measured. Such system establishes financial incentives to invest in emission reducing and removal enhancing activities outside of an established GHG emissions cap. Participation is, other than in the case of cap-and-trade systems, typically voluntary. Baseline-and-credit systems have the potential to drive a wide range of activities that reduce deforestation and increase forest cover. However, the establishment of emission reference scenarios and the creation of credible, permanent, and additional offset credits is complex,[32] and ERRs are never made quite the same across and within different methodologies and standards.

The way how carbon units are created and transacted influences how they are accounted for. Accounting for ERRs under the international climate regime refers to the way what and how the different activities can be used to meet climate objectives, e.g. which activities are eligible to generate emissions reductions or removals under the Kyoto Protocol; are counted to meet a countries self-determined goals under the NDCs of the Paris Agreement; or are eligible carbon pools under REDD+. The challenge is to ensure that country monitoring, reporting and accounting for ERRs is transparent and comparable, and that ERRs are only accounted for once, i.e. avoids double counting. Ensuring transparent accounting is particularly relevant in the case of the Paris Agreement which lacks the features of the Kyoto Protocol's cap-and-trade system which included defined units -assigned amount units-, GHG registries, and an international transaction log.[33] Most tropical countries include the land sector in their NDCs, although it is not always clear which and how land-based activities are accounted for.

[29] Savaresi, A., Perugini, L., & Chiriacò, M. V. (n.d.). Making sense of the LULUCF Regulation: Much ado about nothing? *Review of European, Comparative & International Environmental Law*, *n/a*(n/a). Retrieved June 8, 2020, from https://onlinelibrary.wiley.com/doi/abs/10.1111/reel.12332.

[30] Commission (EU), 'Commission Staff Working Document, Impact Assessment on the role of land use, land use change and forestry (LULUCF) in the EU's climate change commitments' SWD(2012) 40 final, 12 March 2012 para 8.5.

[31] See Article 3.3 and 3.4 of the Kyoto Protocol.

[32] Chagas, T., Galt, H., Lee, D., Neeff, T., & Streck, C. (n.d.). *A close look at the quality of REDD+ carbon credits*.

[33] Briner, G., & Moarif, S. (2016). *Unpacking Provisions Related to Transparency of Mitigation and Support in the Paris Agreement* (No. COM/ENV/EPOC/IEA/SLT(2016)2) (No. COM/ENV/EPOC/IEA/SLT(2016)2; p. 40). Retrieved from http://www.oecd.org/environment/cc/Unpacking-transparency-provisions-Paris-Agreement-CCXG-May2016.pdf.

So far, there is no consistency across REDD+ across communicated forest reference emissions levels, NDCs, national communications and Biennial Update Reports[34], in parts because of competing measurement and reporting systems. Most reference emissions levels that tropical countries have submitted to the UNFCCC consider political developments (e.g. future development prospects or global deforestation rates[35]) to increase potential ERRs.[36] These assumptions are not necessarily in-line with a conservative projection of deforestation. This situation is further complicated by competing REDD+ standards for results-based or market-based system, such as the FCPF or the Green Climate Fund on one hand, and the VCS or Trees/ART on the other, all with different rules and assumptions. This cacophony of national or jurisdictional measurement systems leads to a similarly confusing number of different type of ERRs, stemming from results-based payment, jurisdictional and project-based market systems of different purpose, driven by diverging underlying assumptions, and resulting credits of widely-different quality.

In sum, standards, as they relate to the measuring and accounting for emissions, as well as the uniform accounting for allowances and offset credits are essential for a smooth functioning of a market. While existing carbon markets have made much progress in the harmonization of rules, the development and improvement of methodologies and classification of various emission rights, it remains challenging to create functioning markets around comparable and fungible carbon assets. Until today accountants face ambiguity on how to classify and disclose emissions allowances and offset credits. As a result, companies take very different views on allowances and offset credits accounting them as intangible assets, inventory assets, R&D, financial instrument or, if they have been allocated by governments, as grants.[37] The difference in clarifications makes it difficult to compare corporate performance as standardization of accounting items is a prerequisite to compare financial statements.[38] What is challenging in the case of technical and financial harmonization is even more challenging when it comes to the legal classification of allowances and offset credits.

