Free Market Environmentalism in Peru: The Ups and Downs of a New Wave of Environmental Regulation[1]

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I. Introduction

According to Garret Hardin's tragedy of the commons, insecure tenure discourages long-term investment and conservation of common-pool resources.[2] Without secure rights that enable to exclude others and benefit from one's investment, rational users will shift to more profitable, short-term uses of common-pool resources. What is more, users of common-pool resources will tend to use resources as quickly as possible to prevent others from appropriating the resources first, resulting in a wasteful race.[3] Putting more sheep out to graze, in Hardin's allegory, has devastating consequences for the environment and the integrity of a resource.[4]

Hardin's answer to the "tragedy of the commons" is either to impose regulation or to privatize the commons.[5] In the past years, there has been a growing interest in addressing environmental concerns through property rights.[6] The development of property rights is still controversial, though. Economists have proposed a *happy tale* to

[1] Interviews for this paper were conducted by law students Lucero Silva, Martín La Rosa and Alexandra Carranza.
[2] Garret Hardin, *The Tragedy of the Commons*, 162 SCI. 1243 (1968).
[3] Carol M. Rose, *Property Rights, Development Imperatives, and Environmental Protection*, Seminario en Latinoamerica de Teoria Constitucional y Politica (SELA), Argentina (2008).
[4] Maron Greenleaf, *Using Carbon Rights to Curb Deforestation and Empower Forest Communities*, 18 N.Y.U. ENVTL. L.J. 507 (2001).
[5] ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (Cambridge University Press 1990).
[6] Jonathan Adler, *Back to the Future of Conservation: Changing Perceptions of Property Rights & Environmental Protection*, 1 N.Y.U. J.L. & LIBERTY 987 (2005).

explain the emergence of property rights.[7] According to Harold Demsetz, this process, now described as the *evolution of property rights,*[8] emerges from the bottom up as a reaction to the inefficiencies of collective ownership.[9] That is to say, property rights arise when the social benefits of establishing such rights exceeds the social cost of delineating and enforcing them.[10] Cost-benefit analysis is thus at the heart of this account.

Under the evolutionary process, resources are considered "un-propertied" *(open access)* as long as demand is low and the resource is abundant.[11] When the demand for a resource increases, the story goes, people start asserting property rights to manage access and prevent conflicts for resource use.[12] "Property rights develop to internalize externalities when the gains of internalization become larger than the cost of internalization."[13] The reverse is also true: if an asset becomes more abundant and less valuable, less effort will be spent protecting it.[14]

The first step away from open access is through informal, community-based rules.[15] Yet these rules require community involvement, are considered rigid and do not allow trade outside local circles.[16] So communal property may develop into more precise,

[7] Harold Demsetz, *Toward a Theory of Property Rights,* 57 AM. ECON. REV. 347, 347 (1967).
[8] Gary D. Libecap & James L. Smith, *The Economic Evolution of Petroleum Property Rights in the United States*, 31 J. LEGAL STUD. S589, S595 (2002).
[9] Holy Doremus, *Climate Change and the Evolution of Property Rights*, 1 U.C. Irvine L. Rev. 1094 (2011) at 1095.
[10] Thomas W. Merril, *Introduction: The Demsetz Theory and the Evolution of Property Rights*, 31 J. Legal Stud. S331.
[11] Rose (2008).
[12] Carol M. Rose, *Liberty, Property, Environmentalism*. 26. Ariz. L. Rev. 1-25 (2009).
[13] Harold Demsetz, *Toward a Theory of Property Rights,* 57 AM. ECON. REV. PAPERS & PROCEEDINGS 348 (1967).
[14] THOMAS W. MERRIL & HENRY E. SMITH, PROPERTY: PRINCIPLES AND POLICIES (Foundation Press, Thomson West 2007).
[15] Demsetz (1967).
[16] HERNANDO DE SOTO, The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else (Basic Books. 2000).

modern entitlements, such as individual property entitlements.[17] Individual property rights are: (i) well-defined, measurable, relatively simple, and uniform rights; (ii) subject to monitoring and enforcement through public policing and judicial systems; and (iii) subject to trade in the market.[18] Hence, in this account the destiny of all societies is to "progress" from open access into communal property and then into individual ownership.[19]

