Rights to forests and carbon

Insights from Mexico, Brazil and Costa Rica

Esteve Corbera (University of East Anglia)

Manuel Estrada (Senior Consultant, Mexico)

Peter May (Universidade Federal Rural do Rio de Janeiro)

Guillermo Navarro (CATIE)

Pablo Pacheco (CIFOR)

Prepared for the the 'Oaxaca Workshop on forest governance, decentralisation and REDD+ in Latin America and the Caribbean'

31 August – 3 September 2010, Mexico

Contents

Rights to forests and carbon

Insights from Mexico, Brazil and Costa Rica

Esteve Corbera[1], Manuel Estrada[2], Peter May[3], Guillermo Navarro[4] and Pablo Pacheco[5]

1. Introduction

Incentivising reductions in greenhouse gas (GHG) emissions from deforestation and forest degradation, conserving and enhancing forest carbon stocks and sustainably managing forests (REDD+) have emerged as key international strategies to halt land-use change in developing countries and involve them in climate change mitigation efforts (Angelsen 2009a).[6] Developing countries' REDD+ strategies are likely to involve diverse and combined policies and measures. These should address the drivers of deforestation and may include diverse options, such as agricultural intensification, improved forest management or Payments for Environmental Services (PES) (for a review, see Angelsen 2009b). These options are likely to face governance challenges across political, social and geographical scales, including corruption and coordination between contradictory policies (Forsyth 2009, Angelsen 2009b, Tacconi *et al.* 2009, Corbera *et al.* 2010).

This paper argues, however, that some of the most important challenges will be related to the role of land tenure and carbon rights in achieving emission reductions, ensuring transparent benefit sharing and determining non-permanence (or non-compliance) liabilities. Land tenure systems are made up of social relations, including property rights in favour of individuals, communities, organisations or the state; these relationships influence who gets access to and exercises control over land and forest resources. These relations increasingly involve claims over the ownership of ecosystem services, particularly since market-based approaches to conservation have been popularised through biodiversity and forest carbon markets (Corbera *et al.* 2007, Vira and Adams 2007). It is our view, however, that such issues have been addressed rather shallowly in the literature to date, with studies focusing predominantly, if not exclusively, on the likely effects of tenure (in)security in shaping the outcomes of REDD+ policies and measures. Furthermore, we believe that existing analyses have also failed to explain the particularities of forest tenure regimes in developing countries and discuss how such regimes are likely to shape REDD+ design and implementation, including how they will attribute carbon rights and liabilities.

In this paper we attempt to address this gap by drawing on the analysis of forest tenure regimes and REDD+ strategies in three Latin American countries (Mexico, Brazil and Costa Rica). These countries were chosen because they show divergent land-use history and tenure systems, as well contrasting positions in REDD+ international negotiations.

1 School of International Development, University of East Anglia, United Kingdom. E-mail: e.corbera@uea.ac.uk

2 Senior Consultant, Mexico. E-mail: mporruacop9@gmail.com

3 Department of Development, Agriculture and Society, Universidade Federal Rural do Rio de Janeiro, Brazil. E-mail: peter.may@amazonia.org.br

4 Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Costa Rica. E-mail: gnavarro@catie.ac.cr

5 Center for International Forestry Research (CIFOR), Indonesia. E-mail: p.pacheco@cgiar.org

6 The idea of creating a financial mechanism under the UNFCCC to halt deforestation in such countries is not new; it was one of the most important demands from developing countries since the Clean Development Mechanism (CDM) in the Kyoto Protocol considered afforestation and reforestation activities as the only eligible activities to generate carbon credits in the forestry sector (Boyd *et al.* 2008).

However, they also present some similarities in the type of approaches advocated to halt deforestation and degradation, enhance sustainable forest management and define who is entitled to carbon rights and is responsible for carbon losses in the future.

We maintain that tenure systems influence who becomes involved in efforts to improve forest management and halt deforestation, and that land tenure, carbon rights and liabilities may be linked or divorced; having implications for rural development. Where landownership and carbon rights coincide, landowners would see the economic value of their forests increase and would be potentially able to access a new financial asset to complement (or substitute) existing income streams. However, as a result, they would also become directly liable for future potential carbon losses, thereby having to respond to potential national or international compensations and/or penalties. On the contrary, if carbon is considered a public, state-controlled commodity, the long-term commitment that the generation of REDD+ credits implies will irremediably affect the landowners' land use options. Additionally, in this case REDD+ incentives may not reach – or reach only partially and indirectly, through governmental programmes – rural actors, including the most disadvantaged who live within or next to forested areas, such as indigenous communities and forest-dependent villages and dwellers (Sunderlin *et al.* 2007). In turn, this situation would imply that the state – and not the particular landowners – would be held responsible for any carbon losses before the international community.

2. The role of land tenure and property rights in REDD+

2.1. Conceptualising tenure and property

Land tenure systems have been recognised as critical to ensure the legitimacy and effectiveness of REDD+ strategies (Saunders *et al.* 2002, Sunderlin *et al.* 2009, Streck 2009, Hatcher 2009). Land tenure can be defined as 'the right, whether defined in customary or statutory terms, that determines who can hold and use land (including forests and other landscapes) and resources, for how long, and under what conditions' (Sunderlin *et al.* 2009). Tenure encompasses both property rights, understood as social relationships that contain enforceable claims to rights in something (Fortmann 2000), and informal relations governing access to, use of and exclusion from resources, and involving potentially multiple authorities. This distinction between formally sanctionable property rights and informal relations around natural resource management is important because, on the one hand, it recognises that 'Property is only property if socially legitimate institutions sanction it, and politico-legal institutions are only effectively legitimised if their interpretation of social norms (in this case of property rights) is heeded' (Lund 2002, cited in Sikor and Lund 2009). On the other hand, it underscores the fact that other forms of accessing and benefitting from natural resources transcend formal property rights and may rely on other forms of authority and legitimisation (Fuys and Dohrn 2010).

Ostrom and Schlager (1996) consider that property rights actually embrace differentiated 'bundles of rights' (i.e. rights of access, withdrawal, management, exclusion and alienation) which are mutable over time. In this definition, access rights are constrained by other types of rights for using the land and forest resources. Withdrawal rights allow users to extract existing resources from the land under access; 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. This differentiation allows Ostrom and Schlager to identify five different types of property rights holders depending on the number of claims they can make over a particular resource (i.e. owner, proprietor, claimant, authorised user and authorised entrant).

Tenure systems have been grouped in four categories depending on the nature of underlying property rights (Hanna *et al.* 1996). Open access systems are those in which access to natural resources is unregulated and open to everyone (such as the atmosphere), and where it is difficult, costly, or almost impossible to establish rules of exclusion and regulation across resource users. State and public property implies that the state is the only institution with the legitimacy to vest access rights and management quotas over the resource to other users. Usually, the general public has equal rights to the resource and the state has coercive powers of enforcement. The government can establish regulations for sustainable resource use, but such

regulations can be extremely costly to monitor and, as a result, become ineffective. In fact, public property is often unsuccessful in ensuring exclusion, and informal access to resources prevails. In some cases, when the state has interfered with existing common property regimes, there has been a tendency towards the overexploitation of natural resources, as shown in Vietnamese wetlands and Indian forests (Adger and Luttrell 2000, Agarwal 1997). In many others instances, however, public property can *de facto* be used by individuals, organisations and/or communities who may hold long-term access and withdrawal rights over specific resources.

Private property refers to situations in which individuals and families hold full rights over land and rely on state-based political and legal institutions for the authority to recognise and enforce their property claims. Private property holders have the right to exclude others from resources but the legitimacy of such rights would determine the costs of exclusion. Furthermore, property, particularly in forests, is often subject to regulations that in practice constrain how owners can manage their resources. Finally, common property regimes bring together a group of resource users who share collective ownership over a territory, or over a single environmental resource (e.g. a fishery). These users share rights of access to and management of natural resources and rely on both community- and state-based authorities to assert their claims, establish management rules and exclude outsiders, while the state retains alienation rights. Many traditional and indigenous rural communities in developing countries manage their resources in common but their 'bundles of rights' over such resources can be socially differentiated and regulated by customary practices and community institutions. Members of a common property regime can also hold full or partial private property rights over farming and grazing lands, which in some cases may be transferable to third parties, depending on legal and customary provisions (Meinzen-Dick and Mwangi 2008).[7]

2.2. The implications of tenure systems and tenure reform for REDD+

The different property systems introduced above (open, state, private and common property) constitute somewhat rigid categories, and many situations in practice tend to combine different 'bundles of rights' across different tenure systems that coexist in specific contexts. Forest tenure regimes, in particular, are often characterised by multiple claims on access rights, and competing relations about how to manage resource use and who to exclude. For example, within a forest landscape formally owned by the state there may be local groups or communities who have allocated customary property rights over specific trees and non-timber forest products to their members, while at the same time confronting settled migrants who are claiming exclusive rights over specific forest areas. The state may also have embedded interests in these forest landscapes, mainly for forest conservation, thus resulting in complex situations of contested rights.

Some studies suggest that between 65% and 76% of developing countries' forests remain formally owned and administered by governments, even though the number of hectares being devolved to local communities, indigenous groups and private actors has increased significantly over the last decade through tenure reforms and the recognition of indigenous territories (White and Martin 2002, Sunderlin *et al.* 2008, RRI 2009, FAO 2010a). However, data on forest ownership should be interpreted cautiously, because it varies across sources and countries. A recent study of tenure systems in 39 tropical countries, for example, showed that while in Latin America only 43% of forests are owned by the state, this increases to 68 and 97% in Asia and Africa respectively. Looking into the detail, 7% of Latin American state-owned forests are managed by local communities under formal usufruct agreements, while communities and indigenous peoples control up to 25% and private actors 32% of public forests (RRI 2009).

Landscapes in which contested rights predominate can in part be explained by colonial and postcolonial history, which led states to control access to forests, and grant rights to private logging concessionaires as a way to increase national earnings, thus ignoring the existence of communities and indigenous peoples (Ellsworth and White 2004). In many countries, especially in tropical regions, these contested landscapes have also been shaped by persistent agricultural frontier expansion, in which

7 The reform of the Mexican Constitution in 1992 allowed individual rights holders within a common property regime to transfer such rights to a third party, provided that the community assembly would approve it. Furthermore, the existence of land purchases and sales within common property regimes has been well documented (Tucker 1999).

different rural actors, including smallholders and large-scale landholders, sometimes with active state intervention, compete to take advantage of timber resources and clear the forest as a way to claim ownership rights over the land (Finley-Brook 2007, Araujo *et al.* 2009). This process has often created conflict with indigenous populations that hold customary land rights, although it is changing over time. Pacheco and Barry (2009) note that, since the 1980s, 'a wave of significant land tenure reforms have unfolded in Latin America, mainly affecting forest landscapes'. These reforms were aimed at clarifying the rights of the different rural actors, and especially recognising the rights of indigenous peoples on the lands they have traditionally occupied.

The most common tenure models adopted to formalise tenure rights in Latin America include individual private land holdings, indigenous territories, extractive reserves, agro-extractive and forestry settlements and social or community concessions (Pacheco and Barry 2009). While they entail granting different types of rights, all these models share two main characteristics. The first is that the state has granted rights with the condition that forests are sustainably managed and preserved – each model subject to its own specific regulations. The second is that the state has often retained alienation rights on its lands, so that forests cannot be transferred or purchased by third parties and thus privatised. These conditions are often related to the national governments' interest in biodiversity conservation and climate change mitigation, often influenced by international policies and treaties (Pacheco and Barry 2009). Overall, this evidence suggests that tenure systems are shaped by history, geography and the political context. In other words, they respond to particular claims by local populations, the way tenure reforms are implemented, the political powers and governments' views and discourses on forest conservation and use.

REDD+ strategies will thus unfold in a context of evolving tenure systems. Consequently, any regulation aimed at promoting sustainable forest management and conservation will have to take into account the existing formal and informal rights over forest resources, and the role of the relevant sanctioning authorities, particularly if efficiency and equity need to be ensured. The lack of tenure security has been considered a key element hindering the development of REDD+ interventions (Harvey *et al.* 2010), while it has been critically acknowledged that such interventions run the risk of excluding some categories of formal forest users and informal tenants (Lovera 2009). Some have therefore suggested that REDD+ strategies should support communities and indigenous territories by reorganising tenure relations for the benefit of their poorest members (Cotula and Mayers 2009). It has also been claimed that extending forest tenure reform can help 'to protect people whose rights must be usurped if REDD+ leads to a rush in command and control measures to protect forests, or if REDD+ leads to a resource race when the value of forests increases' (Sunderlin *et al.* 2009). Some have even suggested that securing tenure can have additional benefits such as reducing land-use change and, in the long term, leading to increased reforestation and conservation (Hyde *et al.* 2003).

Extending forest tenure reforms, however, does not guarantee maximising REDD+ legitimacy, effectiveness and equity. The concept of land reform itself has been heavily contested, particularly when it consists of top-down approaches through which governments formalise tenure rights through communal demarcation and granting individual property rights only. Such an approach has been criticised as a mechanism that guarantees a title but not much else (Larson *et al.* 2008), and is incapable of dealing with complex webs of access to natural resources (Sikor and Müller 2009) or empowering particular actors in their struggles to gain control over natural resources (Ellsworth 2002, Meinzen-Dick and Mwangi 2008). Larson *et al.* (2008), when assessing eight local tenure reform processes in Latin America, showed that improvements in access rights to forests have been substantial and have likely led to livelihood benefits derived from such rights, but they also suggest that the imposition of forestry regulations and limited access to credit and markets for forest products have constrained further livelihood improvements. When it comes to environmental outcomes, land reform programmes have also shown mixed results. Sunderlin *et al.* (2008) highlight that tenure security programmes in Papua New Guinea and Peru have not fostered conservation because the right to allocate timber and development concessions (e.g. for roads and mining) has remained in the hands of the state. There is also extensive evidence that securing tenure can lead to increased degradation and deforestation if it is not conditional on conservation commitments or is not accompanied by changes in policy incentives to reduce profits derived from continuous deforestation

and subsequent land uses (Jaramillo and Kelly 1997, Angelsen 1999, Gould 2006, Gueneau and Tozzi 2008).

2.3. Tenure, carbon rights, liabilities and benefit sharing in REDD+

Land tenure regimes increasingly encompass ownership claims over ecosystem services, and such claims may also evolve and be contested (RRI 2010). Evidence from carbon forestry projects, for example, suggests that collective ownership can result in carbon revenues being distributed in favour of those households with more available capital, disposable labour and more active participation in project activities, and against actors who lack resources but still hold rights over the forest commons (Corbera *et al.* 2007, Corbera and Brown 2010). Furthermore, in most of these projects landowners have ceded their carbon rights to the project developer, who has in turn been responsible for selling any carbon credits and sharing any revenues, if convened in the contract between parties. When these projects have been implemented under collective ownership, the distribution of revenue has fallen outside the developer's control, since the authority governing the collective has decided what to do with the revenues and whether such revenues should or should not be shared with informal tenants or settled migrants (Corbera *et al.* 2009). This demonstrates that formal and informal right holders can get involved (or be excluded) in carbon commodification and have a say (or not) in accessing any benefit streams deriving from ecosystem services.