---

[34] Biennial Update Reports contain updates from developing country GHG inventories, including a national inventory report and information on mitigation actions, needs and support received. COP 17 adopted the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention", which are contained in annex III to decision 2/CP.17

[35] Government of Guyana. (2014). *The Reference Level for Guyana's REDD+ Program*. Retrieved from https://redd.unfccc.int/files/guyana_proposal_for_reference_level_for_redd_.pdf.

[36] Hargita, Y., Günter, S., & Köthke, M. (2016). Brazil submitted the first REDD+ reference level to the UNFCCC—Implications regarding climate effectiveness and cost-efficiency. *Land Use Policy*, *55*, 340–347.; Angelsen, A. (2017). REDD+ as Result-based Aid: General Lessons and Bilateral Agreements of Norway. *Review of Development Economics*, *21*(2), 237–264.; Mertz, O., Grogan, K., Pflugmacher, D., Lestrelin, G., Castella, J.-C., Vongvisouk, T., et al. (2018). Uncertainty in establishing forest reference levels and predicting future forest-based carbon stocks for REDD+. *Journal of Land Use Science*, *13*(1–2), 1–15.

[37] Johnson, H. et al. (2017). Business practice, in particular in the U.S., appears to treat carbon units as real assets, more specifically as commodities for the purpose of financial regulations, while derivatives of such rights are financial instruments. Button, J. (2008). Carbon: Commodity or Currency? The case for an international carbon market based on the currency model. *Harvard Environmental Law Review*, *32*, 571–596.

[38] Accounting is also relevant for private entities that seek to classify an allowance or carbon credit under relevant accounting standards. Lovell, H. (2014). Climate change, markets and standards: the case of financial accounting. *Economy and Society*, *43*(2), 260–284. Gallego-Alvarez, I., Martínez-Ferrero, J., & Cuadrado-Ballesteros, B. (2016). Accounting Treatment for Carbon Emission Rights. *Systems*, *4*(1), 12.; Giner, B. (2014). Accounting for Emission Trading Schemes: A Still Open Debate. *Social and Environmental Accountability Journal*, *34*(1), 45–51.; Bebbington, J., & Larrinaga-González, C. (2008). Carbon Trading: Accounting and Reporting Issues. *European Accounting Review*, *17*(4), 697–717.

4. Legal nature of carbon units

As accountants racket their brains on how to classify carbon units, lawyers face a similar variety of options on how to describe carbon units with different regulatory, fiscal and property consequences. Carbon units are at the same time a highly esoteric legal concept and a potentially extremely valuable tradable commodity. Where allowances are allocated by governments, they often are considered as permits which express the authorization or entitlement to emit a certain amount of GHGs: A tradable and fungible permit that is not linked to a particular installation and instead embodies an alienable right to be acquired and transferred.[39] So far, only New Zealand links conservation policies to pollution permits. Under the NZ ETS, land owners can apply for 'New Zealand units' for forests that they commit to conserve, and forest owners have to surrender allowances (New Zealand Units) to gain the right to deforest.[40] While a similar system could be implemented in tropical forests in the future, it currently does not feature in any national policies adopted or contemplated in the context of REDD+.

Offset credits are -independent from an allocating authority- issued under public ('compliance') or private ('voluntary') standards.[41] The CDM represents a compliance standard under public international law, while Australia's Carbon Framing Initiative represents a compliance standard under local law.[42] If issued by a private standard, such as Verra or the Gold Standard, a carbon credit does not embody any administrative authorization. It is a mere private, tradable certificate. An issued offset credit embodies a fungible interest in an ERR which through its conversion into an offset credit has become independent from a particular sequestration or land-related abatement activity.[43] Legally the carbon offset entails the assurance that an abatement activity has met certain social and environmental criteria (safeguards and consultations), and reduced or sequestered an established quantity of GHG emissions. The credit gives the holder the right to exploit, claim and use the benefits of the ERR and embodies the environmental value or service that led to the issuance of the credit. The reputational and spiritual value may drive the generation and acquisition of offset credits. However, whether in compliance or voluntary markets, participation in carbon markets is not only driven by compliance or voluntary environmental commitments but also by speculation. Transactions in derivatives based on carbon