Carol Rose proposes an additional step in the evolutionary ladder of property rights: the commoditization of environmental components. As deforestation renders forests more valuable or as pollution makes clean air more appreciated, individual property rights may further evolve into Environmental Property Rights (EPR), such as rights to trade emission offsets in the carbon markets, conservation easements to preserve land undeveloped, or individual transferrable quotas in the fishing industry.[20]

Efforts to enhance conservation strategies through the creation of property rights in environmental resources are expanding.[21] Free market environmentalists claim that environmental concerns are essentially property rights problems.[22] They contend that the key to overcoming market failure is to establish well-specified, enforceable, and transferable property rights to environmental goods.[23] The creation of new forms of individual property associated to environmental goods is often portrayed as a more

[17] TERRY L. ANDERSON & DONALD R. LEAL, Free Market Environmentalism (Oxford: Westview. 1991).
[18] Rose (2008).
[19] Celestine Nyamu, *De Soto and Land Relations in Rural Africa: Breathing Life Into Dead Theories About Property Rights*, 28 THIRD WORLD Q. 1457-78 (2007).
[20] Rose (2008).
[21] Adler (2005).
[22] *See* PETER HILL AND ROGER MEINERS (editors), WHO OWNS THE ENVIRONMENT? 29 (Lanham, Md.: Rowman & Littlefield, 1998). at xi.
[23] Rose (2008).

sophisticated or *developed* property law[24]. Flexible and fashionable market-based tools are said to be better suited than traditional command-and-control regulation to attain optimal levels of environmental protection at lower costs for society.[25]

The idea of using property rights to solve environmental problems is growing popularity.[26] For example, in 2008 Peru replaced its Olympic-style fishing system for Individual Transferable Quotas (ITQ). In 2014, the Municipality of Miraflores in Lima allowed the sale of air space above cultural heritage landmarks, in a sort of Transfer Development Rights scheme. Moreover, Peru's National Park Service has been trading forest carbon offsets stemming from conservation projects implemented in different national parks in the Amazon. Hence it is likely that Peruvian environmental policy makers are abandoning command-and-control techniques in favor of efficiency-oriented tools.

Yet the significance and efficacy of property-based rules is still controversial. First, EPRs may take time to emerge due to their complexity, high contracting costs, lack of political support, and need for sophisticated monitoring and enforcement.[27] This is why Carol Rose claims that they are likely to be "latecomers" in the evolution of property rights.[28]

Second, whether property rights will emerge as fast or as easy as needed for an effective climate change strategy is contested. Some claim that property law,

[24] Rose (2008).
[25] Douglas A. Kysar, *Law, Environment and Vision*, 97 Nw. U. L. Rev. 675 2002-2003.
[26] Douglas A. Kysar, *Sustainable Development and Private Global Governance*, 83 Texas L. Rev. 1 (2005).
[27] See Carol M. Rose, *Big Roads, Big Rights: Varieties of Public Infrastructure and Their Impact on Environmental Resources*, 50 ARIZ. L. REV. 408-43 (2008).
[28] *Id.*

characterized by sticky rules and the *numerus clausus* principle, is not necessarily attuned to the velocity of climate reforms.[29]

Finally, reducing environmental protection to instrumentalist language is problematic.[30] Discussions about environmental rights or stewardship obligations are now being replaced by talks on trade-off, efficiency, and wealth maximization.[31] By commoditizing environmental goods and allowing the trade of contamination rights, we undermine the idea of sacrifice that should guide environmental ethics.[32]

This paper presents the emergence of three EPRs in Peru, namely: (i) individual transferable quotas in the fishing industry, (ii) transferable development rights to foster preservation of historical sites, and (iii) carbon rights to avoid deforestation. This paper argues that despite Peru's policymaker's proneness to embrace free market tools, they have failed to study the effectiveness and adequacy of EPRs in the first place. The objective of this research is not to assess the success or failure of the reforms, but to phrase out some potential indicators for future research.

2. The Development Environmental Law in Peru

Environmental Law in Peru is especially young. For presentation purposes, we can classify three clear phases in the construction of Peru's environmental law: (i) initial phase (1990-2000); (ii) consolidation phase (2001-2008); and (iii) strengthening phase (2008 to date). We unpack all three next.