In the context of REDD+, it is important to differentiate between the actual nature of the incentives provided to landowners by specific policies or measures, and the economic nature of REDD+ incentives as realised by governments once emission reductions or increases in carbon stocks have occurred and have been verified. This distinction is important because it acknowledges, on the one hand, that REDD+ policies and measures may include direct payments for sustainable resource use and conservation (e.g. through PES systems). On the other hand, it indicates that such payments and the actual consecution of carbon revenues by governments – which are ultimately responsible for REDD+ success before the international community – are temporally and spatially separated from each other. They are temporally apart because policies and measures that entail compensation are likely to involve some degree of upfront support to increase landowners' interest and participation, while REDD+ incentives are likely to be realised only once emission reductions and increases in carbon stocks have been effectively achieved. Furthermore, they are spatially apart because the former should be transferred to and potentially be made conditional on local and regional forest management and conservation improvements, while REDD+ benefits are likely to depend on an overall achievement at national level.

Such existing temporal and spatial separation between the realisation of carbon benefits at local level and the actual benefits achieved by governments at national level can in turn be related to carbon ownership and liability issues. If governments are supposed to receive financial compensation once emission reductions or the enhancement of carbon stocks have been realised (through the sale of REDD+ credits to developed countries and other international buyers), then it seems rather logical for governments to retain the rights over any carbon rights existing or realised in all forests. In practice, this will mean enforcing conservation regulations in public forests as well as finding the means to halt land-use change and support conservation through specific actions in particular territories, which may or may not involve direct payments to landowners as suggested above. If an economic compensation approach is adopted, for example through PES programmes, then the government could also decide whether payments should be related to carbon prices in international markets and actual sequestration rates, or if they should just consist of more or less flat economic incentives defined by local opportunity costs or other parameters. Additionally, if governments claim ownership over forest carbon, they are consequently assuming the responsibility for any future losses, without excluding the possibility of prosecuting landowners who had committed to conservation through public funding programmes and then failed to meet their commitments. To date, however, public prosecution against landowners in PES programmes has been minimal if not impossible to undertake, due to the transaction and political costs involved (Wunder *et al.* 2008).

Governments, nonetheless, could also consider carbon as no different to other resources such as trees or non-timber forest products. In this way, carbon becomes an asset for actors holding long-term usufruct rights in public forests, communities

holding collective titles and private forest owners, and is considered a public resource only in those forests directly and uniquely administered by the state (national protected areas and the like). In this case, tenure and carbon rights will be intrinsically linked to each other and a multiplicity of systems for realising the value of carbon may evolve across geographical and administrative scales. One could find, for example, a country where indigenous communities cede their carbon rights through a private contract to an international NGO to be sold through voluntary carbon markets, while the government develops a national PES programme for indigenous territories under which carbon rights from participating communities effectively belong to the government. In the former case, the government may even decide to retain some of the benefits from REDD+ local projects by, for example, taxing transactions, following the example of the Chinese Government in the CDM (Boyd *et al.* 2009). The larger the number and diversity of initiatives commodifying carbon in a particular country, the more diverse the systems for defining and allocating carbon rights and liabilities will be. Such diversity will also translate into carbon accounting and verification challenges, as the government will be responsible for avoiding double counting in order to respond effectively and transparently to international commitmments (Streck 2009).

We turn below to sketch the recent history of land and forest tenure systems in Mexico, Brazil and Costa Rica. However, a full assessment of land tenure systems and reform processes in these countries falls beyond the scope of this paper, but can be found elsewhere (Seligson 1978, Thiesenhusen 1995, Alston *et al.* 1999, Warman 2001, Assies 2008).

3. Historical insights on land and forest tenure in selected countries

3.1. Mexico

The dual system of indigenous communal tenure and Spanish and 'Criollo' landholdings existing in Mexico by the early nineteenth century was undermined by liberal legislation that sought to privatise community lands. This resulted in a process of land concentration during the late 1850s, lasting until the early 1900s (Assies 2008). The Mexican Revolution of 1910 was thus founded on peasant protests supporting the abolition of private property and the restitution of communal lands to create productive properties for subsistence and commercialisation purposes. As a result, in 1915, the government began an agrarian reform that consisted of returning the communal lands seized to their original owners. The government also decreed that previously landless villages should receive title to lands expropriated from large, private landholdings and from government land; the 1917 new Constitution incorporated these principles into its Article 27 (Merrill and Miró 1996, Assies 2008).

The Constitution established three different forms of land tenure in Mexico: private, public, and social, which still prevail today. Private lands owned and/or managed by companies, sharecroppers, and landless peasants represent 37% of the Mexican agrarian landscape but only encompass 26% of the country's forests (de Ita 2008, FAO 2010b). Although the Constitution limited private holdings to 100 ha, by the early 1990s Mexico had more than 40 000 farms of 101 ha or larger and some 500 farms larger than 50 000 ha (Merrill and Miró 1996). Public lands, in turn, belong to federal or regional public agencies, as well as to public enterprises; these lands represent more than 8% of the agrarian landscape and cover only 4% of forested areas, primarily including protected areas and bodies of water (FAO 2010b).

Social property is divided into two fundamental categories: agrarian communities and ejidos. They represent 52% of the Mexican agrarian landscape (de Ita 2008) and control 70% of the forests (FAO 2010b).[8] From 1915 to 1992, the number of ejidos and communities established increased year after year, with two particular peaks between 1934-40 and 1964-76 (Warman 2001, Assies 2008).

Agrarian communities' rights derive from those recognised by the Spanish Crown to original settlers. The communities generally consist of indigenous people who have historically inhabited a region and share language, traditions and governing institutions. Agrarian communities hold forests and pastures in common while individual rights holders – known

8 Data on the number of forests controlled by rural communities differ depending on the source. Bray *et al.* (2002), for example, note that scholars and policy makers maintained for decades that 80 per cent of the forests were in the hands of rural ejidos and communities, although the empirical basis for such a figure was never well documented.

as *comuneros* – have all but alienation rights over their farming plots, which ultimately belong to the community and cannot be transferred outside the group. Community life, including forest regulation, is governed by a communal assembly made up of all *comuneros* – some of whom may be women – and a council of authorities renewed periodically, normally every three years. The geographical fragmentation of indigenous territories across the country is the outcome of a complex historical process of land rights given, taken and violated many times.

Ejidos are also a specific product of the agrarian reform, but are substantially informed by indigenous forms of social organisation (Morett Sánchez 2001). They were constituted when a group of families claimed rights over a territory (to which, for example, they had migrated) and were granted such new rights by the state. Claimants received a parcel of land, which remained under communal ownership, with no rental or land sales allowed. Right holders – known as *ejidatarios* – could only bequeath access rights to their land to a single descendant and ejidos usually kept an area of forest and pasture managed in common, to which all community members had access for grazing and fuelwood collection. They are also governed by an ejido assembly and a council of authorities.

Mexico's economic crisis in the late 1980s brought important political, economic and social reforms to the countryside. The constitutional reform of Article 27 implied that no further land would be distributed among rural people. It also legalised and encouraged the formation of joint ventures of communities and ejidos with private capital. A new agrarian law in 1992 provided the means for *ejidatarios* and *comuneros* to become private owners and to rent and sell their land to third parties, including foreigners and mercantile societies.[9] These reforms also sought to legalise informal property rights and to stimulate rural investment by allowing *ejidatarios* and *comuneros* to use their holdings as collateral for raising capital.[10] The forest commons could now also be sold to a third party but the activities developed by the buying party had to be economically and socially equitable, as well as environmentally sound (Merrill and Miró 1996, ARD Inc. 2007).

The 1992 reforms were seconded by a land rights certification programme (PROCEDE) which aimed to resolve boundary conflicts, regularise tenure, and issue property rights certificates to members of ejidos and communities. The latest official statistics show that 94% of all Mexican communities and ejidos joined PROCEDE, benefitting more than 4 million farmers (Table 1). However, most of these farmers opted to obtain rights over their actual parcelled land, without acquiring full property rights; only 0.33% of the total social property endowed to ejidos and communities was privatised.[11] Still, it is worth noting that the certified surface area represents 86% of all social property and that 6% of the agrarian nuclei are not interested in delimiting their property

Table 1: Historical progress of PROCEDE (in hectares), 1993 to 2006

	National total	PROCEDE total	Percent (%)
Nuclei	30,513	28,757	94%
Beneficiaries (individuals holding title of parceled land/private property)		4,445,213	
Parceled land certified		25,851,329.7370	25.44%
Common land certified		62,400,843.3458	61.42%
Titled and privatised		332,484.1365	0.33%
Land	101,591,095	88,584,657.2193	87%

Source: own elaboration from data available at Registro Agrario Nacional (2010)

9 Under the 1992 reform, agrarian communities preserve their legal status as landed communities under the communal regime but, if willing, they can adopt the ejidal regime with the tenure and privatisation implications described above.

10 An ejidatario cannot accumulate land for more than 5 per cent of the ejido's size or above the legal limits for a small private property. Furthermore his ability to exercise full private rights and sell them depends on the ejido's assembly granting approval. Foreigners, in turn, cannot own more than 49 per cent of total shares in mercantile societies.

11 PROCEDE's high participation level has been partly explained by communities' and individuals' interest in securing tenure certificates and territorial boundaries, but also by political motivations and coercion of public agents (Cornelius and Myhre 1998). In turn, the programme's failure to encourage land privatisation has been explained by many factors, including taxation (Lavadenz and Deininger 2001), lack of market opportunities (Bouquet 1996) and the need to retain social and cultural bonds among community and ejido members (de Ita 2008).

or conflicts related to politics and organised crime make such titling process unviable (Mexico R-PP 2010). Land conflicts remain a problem in about 2 million ha of social property, which are disputed within or across indigenous groups and between indigenous and non-indigenous communities. Consequently, the government has set up special tribunals to force the resolution of many long-standing conflicts (ARD Inc. 2007).

Forest tenure in Mexican forests has evolved considerably during the last century, with implications for the rate of forest loss and degradation. Before the Mexican Revolution, the country's forests were heavily exploited for 'development' purposes, leading to massive land concessions and rural dispossession. From the early years of the agrarian revolution to the early 1970s, communities and ejidos secured control over approximately 18% of the forests while the rest remained in private and state hands, with the latter granting short- and long-term concessions to national and international companies. The companies extracted logs with the highest market value, leaving the forest damaged, and failed to compensate the communities that owned the forest but were banned from commercialising its resources. Deforestation and degradation became rampant, particularly in central Mexico (Merino-Pérez and Segura-Warnholz 2005).

In the early 1970s, and in the face of increasing farmer protests, the government redistributed large tracks of tropical forests to rural communities, who ended up controlling more than 65% of the country's forests (Merino-Pérez and Segura-Warnholz 2005). These communities, however, lacked the necessary skills and resources to manage forests and they prioritised other productive activities, leading to massive deforestation. This was further aggravated by colonisation policies that encouraged farmers to move from crowded areas in central Mexico to the south, leading to 80% of the humid rainforest being cleared. In parallel, the government promoted partnerships between communities and logging concessionaires (some state owned) but these rarely worked and led to inequities in access to timber benefits (Merino-Pérez and Segura-Warnholz 2005). Community forestry only took off in the 1980s and has been consolidating ever since. According to different sources cited by Bray and Merino-Pérez (2005), between 7000 and 9000 agrarian communities and ejidos (i.e. nearly one-third of the country's total) have more or less degraded, but extensive forests, while the number of community-forest enterprises (CFEs)[12] oscillates between 300 and 700. Many others still manage their forests through external third parties, to which they grant access rights to valuable timber in exchange for employment and a share of timber revenues.

Unfortunately, communities' larger control of forest resources has not translated yet into a significant decrease in deforestation rates at national level. From 1976-2000, Mexico was among the most deforested countries in the world, with average deforestation rates of 86 718 ha/year for temperate forests and 263 570 ha/year for tropical forests, while the total annual loss for all ecosystem types averaged 545 000 ha/yr (Bray *et al.* 2005). Deforestation has many causes, including governments' inability to regulate the activities of logging concessionaires or tackle migratory processes into areas of high biodiversity value (O'Brien 1998), but also the failure of rural communities to establish sustainable forestry management plans and arrest clandestine logging (Klooster 1999). In fact, land-use change in most rural communities has been driven by population growth and an institutional preference towards degradation and fracturing of the forest commons. The number of informal right holders has naturally increased over time, as some household descendants received land but no title, or others joined the community through marriage and immigration (Sarukhán and Larson 2001, Corbera *et al.* 2007). This continuous division of *comuneros* and *ejidatarios*' original land holdings for the benefit of their descendants translated into increasingly smaller land units and led to pressures over standing forest resources (Warman 2001).

3.2. Brazil

Brazil's land tenure regimes have evolved from the colonial era, when large land grants (known as sesmarias) were granted by the Portuguese Crown to followers of the royal court, usually traders or lesser nobility, on the condition that they developed those lands for productive use and paid tributes. After the abolition of slavery in 1888, former slaves

12 By CFEs we mean a legal organisation constituted by periodically renewed community members, which actively manages the forests following a government approved plan. It undertakes selective logging and sells timber to the market, either processed or unprocessed (Bray and Merino-Pérez 2005).

were also permitted to occupy untitled inland territories, making claims founded on use rights. Clearing as proof of effective occupation became tantamount to ownership. Nevertheless, due to overlapping jurisdictions, competing claims and outright usurpation by *grileiros*[13] (land grabbers), multi-tiered titles to the same property often still exist today. Some municipalities in the Amazon region, for example, have titled properties that far exceed the effective area of their jurisdictions. Since the 1850s, Brazilian public lands could be removed from the category of 'devolute' to private status through a specific administrative act. This artifice was widely used in frontier territories to cede lands to private investors and public authorities engaged in colonisation and land reform projects from the early 1970s onwards (Alston *et al.* 1999). Brazil has been the tropical country with the highest level of forest lands devolution from government-administered to social and private ownership during the last decade (RRI 2009). Between 2002 and 2008, the amount of collectively-managed and communally owned forests has increased 119% and 48%, respectively. The amount owned by individuals and organisations has tripled (RRI 2009, FAO 2010c).