[39] Wemaere, M., Streck, C., & Chagas, T. (2009). Legal Ownership and Nature of Kyoto Units and EU Allowances. In *Legal Aspects of Carbon Trading: Kyoto, Copenhagen and beyond* (Freestone, D.; Streck, C. (eds), pp. 35–58). However, allowance themselves are generally not considered as right to emit. For allowances, the International Financial Reporting Interpretations Committee concluded that: '*an allowance itself does not confer a right to emit. Rather it is the instrument that must be delivered in order to settle the obligation that arises from emissions'*. IFRIC (International Financial Reporting Interpretations Committee) (2004). IFRIC interpretation 3: Emission rights. London: International Accounting Standards Board, p.19.

[40] Leining, C., Kerr, S., & Bruce-Brand, B. (2020). The New Zealand Emissions Trading Scheme: critical review and future outlook for three design innovations. *Climate Policy*, *20*(2), 246–264. Deforesting forest land, Te Uru Rākau, Forestry New Zealand, https://www.mpi.govt.nz/growing-and-harvesting/forestry/forestry-in-the-emissions-trading-scheme/deforesting-forest-land/, accessed 1 July 2020.

[41] Streck, C., & von Unger, M. (2016). Creating, Regulating and Allocating Rights to Offset and Pollute: Carbon Rights in Practice. *Carbon & Climate Law Review (CCLR)*, *2016*(3), 178–189.

[42] Carbon Credits (Carbon Farming Initiative) Regulation 2011, Select Legislative Instrument No. 268, 2011, made under the Carbon Credits (Carbon Farming Initiative) Act 2011, compilation date 4 April 2020.

[43] Zahar, A., Peel, J., & Godden, L. (2013). *Australian Climate Law in Global Context*. Page 348.

units are undertaken by traders that look to profit from the market. They tend to discount the ethical component of the offset credit and focus on expected profits. In line with this perspective on offset credits, a court in Louisiana compared unregulated carbon offsets to junk bonds, or low-grade investments with low likelihood of return, but potential for high yield.[44]

It is important, in particular for credits recognized under a legal regime, to understand the mix of public and private characteristics of carbon units.[45] Regulated carbon units exhibit features of both a regulatory instruments and private property, while the lacking public element of voluntary offset credits throws them entirely into the realm of private law. Public rules generally include reporting requirements, authorizations, quality standards, and administrative or criminal sanctions. The use of private transaction rules exposes carbon markets to worries about reputational and delivery risks as well as speculative pressures, affecting market segments in which financial intermediation plays an important role. The legal nature, including the property right elements of carbon units is relevant when deciding to which extent a government that has created or recognized such unit can adjust or change such recognition without breaching constitutional protection against property forfeiture.[46] The private law element of a carbon unit defines the rights a holder can exercise against third parties in relation to the unit.

At the end it depends on domestic regulation how carbon units are being treated; an issue with implications of practical concerns. Most trading systems are silent as to the legal characteristics of carbon units, except for taking care to clarify – in particular in U.S. systems - that carbon units are not property rights.[47] This is relevant, including for REDD+, as the legal characterization can affect whether, under a country's legal system, a holder can bring a claim against the government for interfering with their property rights in the entitlement.[48] So far, no tropical forest country has adopted legislation that would defined the legal characteristics of tradable forest carbon units. In this case, general principles of law apply and interferences of the legal characteristics of these traded units will have to been drawn from the way how ERRs are generated and offset credits are being issued.