[29] Doremus (2011).
[30] See Adrian Kuenzler and Douglas A. Kysar, *Environmental Law*. In: Eyal Zamir and Doron Teichman (Ed.), THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS AND THE LAW. Chapter 29, p. 748. Oxford (2014).
[31] *See also* Douglas A. Kysar, Regulating from Nowhere, Yale University (2010) at 2.
[32] Michael Sandel, *What Money Can't Buy: The Moral Limits of Markets*, Farrar, Straus and Giroux (2013).

a. Initial phase:

The first environmental legislation ever passed in Peru was the *1990 Environmental Code*. Although it is possible to identify some scattered pieces of legislation related to water, forests, and conservation prior to 1990, none of them responded to an explicit or articulated environmental policy. [33] Thus the *1990 Environmental Code* represented a turning point as it regulated the prevention and polluter-pays principles; the right to a healthy environment and to public participation in environmental topics; and the environmental impact assessment (EIA).

During this period, the first mining, energy and fishing environmental regulations appeared as properly organized bodies of laws. For the first time, extractive industries were forced to adequate their existing operations to environmental regulations. As regards institutions, in 1994 the government created the *National Environmental Council* (CONAM) as a political and coordinating body in charge of implementing the national environmental policy. Yet CONAM had little teeth, therefore each ministry remained in control of the environmental policy in a fragmented and unarticulated way (i.e. the Ministry of Energy and Mines regulated the environmental obligations pertaining to mining companies).

Overall, the 1990-2000 period was characterized by a "ministerial" and fragmented approach to environmental problems, incipient environmental rules, and poor governance and legal enforcement.

[33] Charpentier e Hidalgo, *Políticas Ambientales en el Perú* (1999).

b) Consolidation Phase:

Between 2001-2008, Peru's environmental law grew significantly. The first milestone in this period was the *2001 Environmental Impact Assessment Law*, which sanctioned that all investment projects had to prepare an EIA prior to commencing operations. What is more, in 2004 the *General Environmental Law* replaced the *1990 Environmental Code*, and is still today the most comprehensive piece of legislation for environmental protection. During this period, new laws appeared to address specific environmental concerns, such as mining reclamation, solid waste control, and biodiversity protection.

c. Strengthening Phase:

A new era in Peru's environmental law history was crystallized in the aftermath of the signature of the 2008 US-Peru Free Trade Agreement (FTA). The signature of the FTA in 2008 brought about a series of implementation laws, including the creation of the Ministry of Environment (replacing CONAM), which moved environmental concerns to the highest political quarters. Since 2008, the Ministry of Environment has fostered important institutional reforms, such as the creation of an independent *Environmental Supervisory Agency* (OEFA) in charge of environmental enforcement (it can now fine companies with up to $45 million). Similarly, it promoted the formation of an independent agency in charge of evaluating EIA for megaprojects (SENACE).

Since 2008, the level of specialization of environmental regulations has increased noticeably. New regulations have emerged spanning the fields of public access to environmental information; hazardous waste transportation; e-wastes; moratorium on

transgenic products; compensation mechanisms for ecosystem services; new marine conservation areas; eco-efficiency rules for public buildings; among others.

Despite some inconsistencies and challenges, environmental law has been strengthened since 2008. Both environmental lawmaking and environmental institutions have been consolidated during this period characterized by specialization and better law enforcement.

3. Individual Transferable Quotas (ITQ)

Peru is the large producer of fishmeal.[34] For decades, Peru's fishing industry was dominated by the Olympic style system. Under this scheme, both quotas and a start date were established for the entire system, and then individual vessels would have to race to get as much fish as possible in the shortest time. This "race for fish" was deemed inefficient and brought about the overexploitation of fish stocks, overcapacity of vessels, environmental degradation, among other ills.

In 2008, Peru moved away from the Olympic style system and implemented an ITQ system for anchovies, replicating similar reforms conducted in Canada, Chile or Iceland. Indeed, Decree 1084 allowed the Ministry of Fisheries to assign individual quotas per vessel, respecting a global fishing quota, which is set by the *Sea Institute* (IMARPE), a government agency that studies the biomass and oceanographic conditions. Considering that each company holds an individual quota for a given period, the theory goes, it will seek to minimize its extraction costs. So as long as the fish stock allows all agents to catch their individual quotas, no titleholder should have the incentives to add additional fishing effort.[35]

[34] United States Department of Agriculture.
[35] Elsa Galarza. *La Economía de los Recursos Naturales.* 161 Universidad del Pacífico, 2da. ed. (2010)

Distributing individual quotas for the first time is a complex task, but key to the success of the reform. In Peru, individual quotas were distributed to those vessels that had valid fishing permits at the time of the reform, and took into account their fishing record and their fishing capacity.[36] Yet the decision to grandfather existing fishing companies brought about the concentration of fishing rights in few companies.