The Legal Amazon region in Brazil contains most of the remaining tropical rainforest, as well as significant areas of *cerrado* (i.e. savanna lands, forested or not). In contrast with Mexico, forest tenure in the Brazilian Amazon is divided between public (76%) and private lands (24%). The former include protected areas (36% encompassing indigenous reserves (21%), sustainable use areas (10%) and exclusively protected areas (5%)); land reform settlements (5.3%); and, forest areas under dispute (33%). Private lands, in turn, encompass forests primarily owned by individuals or private organisations, as well as some under evolving ownership by hundreds of *Quilombola* (former slave) communities (Table 2).

Private owners in the Amazon biome (i.e. that part of the Legal Amazon which is covered by tropical humid forests), are required by the 1964 Forest Code to keep at least 80% of their land in the form of a legal reserve, which can be managed sustainably for timber and non-timber products. The Forest Code is currently being revised and, if the rural propertied class has its way, it could roll back the legal reserve requirement to 50%, provide amnesty for those who have deforested beyond the permissible share, and permit landowners to plant perennial species in areas formerly subject to more rigid environmental protection, such as steep hillsides and hilltops. Such a ruling would have disastrous implications for Brazil's commitments for REDD+, as it would in effect permit significant additional deforestation.

Table 2: Land tenure structure in the Brazilian Legal Amazon region

Land tenure category	Percentage over total (%)
Private Land	24.0
Public Land	76.0
Protected Areas	36.6
of which Indigenous Reserves	21.1
of which under Sustainable use*	10.0
of which Integrally protected	5.5
Land reform settlements	5.3
Undefined / contested	33.0
Total	100% 5.5 million km^2

*Includes sustainable use protected areas such as extractive reserves (6.3%) and environmental protection areas (3.7%).

Source: Lentini *et al*. (2005)

Furthermore, the recent 2007 law on Public Forest Management allowed forest concessions to be established within public lands, and some have claimed that the law could become an instrument to 'privatise' the remaining Amazon forests and provide long-term forest concessions to private, national or foreign companies. In fact, the law maintains such forests in the public domain but aims to encourage long-term sustained yields through secure tenure and the oversight of a newly created Brazilian Forest Service. Such concessions would only be permitted once areas more appropriate for permanent protection and community resource use had been circumscribed. Forest privatisation in the Amazon will in all probability expand considerably in coming years as public lands at the frontier become subject to title regularisation in accordance with a controversial recent initiative.[14] This initiative has

13 '*Grilagem*' is the practice of falsifying land titles (often resorting to a technique of paper ageing using the excreta of crickets – *grilos*, hence the name). It can be loosely translated as 'land grabbing', but this is usually accompanied by threatened or actual violence to occupants, whether or not they possess legal title.

14 Medida Provisória No. 458, February 2009, subsequently converted into federal law 11.952 in June 2009.

the stated objective of regularising the land claims of small to medium squatters who had occupied public lands in 'good faith', with benefits that would ostensibly include improved compliance with forest and environmental legislation. However, critics have argued that loopholes in the legislation have favoured land speculators, contributing to increased deforestation, social conflicts and land concentration (Brito and Barreto 2010).

Communities that have gained access to land through agrarian reforms are subject to administration by the state, which still retains the legal control over the property until such communities may be considered to have been adequately structured so as to be 'emancipated' from such control – a status rarely attained because it is arbitrarily defined by administrators acting in their own interests. Such colonists become effectively in thrall to the state, subject to a land-use plan developed by state or federal land reform authorities. In some cases, legal reserves have been established as common management areas in such settlements, but in most cases, the legal reserve is designated on each lot individually and is often subject to degradation due to individuals' unrestricted use. Although unable to buy and sell these lands until formally titled, they have been informally consolidated over time as small farming enterprises that were not supported with adequate technical assistance or the infrastructure needed to become economically viable. In some cases, they have become large cattle ranches.

Indigenous or riverine communities have greater autonomy but they also show mixed results for tenure conflict and sustainable resource management. In the case of formally recognised indigenous areas, for example, tribal management prevails and no other uses are encouraged. Indigenous areas are subject to oversight by the National Indian Agency (FUNAI). The strength of the indigenous organisation and the resources generated by its own activities – although timber extraction and mining are formally prohibited – have determined the extent to which tribal groups have been able to develop sophisticated monitoring and surveillance capabilities and keep incursions at bay, with or without support from FUNAI. In other cases, this has not been possible and encroachment by external actors and conflict over forest resources persist.

Communities living within sustainable use protected areas or indirect use areas are subject to additional regulations which shape their 'bundles of rights' over forest resources. These include sustainable use management plans which should in theory assure local development, but may be overly restrictive, undermining traditional common property resource management institutions. Such government controls can also act against conservation by undermining local rights claims and indirectly favouring the illegal appropriation of forest resources. In the context of extractive reserves, there have been cases where the government's failure to oversee regulations and prevent incursions, combined with restrictions on communities' agency, has led to increasing pressures from illegal mining, logging and cattle ranching activities (RRI 2009).

Brazilian forest tenure systems are thus affected by multiple claims and conflicts over resources (Nepstad *et al.* 2006, Larson *et al.* 2008). Conflicts are common between timber extraction enterprises and local communities, as well as between local communities and cattle ranchers. There are also conflicts between colonists and communities as the former aim to take control over indigenous or informally occupied lands at the frontier (de Oliveira 2008, Pacheco 2009). It is thus not surprising that deforestation has proceeded apace. Although remote sensing data is too coarse to establish clear responsibility, the vast majority of deforestation has occurred since the 1970s, at a scale larger than can be accounted for by shifting agriculture alone. Total regional deforestation is estimated to have averaged nearly 20 000 km^2/yr from 1996 to 2005, according to the government's historical REDD+ baseline. Ranching is considered responsible for more than 80% of total deforestation, with the remainder due to a combination of recent soybean and other crop incursion and urban-industrial occupation, including road building and hydroelectric reservoirs. To date, about 18% of the Brazilian Amazon has been put to the axe or the torch, and a sizeable additional area – perhaps twice as large – degraded by unsustainable logging practices (May and Millikan 2010).

3.3. Costa Rica

Costa Rica diverges considerably from Mexico and Brazil, insofar as 'only' 45% of the country's forests are publicly owned while the rest are private. In fact, Costa Rica has nearly doubled the number of public forests (from 24% in 1990 to 45% in 2005) while forest private ownership has decreased from 75% in 1990 to 55% in 2005 (FAO 2010d). However,

contrary to common perception, deforestation and forest degradation are also occurring in the country, but to a much lesser extent than in Mexico and Brazil. During 2000-05, the country lost between 144 398 and 224 406 ha, predominantly from early and medium-aged private forests, while another 207 983 to 288 886 ha were regenerated, due to increasing densities in existing forests and new forest plantations. This translated into a forest recovery of between 63 585 and 64 479 ha, and approximately the mitigation of 55 808 million tonnes of CO_2e (Costa Rica R-PP 2010).

Land tenure regimes across the Costa Rican countryside are also a product of an historical process of land transformation, initially for agricultural and cattle ranching, and more recently for the conservation of forests, their biological diversity and ecological functions. Colonisation of the Costa Rican 'forest frontier', with corresponding land clearance, was encouraged during the nineteenth and twentieth centuries because formal titling was granted 10 years after occupation and cultivation (Augelli 1987, cited in Brockett and Gottfried 2002). The expansion of the agricultural frontier was counteracted by the enactment of ambitious conservation and forest policies from the early 1970s onwards, including several forest management laws, the provision of incentives for reforestation and conservation, and the development of a system of national protected areas which now encompass 25% of the country's land (Brockett and Gottfried 2002).

As of today, four main tenure regimes underly the country's forests. First, public conservation agencies protect and manage national parks and biological reserves, which represent 11% of the country and 21% of forest cover. Most of these areas have been directly expropriated from forest owners, who have not received the correspondent financial compensation (Brockett and Gottfried 2002). Their administration suffers from a lack of financial, technical and human resources, which translates into increasing encroachment by squatters, illegal loggers, hunters and miners. Second, protected wilderness areas, composed of forest reserves and wildlife refuges, cover 14% of the country and 19% of the forest cover and most have been established on private domain lands. In these cases, legislation requires the holder to demonstrate possession for at least 10 years before establishing the reserve, which in many cases has been impossible and has led to conflicts (Costa Rica R-PP 2010).

Third, private ownership underlies 50% of forests, and resource use is restricted by limits established by the 1996 Forest Law (Poder Legislativo 1996). This law was a turning point in the country's land-use history, as it set critical prerogatives for forest conservation and sustainable management, including a total ban on deforestation (Art. 19) and the introduction of a country-wide PES system (see Section 4.3 for further details). The law allowed sustainable forest management plans through an additional set of economic and institutional incentives, but also imposed heavy regulation and high costs for compliance (Navarro and Bermudez 2007). In addition, the forest law imposed restrictions on private landholdings, including management restrictions on tree harvesting along rivers, water springs and steep slopes. On the other hand, the forest law also offers incentives for reforestation to counteract land-use change.

It has been argued, however, that such over-regulation of private forests, aggravated by a parallel ban on incentives for natural forest management, has not always resulted in positive environmental outcomes. The lack of economic and legal opportunities to create a competing forest rent from forests under Sustainable Forest Management (SFM) has led to increased land-use change in forests with higher opportunity costs for agriculture but suitable topography and relatively good access to markets. Furthermore, the PES programme (politically perverted by environmental groups to deliver incentives for forest conservation only) is burdened with a package of legal constraints and higher costs on administrative and productive activities such as plantation forestry and sustainable management of natural forests; this has made the latter less competitive, leading to lower timber prices, owners' unwillingness to invest in sustainable logging practices and increased deforestation (Watson *et al.* 1998, de Camino *et al.* 2000, Costa Rica R-PP 2010).

The fourth land tenure system encompasses indigenous reserves, which cover 10% of the country's forests. The reserves are governed through Indigenous Integral Development Associations (ADIIs in Spanish) and they cannot access commercial forest management permits because their lands fall outside the scope of the 1996 Forest Law with respect to the commercial management of natural forests (Costa Rica R-PP 2010). However, they can harvest dead logs and cut timber from

agroforestry systems as long as these are used within the reserve boundaries. Such restricted access to timber markets has had a negative impact on indigenous peoples' income, and it has not translated necessarily into positive conservation outcomes. Indigenous reserves show a relatively lower percentage of average deforestation than private forests, but higher than protected areas. Ongoing deforestation and degradation can be attributed to encroachment by migrant settlers and the latter's ability to illegally entitle their land (Costa Rica R-PP 2010).

4. REDD+ history, strategies and perspectives on tenure and carbon rights

4.1. Mexico

Mexico has been very active in REDD+ discussions under the UNFCCC, working alongside many other Latin American countries to produce joint submissions at a very early stage of the negotiations.[15] Mexico and other Latin American parties supported a flexible REDD+ mechanism to allow developing countries to receive financial incentives (including through the carbon market) for successful REDD+ actions carried out at all levels, from project to national scale, according to each country's particular capacities and circumstances, building on and including the CDM. This concept was further developed in a 2007 submission by Paraguay on behalf of Honduras, Mexico, Panama, Paraguay and Peru and supported by Ecuador, in which the idea of a 'nested approach' (Pedroni *et al.* 2009) was introduced to the UNFCCC negotiations.[16]

Mexico has expressed a preference for the coordinated development of REDD+ activities at different scales, including project-type efforts to be developed within a national accounting system (de Jong *et al.* 2008). In fact, the identification of REDD+ pilot projects has gained momentum, and government agencies and NGOs are working – together, in some cases – on the design and/or implementation of regional and local projects. Mexico's fourth National Communication to the UNFCCC presents some of the projects currently being considered for funding by the National Protected Areas Commission, including 'La Laguna' Biosphere Reserve in the state of Baja California Sur; the 'Chichinautzin' Biological Corridor in the states of Mexico, Morelos and Distrito Federal; and the Biosphere Reserve 'El Ocote' in the state of Chiapas. REDD+ pilots have also caught the attention of state governments, and Michoacán has announced its intention to develop a state-wide project. Additional small-scale projects in temperate and tropical regions of the country are being developed by NGOs with the support of private sponsors and the voluntary carbon market (Harvey *et al.* 2010).

The country's national REDD+ strategy is being developed under the auspices of the World Bank's Forest Carbon Partnership Facility (FCPF); an initiative to assist developing countries in their efforts to reduce emissions from deforestation and forest degradation, and to build their capacities while helping them tap into any future system of positive incentives for REDD+ building and promoting pilot REDD+ programmes.[17] The latest official document submitted to the FCPF, known as the Readiness Preparation Proposal (Mexico R-PP 2010), indicates that Mexico will aim to coordinate all these emerging initiatives on REDD+ at different geographical scales and bring them together with existing programmes for sustainable forest management and conservation under a common financial and operational framework, following in turn the mandate of the country's Special Climate Change Programme (PECC 2009). The PECC comprises 105 objectives and 294 goals that, while contributing to the fulfillment of the country's National Development

15 Submission by Peru on behalf of Colombia, Costa Rica, Ecuador, México, Nicaragua and Panama with the support of Bolivia. FCCC/SBSTA/2006/MISC.5 11 April 2006; and Costa Rica on behalf of Costa Rica, Dominican Republic, Guatemala, Honduras, Mexico, Panama, Paraguay and Peru and supported by Ecuador. FCCC/SBSTA/2007/MISC.2. 2 March 2007.

16 The 'nested approach' is a scheme that incentivises immediate greenhouse gas emission reductions in developing countries at a scale compatible with their capacities and governance levels, while facilitating, through negotiated 'triggers', their 'natural' (but planned) transition from subnational mitigation activities to a country/sector-wide emission reduction scheme as such indicators improve with time. Moreover, it integrates incentives for the private sector and developed countries' governments to support and invest in reducing emissions in developing countries by linking effective funding to the pace at which mitigation actions are scaled-up in such countries. The scheme is complemented by an accounting system that covers both subnational and national scales, as well as provisions allowing a smooth transition from the former to the latter (Estrada 2010, in press).

17 More information available at http://www.forestcarbonpartnership.org/fcp/

Plan 2007-12, also contains explicit courses of action for climate change mitigation and adaptation.[18] The PECC highlights that a significant proportion of the emission reductions in the forest sector would result from increases in the areas under sustainable forest management, incorporating 750 000 ha of forests into national protected areas (NPAs), establishing REDD pilot programmes in 40% of existing NPAs, increased support for wildlife conservation and managrianement units, and the extension of existing PES programmes (Muñoz-Piña *et al.* 2008, Corbera *et al.* 2009).