5. Carbon rights

Issued and tradable carbon units must be distinguished from the notion of 'carbon rights'[49], which describes "*the right to benefit from sequestered carbon and/or reduced greenhouse gas emissions*".[50] While

[44] Roseland Plantation, LLC v. U.S. Fish & Wildlife Serv., 2006 U.S. Dist. LEXIS 29334, 7–8 (W.D. La. 2006).
[45] Discussed for Green Certificates in the context of Italian law in: Colcelli, V. (2012). The problem of the legal nature of Green Certificates in the Italian legal system. *Energy Policy*, *40*, 301–306.
[46] For carbon units in general, see: Hedges, A. (2016). Carbon Units as Property: Guidance from Analogous Common Law Cases. *Carbon & Climate Law Review (CCLR)*, *2016*(3), 190–201.
[47] For example, Regional Greenhouse Gas Initiative Model Rule Para. XX1.2(k) (2007) or Cal. Code Regs. Tit. 17 para 95820 (c).
[48] Johnson, H., O'Connor, P., Duncan, B., & Christensen, S. (2017). *Towards an International Emissions Trading Scheme: Legal Specification of Tradeable Emissions Entitlements* (SSRN Scholarly Paper No. ID 2924929) (SSRN Scholarly Paper No. ID 2924929). Retrieved June 20, 2020, from https://papers.ssrn.com/abstract=2924929.
[49] Carbon rights are almost exclusively referred to in the plural form of multiple rights.
[50] Knox, A., Vhugen, D., Aguilar, S., Peskett, L., & Miner, J. (2012). *Forest Carbon Rights Guidebook: A Tool for Framing Legal Rights to Carbon Benefits Generated through REDD+ Programming*.

the concept suffers from inflationary use from lawyers and non-lawyers in discussions around REDD+, it remains poorly defined. Carbon rights lack clear legal taxonomy, and there is little legal scholarship around these rights. Instead, carbon rights occupy the a particular legal-ethical dimension of REDD+ by pointing to those that ought to benefit from REDD+. Forest carbon rights lead to a claim to ERRs and from there to resulting offset credits or to a fair participation in REDD+ payments. The deeper sense of entitlement that comes with carbon rights makes them a both decisive and contested notion in REDD+ where often many people, communities and entities are involve in a project or program. Even though legal constructs, such as land or tree ownership, customary or ancestral rights, or the ability to perform an ecosystem service, are used to create a link from a carbon right to a carbon credit, notions of equity and fairness set an important subtone in the discussion around carbon rights.

Carbon rights can flow from the ownership of the 'asset' or from the control of the 'activity'. The control of the asset can refer to the carbon sink (the actual biomass) or the land, and rights can imply full ownership, usufruct, or management rights, under statuary, customary or traditional legal systems. There may be access rights that concern the right to enter a defined physical property, while withdrawal rights allow users to obtain the products of a resource (e.g. to catch fish, collect firewood, appropriate water); users with management rights have the right to establish the rules and sanctions under which the resources can be managed; users with exclusion rights can determine who has access and withdrawal rights; and, finally, users with alienation rights have the right to transfer their acquired rights to other parties.[51]

The control of the activity – the environmental service that leads to a reduction of deforestation or additional tree planting- refers to the stewards of the forest or individual trees, i.e. to a defined community, a municipality, or government agency controlling the conservation activity. Project developers or investors often claim a secondary, transferred carbon rights in turn of their service in financing and monetizing the ERRs flowing from a project. In the case of REDD+ projects, there are usually several entities that may cooperate in providing an environmental service. In the case of jurisdictional or national REDD+ an -often innumerable - number of actors is involved. There may be many right holders, but there may also be many rights affected. What makes things worse is that, in many countries, land tenure is contested, there is general lack of land cadasters, and customary rights may conflict with statutory rights.[52]

Due to their association with the land, carbon rights are closely linked to land rights and associated land conflicts. Weak recognition of tenure rights, failure to respect the principle of free, prior, and informed consent, and growing demand for land have led to an increase in land conflicts and growing dangers for communities defending their land rights, including increased violence against forest defenders.[53] Contestable land title, overlapping tenure regimes, and land