A key factor for the success of ITQs is the transferability of rights, as it allows "free trade among agents and thus the creation of a market of ITQs in which agents with high extraction costs can opt to transfer, rent or sell her rights to more efficient operations"[37]. Yet Decree 1084 establishes that the individual quota is tied to the vessel, so fishing rights cannot be sold separately from the vessel. When the vessel is broken up, the individual right can be associated to other vessel of the same company. All transactions are recorded before the Ministry of Fisheries prior to the start of the fishing season.

Decree 1084 defines individual quotas as a regulatory right, not a property right. Yet Peru's ITQ system can be framed as an EPR for rights are: (i) well-defined, measurable, relatively simple, and uniform rights; (ii) subject to monitoring and enforcement; (iii) subject to trade in the market.

A condition for ITQ systems to work is the need for strong monitoring and supervision of fishing activities. This requires public investment in equipment, satellites and law enforcement. Yet the main challenge for Peru's ITQ scheme is still corruption. Some entrenched practices in the fishing industry, such as capture of endangered species, capture of juvenile fish, overcapacity of vessels, or undeclared catch, are still latent. The

[36] Paredes, Carlos. *Eficiencia y Equidad en la Pesca peruana: La Reforma y los Derechos de Pesca*. Instituto del Perú (2012)

[37] Galarza (2010).

Ministry of Fisheries has put in place a monitoring program that includes electronic weigh control in unloading areas and compulsory use of GPS in each vessel.

The existing literature coincides that the shift to an ITQ system has been positive.[38] First, the end of a "race to fish" has helped preserve the biomass, especially juvenile fish. There is still limited data on the positive impact to biomass, though.[39] Other variables can actually affect the biomass, such as El Niño phenomenon, the reduction of nutrients in the ocean, the warming of currents, the reproduction cycles, among other factors.

Second, some evidence suggests that the introduction of the ITQ scheme has contributed to help the environment; there has been a reduction of wastewaters poured into the ocean and the fuel cost has shrunk (it passed from 100,000 gallons per vessel prior to the reform, to 20,000 gallons after 2008[40]).

Third, the number of effective fishing dates has increased: between 2006 and 2008 the fishing season lasted 49 days, while after 2008 it increased to 150 days[41]. In addition, Peru's total fishing fleet has decreased from 836 boats in 2008 to less than 300 in 2009[42]. Consequently, by the end of 2012 there was a 30% decrease to Peru's original fleet.[43] It is important to mention that Decree 1084 included a retirement program for those workers that had to leave the industry due to the shirking of the total fleet.

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38 Julio Peña Torres, *Debates sobre Cuotas Individuales Transferibles: ¿"Privatizando" el mar? ¿Subsidios? o ¿Muerte anunciada de la pesca extractiva en Chile?* 184 Estudios Públicos 86 (2002) http://www.cepchile.cl/dms/archivo_3095_788/rev86_pena.pdf

39 Reduce el nivel de captura en el año en aproximadamente 40% en comparación de años normales. 3

40 Macroconsult. *Evaluación Económica de los Límites Máximos de Captura por embarcación en la Pesca de Anchoveta*. Elaborado para la Sociedad Nacional de Pesquería 55 (2012).

41 *Id.*

42 *Id.*

43 Ministerio de la Producción. Anuario Estadístico Pesquero y Acuícola (2014).

Finally, the number of accidents and fines has also been reduced[44].

While the ITQ system has transformed the fishing industry, Peru is still needs to balance economic efficiency and the sustainability of fish stocks. The design of the ITQ system has privileged economic efficiency, including the reduction of the. If accompanied by other reforms and environmental regulations, the ITQ system may prove to be a transformative policy.[45]