PES programmes have been a key pillar of Mexican forestry policy over the last decade and result from the promulgation of the 2003 Law on Sustainable Forest Management. The law considers ecosystem services as public goods (Art. 30.VII) and endows the government with the obligation to develop the appropriate economic instruments through which society as a whole could assume the costs of conserving ecosystem services and compensate landowners for providing such services. It also establishes the Mexican Forestry Fund as a financial instrument to promote the conservation, sustainable management and restoration of forest resources; facilitate market access; promote projects to increase forest industry competitiveness; and, develop instruments for the conservation of ecosystem services (Art. 142). The law also recognises that the fund can create financial bonds associated with forest conservation and ecosystem services provision, which can be granted to the landowners (Art. 141). Additionally, it highlights that the government can establish quotas or taxes over third parties who directly or indirectly benefit from the commercialisation of ecosystem services, thus also recognising that ecosystem services can be commercialised by actors other than landowners (Art. 138).

Land tenure issues are referred in Mexico's R-PP (2010) in relation to deforestation risk and less so in relation to what they imply for REDD+ design and implementation. The R-PP recognises that 'the risk of deforestation and degradation seems to increase in areas with unresolved land tenure conflicts' and that there are divergences in deforestation and degradation rates across forest tenure regimes. In particular, it highlights that net deforestation in privately-owned forests is slightly higher than in community-owned forests, and argues that the causes of forest degradation under different tenure regimes are still not well understood. It also recognises that communities and ejidos with sustainable forest management plans are more successful in halting deforestation than those which do not have these plans.

Mexico's R-PP (2010) briefly reflects on the difficulties of establishing forest management and conservation programmes based on financial compensation unless communities and ejidos are effectively organised and commited to such programmes. If this is not the case, programmes are likely to fail because it will be difficult, if not impossible, to enforce carbon liabilities, insofar as community members who undertake forest clearance probably do so without the permission of the collective authority. Mexico's R-PP suggests developing strategies to enhance security over forest resources, such as ensuring that timber rights from plantations and forest management schemes are efficiently attributed and equitably shared; developing policies related to carbon rights; clarifying and extending the current provisions of the 2003 Law on Sustainable Forest Management; increasing the communication between different levels of government to develop user rights policies; and, developing a wide communication and consultancy programme among and between forest owners.

The Technical Assessment Panel (TAP) of the World Bank's FCPF (FCPF-Mexico 2010) has evaluated the country's R-PP and highlighted that the government has not sufficiently engaged with conflicts over land and forest tenure, illegal logging, and other illegal activities. It also highlights the need to consider that tenure conflicts pose a major problem for implementing government incentive programmes, since PES programmes' procedural regulations do not permit landowners to receive funds unless they have clear and undisputed ownership. Furthermore, the report suggests that the R-PP 'largely fails to recognise the special needs, circumstances, and rights of indigenous peoples', including their linguistic and cultural diversity, and does not have 'a clear strategy for consulting with indigenous peoples organisations' (FCPF-Mexico 2010).

---

18 The PECC is expected to result in a total emission reduction of around 51 million tonnes of CO2 equivalent (CO2e) in 2012 with respect to the 'business as usual' scenario, representing a 6 per cent deviation from the baseline estimate for 2012 (786 million tonnes of CO2e). Of these, 30 per cent are expected to be achieved in the agriculture, forest and other land uses sector.

4.2. Brazil

Brazil has gradually moved from total opposition to grudging acceptance of standing forests being included in the global climate regime; however, the country remains ambivalent regarding the use of carbon offsets to finance conservation efforts. In 1997, the Brazilian Federal Government opposed the inclusion of instruments to promote tropical forest conservation and avoidance of deforestation in the Kyoto Protocol on the grounds that this would deviate Annex I countries from their responsibility to reduce domestic emissions, and would challenge the country's national sovereignty. The latter mantra had a contradictory overtone because the incursion into Brazil's forest frontiers had already been driven by international agribusiness in the surge for beef, soybeans and tropical timber (Lentini *et al.* 2005).

To counter the government's opposition to crediting the standing forest, Brazilian environmentalists proposed the creation of a mechanism termed 'compensated reductions', which would involve establishing reduction targets and compensation for avoided deforestation contingent upon verified reductions in annual clearing rates, as compared to a periodically-adjusted historical baseline (Santilli *et al.* 2005). Drawing on the former proposal, and shortly before COP-12 in 2006, the Brazilian Government tabled a mechanism that would reward positive incentives for the net reduction of emissions from deforestation in developing countries that voluntarily reduced their greenhouse gas emissions from deforestation in relation to a reference emission rate.[19] The proposal stressed that efforts should neither be mandatory nor include targets nor timeframes, and it remained leery of permitting credits for avoided deforestation activities to be traded in the compliance and voluntary carbon markets (Government of Brazil 2006).

In 2007, a group of nine NGOs launched the 'Zero Deforestation Pact' in the Brazilian Congress,[20] proposing a national commitment to reduce deforestation rates in the Amazon from an average of 14 000 km^2 in 2005-06 to zero in 2015. Such a commitment would be based on annual targets and a series of actions to strengthen forest governance in conjunction with state governments. It also proposed a nationwide PES programme to incentivise forest conservation among rural communities and private owners, and called for the consolidation of existing protected areas, the implementation of alternative settlement projects, and increasing support for forest management within indigenous territories; it also suggested creating a special Amazon Fund within the National Bank for Economic and Social Development (BNDES).

The Amazon Fund was established a year later and has now become the leading financial instrument in the prevention, monitoring and control of deforestation and promotion of conservation and sustainable use of the Amazon biome. The Fund is the core financial element of Brazil's REDD+ strategy and its contributions will be channelled towards the following priority areas: management of public forests and protected areas; environmental monitoring, control and enforcement; sustainable forest management; (other) economic activities based on the sustainable use of forests; ecological-economic zoning, territorial management and land tenure regularisation; conservation and sustainable use of biodiversity; and, rehabilitation of degraded lands. Contributions to the fund are voluntary, but linked to continuous and verifiable emission reductions.[21]

The fund is operating under the overarching National Climate Change Plan (PNMC 2008), which establishes the goal of reducing Amazon deforestation by 72% by 2017, relative to a moving baseline of average annual deforestation measured over the previous decade.[22] To achieve these goals, the PNMC calls for strengthening the implementation of the former Action Plan to Prevent and Control Deforestation in the

19 Available at http://unfccc.int/files/meetings/dialogue/application/pdf/wp_21_braz.pdf

20 Pacto para a Valorização da Floresta e pelo Fim do Desmatamento na Amazônia (2007). Available at http://www.greenpeace.org/brasil/amazonia/noticias/pacto-nacional-prop-e-metas-an

21 The Norwegian Government announced an initial donation of US$110 million in 2009, with the intention of contributing up to US$1 billion over 10 years.

22 In relation to the average emissions over 1996-2006, this would result in a reduction of 4.8 billion tonnes of CO2e. This initial 40 per cent reduction had already been achieved by the time the PNMC was promulgated, so that future reductions were not as onerous as they appeared. Of course, such reductions will be subject to the winds of change in global commodity markets as well as the political will to enforce reduction commitments on the ground.

Brazilian Amazon (PPCDAM),[23] especially within its 'sustainable productive activities' component, which is also a major segment of activities eligible for funding from the Amazon Fund. The plan also calls for the implementation of similar action plans in other Brazilian biomes, with improvements in capacities for monitoring deforestation and land-use change. Within this framework, the government has pursued negotiations to strengthen the voluntary commitment of resources by northern nations to fortify its national response. Unlike Mexico and Costa Rica, the Brazilian Government has not become part of the World Bank's FCPF, and it is also not engaged in the UN-REDD programme,[24] preferring to define autonomously its response to forest protection as part of the climate negotiations.

Brazil, however, is no different in its rather haphazard development of REDD+ early actions and activities across governance scales. The federal government has commissioned a study to investigate the potential of developing a large-scale PES programme in the Amazon to promote conservation and reduce land-use emissions (Wunder *et al.* 2008) while state governments have prepared action plans that would provide for a 'nested strategy' involving subnational projects and a gradual transition to a national REDD+ approach. Furthermore, while the federal government still resists access to the carbon market for this purpose, and indeed proposes that any and all funding for REDD+ should be channelled through the Amazon Fund, state governors are willing to welcome additional offset financing. An example is the Juma Sustainable Development Reserve–REDD Project in the state of Amazonas, already registered under the Climate Community and Biodiversity Alliance (CCBA) Standard and selling carbon in voluntary markets. As these policies and projects unfold with early initiatives toward REDD+ at a global level, it may be anticipated that a means for conciliation between the federal and state governments' positions will be found, providing for a mix of funding sources, while searching for consistency in national accounting against the baseline.

Since legal title is fairly rare in the areas under most pressure from illegal logging and deforestation at the Amazon fringe, current efforts to support titling, and with it environmental licensing on private lands, have been a high priority, and have absorbed a good share of the resources in the Amazon Fund's initial allocation. Land tenure regularisation – whether through individual land titles or community usufruct concessions – is being promoted through pilot projects co-managed by NGOs and state agencies, which aim to clarify tenure, allocate titles and enforce environmental restrictions. Nonetheless, these titling efforts have not translated into clarity regarding who is entitled to carbon rights and other ecosystem services in different contexts.

According to the 2007 Law on the Management of Public Forests, all services except those associated with forest carbon can be commercialised by forest concessionaires, which implies reserving for the national government the right to put any such credits into the markets (The Terrestrial Carbon Group 2009). However, it is unclear whether carbon transactions would be taxable and by what authority. Likewise, biodiversity constituents of land rights are considered constitutionally to be in the common interest and inalienable – although Congress has not yet incorporated this recognition as a constitutional amendment – and the research and development of products based on biodiversity constituents are subject to approval by a federal commission. This is not the case for water rights, which are now licensed in order to facilitate the approval of specific uses for economic benefit and to establish watershed payments to finance basin management; however, most river basins do not yet have such management structures.

The nature of carbon rights associated with activities on community and indigenous public lands is unclear but it seems to be heading towards granting such rights to communities and private landowners rather than to the state. Stakeholders at the state level have discussed the prospect of incorporating PES payments for carbon conservation as a means of encouraging participation in land use regularisation. However, such schemes have only reached the preliminary discussion stage, although some pilots have been initiated under legislation approved by the state of Amazonas (see discussion below on the 'Bolsa Floresta' programme), while other states are quickly drawing up their own pilot programmes. Congress

23 This plan has been recently updated and renamed as the National Plan to Combat Deforestation and Plan to Combat Deforestation at state Level for the Period 2008-2011.

24 This is a similar initiative to the World Bank's FCPF involving other target countries and funding agencies.

is now considering a specific law regulating REDD+ related environmental service commercialisation in an effort to grease the wheels for developing a larger market in carbon forestry, beyond existing CDM and voluntary pilot projects.

There is some divisiveness regarding who should be the target of REDD+ payments, and what outcomes such decisions might have in terms of equity and efficiency in promoting REDD+. Environment ministry officials have proposed a cap on the amount any individual landholder can receive in exchange for forest conservation commitments, rather than letting the market set a price on carbon forestry. Where agribusiness interests are by far the dominant voice in local politics, REDD+ benefits have sparked considerable interest among those who are unwilling to avoid future deforestation without substantial compensation. However, it is difficult to justify magnanimous payment schemes to actors who have already, for the most part, overshot the limits set by law. Nevertheless, such an approach is being sought, for example, in the state of Mato Grosso, where a pilot REDD+ project is being initiated at the northwest frontier. In this region, a complex mosaic of land reform settlements, private ranches, timber operations and indigenous territories co-exist and the REDD+ approach can help to clarify tenure disputes and substitute more rigorous land use enforcement strategies with the acquiescence of those who, thereby, would be entitled to receive payments for avoided deforestation. Although some progress has been made in defining such a strategy for private lands, the access to such benefits by agrarian reform beneficiaries remains to be worked out over the coming months.

In contrast with projects such as the northwest Mato Grosso initiative, community-directed benefit sharing strategies such as 'Bolsa Floresta' seek to legitimise informal occupation, by reinforcing and stabilising long-term usufruct rights of traditional groups that have lived for generations in harmony with the forest, in areas that are not necessarily threatened by excessive deforestation pressures. In these circumstances, communities have been granted usufruct rights over so-called Sustainable Development Reserves (RDS) by the state government, so tenure insecurity is not a critical issue. The Sustainable Amazonas Foundation (FAS), also a major grant recipient of the Amazon Fund's first set of approved projects, manages 'Bolsa Floresta' in conjunction with traditional community development projects in state-owned RDS in Amazonas state, with additional support from private donors (Brazil's largest private bank, Bradesco, and the Mariott hotel chain are major contributors). FAS has implemented three main categories of payments and benefit sharing strategies, including i) financial compensations to individual households to defray part of the opportunity costs involved in implementing REDD+; ii) incentives/rewards to communities to motivate conservation actions; and, iii) interventions (investments necessary for REDD+ to become effective, such as legal and technical support and modest investments in community enterprises based on non-timber forest products and ecotourism, for example) (Gebara in press). We acknowledge that such distribution of REDD+ incentives to low income forest dwelling groups is more equitable than paying large landowners to avoid deforestation, but probably does not make a significant dent in meeting REDD+ targets.

4.3. Costa Rica

Costa Rica, jointly with Papua New Guinea (PNG), was the first country to propose a mechanism at UNFCCC negotiations for reducing emissions from deforestation and forest degradation in developing countries in 2005. Two years later, at COP-13, other countries, such as India, Indonesia and Bhutan, joined forces to support the inclusion of conservation activities under a REDD framework and to ensure that those countries which had a relatively stable forest cover over the past few decades could also benefit and strengthen such programmes and further increase forest cover (Corbera *et al.* 2010). As for Mexico, the country joined the World Bank's FCPF to design a common financing and implementation framework for REDD+ policies and measures, which will be built predominantly on existing efforts in sustainable forest management and the existing country-wide PES programme (Rojas and Aylward 2003, Zbinden and Lee 2005, Pagiola 2008).

Costa Rica's PES programme was the world's first initiative of this kind which, as noted in Section 3.3, was established under the precepts of the country's 1996 Forest Law. The law defined fiscal instruments that would serve the creation of an economic and institutional framework through which forest owners could be compensated for providing environmental services and public goods, including the National Forestry Financing Fund (FONAFIFO). This Fund administers and allocates funds from fuel and water

taxation, international funds and other donations to forest owners providing ecosystem services. FONAFIFO is being reorganised for the purpose of REDD+ so that its board of directors also includes representatives from indigenous development associations and civil society groups. It will also encompass a Coordinating Unit, which will include technical and administrative staff and an External Body, which will be responsible for monitoring, reporting and verifying the country's reduced emissions and increased carbon stocks. In the short term, REDD+ preparedness funding will be used to discourage illegal logging, promote the consumption of sustainable wood from natural, secondary, and planted forests, and maximise voluntary participation in the PES programme (Costa Rica R-PP 2010). Additionally, Costa Rica aims to strengthen the role of the National System of Conservation Areas (SINAC in Spanish) in controlling illegal logging by developing a satellite digital system backed up by field-based verification activities.