[51] Corbera, E., Estrada, M., May, P., Navarro, G., & Pacheco, P. (2011). Rights to Land, Forests and Carbon in REDD+: Insights from Mexico, Brazil and Costa Rica. *Forests*, *2*(1), 301–342.
[52] Streck, C. (2015). In the Market Current Developments in Carbon & Climate Law: Forest Carbon Rights - Shedding Light on a Muddy Concept. *Carbon & Climate Law Review (CCLR)*, *2015*(4), 342–347.
[53] NYDF Assessment Partners. (2018). *Improving Governance to Protect Forests: Empowering People and Communities, Strengthening Laws and Institutions – New York Declaration on Forests Goal 10 Assessment Report.*

grabbing leads to violence, illegality and marginal livelihoods across developing countries. High concentration of land ownership in Latin America as a result of colonial land policy further aggravates land conflicts.[54] In Africa, land conflicts are also fueled by land concentration, commercialization, and deepening social differentiation among land-users.[55] The question of who has the right to benefit from REDD+ thus becomes a proxy for unsolved and contested rights to land and with it to opportunities and development. REDD+ also intersects with the historic marginalization of indigenous and forest communities and their long struggle to assert land and resource rights.[56]

A claim to benefit from REDD+ can either be explicitly established by law or implied through rights to benefit from land, trees or other forest resources are framed.[57] In Australia, a person is authorized to carry out an offset project if she holds the 'applicable carbon-sequestration right' in relation to the project area.[58] The carbon sequestration right must imply the control over the carbon pool of the project area and include "*the exclusive legal right to obtain the benefit (whether present or future) of sequestration of carbon in the relevant carbon pool on the area of land.*"[59] It is up to the Australian states to define a property law mechanism to recognize the right to the carbon sequestered on a piece of land and separate this land from the rights to the land itself. In most cases Australian states use specific property law mechanisms to create a carbon sequestration right, such as *profit à prendre*, chose in action or covenant.[60] This rights-based approach depends on the notion of carbon rights to establish a (property) right to the benefits of the activities that lead to carbon sequestration and the avoidance of carbon emissions.[61]

However, there is a logical difference between claims to carbon sequestered and emissions avoided. After all, activities that reduce pressure from forests have a much less direct link with the land on which trees are standing than afforestation or reforestation projects. The removal of pressure from the land means the diversion of an activity from the land to be conserved, while the planting of trees means a direct engagement on the land. In the case of avoided deforestation the claim to carbon rights is more likely to be constructed as "environmental service" of conservation than a right to sequestration (as, for example, in the Australian case). The right to benefit from REDD+ becomes more abstract since it may involve activities at significant distance

[54] Fetzer, T., & Marden, S. (2017). Take What You Can: Property Rights, Contestability and Conflict. *The Economic Journal*, *127*(601), 757–783.; Guardado, J. (2018). Land tenure, price shocks, and insurgency: Evidence from Peru and Colombia. *World Development*, *111*, 256–269.

[55] Peters, P. E. (2013). Conflicts over land and threats to customary tenure in Africa. *African Affairs*, *112*(449), 543–562.; Couillard, V., Gilbert, J., Kenrick, J., & Kidd, C. (2009). *Land rights and the forest peoples of Africa: Historical, legal and anthropological perspectives*.

[56] Streck, C. (2015).

[57] Knox, A. et al. (2012).

[58] Durrant, N. (2011). Legal issues in carbon farming: Biosequestration, carbon pricing, and carbon rights. *Climate Law*, *2*(4), 515–533.

[59] Carbon Credits (Carbon Farming Initiative) Regulation 2011, Select Legislative Instrument No. 101. 2011, Compilation No. 16 8 March2017, para. 43.

[60] Durrant, N. (2011).

[61] Loft, L., Ravikumar, A., Gebara, M., Pham, T., Resosudarmo, I., Assembe, S., et al. (2015). Taking Stock of Carbon Rights in REDD+ Candidate Countries: Concept Meets Reality. *Forests*, *6*(12), 1031–1060.

from the forest frontier. This is where carbon rights are linked to activities that remove pressure forests and it becomes more difficult to compare them to land easements.[62]

So far, only few tropical forest countries have defined rights to REDD+ benefits, and where they have done so, mostly to exclude private claims and confirm that all carbon rights rest with the state. In many developing countries, forest resources are deemed to be the property of the state which affords countries wide latitude to assert rights and deny others rights, particularly when new economic opportunities surface.[63] Examples include the Democratic Republic of Congo which has passed a 'Homologation Decree' in 2012 that asserts that the national government has the primary right to all carbon units, which can be transferred to private project developers through a "certificate d'homologation".[64] Taking a very similar route, Cambodia has presented a draft sub-decree for all 'GHG mechanisms' that provides that all forest carbon rights reside with the national government, but can be transferred to project developers.[65] Madagascar has presented a Draft REDD+ Decree that rules that the government owns all ERRs generated by REDD+ activities and holds the exclusive right to the commercializing such rights.[66] The decision to claim all forest carbon rights for the state runs into legal problems in countries with private forest holdings or different customary, traditional or statutory land rights which may conflict with a decision to 'centralize' all forest carbon right with the government. The monopolistic claiming of forest carbon rights by the government may well result in countries with strong private property systems in a taking of a property right for which governments would have to compensate the original right holder.