Table 1: The ITQ reform in Peru

Description of the reform and applicable legal framework	In 2009 the government implemented an ITQ system by which each vessel is assigned an individual quota based on a global fishing quota set by the *Sea Institute* (IMARPE). Note that ITQs only cover the anchovies industry, that is, one species of fish. Applicable regulations: - Decree 1084
Purposes of the reform	- Foster efficient exploitation schemes - Ensure the sustainability of fish stocks - Reduce fishing effort - Promote competitiveness in the sector - Redirect fishing activities to products of aggregate value (products other than fishmeal) - Preserve the environment and biodiversity
Co-benefits of the reform	- Reduce fishing costs - Better planning - Better fishing yield - Improve technology and quality of catch
Date of the reform	2008
Current status of the reform	Implemented. No additional individual quotas are issued nowadays.
Is there any grandfathering provision?	Yes, individual quotas were distributed to those vessels that had valid fishing permits at the time of the reform, taking into account their fishing record and fishing capacity.
International comparative law that inspires the Peruvian scheme	Canada, Chile, Iceland, New Zealand, Norway.
Is it proposed as an EPR?	No. It is framed as a "regulatory right", not a property right.
Does it comply the requirements to be an EPR?	Yes. Peru's ITQs: (i) are well-defined rights that provide access to a specific number of catch; (ii) they are subject to recording, supervision and monitoring by the Ministry of Fisheries; and (iii) they are tradable in the market and can be transferred (though restrictions apply).
Level of sophistication of	The reform is simple. It requires following a recording process

[44] Galarza (2010).
[45] Interview with Juan Carlos Sueiro, economist at NGO Oceana (19 February 2016).

the reform / Access to the EPR	before the Ministry of Fisheries.
Is there a baseline?	Olympic-style fishing
Related regulation to compare the EPR.	Olympic-style fishing
Potential indicators to determine the success of the reform	- Number of policing operatives - Number of supervisory agents - Shifts in biomass - Number of boats - Change in profits - Change in exports - Change in number of fishing companies in the market - Quality of fishing products - Number of effective fishing days of the fleet - Overcapacity
Potential / real benefits	- Reduction of monthly trips by vessel - Reduction of the total number of operating vessels - Use of newer and larger vessels - Better fishing yields - Savings in operating costs - More stable fishing patterns - Better capture ratios per vessel - Larger profits for companies - Less pollution - Less effort per ton of fish captured
Potential / real costs of the reform	To be determined
Have the objectives been met?	- End of the race for fish - Fleet reduction - Better quality of fish - Prohibition of new licenses - Less pollution

4. Transferable Development Rights (TDR)

Peru is known for its vast cultural patrimony, which includes both archaeological sites from the Inca era and historical landmarks dating the Colonial period. Traditionally, Peruvian legislators have preserved cultural landmarks through command-and-control regulations, such as zoning laws, or by declaring a specific site or neighborhood intangible. These rules limit the landowner's right to do with her parcel of land as she pleases due to the public interest underlying cultural protection. Such declaration,

however, burdens the landowner with a series of restrictions without providing any compensation. Hence, landowners have to bear the cost of preserving her building while the society reaps all the benefits associated with well-preserved historical landmarks (from aesthetic significance to increased property value).

By contrast, TDR is a market-based mechanism that purports to incentivize the conservation of historical sites by allowing the landowner "deprived" of his development rights for cultural considerations to "transfer" such rights elsewhere.[46] In this scheme, local governments designate "sending areas" (areas that can be further developed) and "receiving areas" (areas of environmental or historical value). As a result, landowners located in "sending areas" cannot develop their parcel any further but can sell their development rights to landowners in receiving areas, so the latter can extend their buildings beyond the restrictions imposed by the zoning regulation.[47]

Who will buy TDR rights? Housing developers are potential buyers because they may find it attractive to build taller buildings and thus selling "additional" flats per development project, in relation to those originally permitted pursuant to zoning regulations. Therefore, this tool allows safeguarding valuable environmental or historical goods from the perils of urban sprawl.

In 2012, the Municipality of Miraflores, one of Lima's iconic neighborhoods, passed Peru's first-ever TDR scheme. Amid Peru's housing boom, which threats to tear down important historical landmarks for housing projects, Ordinance 387 created micro-urban areas (sending areas) and areas of urban development (receiving areas), with the purpose of providing economic incentives to landowners of historical landmarks that

[46] *See* Linda Malone, *The Future of Transferable Development Rights in the Supreme Court* (1985).
[47] *See* James A. Coon, *Transfer of Development Rights* (2015).

decide not to sell their buildings to housing developers. Ordinance 387 requires that part of the income obtained from the sale of certificates be invested to preserve the historical site.

The success of TDR schemes depends on the efficient design of the sending and receiving areas, which in turn depends on a careful and comprehensive planning process by local governments.[48] Sending areas should consist of sites of historical, cultural, aesthetic or economic value that require government protection. Yet the landowner's promise to preserve her building (through a covenant) needs to be recorded in the property title so that prospective purchasers of TDR certificates can rely on the existence of a permanent restriction.[49] Here it is clear how TDR systems demand that modernist or formal property rights are already in place.