Regarding tenure issues, Costa Rica's R-PP (2010) strategy recognises that, until 2008, those lacking formal titles and living within private landholdings, protected areas or indigenous reserves, were unable to benefit from PES activities. However, now they can access a legal land title only if they show proof that they have held informal tenure from 1998 to 2008, accompanied by a legal declaration by neighbouring owners accepting the creation of a new landholding (Poder Legislativo 2008). This legislative amendment demonstrates the government's willingness to make land titling a priority, insofar as the latter is the only means to secure access to sustainable forest management and PES programmes or to engage in carbon rights transactions with third parties. In the particular case of indigenous reserves, ADIIs hold the legal title to the land, according to cadastral maps and official decrees which contain exact information on the reserve's size, its perimeter and location. These collective authorities are thus legitimised to sign PES contracts or participate in carbon projects.

In this regard, Costa Rica's R-PP (2010) is more explicit than Mexico's in defining carbon rights as 'an "asset" or "good" belonging to the owner of the land where the benefit is achieved', based on existing jurisprudence. The constitutional court has ruled that the 'asset' into which forests or plantations may turn as a result of the ecosystem services they provide is an actual right, derived from the ownership of the forest and, therefore attributable to its owner.[25] Any party owning carbon is thus entitled to participate in national and international transactions related to emission reductions; while private contract law will regulate transactions between private actors, public law will be applicable if the state is one of the parties.

Taking into account these legal precepts, Costa Rica's R-PP (2010) also highlights that PES beneficiaries are *de facto* transfering their carbon rights to FONAFIFO, and therefore should refrain from selling carbon reductions to third parties in order to avoid double counting. Non-PES participants, however, are entitled to sell their carbon rights to third parties but should inform the government for accounting and transparency purposes. In this regard, the Costa Rican Government aims to create a Fraud Control Unit and a Registry of Environmental Service Rights to control the commercialisation and exchange of carbon rights as well as their proper accounting.

As happened in the Mexican case, the World Bank's TAP for Costa Rica has highlighted that the government needs to explain further how it will deal with illegal squatting in public and private forests, besides trying to enforce the rules, and how it will deal with a possible trend towards more profitable economic activities induced by market changes, real estate expansion or population growth (FCPF-Costa Rica 2010). The TAP also notes that the R-PP does not make any explicit reference to how landowners' liabilities regarding carbon conservation over time will be dealt with in the context of the PES programme and subnational carbon projects, an aspect which was also underdeveloped in the Mexican R-PP.

5. Discussion

5.1. Forest tenure, deforestation and enforcement in REDD+

Land and forest tenure is a central issue of concern for future REDD+ policies and measures at country level. This is because tenure regimes define rights over forest resources and, as such, they determine who should be held responsible for making decisions on forest management and land use; in other

25 Resolution No. 546-90

words, who should be held responsible for losses or gains in forest carbon. Forest tenure regimes also determine who can claim ownership and access to ecosystem services and their benefit streams, and thus these regimes will critically mediate the ability of REDD+ policies and measures to achieve effective environmental outcomes in an efficient, equitable and legitimate way (Sunderlin *et al.* 2009, Lyster forthcoming). In many cases, insecure forest tenure often contributes to deforestation and forest degradation processes, although secure rights do not necessarily contribute to forest conservation (Angelsen 1999). Thus secure tenure helps to foster investments not only in forest conservation and sustainable forest management but also in the expansion of agricultural crops. However, although secure tenure has contradictory outcomes for forest conservation, it often shapes the decisions on land and forest use, and also levels the playing field among the different actors aiming to formalise their rights. Furthermore, tenure will determine REDD+ policies and measures in terms of effectiveness, efficiency, equity and legitimacy (Adger *et al.* 2003); it will determine conservation outputs and their cost-effectiveness, the likely impacts across forest users in terms of access to benefits and the latter's involvement in the design and implementation of such measures.

Some of these arguments have been effectively picked up by the evolving REDD+ strategies of our three selected countries, as well as by other countries getting involved in the World Bank and UN-REDD programmes (Davis *et al.* 2010a/b). However, countries tend to identify the wide array of factors driving deforestation and degradation – predominantly unclear land tenure and weak capacity for forest management and law enforcement – but fail to analyse in depth how REDD+ strategies could respond to these challenges, and involve key stakeholders and forest users in such analysis (Davis *et al.* 2010a/b).[26] Mexico and Costa Rica are no exception and their R-PPs do not include sufficient detail on how governments plan to address persisting tenure insecurities, and ongoing and potential new conflicts in forested areas. Mexico does not clarify what will be done to mitigate conflicts in about 2 million ha of the country's forests – conflicts that have not been resolved through PROCEDE – and whether REDD+ policies and actions will simply avoid targeting the areas in which tenure disputes persist (Mexico R-PP 2010). Costa Rica does mention that titling efforts will be pursued, particularly in state-owned forest reserves, so that illegal squatters can engage with sustainable forest management and conservation. However, it does not clarify what rights the squatters should be given and whether they would be willing to accept the conditions, and the institutional incentives that will expand their livelihood opportunities (Costa Rica R-PP 2010).

In Brazil, since deforestation is concentrated along the so-called 'Arc of Deforestation', where tenure insecurity and '*grilagem*' prevail, land tenure regularisation is being promoted as a prerequisite to win contracts for environmental services, be they global or local in scope. The recent law that provides for title regularisation of recent and historical occupations in the Amazon (see Section 3.2) could in fact promote additional deforestation. This is particularly true because the national Forest Code is under revision and may allow private landowners to clear land in excess of the levels currently permitted under this code. Although a perfunctory environmental licence is now required for additional deforestation in the Amazon biome, for REDD+ to be effective within the context of land tenure regularisation, it would be necessary to establish additional environmental restrictions to ensure forest permanence.

Enforcement of existing forest rights and legal provisions, through both state and customary institutions, thus appear as central elements of REDD+ strategies in our selected countries and other developing countries (Davis *et al.* 2010a). It is generally accepted that illegal logging and squatting in forest areas has occurred because neither local landholders nor the government have been able to exclude encroachers or to prosecute them. In many cases, due to weak enforcement, landholders have obtained fake titles for illegally appropriated lands, often linked to corruption involving private land registration offices. In this context, REDD+ incentives are seen as an opportunity to cover some, if not all, of the incremental costs involved in strengthening enforcement, addressing corruption and monitoring illegal logging and trade. Nonetheless, as is the case for insecure tenure

26 The two most recent reviews have included the R-PPs from Argentina, Costa Rica, Kenya, Nepal, Republic of Congo and Tanzania, the Democratic Republic of Congo, Ghana, Guyana, Indonesia, Madagascar, Mexico, Panama and Suriname.

and land-use conflicts, detailed plans on how to address current enforcement problems have not been outlined by most countries involved in REDD+ (Davis *et al.* 2010a), probably because they involve local authorities, forestry officers and national and local elites, while forest users have vested interests and thus prefer to maintain the status quo (Karsenty 2008, Tacconi *et al.* 2009). Furthermore, a critical but as yet undebated question is how enhanced enforcement in particular contexts can lead to detrimental impacts on forest dwellers holding (or not) formal land titles and on those who, within a collective forest regime, only hold limited withdrawal rights over forest resources.

In this context, we are inclined to suggest that putting all the burden for resolving historical land use and property rights conflict on REDD+ is a fallacy that must be put to rest. We agree with those who claim that REDD+ may offer an opportunity to promote reduced deforestation and degradation within those contexts in which property rights issues have been sorted out and that it can be an important source of new resources to assist in bridging improved land-use practice and property rights protection for those who are performing well on social and environmental grounds (Börner and Wunder 2008, Sunderlin *et al.* 2009). But it certainly cannot cover 'all' of the incremental costs associated with property rights regularisation and enforcement of illegal extraction.

5.2. Multiple forest tenure regimes, multiple REDD+ approaches

In Section 3 we showed that each country is characterised by multiple forest tenure systems, and thus varied shares of public, collective or private forests (Table 3). Acknowledging such distribution, including the political and economic context configuring their evolution, should be the starting point for designing policies and measures that can effectively translate into increased carbon stocks and improved economic benefits for all rights holders involved, with special attention on the poorest and less powerful.

While in Mexico collective ownership underpins the management and conservation of most of the country's forests (above 70%), due to the agrarian reform undertaken during the twentieth century (Assies 2008), only about 35% of the Brazilian Amazon forests are managed by rural communities and indigenous groups under different property regimes and regulations. These percentages are, of course, likely to change as long as the partial devolution of public lands to rural communities continues, particularly in extractive reserves, reserves of sustainable development and agroforestry settlements in both federal and state-owned lands (Larson *et al.* 2008). In Costa Rica, public and private ownership are approximately equally shared, with forest collective management being undertaken in at least 10% of the country's forests, while there has been a trend in recent years towards a re-appropriation of private forests by the state.

The fact that forests are to a considerable extent controlled by rural communities, particularly in Mexico and to a lesser degree in Brazil and Costa Rica, can be regarded as an opportunity to maximise the environmental and social outcomes of REDD+. Although depending on institutional conditions and self-governance capacity, rural communities have proved to be effective forest stewards, engaging in community forest management and payment for environmental services related-projects, among others (Bray *et al.* 2002, Nepstad *et al.* 2006, Corbera *et al.* 2009). Thereby, if communities get well organised, and internal conflicts over land and resources are managed, they often build legitimate benefit sharing arrangements for timber and other forest products (Bray and Klepeis 2005, Durán-Medina *et al.* 2005), which can be used by REDD+ policies and measures to channel financial incentives to the local level. One could, of course, argue the opposite and draw on evidence from common property forest regimes where degradation and land-use change have been rather frequent, and particularly severe if they resulted in substantial profits for their members and/or their elites (Klooster 1999).

The evidence presented in Tables 3a/b/c distinguishes multiple 'bundles of rights' in collectively-managed forest regimes, which are considerably distinct depending on whether communities hold all but alienation rights over forest resources (e.g. indigenous communities and ejidos in Mexico, and smallholder settlements in Brazil) or they hold more or less regulated access, withdrawal and management rights over forest resources (e.g. indigenous land and extractive reserves in Brazil, and indigenous reserves in Costa Rica). A shared characteristic of these regimes, however, is the fact that they are governed by a combination of state-based and community/customary authority systems, which in

Table 3a: Forest tenure systems in Mexico - "bundles of rights" and implications for REDD+ design and implementation

	Private forests	**Social property forests**		**state-owned forests**	
	Individual or family landowner; private cooperative/organization, NGOs	**Indigenous communities**	**Ejidos**	**Natural protected areas, biological reserves, etc.**	**Public forests under short/ long-term concessions for forest management**
Rights of access	Privately mediated.	Collective, but mediated by the community assembly.		Access regulated in buffer zones and often prohibited in core protection areas, except in occasional circumstances and for particular recreational uses.	Access defined by the terms of the agreement with the concessionaire.
Rights of withdrawal	Withdrawal of timber, NTFPs requires authorization by the state and the development of a forest management plan.	No restrictions over Non-Timber Forest Products (NTFPs) and firewood, but restrictions over timber extraction (internal quotas). Resource use is often gender differentiated, particularly in indigenous groups. Withdrawal for marketing purposes requires authorization by the state and the development of a management plan.		Authorized for some NTFPs and fuelwood in buffer zones and forbidden for timber. Any kind of withdrawal forbidden in core protection areas.	Authorized only for the concessionaire, following the terms of agreement regarding NTFPs and timber.
Rights of management	Privately mediated, as defined in the previously authorized Forest Management Plan.	Established by the community assembly; The development of CFEs or the concession of rights to third parties is subject to community assembly approval and government authorization.		Established by state regulations.	Established by the state, under the terms of the forest management plan agreed with the concessionaire.
Rights of exclusion	Private owners have the right to exclude outsiders from their property.	Community/ejido members have the right to exclude outsiders from accessing/withdrawing resources in farming lands or the commons.		Held by public agencies in charge of managing the site.	Held by public agencies in charge of the site, as well as by the concessionaire.
Rights of alienation	Private owners can sell or lease their rights to other parties.	Land transactions among community members are allowed but sales to third parties are forbidden.	Land transactions among community members are allowed but sales to third parties should be approved by the ejido assembly.	Held by the state; lands in buffer zones cannot be parceled or transfered.	Held by the state. The concessionaires cannot sale or further lease the land under their management.
Authority (to sanction rights and/or representing the collective)	state institutions, including the Ministry of Environment and Natural Resources (SEMARNAT) in case of violation of forest management rights and the Agrarian Reform Ministry if property rights result threatened by third parties.	Traditional community assembly and periodically elected authority council; the state can mediate in favour of the community in cases of illegal use and land encroachment by migrants or neighbouring communities.	Ejido assembly and periodically elected authority council; the state can mediate in favour of the community in cases of illegal use and land encroachment by migrants or neighbouring communities.	The Ministry of Environment and Natural Resources (SEMARNAT), in particular through the Environmental Protection Agency (PROFEPA) and the National Commission of Protected Areas (CONANP).	The Ministry of Environment and Natural Resources (SEMARNAT), in particular through the National Forestry Commission (CONAFOR).

	Private forests	**Social property forests**		**state-owned forests**	
	Individual or family landowner; private cooperative/organization, NGOs	**Indigenous communities**	**Ejidos**	**Natural protected areas, biological reserves, etc.**	**Public forests under short/ long-term concessions for forest management**
Rights of access	Privately mediated.	Collective, but mediated by the community assembly.		Access regulated in buffer zones and often prohibited in core protection areas, except in occasional circumstances and for particular recreational uses.	Access defined by the terms of the agreement with the concessionaire.
Rights of withdrawal	Withdrawal of timber, NTFPs requires authorization by the state and the development of a forest management plan.	No restrictions over Non-Timber Forest Products (NTFPs) and firewood, but restrictions over timber extraction (internal quotas). Resource use is often gender differentiated, particularly in indigenous groups. Withdrawal for marketing purposes requires authorization by the state and the development of a management plan.		Authorized for some NTFPs and fuelwood in buffer zones and forbidden for timber. Any kind of withdrawal forbidden in core protection areas.	Authorized only for the concessionaire, following the terms of agreement regarding NTFPs and timber.
Implications for REDD+ design & implementation	Need to establish mechanism which clarify carbon ownership and liabilities if landowners have leased their land to third parties. Need to increase technical and legal support for landowners so that they can more effectively deal with the external violation of their forest management plans, for example by illegal loggers or land squatters.	Carbon rights belong to community/ejido members but enforcement of long-term commitment can be difficult. Attribution of individual liabilities in a community context is difficult, if not impossible. Distribution of incentives among community members can be a conflictual process, particularly if forests are managed by multiple actors (e.g. CFEs, external concessionaires) and for multiple purposes.		Increase patrolling by area rangers necessary but potentially conflictual: establishment of usufruct resource-conservation arrangements with third parties and promote livelihood diversification may be required. Carbon rights and liabilities fall exclusively on the state.	There is a need to clarify who is entitled to carbon revenues and who is responsible for losses. It should also be clarified if concessinaires are entitled to sell carbon benefits to third parties and, if so, under which conditions (including taxation if applicable).