Consequently, many countries seek to differentiate between the rights pertaining to state forest resources and those resting with individuals, indigenous or other communities. Guatemala clarifies, for example in Law-Decree 7-2013-Climate Change Law that "the rights, title and negotiations of the carbon emission reduction units"[67] belongs to project developers and those with a title to manage the land, and thus opens the door for private carbon market projects. Mexico differentiates between carbon sequestration activities, for which land owners hold carbon sequestration rights, and avoided deforestation, which per definition is illegal in the country. Since it is not possible to claim a right on the avoidance of an illegal activities, emission reductions from REDD+ are owned by the government.[68]

---

[62] As proposed by Karsenty, A., Vogel, A., & Castell, F. (2014). "Carbon rights", REDD+ and payments for environmental services. *Environmental Science & Policy*, *35*, 20–29.

[63] Knox, A. et al. (2012).

[64] The ministerial decree dated February 2012 (Arrêté ministériel No 004/CAB/MIN/ECN-T/012 du 15 février 2012 fixant la procédure d'homologation des projets REDD+) is currently under revision. It recognizes the concept of projects aiming at generating ERRs to supply any future carbon market.

[65] [to be added]

[66] [to be added]

[67] Article 22 (2), Decreto 7-2013, Congreso de la República de Guatemala. Ley Marco para regular la reducción de la vulnerabilidad, la adaptación obligatoria ante los efectos del cambio climático y la mitigación de gases de efecto invernadero.

[68] Felicani Robles, F. (2019). *Análisis legal en materia de titularidad de las emisiones reducidas en México*. Retrieved from https://www.unredd.net/documents/redd-papers-and-publications-90/17167-analysis-legal-en-materia-de-titularidad-de-las-emisiones-reducidas-en-mexico.html.

In the absence of an explicit law and different overlapping claims over the benefits that come with sequestered carbon and/or reduced GHG emissions, the only remedy to avoid conflict over responsibilities and benefits in relation to REDD+ is to secure rights via local land and service agreements. Rights can be regulated via community concessions from the government,[69] and contracts can also divide the roles and responsibilities, as well as the rights to benefit from payments associated with the commercialization of carbon rights via market or non-market transactions. To avoid socially undesirable outcomes and dispute, contracts between parties have to clarify who has the right to generate and transact carbon units. The right to the ERRs can be assigned among those involved in making the environmental service possible: the land owner, the implementer of the activity, and the investor. However, the notion of 'benefit sharing' in the context of REDD+ reaches beyond allocation of carbon rights, because it also involves the allocation of conservation burden, costs and budgeting, and a sharing of responsibilities between public and private actors.

6. Burden and benefit sharing

The distribution of direct and indirect gains from participating in REDD+ -the so-called benefit-sharing- has emerged as a key concept in national deliberations and discussions around REDD+ implementation. REDD+ benefit sharing concerns itself with how results-based and carbon finance should be spent across government levels, private actors and local communities.[70] Establishing carbon rights forms an integral part of the national benefit-sharing discussion; and worries about the exclusion of beneficiaries with a legitimate claim towards REDD+ benefits makes those that pay for ERRs or acquire offset credits formulate conditions for a fair benefit sharing.[71]

The arguments for a pro-poor equitable sharing of benefits if often based on the argument that benefits should go to those forest stewards who have been managing the forests sustainably[72] or marginalized communities that push into the forest because of a lack of other development opportunities. For those communities REDD+ should come with an opportunity to increase resilience, and address poverty. Others, looking at the opportunity costs of REDD+, would distribute REDD+ payments among those bearing the costs of reducing deforestation. McKinsey

[69] In the context of the GuateCarbon project, for example, he Government of Guatemala has issued 12 community forestry concessions to local communities. See: GuateCarbon Supporting Forest Communities, Rainforest Alliance. https://www.rainforest-alliance.org/lang/sites/default/files/publication/pdf/GuateCarbon-RA-151123-print-2.pdf, accessed 1 July 2020.