Regarding the receiving areas, they are usually sectors of a city in which further growth is both desirable and possible.[50] Once the development rights are used, the density in the area will increase, which translates into an increase in public services and infrastructure demand[51] (i.e. transportation, water supply, waste disposal, fire protection, etc.).[52] The increase in density may bring about more traffic or reduce property value, all of which may cause neighbor backlash. Finally, the soil quality and stability needs to be considered in the process, especially in countries with seismic activity.

The Municipality of Miraflores designated 182 historical landmarks within the sending areas. Ordinance 387 establishes that the conservation covenant is recorded in

[48] *Id.*
[49] *Id.*
[50] https://www.uwsp.edu/cnr-ap/clue/Documents/PlanImplementation/Transfer_of_Development_Rights.pdf
[51] See Coon (2015)
[52] *Id.*

the property registry and that the municipality will enforce compliance with the regulations. It also designates 17 main streets as receiving areas. Miraflores' public servants interviewed for this paper claimed that the receiving areas could endure the higher density (estimated in 1 to 3 additional floors). However, the fact that Miraflores designated all 17 main streets in the district as receiving areas is perhaps an indication that no careful planning was conducted.

For TDR schemes to work there needs to be a market for "additional" development rights in receiving areas.[53] Field and Conrad claim that a well-organized auction can provide buyers and sellers with information on the pricing of TDRs.[54] High transaction costs lead to lower incentives for both parties to participate and thus decreases the number of properties conserved.[55] Additionally, trades need to happen on a timely manner to maintain stable prices. The lack of efficient means of communication between buyers and sellers may lead to limited market activity based on high transaction costs and little information of prices.[56]

But Miraflores has not put in place a system to facilitate communication between buyers and sellers. Information on TDR prices is difficult to obtain because the local government never created a registry to organize data on certificate sales. Hence, the transaction costs of Miraflores TDR scheme are significantly high.

TDR programs are complex systems that require public education programs to raise awareness and promote market transactions.[57] The public officials interviewed for

[53] *See* Kent D. Messer (2007)
[54] *See* B.C. Field and Jon M. Conrad (1975) *Economic Issues in Programs of Transferable Development Rights. Land Economics* (4) 331-340
[55] *See* Messer (2007)
[56] *Id.*
[57] *Id.*

this paper acknowledged that Miraflores faced several difficulties explaining the system to potential beneficiaries.

As of late 2014, only 17 landowners had initiated the procedure to receive a TDR certificate from Miraflores. What is more, only one out of the 17 was able to receive such right but has decided not to sell it.[58] In late 2014, the Municipality of Lima established that the power to create TDR schemes within the jurisdiction of City of Lima relied solely on her. Hence Miraflores' TDR program has been shut down.

Table 2: Miraflores Transferable Development Rights

Description of the reform and applicable legal framework	Miraflores aims to incentivize owners of cultural sites through TDR certificates so that they can trade them and invest the profit in maintaining the property in good shape. Applicable law: - Ordinances 387 and 401
Purposes of the reform	To preserve Miraflores historic landmarks
Co-benefits of the reform	- To create compact cities - To increase property value in receiving and sending areas
Date of reform	2012
Current status of the reform	The TDR program has been abandoned.
Is there any grandfathering provision?	No. Yet the Municipality of Lima ordinance acknowledges the value of those TDR certificates that were issued by Miraflores while the reform was in place.
International comparative law that inspires the Peruvian scheme	United States, Brazil and Italian TDR programs.
Is it proposed as an EPR?	Yes.
Does it comply the requirements to be an EPR?	Yes. Miraflores TDR certificates: (i) are recognized as property rights that allow the construction of extra floors in receiving areas; (ii) are subject to registry in the public record and can be enforced by the Administration or in court; and (iii) are transferable and tradable in open markets.
Level of sophistication of the reform / Access to the EPR	The TDR program is highly sophisticated. Based on the opinion of public officials that were interviewed for his paper, Miraflores faced several difficulties when explaining and marketing the potential benefits of the reform to landowners and construction companies.
Is there a baseline?	No.
Related regulation to compare the EPR.	- Cultural Heritage Law (28296) - Zoning regulations
Potential indicators to determine the success of the	- Number of participants: 16 - Number of participants that received TDR certificates: 1

[58] Interview with Mr. Javier Echecopar, the only applicant to TDR that secured a TDR certificate.

reform	- Number of historic landmarks protected: 0 - Possibility of enforcement: Miraflores ordinance established diverse supervision and follow up provisions - Transaction costs: Approximately $ 2,500 - How much of the profit obtained from the sale of TDR certificate is reinvested to preserve an historic landmark: As much as required by the Municipality - Increase in property value of the area: Not available - Relevance of conservation of the property value in square meters: Not available - Risks associated to building more floors: In theory, there should not be further risks. The problem is providing public service to such areas.
Have the objectives been met?	No.