Source: own elaboration

Table 3b: Forest tenure systems in Brazil - "bundles of rights" and implications for REDD+ design and implementation

	Private forests	Social property	state-owned forests					
	Individual or family landowner; private cooperative/ organization, NGOs	**Traditional community (shared property systems)**	**National parks, protected areas, etc.**	**Indigenous reserves**	**Extractive reserves**	**Sustainable development reserves**	**Agro-extractive and forestry settlements**	**Private concessions**
Rights of access	Privately mediated, regulated by the state for Legal Reserves and APPs.	Attributed by groups of proprietors in accord with consuetidinary practices.	Mediated by the federal, state or local government.	Delimited by the state according to historical occupation/claims.	Collective / mediated by RESEX Council.	Mediated by state or federal government.	Mediated by INCRA or state agrarian reform agency.	Mediated by federal, state or local government
Rights of withdrawal	Unrestricted extraction for direct local use except from APPs.	Unrestricted extraction for direct local use.	No extraction permitted of any kind.	No restrictions on extraction of NTFPs or timber for domestic or collective local use (except Permanent Protection Areas-APPs).				No restrictions for NFTPs or timber products for direct local use by concessionaire or laborers.
Rights of management	Rights to withdraw timber, NTFP subject to a state-approved management plan.	Rights to withdraw timber, NTFP subject to collective agreements.	No extraction permitted of any kind; research, education and tourism subject to management plan.	Commercial logging may be allowed based on approved management plans (no approved cases to date).	Commercial logging allowed if it complements other activities based on approved management plans.			Commercial logging allowed based on approved management plans and subject to payment of fees to the state.
Rights of exclusion	Private landowners exclude other users subject to "social function" of land (may offer limited access by others).	Traditional communities have no legal right to exclude contested users but seek to regularize use.	state managers have the right to demand removal of conflicting users (problems exist where these are not indemnified).	Indigenous groups have the right to exclude or demand removal of all non-tribal users.	Members have the right and responsibility to exclude outsiders.			Concessionaires have the right to exclude outsiders.
Rights of alienation	Private owners can sell or lease their rights to other parties.	Community members cannot sell common property, but their rights may be usurped since they lack titles.	No land sale is permitted; concessions to operate non-extractive activities may be permitted.	Land transactions are not allowed; rights are hereditary to tribal members collectively.	Land transactions are not allowed; rights are hereditary.	Land transactions are not allowed; rights are hereditary.	Until titling and emancipation of settlement, no land transactions may take place except to other approved settlers	Concessionaires may withdraw or be removed if they do not follow the management plan or pay fees.

	Private forests	Social property	state-owned forests					
	Individual or family landowner; private cooperative/ organization, NGOs	**Traditional community (shared property systems)**	**National parks, protected areas, etc.**	**Indigenous reserves**	**Extractive reserves**	**Sustainable development reserves**	**Agro-extractive and forestry settlements**	**Private concessions**
Rights of access	Privately mediated, regulated by the state for Legal Reserves and APPs.	Attributed by groups of proprietors in accord with consuetidinary practices.	Mediated by the federal, state or local government.	Delimited by the state according to historical occupation/claims.	Collective / mediated by RESEX Council.	Mediated by state or federal government.	Mediated by INCRA or state agrarian reform agency.	Mediated by federal, state or local government
Rights of withdrawal	Unrestricted extraction for direct local use except from APPs.	Unrestricted extraction for direct local use.	No extraction permitted of any kind.	No restrictions on extraction of NTFPs or timber for domestic or collective local use (except Permanent Protection Areas-APPs).				No restrictions for NFTPs or timber products for direct local use by concessionaire or laborers.
Authority (to sanction rights and/or representing the collective)	The state sanctions private occupation and use; approves management plans over Legal Reserves.	Proprietors attempt to sanction rights, but may be contested.	The designated local, state or federal agency approves the management plan; in absence of plan no use is permitted.	The federal government agency FUNAI assists but does not control tribal land management and protection against incursion.	The state approves management plans. The RESEX council oversees resource use/management.	The state approves management plans; local community associations oversee resource management and protection.	The state imposes individual and collective land use plans and oversees management plans for forest resource use in cases they exist	The state sanctions and authorizes concessionaire's use rights, subject to periodic evaluation and third-party certification.
Implications for REDD+ and carbon rights	REDD+ benefits should only be provided when landowner formally protects area in excess of Forest Code requirement.	Common property and management need strengthening; could be favourable to REDD+.	Unclear whether protected non-use areas should be considered additional for REDD+; de facto versus de jure protection may imply value added by REDD+.	Unclear to whom carbon rights belong, but tendency to remain with tribal authority; REDD+ can be crucial to protect and sustain indigenous areas.	Collective favourable to REDD+; Distribution of REDD+ incentives through RESEX board possible, but public property may imply governmental control.	Collective favourable to REDD+; require structuring of local administrative entity to avert transactions costs to members.	PES to individual settlers can make agroextractive settlement more viable and valorize remaining forests; important opportunity for REDD+.	Public forests law specifically excludes commercialization of carbon services; long-term permanence and reduced degradation important to REDD+.

Source: own elaboration

Table 3c: Forest tenure systems in Costa Rica - "bundles of rights" and implications for REDD+ design and implementation

	Private forests		state-owned forests	
	Individual or family landowner; private cooperative/ organization, NGOs	Indigenous reserves	Natural protected areas, biological reserves, etc.	Protected wilderness areas (PWA)
Rights of access	Privately mediated.	Collective, but mediated by the community general assembly of the ADIIs.	Access regulated and often prohibited in the whole protection areas, except in particular public use zones where regulated activities are allowed according to management plan.	Access regulated and often prohibited in state land and privately mediated in private land.
Rights of management	In natural forests: privately mediated, but only for those activities authorized in SFM and Forest Conservation plans. In forest plantations: private owner has the right to manage forest resources freely. Under a PES contract, there may be some management restrictions.	No forest management rights for commercial use. Land-use change is forbidden.	Established by state regulation. Some management activities which are allowed are fire breaks, fencing, vigilance, and visitation management, maintenance of trails, signs, and infrastructure which are directed to protection and biodiversity research which are the main activities allowed by law.	Land-use change is forbidden. (For private land in PWA the following rights apply) In natural forests: access is privately mediated, but only for those activities authorized in SFM and Forest Conservation plans. Withdrawal of timber and NTFP requires specific authorization by SINAC. Management plans have additional restrictions and requirements like Environmental Impact Studies. Forests involved in the PES programme do not have rights for withdrawal during the contract. Development of management plans or involvement in the PES programme are only possible with land title - the state may recognize tenure if the owner shows proof of a 10-year peaceful and continuous occupation of the land before the creation of the PWA. In forest plantations: the owner has the right to manage resources freely. Timber can be harvested without permission -but a transportation permit is required. Plantations involved in the PES programme may face some management restrictions as defined in the PES contract. (For public land the following rights apply) Resource withdrawals are forbidden. Management for conservation follows state regulations
Rights of exclusion	Private owners have the right to exclude outsiders from their property.	Community members have the right to exclude outsiders from accessing/ withdrawing resources in family landholdings or their common forests.	Held by the state through SINAC which is responsible of their protection.	In private land: private owners have the right to exclude outsiders from their property. In Public land: held by SINAC, in charge of managing protected areas.

	Private forests		state-owned forests	
	Individual or family landowner; private cooperative/ organization, NGOs	Indigenous reserves	Natural protected areas, biological reserves, etc.	Protected wilderness areas (PWA)
Rights of access	Privately mediated.	Collective, but mediated by the community general assembly of the ADIIs.	Access regulated and often prohibited in the whole protection areas, except in particular public use zones where regulated activities are allowed according to management plan.	Access regulated and often prohibited in state land and privately mediated in private land.
Rights of alienation	Private owners can sell or lease their land, forest and carbon rights to other parties. In the case of carbon, the owner may assign his/her carbon rights to a third party subject to a compensation mechanism. Therefore, carbon rights bought by FONAFIFO belong to the state, since they were acquired with public funds, and FONAFIFO, in turn, may commercialize such rights at its convenience according to the current legal framework.	Land transactions among community members are allowed but sales to third parties are forbidden. However, there are severe problems of squatting and appropriation of forest resources in indigenous territories.	Held by the state, but some concession in no essential services can be made to private agents (parking lots, stores, food, trail maintenance).	state cannot sell land, but it could allow non strategic concessions Private owners can sell or lease their land, forest and carbon rights to other parties. In the case of carbon, the owner may assign his/her carbon rights to a third party subject to a compensation mechanism.
Authority (to sanction rights and/or representing the collective)	state institutions (SINAC, FONAFIFO), including the Ministry of Environment (MINAET), forest regents, police, colleague of agricultural engineers (CIAGRO), and the judiciary in case of violation of forest management rights, or PES contract.	Customary law and institutions by the community assembly.	The Ministry of Environment (MINAET), and SINAC in particular through the National Park Service with the help of police and the Committees for the Surveillance of Natural Resources (COVIRENAS) should enforce the law. The state judiciary is in charge to process violations of forest rights.	
Implications for REDD+ design & implementation (e.g.	Environmental services, including carbon, generated by forest or plantations are considered an "asset" or "good" belonging to the owner of the land. Rural actors may be prompted to participate in REDD+ actions, with the subsequent establishment of solid independent monitoring, evaluation and reporting mechanism. No incompatibilities are foreseen between the proposed implementation framework and the possible obligations under an eventual UNFCCC REDD+ mechanism, nor are there any identified elements additional to those already included for guaranteeing transparency, accountability and equity, or additional institutional and governance reforms.	In indigenous territories, environmental services, and carbon belong to the indigenous community, and idem to first column. Internal distribution of REDD+ incentives through ADIIs own procedures.	In public lands, carbon rights belong to the state.	In public lands carbon rights belong to the state, and in private land idem to first column.

Source: own elaboration

turn are critical for developing forest management and conservation activities, and ensuring the local legitimacy of any REDD+ related adopted options, contributing to enforce existing and new regulations regarding land and forest use. Therefore, there are important implications in the way that tenure regimes interact with local systems of authority, not only for decision making on land and forest use, but also for benefit sharing.

We suggest that four important issues should be considered when REDD+ actions are developed through collective forest tenure regimes. The first has to do with procedural legitimacy; that is, ensuring that indigenous and rural communities, or at least their representatives, are involved from the start in designing REDD+ strategies across governance scales, even if such involvement increases the cost of the consultation process and the time employed to draft such strategies. Many scholars have already observed that the early involvement of community groups in REDD+ design, both at country and international levels, is critical from democratic and legal standpoints, as well as ensuring the long-term success of REDD+ actions (Humphreys 2007, Lyster forthcoming). Unfortunately, evidence from Mexico and Costa Rica suggests that there are not yet clear government procedures for how indigenous peoples and community groups will shape REDD+ policies and measures – in fact, these strategies seem pretty well defined already – or how they will be involved, for example, in monitoring early actions. This is, again, a common vacuum in other countries involved in the World Bank FCPF initiative (Davis *et al.* 2010a/b).

A second important issue to take into account when REDD+ options are implemented by rural communities, and which is also relevant for privately-owned forests, concerns the provision of clear, but substantive information on why and where REDD+ activities should be developed, and who is entitled to forest carbon and its correspondent benefit streams. Governments should clearly identify who owns carbon in community-managed forests; state-owned or not, how carbon rights should be transferred or managed for commercialisation and what are the implications of the chosen strategies for benefit sharing by all parties (i.e. government, forest rights holders and other interested actors, including CFEs, timber concessionaires and NGOs).

The third issue concerns the future distribution of REDD+ incentives within forest communities. This tends to be overlooked in REDD+ writings, insofar as communities are perceived to have their own legitimate systems of benefit sharing. However, evidence from carbon forestry projects operating on common property has shown that project developers ignore community politics and do not pay attention to the exclusion of particular social groups from carbon payments, such as women, landless people, and other vulnerable groups of the rural poor (Corbera *et al.* 2007, Sunderlin *et al.* 2009). This inevitably poses difficult questions: should governments and project developers oversee the distribution of REDD+ benefits within rural communities and indigenous groups? And, if they should, what are the political costs and the organisational challenges of doing so? Communities partnering with timber concessionaires will encounter an additional layer of complexity, since REDD+ related activities will have to be aligned with the concessionaire's interest, and *vice versa*, and carbon revenue sharing may become a source of conflict.

The fourth and last issue to take into account is the likely impact of proposed instruments not only on benefit sharing, but also on local culture and future attitudes towards conservation, and the subsequent need to rethink and adapt REDD+ options to local contexts. However, there seems to be a clear trend in selected countries, as well as across Latin America, to use economic instruments like PES programmes as pillars of national REDD+ strategies, to effectively pay landowners to engage in forestry rather than in other agricultural activities and compensate rural communities for their forest stewardship role. These programmes are still relatively young experiments, with uncertain and mixed outcomes on deforestation avoidance, conservation and livelihood impacts, including poverty alleviation (Zbinden and Lee 2005, Muñoz-Piña *et al.* 2008, Pagiola 2008, Hall 2008, Corbera *et al.* 2009) and therefore it would be risky to make a considerable part of REDD+ success conditional on PES performance. In fact, there is emerging evidence that these programmes can result in a 'crowd-out' effect on conservation outcomes (Vatn 2010, Kosoy and Corbera 2010) and they can in fact induce forest users to threaten deforestation unless they are continuously rewarded (Kaimowitz 2008).

The opportunities and challenges involved in bringing forest communities to participate actively in REDD+ should not, however, make us forget about the likely benefits and risks involved in engaging private forest owners, or long-term usufruct concessionaires, in policies and measures for sustainable forest management and conservation. Private forest owners are likely to be interested in REDD+ if the designed policies and measures are sufficiently attractive in both procedural and economic terms, insofar as trade-offs are very likely between carbon emissions due to logging, which can be low under good forest management, and the economic returns on that activity (Nepstad *et al.* 2007, cited in Johns *et al.* 2008). For example, Brazilian private concessionaires on public forest lands have been explicitly excluded from commercialising carbon credits obtained by avoiding deforestation, although they may sell such credits if derived from restoring degraded sites through reforestation. This may therefore restrict the benefits potentially obtainable through good timber extraction practice – a clear case of rent seeking on the part of the national state – and may be one reason for so few proposals for public forest timber concessions to date. Generally speaking, in private forests, benefit sharing may not be as complex a process as for collective forest tenure regimes, but the same concerns highlighted above about transparency of information and clarification of carbon ownership issues also apply. Furthermore, as for those communities who engage in commercial logging through CFEs or the like, the government will need to account for carbon balances in carbon management and build the corresponding monitoring and verification systems which link in efficiently with regional or national carbon accounting systems.