[70] The notion of benefit sharing in the context of forest resources and projects has its roots in the Convention on Biological Diversity (CBD) where it seeks to ensure the fair and equitable sharing of benefits arising from genetic resources. See, for *example, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity* under the CBD.

[71] See, for example, the FCPF methodological framework that "outlines requirements for benefit sharing plans that must be finalized and disclosed before FCPF programs can receive payments for emission reduction", FCPF website: https://www.forestcarbonpartnership.org/redd-benefit-sharing, accessed 1 July 2020. FCPF Carbon Fund, Methodological Framework, Version 3.0, April 2020, section 5.2.

[72] Luttrell, C. et al. (2013).

& Company's Global GHG Abatement Cost Curve[73] had a disproportional influence on shaping REDD+ suggesting that the curve provided a quantitative basis for discussions on how to prioritize mitigation activities based on – a limited perspective of- costs. The influence of McKinsey and the abatement cost logic has received criticism on the basis of undue policy influence [74] as well as on the basis of misrepresenting and simplifying the realities of REDD+.[75] Until today, the abatement cost logic remains associated with the belief that REDD+ will generate (economic) ''rents'' – i.e. revenues largely exceeding the cost of the corresponding effort – and leads to a framing of the discussion in the terms of entitlement to a financial godsend.[76]

Policy makers designing REDD+ policies and 'benefit sharing plans' seek to define a path between a rights-based and opportunity cost-based logic. In the context of national results-based REDD+ programs, governments need to consider how ERRs can be delivered and which incentives have to be put in place in addition to ensuring that government expenses and governance reforms are covered. It has been proposed that countries should adopt dedicated laws to distribute REDD+ payments, based on an analysis of the benefits and chosen beneficiaries as well as an appropriate method for distributing benefits.[77] While this method will help to fill in program templates of donors and multilateral agencies, prudent policy making would start with an analysis of real costs of REDD+ and decide on how to spend REDD+ payments in a way that maximizes ERRs, ensures sustainability of spending and operates within the policy and legal context. The starting point in this case would be the evaluation of different pathways towards the desired environmental outcome, and the political and social costs and benefits. This includes a consideration of rights, including carbon rights, but should also consider dependencies that are not based on rights as much deforestation takes place in an illegal, irregular or at least informal context. It also includes the costs of REDD+, which may require compensation for opportunity costs where concession holders, land owners or others can claim a legal right to exploiting or converting the forest. Vulnerable groups that are losing access to essential land or forest resources have to be compensated and their situation has to improve through REDD+. Large commercial operations, however, do not need to be compensated for frustrated expectations of future exploitation of forest land neither have illegally operating actors receive compensation or a 'fair share of benefits.'

There is no blueprint for benefit sharing, as it depends from the drivers of deforestation and country-specific strategies on how to confront those drivers. The successful implementation of

[73] McKinsey&Company. (2013). *Pathways to a Low-Carbon Economy, Version 2 of the Global Greenhouse Gas Abatement Cost Curve*. Retrieved from https://www.mckinsey.com/business-functions/sustainability/our-insights/pathways-to-a-low-carbon-economy#.

[74] Bock, S. (2014). Politicized expertise – an analysis of the political dimensions of consultants' policy recommendations to developing countries with a case study of McKinsey's advice on REDD+ policies. *Innovation: The European Journal of Social Science Research*, *27*(4), 379–397.

[75] For many: Gregersen, H., Lakany, H. E., Karsenty, A., & White, A. (n.d.). Does the Opportunity Cost Approach Indicate the Real Cost of REDD+? 29.; Luttrell, C., Sills, E., Aryani, R., Ekaputri, A. D., & Evinke, M. F. (2018). Beyond opportunity costs: who bears the implementation costs of reducing emissions from deforestation and degradation? *Mitigation and Adaptation Strategies for Global Change*, *23*(2), 291–310.