5. Carbon Rights

Forests sequester and store vast amounts of carbon dioxide (CO_2) and play a fundamental role in global climate regulation.[59] The carbon sequestration and storage functions of the world's forests provide ecosystem services, but ecosystem services are generally taken for granted.[60] We benefit from the clean air and carbon offsetting services that forests provide but do not equally share the costs for their preservation.[61] To address this situation, mechanisms to value ecosystem services through economic incentives have developed.[62] Reducing Emissions from Deforestation and Forest Degradation (REDD) is one such incentive scheme.[63]

[59] David Takacs, *Carbon Into Gold: Forest Carbon Offsets, Climate Change Adaptation, and International Law*, 15 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 39 (2009).
[60] James Salzman, *Creating Markets for Ecosystem Services*, 80 N.Y.U. L. REV. 870 (2005); Wayburn & Chiono, *supra* note 41, at 393.
[61] Charlotte Streck et al., *Climate Change and Forestry: An Introduction*, *in* CLIMATE CHANGE AND FORESTS: EMERGING POLICY AND MARKET OPPORTUNITIES (Charlotte Streck et al., eds., 2008).
[62] Esteve Corbera & Heike Schroeder, *Governing and Implementing REDD+*, 14 ENVTL. SCI. & POL'Y 89-99 (2011).
[63] *Id.*

The idea behind REDD+ is to pay developing countries to stop deforestation and forest degradation.[64] REDD+ relies on historical data to establish the projected rate of emissions in a business-as-usual scenario, which then can be used to issue "additional" carbon offset credits[65] to be traded in the market.[66] It purports to provide economic incentives to forest managers to reduce deforestation and stimulate forest cover.[67] These transactions can be set forth in voluntary contracts, for example, by which someone buys a well-defined environmental service or pays for land use proxies.[68]

To be effective, REDD+ requires clearly defined and allocated carbon rights.[69] Carbon rights are difficult to conceptualize and define because they challenge traditional property law.[70] They are a new form of property rights created by to benefit from the carbon sequestered and stored in a tract of forest national and thus "commoditize" carbon.[71] A carbon right confers upon the holder "all of the intangible commercial and economic benefits that may flow from the [carbon] sequestration process."[72]

Civil society, communities, and private companies are leading REDD+ projects in Peru.[73] There are at least 40 REDD+ early initiatives being implemented. In 2013, Peru passed its first-ever PES Law to promote, regulate and supervise the PES schemes created by voluntary agreements that establish actions for the conservation, restoration

[64] Greenleaf.
[65] "Additionality" is the requirement that the GHG removals after the implementation of the project activity are greater than those that would have occurred in the baseline scenario (the most plausible alternative scenario to the implementation of the project activity).
[66] Greenleaf.
[67] Sunderlin,
[68] Wunder
[69] Greenleaf.
[70] Savaresi & Morgera.
[71] L. Cotula & J. Mayars, Tenure in REDD--Start-Point or Afterthought?, International Institute for Environment and Development 9-10 (2009).
[72] Samantha Hepburn, *Carbon Rights as New Property: The Benefits of Statutory Verification*, 31 SYDNEY L. REV. 243 (2009).
[73] Conservation International.

and sustainable use of ecosystems. Specific rules for PES projects located within natural protected areas (NPA) were approved in 2014 through Directive 026-2014-SERNANP.

SERNANP, Peru's agency in charge of NPAs, has the power to promote, grant and regulate rights over ecosystem services. It has the authority to entrust the administration of an NPA to non-for profit entities (such as an NGO or university) through management agreements. Such administrators can conduct REDD+ projects within the NPA they administer and thus trade the carbon certificates issued. The monies obtained must be reinvested in the park.