In the case of state-owned and managed forests, the enforcement and likely redefinition of existing 'bundles of rights'[27] to halt deforestation, degradation and to further steer conservation will drive governments' efforts in these very often controversial spaces. It has been argued that REDD+ and its associated climate change/ecosystem services discourse will be used by public conservation agencies to increase their operational resources and promote conservation strategies which become more restrictive (Lovera 2009), following those who advocate for a renewed exclusionary conservation agenda (Terborgh 1999). REDD+ incentives may not make a substantial difference in addressing current management problems and enforcement levels in many protected areas, particularly because, as for community-managed forests, land-use change in these areas reflects complex interactive social and political processes within which no single process alone explains the illegal appropriation of forest resources (Adams and Hutton 2007). This requires effective coordination and willingness to cooperate across government agencies and from those involved in land-use change processes, a difficult but of course not impossible endeavour that will require both additional resources and political willingness (Kaimowitz 2008). Furthermore, as occurring in Brazil, there may be social contestation over the use of protected areas designated for integral non-use to become objects for REDD+ carbon accounting, even if significant logging proceeds in these areas. Where specific REDD+ actions result in the creation of new protected areas, carbon revenues will probably be critical in guaranteeing their viability and addressing conflicting uses of forest resources.

5.3. Framing carbon rights across forest tenure regimes

The last critical question concerns the treatment of carbon rights and their associated liabilities. Mexican and Costa Rican jurisprudence recognises that carbon rights belong to forest owners, and such a perspective re-emphasises the critical role that forest tenure rights play in REDD+, insofar as lacking title would impede a resource user becoming entitled to carbon rights and accessing their potential benefits. On the other hand, it establishes a clear legal framework on which resource users can rely to claim and benefit from carbon rights. Such a legal framework also defines how forest owners can transfer their carbon rights to third parties, and explicitly acknowledges that such rights become *de facto* owned by the state if forest owners engage in publicly-funded PES programmes; this is very explicit in Costa Rica and less so in Mexico and Brazil. The state is regarded as the legitimate owner of carbon rights in those forests exclusively administered by the government, such as protected areas, which in turn has implications for the likely or unlikely benefits that communities and forest users living within these areas may be able to derive. Brazil is in the process of drafting national legislation for

27 Table 3 shows how specific social actors can occasionally be granted access and withdrawal rights over certain resources in protected areas.

REDD+ quotas on private lands and a proposed PES law which specifically includes traditional communities, although it is unclear whether the latter would be able to access payments when their usufruct rights are exercised on public lands. As noted in Section 4.2 and above, the Law on the Management of Public Forests already contains an explicit reference to the state's legitimate entitlement to forest carbon from concessionaires and it is thus likely that the state will also claim the carbon rights from government-administered areas, as in Mexico and Costa Rica.

The existing jurisprudence and the preliminary steps being taken to define how carbon rights will be played out under each type of forest regime are necessary and should be welcomed. These steps are also being taken in other developing countries, where there also seems to be a clear trend towards linking carbon rights directly with those who are actually responsible for forest management, as defined in formal property arrangements and regulations (Davis *et al.* 2010a/b). States seem to be willing to grant carbon rights to actual forest users while retaining carbon rights from publicly-administered forests and, in some cases, as in Brazil, also from forest management activities in private concessions. The latter approach may be precisely aimed at preventing private actors like timber companies profiting from carbon trading.

It is our view, however, that governments have still not reflected clearly on the liabilities associated with holding and exercising carbon rights. This is clearly an underdeveloped aspect in evolving REDD+ national strategies under the World Bank and UN programmes. In our selected cases, neither Mexico nor Costa Rica explain in their R-PPs the penalties associated with carbon rights if carbon rights holders fail to meet their long-term commitments to forest management and conservation. Insights, for example, on how the non-compliance penalties in PES programmes have actually been enforced (and if not, why) have not been provided. Similarly, there is no information on how local communities who have sold their carbon rights should respond to any carbon losses in the future. For example, should a community that deliberately engages in land-use change respond to carbon removals in the same way as another one where such removals result from illegal logging by third parties or a natural hazard? Seemingly, it is unclear how communities engaging with third parties in carbon trading can enforce their rights if these parties fail to meet contract requirements.

These are, of course, only some of the questions that could be posed when we think about the relationship between carbon rights and liabilities, which is likely to be played out in different forest tenure regimes responding to different authorities regarding forest management regulations. Therefore, coming up with understandable regulations for forest users, government officers and other actors involved in REDD+ is particularly urgent given the increasing number of REDD+ sub-national activities being developed by state and non-state actors. In this regard, as Costa Rica's example suggests, new institutions to deal with carbon accounting and carbon rights transfers, as well as monitoring, enforcement and verification of carbon credit trading, are likely to be created. These should operate in a transparent manner as well as be endorsed by both formal and customary authorities engaged in the management, control and sanctioning of forest resource use from the local to national levels.

6. Conclusion

REDD+ is becoming a reference framework in developing countries to strengthen and develop new policies and measures for halting land-use change and increasing sustainable forest management and conservation initiatives. In this paper, we have reflected on the role of forest tenure in the context of REDD+, and particularly on the interactions between forest rights, REDD+ policies and measures, and carbon rights and liabilities. Informed by evidence from Mexico, Brazil and Costa Rica, we have shown that forest tenure regimes are a product of historical processes, which encompass multiple 'bundles of rights' over different forest resources and that in turn determine who has access to and control over these resources. We have explained the different configuration of forest tenure regimes in these countries and shown how REDD+ national strategies have considered issues related to deforestation and degradation, as well as enforcement and carbon rights in these particular regimes. We have also discussed how these different forest tenure regimes are likely to shape the development of REDD+ policies and measures, including benefit sharing, the allocation of carbon rights and the distribution of liabilities.

Overall, we believe that efforts to provide more legal clarity on forest tenure systems should be, and often already are, a first and necessary step for developing countries to secure REDD+ success. However, it would be a mistake to assume that forest tenure security should naturally translate into a greater concern for the environment on behalf of the new rights holders. In this regard, we have shown that forest tenure regimes with formally established 'bundles of rights' and sanctioning authorities are still subject to deforestation and degradation processes, led by rights holders themselves or by external actors who compete for forest resources. Forest users are continuously exposed to development and economic policies which try to push the boundaries of agricultural and other commodity frontiers.

We are thus convinced that for REDD+ policies and measures to be effective, equitable and legitimate it is important for countries not only to address tenure insecurities and conflicts, but to understand what forest rights mean for different people under different forest tenure regimes, how they exercise their rights over forest resources or why they fail to do so. The diversity of forest tenure systems in Latin America and across all developing countries implies that a 'one size fits all' approach to REDD+ is doomed. For this reason, we welcome the combination of SFM, PES and other programmes taking place in our selected countries, but we urge governments to particularise their policies and measures in order to minimise the likely trade-offs involved. We are aware that organising context-specific responses to land-use change and forest resource use is likely to lead towards increasing political and organisational complexity, as well as higher economic costs, but we are also sure that this will maximise the chances for successful actions and resource users' long-term commitment to forest management and conservation. It is certainly worth a try.

References

Adams, W.N. and Hutton, J. 2007 People, parks and poverty: Political ecology and biodiversity conservation. Conservation and Society 5(2): 147-183.

Adger, W.N. and Luttrell, C. 2000 Property rights and the utilisation of wetlands. Ecological Economics 35: 75-89.

Adger, W.N., Brown, K., Fairbrass, J., Jordan, A., Paavola, J., Rosendo, S. and Seyfang, G. 2003 Governance for sustainability: Towards a 'thick' analysis of environmental decisionmaking. Environment and Planning A 35(6): 1095-1110.

Agarwal, B. 1997 Environmental action, gender equity and women's participation. Development and Change 28: 1-44.

Alston, L.J., Libecap G.D. and Mueller, B. 1999 Titles, conflict and land use: The development of property rights and land reform on the Brazilian Amazon frontier. Economics, Cognition and Society Series, University of Michigan, Ann Arbor.

Angelsen, A. 1999 Agricultural expansion and deforestation: Modeling the impact of population, market forces and property rights. Journal of Development Economics 58: 185-218.

Angelsen, A. (ed.) 2009a Realising REDD+: National strategy and policy options. Center for International Forestry Research, Bogor.

Angelsen, A. 2009b Policy options to reduce deforestation. *In:* Angelsen, A. (ed.) Realising REDD+: National strategy and policy options, 125-138. Center for International Forestry Research, Bogor.

Araujo, C., Araujo Bonjean, C., Combes, J.L., Combes Motel, P. and Reis, E.J. 2009 Property rights and deforestation in the Brazilian Amazon. Ecological Economics 68(8-9): 2461-2468.

ARD Inc. 2007 Land tenure and property rights regional report Volume 2.10: The Caribbean, Central America, and North America. Publication produced for review by the United states Agency for International Development by ARD, Inc.

Assies, W. 2008 Land tenure and tenure regimes in Mexico: an overview. Journal of Agrarian Change 8(1): 33-63.

Börner, J. and Wunder, S. 2008 Paying for avoided deforestation in the Brazilian Amazon: From cost assessment to scheme design. International Forestry Review 10(3): 496-511.

Bouquet, E. 1996 La tierra ejidal en Mexico: mercancia u objeto social? Revista Estudios Agrarios, 5. Available at http://www.pa.gob.mx/publica/pa07a.htm

Boyd, E., Corbera, E. and Estrada, M. 2008 UNFCCC negotiations (pre-Kyoto to COP-9): What the process says about the politics of CDM-sinks. International Environmental Agreements: Politics, Law and Economics 8: 95-112.

Boyd, E., Hultman, N., Timmons Roberts, J., Corbera, E., Cole, J., Bozmoski, A., Ebeling, J., Tippman, R., Mann, P., Brown, K. and Liverman, D. 2009 Reforming the CDM for sustainable development: Lessons learned and policy futures. Environmental Science and Policy 12(7): 820-831.

Bray, D.B., Merino-Pérez, L., Negreros-Castillo, P., Segura-Warnholz, G., Torres-Rojo, J.M. and Vester, H.F.M. 2002 Mexico's community-managed forests as a global model for sustainable landscapes. Conservation Biology 17(3): 672-677.

Bray, D.G. and Klepeis, P. 2005 Deforestation, forest transitions, and institutions for sustainability in south-eastern Mexico. Environment and History 11: 195-223.

Bray, D.B. and Merino-Pérez, L. 2005 La experiencia de las comunidades forestales en México. Veinticinco años de silvicultura y construcción de empresas forestales comunitarias. Secretaría de Medio Ambiente y Recursos Naturales, Mexico.

Bray, D.B., Merino-Pérez, L. and Barry, D. 2005 Community managed in the strong sense of the phrase: The community forest enterprises of Mexico. *In:* Bray, D.B., Merino-Pérez, L. and Barry, D. (eds.) The community forests of Mexico: Managing for sustainable landscapes, 3-26. University of Texas Press, Austin.

Brito, B. and Barreto, P. 2010 Impactos das novas leis fundiárias na definição de direitos de propriedade no Pará. O Estado da Amazônia 15: March 2010. Belém: Imazon.

Brockett, C.D. and Gottfried, R.R. 2002 state policies and the preservation of forest cover: Lessons from contrasting public-policy regimes in Costa Rica. Latin America Research Review 37(1): 7-40.

Corbera, E., Brown, K. and Adger, W.N. 2007 The equity and legitimacy of markets for ecosystem services. Development and Change 38(4): 587-613.

Corbera, E., González Soberanis, C. and Brown, K. 2009 Institutional dimensions of payments for ecosystem services: An analysis of Mexico's carbon forestry programme. Ecological Economics 68: 743-761.

Corbera, E., Estrada, M. and Brown, K. 2010 Reducing greenhouse gas emissions from deforestation in developing countries: Revisiting the assumptions. Climatic Change 100: 355-388.

Corbera, E. and Brown, K. 2010 Offsetting benefits? Analyzing access to forest carbon. Environment and Planning A 42(7): 1739-1761.

Cornelius, W. and Myhre, D. (eds.) 1998 The transformation of rural Mexico: Reforming the ejido sector. Center for US-Mexican Studies, La Jolla.

Costa Rica: Readiness preparation proposal (Costa Rica R-PP) 2010 Forest Carbon Partnership Facility, World Bank, Washington DC.

Cotula, L. and Mayers, J. 2009 Tenure in REDD - Start-point or afterthought? Natural Resource Issues No. 15. International Institute for Environment and Development. London, UK.

Davis, C., Nakhooda, S. and Daviet, F. 2010a Getting ready. A review of the World Bank Forest Carbon Partnership Facility readiness preparation proposals, v 1.3. WRI Working Paper. World Resources Institute, Washington DC. Available at http://www.wri.org/gfi

Davis, C., Williams, A., Goers, L., Daviet, F. and Lupberger, S. 2010b Getting ready with forest governance. A Review of the World Bank Forest Carbon Partnership Facility readiness preparation proposals, v.1.4. WRI Working Paper. World Resources Institute, Washington DC. Available at http://www.wri.org/gfi

de Camino, R., Segura, O., Arias, L.G. and Pérez, I. 2000 Costa Rica: Forest strategy and the evolution of land use. World Bank, Washington, DC.

de Ita, A. 2008 Land concentration in Mexico after PROCEDE. *In:* Rosset, P.M., Patel, R. and Courville, M. (eds.) Promised land: Competing visions of agrarian reform. Institute for Food and Development Policy, Oakland.

de Jong, B.H.J., Iglesias Gutiérrez, L. and Alanís de la Rosa, J.A. 2008 Advances of Mexico in preparing for REDD. Presentation at the UNFCCC Workshop on Methodological Issues relating to Reducing Emissions from Deforestation and Forest Degradation in Developing Countries. Tokyo, Japan 25-27 June 2008.

de Oliveira, J.A.P. 2008 Property rights, land conflicts and deforestation in the Eastern Amazon. Forest Policy and Economics 10(5): 303-315.

Durán-Medina, E., Mas, J.F. and Velázquez, A. 2005 Land use/cover change in community-based forest management regions and protected areas in Mexico. *In:* Bray, D.B., Merino-Pérez, L. and Barry, D. (eds.) The community forests of

Mexico: Managing for sustainable landscapes, 215-238. University of Texas Press, Austin.

Ellsworth, L. 2002 A place in the world: Tenure security and community livelihoods. A Literature Review. Forest Trends, Washington DC.

Ellsworth, L. and White, A. 2004 Deeper roots: Strengthening community tenure security and community livelihoods. Ford Foundation, New York.