[76] Karsenty, A. et al. (2014).

[77] Chapman, S., Wilder, M., & Millar, I. (2014). Defining the Legal Elements of Benefit Sharing in the Context of REDD. *Carbon & Climate Law Review (CCLR)*, *2014*(4), 270–281.

REDD+ also depends on the integration of REDD+ into broader low-emission development strategies. Eventually, provided that investment is predicated on sustainable development valuing public goods as well as private gain which integrates market-based incentives into a broader framework of sustainable land use.[78] Where carbon projects are 'nested' in national REDD+ frameworks they can directly market and sell ERRs. Payment-for-ecosystem services can pass on a results-based logic on larger segments of the populations and can target forest frontiers. Other measures may include the phasing out or re-directing of subsidies, land use planning and the strengthening of law enforcement and forest institutions. Any system should recognize the needs and rights of forest-depended, indigenous and other local populations as strong and enforceable rights for those groups will significantly enhance the chances of achieving REDD+ goals.

7. Conclusions: REDD+ markets and rights

Reducing tropical deforestation will depend on a combination of public policies and incentive programs as well as private investments into deforestation-free supply chains and forest conversation. Results-based payments and carbon market programs feature high in the promoted policy mix as they link finance to ERRs and suggest greater impact. Without judging the effectiveness of such policy measures, this paper sought to contribute to the discussion on how such economic instruments relate to the rights to resource rights and achieved ERRs.

In the context of REDD+ it is important to differentiate between the different levels of law making and standard setting: (1) REDD+ as it has been conceived in the context of the UNFCCC and the Paris agreement, as international incentive mechanism applicable to state parties; (2) national emission trading and offset systems as in New Zealand, Australia or Colombia; (3) laws that implement and regulate REDD+ at the national level, and (4) voluntary carbon markets governed by private standards and law. All four systems create different units applying their specific rules. Efforts to 'nest' private projects in national accounting systems seek to harmonize different accounting rules to ensure the environmental integrity of different units and avoid double counting. However, in the absence of a global carbon trading systems, it is unlikely that units will completely converge as the obey different standard-setters.

Where domestic legislation fails to establish the legal nature of REDD+ offset credits, general principles of law apply to the carbon transactions. Primary private transactions under voluntary markets bind only those that are parties to a transaction, typically, the owner or developer of a project on one hand, the off-taker or investor on the other. However, carbon units also include rights that are valid against anybody, such as the ability to offset emissions with a carbon unit or, if recognized, fulfil a compliance duty. The rights included in holding a carbon unit are also capable to support proprietary interests.

[78] Streck, C. (2012). Financing REDD+: matching needs and ends. *Current Opinion in Environmental Sustainability*, *4*(6), 628–637.

Any of the four ways on how REDD+ carbon units can come into existence faces the question on who has to be engaged in effective REDD+ or AD transactions and who is entitled to payment and compensation. This question links regulation and standards to 'carbon rights' and the implementation of REDD+ on the ground. In a market-based approach, offset credits are often the only tangible financial expression of the carbon right.[79] However, in results-based payment systems, such as REDD+, carbon rights are also an important argument to participate in results-based payments, payment-for-ecosystem services systems or other market and non-market systems that reduce deforestation and enhance carbon stocks. The entitlement to benefit from sequestered carbon and/or reduced GHG emissions includes the rights enjoyed by the asset holder, i.e. forest or land rights, as well as those that may hold the means to create ERRs, i.e. communities, public agencies, project developers and investors. Resources and action have to come together to achieve conservation. It is essential to recognize these two aspects of REDD+ to appropriately involve land custodians and those that address drivers of deforestation as actors and beneficiaries of national and international REDD+ and AD investments.

At the end REDD+ can only be achieved if it increases the prosperity of forest-dependent, indigenous and local communities, smallholders and others that edge out a life at the forest frontier, as well as if it is flanked by improved forest governance and supported by strong political will. Legal standards and clear concepts can contribute to long-term sustainable forest landscapes.

[79] Karsenty, A. et al. (2014).