Table 3: REDD Projects in Natural Protected Areas

Description of the reform and applicable legal framework	The central idea behind REDD+ is to pay developing countries to stop deforestation and forest degradation. Applicable law: - PES Law 30215 - SERNANP Directive 026-2014-SERNANP that governs the trading of the REDD+ Certificates generated by the implementation of conservation projects within a Natural Protected Area of national administration.
Purposes of the reform	REDD+ seeks to create economic, social and environmental incentives for developing countries to reduce emissions by the economic use, protection and restoration of forests.
Co-benefits of the reform	- Reduction of poverty - Capacity building in subnational governments - Protection of indigenous peoples
Date of the reform	2014
Current status of the reform	In place
Is there any grandfathering provision?	Yes. It awards carbon rights to native communities that hold title to land.
International comparative law that inspires the peruvian scheme	Costa Rica
Is it proposed as an EPR?	Yes
Does it comply the requirements to be an EPR?	According to the 2014 Directive, carbon certificates are property rights that can be registered and traded in the carbon market. Such carbon certificates can be considered EPR because: (i) they are well-defined property rights framed as sequestered carbon in a tract of forest; (ii) they are subject to the registry, supervision and follow up of SERNANP; (iii) they are tradable in carbon markets.
Level of sophistication of the reform / Access to the	Very sophisticated. Access to REDD+ requires certification and validation processes, which are very expensive.

EPR	
Is there a baseline?	There is no national baseline for REDD+. On the contrary, each REDD+ project has its own baseline and each carbon reduction is counted by project.
Indicators to determine the success of the reform	- Number of environmental crimes within NPAs (up to February 2016) • Cordillera Azul National Park: 4 • Alto Mayo Protection Forest: 23 • Bahuaja Sonene National Park and Tambopata Reserve: 50 - Number of supervisions conducted to the REDD+ project (2014): • Cordillera Azul National Park: 415 patrollings • Alto Mayo Protection Forest: 118 patrollings • Bahuaja Sonene National Park 10 • Tambopata Reserve: 260 - Percentage of forests within NPAs • Cordillera Azul National Park: 95.85% • Alto Mayo Protection Forest: 100% • Bahuaja Sonene National Park and Tambopata Reserve: 100% - Percentage of forests loss within NPAs (2001-2014) • Cordillera Azul National Park: 3,978 hectares. In 2001, the number of hectares of forests lost was 615 and to date it has risen to 386. • Alto Mayo Protection Forest: 6,390 hectares. In 2001, the number of hectares of forests lost was 145 and to date it has risen to 386. • Bahuaja Sonene National Park and Tambopata Reserve: PNBS: 2,869 hectares. In 2001, the number of hectares of forests lost was 99 and to date it has risen to 522. RNT: 1,061 hectares. In 2001, the number of hectares of forests lost was 81 and to date it has risen to 110. - Number of economic activities conducted within the NPA (up to 2015) • Cordillera Azul National Park: 60. • Alto Mayo Protection Forest: 82. • Bahuaja Sonene National Park and Tambopata Reserve: 31. - Number of transactions over carbon certificates • Cordillera Azul National Park: 6 (Notaria Paino - twice, Open Plaza SA, Seguros Rimac, Althelia Climate Fund and Scotiabank Peru). • Alto Mayo Protection Forest: 10 (Disney, Paul Mitchell - twice, Conservacion Internacional, Toyota Motor Sales USA INC, Microsoft, United Airlines,

	SC Johnson Company, SURA and Pearl Jam). • Bahuaja Sonene National Park and Tambopata Reserve: 7 (Pacifico Seguros, Condor Travel, South Pole Carbon, Toyota del Peru SA, UICN, Althelia Climate Fund and CAF).
Have the objectives been met?	To be determined.

Conclusions

For the past 10 years, Peru's policymakers have been introducing pro-market reforms to tackle environmental ills. The result of such reforms needs to be further studied. Yet the following conclusions can be drawn from the three EPR schemes discussed in this paper:

- Policymakers are experimenting with pro-market tools, shifting away from command-and control regulations
- The lack of pre-existing baselines affects the way results can be measured
- Policymakers have preferred not to explicitly frame EPRs as property rights, but as regulatory rights
- EPRs are small in scale: they comprise small areas of the country (only applicable to NPA or Miraflores)
- EPRs only cover specific species (anchovies in the case of ITQ) or monuments (192 cultural sites out of thousands across the country)
- EPRs are sophisticated and require education and marketing campaigns
- The lack of consolidated property rights in Peru is challenging for the introduction of EPRs