Finley-Brook, M. 2007 Indigenous land tenure insecurity fosters illegal logging in Nicaragua. International Forestry Review 9(4): 850-864.

Food and Agriculture Organization of the United Nations (FAO) 2010a Global forest resources assessment 2010. Key Findings. Available at http://foris.fao.org/static/data/fra2010/KeyFindings-en.pdf

Food and Agriculture Organization of the United Nations (FAO) 2010b Evaluación de los Recursos Forestales Mundales. Informe Nacional, México. Available at http://www.fao.org/forestry/20262-1-176.pdf

Food and Agriculture Organization of the United Nations (FAO) 2010c Global forest resources Assessment. Brazil, Country Report. Available at http://www.fao.org/forestry/20262-1-206.pdf

Food and Agriculture Organization of the United Nations (FAO) 2010d Evaluación de los Recursos Forestales Mundiales. Informe Nacional, Costa Rica. Available at http://www.fao.org/forestry/20262-1-172.pdf

Forest Carbon Partnership Facility-Mexico (FCPF-Mexico) 2010 Readiness preparation proposal review: Mexico. Reviewer: David Kaimowitz (lead) + 10 reviewers. Date of review: 3 March 2010.

Forest Carbon Partnership Facility-Costa Rica (FCPF-Costa Rica) 2010 Readiness preparation proposal review: Costa Rica. Reviewer: Eduardo Morales and Sandra Brown + other reviewers. Date of review: 17 June 2010.

Forsyth, T. 2009 Multilevel, multiactor governance in REDD+: Participation, integration and coordination. *In:* Angelsen, A. (ed.) Realising REDD+: National strategy and policy options, 113-124. Center for International Forestry Research, Bogor, Indonesia.

Fortmann, L. 2000 Property in non-timber forest products. European Tropical Forest Research Network 32: 72-73.

Fuys, A. and Dohrn, S. 2010 Common property regimes: Taking a closer look at resource access, authorisation, and legitimacy. *In:* German, L.A., Ramisch, J.J. and Verma, R. (eds.) Beyond the biophysical knowledge, culture, and politics in agriculture and natural resource management, 193-214. Springer, The Netherlands.

Gebara, M.F. (in press) Benefit sharing mechanisms for REDD+: How to equitably share benefits among forest managers. Conservation and Society.

Gould, K.A. 2006 Land regularization on agricultural frontiers: The case of Northwestern Petén, Guatemala. Land Use Policy 23(4): 395-407.

Government of Brazil 2006 Submission of Brazil: Dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention, Second workshop Nairobi, 15–16 November 2006, UNFCCC.

Gueneau, S. and Tozzi, P. 2008 Towards the privatization of global forest governance? International Forestry Review 10(3): 550-562.

Hanna, S., Folke, C. and Mäler, K.G. 1996 Property rights and the natural environment. *In:* Hanna, S., Folke, C. and Mäler, K.G. (eds.) Rights to nature: Ecological, economic, cultural and political principles of institutions for the environment, 1-10. Island Press, Washington, DC.

Hatcher, J. 2009 Securing tenure rights and reducing emissions from deforestation and degradation (REDD): Costs and lessons learned. Rights and Resources Initiative, Washington DC.

Hall, A. 2008 Better RED than dead: Paying the people for environmental services in Amazonia. Philosophical Trnsactions of the Royal Society 363: 1925-1932.

Harvey, C.A., Zerbock, O., Papageorgiou, S. and Parra, A. 2010 What is needed to make REDD+ work on the ground? Lessons learned from pilot forest carbon initiatives. Conservation International, Washington DC.

Humphreys, D. 2007 The politics of 'avoided deforestation': Historical context and contemporary issues. International Forestry Review 10(3): 433-442.

Hyde, W.F., Belcher, B. and Xu, J. (eds.) 2003. China's forests: Global lessons and market reforms. Resources for the Future, Washington DC and CIFOR, Bogor.

Lentini, M., Pereira, D., Celentano, D. and Pereira, R. 2005 Fatos Florestais da Amazônia. Instituto do Homem e Meio Ambiente da Amazônia, Belém.

Jaramillo, C.F. and Kelly, T. 1997 Deforestation and property rights in Latin America. Inter-American Development Bank Report.

Johns, T., Merry, F., Stickler, C., Nepstad, D., Laporte, N. and Goetza, S. 2008 Three-fund approach to incorporating government, public and private forest stewards into a REDD funding mechanism. International Forestry Review 10(3): 458-464.

Kaimowitz, D. 2008 The prospects for Reduced Emissions from Deforestation and Degradation (REDD) in Mesoamerica. International Forestry Review 10(3): 484-495.

Karsenty, A. 2008 The architecture of proposed REDD schemes after Bali: Facing critical choices. International Forestry Review 10(3): 443-457.

Klooster, D. 1999 Community-based forestry in Mexico: Can it reverse processes of degradation? Land Degradation and Development 10: 365-381.

Kosoy, N. and Corbera, E. 2010 Payments for ecosystem services as commodity fetishism. Ecological Economics 69: 1228-1236.

Larson, A.M, Cronkleton, P., Barry, D. and Pacheco, P. 2008 Tenure rights and beyond: Community access to forest resources in Latin America. Center for International Forestry Research, Bogor, Indonesia.

Lavadenz, I. and Deininger, K.W. 2001 Mexico: Land policy a decade after the ejido reform. Report No. 22187 ME. The World Bank, Washington DC and Secretaría de Reforma Agraria, Mexico City.

Lovera, S. 2009 REDD realities. *In:* Brand, U., Bullard, N., Lander, E. and Mueller, T. (eds.) Contours of climate justice: Ideas for shaping new climate and energy politics. Dag Hammarskjöld Foundation Occasional Paper No. 6.

Lyster, R. (forthcoming) REDD+ transparency, participation and resource rights: The role of law. *In:* Corbera, E., Schroeder, H., and Springate-Baginski, O. (eds.) Governing and implementing REDD+, special issue for Environmental Science and Policy (winter 2010-2011).

May, P. and Millikan, B. 2010 Learning from REDD: A Global Comparative Study – country profile report: Brazil. Draft report to CIFOR.

Meinzen-Dick, R. and Mwangi, E. 2008 Cutting the web of interests: Pitfalls of formalizing property rights. Land Use Policy 26: 36-43.

Merino-Pérez, L. and Segura-Warnholtz, G. 2005 Forest and conservation policies and their impact on forest communities in Mexico. *In:* Bray, D.B., Merino-Pérez, L. and Barry, D. (eds.) The community forests of Mexico: Managing for sustainable landscapes, 49-69. University of Texas Press, Austin.

Merrill, T.L. and Miró, R. (eds.) 1996 Mexico: A country study. GPO for the Library of Congress, Washington DC.

Mexico: Readiness preparation proposal (Mexico R-PP) 2010 Forest Carbon Partnership Facility, World Bank, Washington DC.

Morett Sánchez, J.C. 2001 El ocaso de la reforma agrarian Mexicana. Departamento de Sociología Rural, Universidad Autónoma Chapingo, Mexico.

Muñoz-Piña, C., Guevara, A., Torres, J.M. and Braña, J. 2008 Paying for hydrological services of Mexico's forests: Analysis, negotiations and results. Ecological Economics 65: 725–736.

Nepstad, D., Schwartzman, S., Bamberger, B., Santilli, M., Ray, D., Schlesinger, P., Lefebvre, P., Alencar, A., Prinz, E., Fiske, G. and Rolla, A. 2006 Inhibition of Amazon deforestation and fire by parks and indigenous lands. Conservation Biology 20(1): 65-73.

Navarro, G.A. and Bermudez, G. 2007 Estudio sobre el impacto de las restricciones técnicas y legales sobre la rentabilidad del manejo forestal sostenible de bosques naturales intervenidos y su competitividad respecto a otros usos de la tierra en Costa Rica. Informe de consultoría PTC/COS/3003/FAO para ECTI-SINAC-MINAE. Costa Rica.

O'Brien, K.L. 1998 Sacrificing the forest: Environmental and social struggles in Chiapas. Westview Press, Colorado.

Ostrom, E. and Schlager, E. 1996 The formation of property rights. *In:* Hanna, S., Folke, C. and Maler, K.G. (eds.) Rights to nature: Ecological, economic, cultural and political principles of institutions for the environment, 127-156. Island Press, Washington DC.

Pacheco, P. 2009 Agrarian reform in the Brazilian Amazon: Its implications for land distribution and deforestation. World Development 37(8): 1337-1347.

Pacheco, P. and Barry, D. 2009 From agrarian to forest tenure reform: The recognition of forest rights in Latin America. XIII World Forestry Congress, Buenos Aires, Argentina 18-23 October 2009.

Pagiola, S., 2008 Payments for environmental services in Costa Rica. Ecological Economics 65: 712-724.

Pedroni, L., Dutschke, M., Streck, C. and Estrada, M. 2009 Creating incentives for avoiding further deforestation: The nested approach. Climate Policy 9: 207-220.

Plan Especial de Cambio Climático (PECC) 2009 Comisión Intersecretarial de Cambio Climático, Gobierno de México. Available at http://www.semarnat.gob.mx/queessemarnat/politica_ambiental/cambioclimatico/Documents/pecc/090828_PECC.Capitulos_DOF.pdf

Plano Nacional de Mudanças Climáticas (PNMC) 2008 Casa Civil da Presidência da República, Brasília.

Poder Legislativo 1996 Ley Forestal No 7575. Alcance N°21 a la Gaceta N°72. Imprenta Nacional. La Uruca, San José Costa Rica.

Poder Legislativo 2008 Ley de Aprobació del Contrato de Préstamo No 7388-CR del BIRF N°8640. Gaceta N°128. Imprenta Nacional. La Uruca, San José Costa Rica.

Registro Agrario Nacional 2010 http://www.ran.gob.mx/ran/programas_sustantivos/ran_procede.html Accessed 27 July 2010.

Rights and Resources Initiative (RRI) 2009 Tropical forest tenure assessment: Trends, challenges and opportunities. Available at http://www.rightsandresources.org/documents/files/doc_1075.pdf

Rights and Resources Initiative (RRI) 2010 The End of the hinterland: Forests, conflict and climate change. Rights and Resources Institute, Washington DC.

Rojas, M. and Aylward, B. 2003 What are we learning from experiences with markets for environmental services in Costa Rica? A review and critique of the literature. Environmental Economics Programme. International Institute for Environment and Development, London.

Sarukhán, J. and Larson, J. 2001 When the commons become less tragic: Land tenure, social organisation and fair trade in Mexico. *In:* Burger, J., Ostrom, E., Norgaard, R.B., Policansky, D. and Goldstein, B.D. (eds.) Protecting the commons: A framework for resource management in the Americas, 45-70. Island Press, New York.

Saunders, L.S., Hanbury-Tenison, R. and Swingland, I.R. 2002 Social capital from carbon property: Creating equity for indigenous people. Philosophical Transactions of the Royal Society 360: 1763-1775.

Santilli M.P., Moutinho, P., Schwartzman, S., Nepstad, D.C., Curran, L. and Nobre, C. 2005 Tropical deforestation and the Kyoto Protocol: An editorial essay. Climatic Change 71: 267-276.

Seligson, M.A. 1978 La reforma agraria en Costa Rica: Evolución de un programa. Estudios Sociales Centroamericanos 19: 55-84.

Sikor, T. and Lund, C. 2009 Access and property: A question of power and authority. *In:* Sikor, T. and Lund, C. (eds.) The politics of possession: Property, access and authority, 1-22. Blackwell, London.

Sikor, T. and Müller, D. 2009 The limits of state-led land reform: An introduction, World Development 37(8): 1307-1316.

Streck, C. 2009 Rights and REDD+: Legal and regulatory considerations. *In:* Angelsen, A. (ed.) Realising REDD+: National strategy and policy options, 155-162. Center for International Forestry Research, Bogor.

Sunderlin, W., Dewi, S. and Puntodewo, A. 2007 Poverty and forests. Multi-country analysis of spatial association and proposed policy solutions. Center for International Forestry Research Occasional Paper No. 47.

Sunderlin, W., Hatcher, J. and Liddle, M. 2008 From exclusion to ownership: Challenges and opportunities in advancing forest tenure reform. Rights and Resources Initiative, Washington DC.

Sunderlin, W., Larson, A.M. and Cronkleton, P. 2009 Forest tenure rights and REDD+: From inertia to policy solutions. *In*: Angelsen, A. (ed.) Realising REDD+: National strategy and policy options, 139-150. Center for International Forestry Research, Bogor.

Tacconi, L., Downs, F. and Larmour, P. 2009 Anti-corruption policies in the forest sector and REDD+. *In*: Angelsen, A. (ed.) Realising REDD+: National strategy and policy options, 163-174. Center for International Forestry Research, Bogor. .

Terborgh, J. 1999 Requiem for nature. Island Press, Washington DC.

The Terrestrial Carbon Group 2009 Background analysis of REDD regulatory frameworks. Report prepared for the UN-REDD programme. Available at http://www.un-redd.org/Publications/tabid/587/language/en-US/Default.aspx

Thiesenhusen, W.C. 1995 Broken promises: Agrarian reform and the Latin American campesino. Westview Press, Boulder.

Tucker, C. 1999 Common property design principles and development in a Honduran community. Praxis-The Fletcher Journal of Development Studies 14: 1-23.

Vatn, A. 2010 An institutional analysis of payments for environmental services. Ecological Economics 69: 1245-152.

Vira, B. and Adams, W.M. 2008 Institutional complexity, biodiversity and ecosystem services. Paper presented at Governing Shared Resources: Connecting Local Experience to Global Challenges, 12th Biennial Conference of the International Association for the Study of Commons, Cheltenham, England, 14-18 July 2008.

Warman, A. 2001 El campo Mexicano en el siglo XX. Fondo de Cultura Económica, México.

Watson, V., Cervantes, S., Castro, C., Mora, L., Solis, M., Porras, I.T. and Cornejo, B. 1998 Making space for better forestry: Policy that works for forests and people. Costa Rica Country Study. Centro Científico Tropical, San José and International Institute for Environment and Development, London.

White, A. and Martin, A. 2002 Who owns the world's forests? Forest tenure and public forests in transition. Forest Trends, Washington DC.

Wunder, S., Engel, S. and Pagiola, S. 2008 Taking stock: A comparative analysis of payments for environmental services programmes in developed and developing countries. Ecological Economics 65: 834-852.

Wunder, S., Börner, J., Rügnitz Tito, M. and Pereira, L. 2008 Pagamentos por Serviços Ambientais. Perspectivas para a Amazonia Legal. Série Estudios 10, Ministério de Meio Ambiente, Brasília.

Zbinden, S. and Lee, D.R. 2005 Paying for environmental services: An analysis of participation in Costa Rica's PSA program. World Development 33(2): 255–272.