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Actors and landscape changes in tropical Latin America

Challenges for REDD+ design and implementation

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Key points

- Five dominant trends are occurring in tropical Latin America with implications for land use change: (1) rapid growth of agribusiness, (2) expansion and modernisation of traditional cattle ranching, (3) slow growth of small-scale agriculture, (4) logging in production forest frontiers and (5) resurgence of traditional agro-extractive economies.
- These trends are driven by global markets and national policies, and have significant impacts on landscape change, with diverse associated trade-offs between agricultural development and forest conservation, and impacts on people's livelihoods.
- Agribusiness expansion helps create economic growth but leads to deforestation and tends to concentrate incomes. Cattle ranching demands extensive land surface and creates few jobs, which also leads to forest conversion. Peasant agriculture creates jobs and local income but has diverse impacts on deforestation. Indigenous and community lands help to protect forests, but generate few opportunities for livelihoods improvement. Forest concessions do little damage to forests but concentrate incomes among a few people.
- These contrasting outcomes call for differentiated policy measures for agricultural development, forest conservation and poverty alleviation. There is a need to manage the expansion of large-scale agribusiness and ranching, whilst improving the economic options of smallholders, indigenous groups and other disadvantaged people.
- REDD+ schemes may help to reduce pressures on forests by compensating land users for foregone benefits. However, there is a need to balance efficiency in reducing emissions from deforestation and equity in the distribution of economic incentives.
- No 'one-size-fits-all' approach to REDD+ could possibly deliver both cost-effectiveness and equity across such diverse landscapes and groups of actors. Whilst some REDD+ activities should target deforestation hotspots at the forest frontier, national strategies must remain inclusive and ensure that benefits and costs are shared among diverse stakeholder groups according to criteria of political fairness.
- REDD+ thus must go far beyond the compensation of land users' opportunity costs in high-pressure areas. It will need to address some of the underlying structural reasons for resource overuse and underdevelopment in tropical forest areas.

Introduction

Growth in domestic consumption and exports has occurred at the expense of tropical forestlands (Gibbs *et al.* 2010). The trade-off between development and conservation in tropical landscapes has been widely debated (Lee and Barrett 2001). As the role of forests in climate change mitigation has become ever more irrefutable, the trade-off debate has gained momentum. A number of perspectives on development–conservation trade-offs coexist. Whereas some argue that promoting intensive and large-scale agriculture could lead to greater economic growth, reduce deforestation and improve land use efficiency (Grau and Aide 2008), others claim that securing tenure rights of forest-dependent communities constitutes an effective way to enhance local people's livelihoods whilst protecting forests (Bray *et al.* 2005). Others suggest that the establishment of diversified production systems has positive impacts on smallholders' welfare (Barham *et al.* 1999). We argue that the above views complement each other, but that managing the trade-offs between agricultural development and forest conservation will require a more comprehensive understanding of the different social and economic dynamics taking place across the diverse landscapes in tropical Latin America.

Five trends are currently occurring in rural landscapes in tropical Latin America, each of which is associated with different social-actor contexts and related landscape outcomes:

- rapid market-driven growth of agribusiness (medium- and large-scale farmers);
- expansion and modernisation of traditional cattle ranching (medium- and large-scale ranchers);

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- slow growth of small-scale agriculture (small-scale farmers);
- logging in production forest frontiers (logging companies and small-scale loggers); and
- resurgence of agro-extractive economies (indigenous people and traditional communities).

In tropical landscapes in Latin America, the design of schemes for reduction of emissions from deforestation and forest degradation and enhancing carbon stocks (REDD+) should acknowledge these diverse trends. This recognition is necessary because REDD+ implementation will influence which development paths—with their likely different effects on actors and landscape change—will prevail.

Diverse actors in tropical Latin America

About 109 million people live in rural areas in Latin America. The rural population comprises 5 different groups: (1) indigenous people, (2) traditional subsistence smallholders, (3) small-scale farmers, (4) large-scale farmers and ranchers and (5) loggers and timber companies (Table 1). The first 2 groups practise mixed subsistence and commercial agriculture, and are marginally connected to markets. The smallholders, including colonists, have developed diversified production systems with various degrees of specialisation. In turn, large-scale farmers are engaged in commercial production, tend to control significant tracts of land and often have good access to markets and financial resources. The last group comprises independent loggers and logging companies, with different scales of operation, which rely on timber extraction for their income. Finally, an important number of people are also engaged in processing, trade and provision of services linked to activities being developed in these landscapes.

It is important to distinguish between actors: what happens to land and forest resources depends to a large extent on who owns these resources, as each actor group tends to use the resources in different ways and with different objectives. The next section explores some of the main trends of landscape transformation for the region as a whole. This sets the stage for the assessment of the different pathways of landscape change associated with each of the actors described above.

Factors shaping landscape transformation

Net annual deforestation rates over the period 1990–2005 were significant in both Mesoamerica and South America (0.71% and 0.47%, respectively). They then tended to decrease during the period 2005–2010, although the magnitude of deforestation remains higher in South America. It is

Table 1. Types of forest-based livelihoods and associated attributes of forest use

Type of social actor	Attributes linked to the type and objectives of land management				
	Land use and management	Land use objectives	Factors that affect land use decisions	Main type of land use	Forest income as share of total income of actor group
Indigenous people	Hunting, gathering and agriculture	Largely subsistence oriented	Family size and availability of labour	Capture and collection of forest fauna and flora, and agriculture	High
Traditional subsistence smallholders	Shifting agriculture	Predominantly for subsistence	Family size and availability of labour	Food production in land restored by forest fallows	Medium
Small-scale farmers	Small-scale sedentary agriculture	Mixed goals of subsistence and cash income	Access to labour influenced by household lifecycle, and availability of land, capital and markets	Mainly agricultural production under diversified systems	Low to medium
Large-scale farmers and ranchers	Large-scale agriculture and ranching	Profit maximisation	Access to land, availability of capital and market access and conditions	Often agriculture under intensive, and ranching under extensive production systems	None to low
Loggers and timber companies	Logging, could be linked to land speculation goals	Profit maximisation	Access to timber, and availability of capital and markets	Selective logging and marketing of valuable timber species	High

Table 2. Characteristics of stylised landscapes in tropical Latin America

Type of landscape	Attributes associated with landscape type			
	Area with forest	Social actors	Land tenure	Access to markets
Agricultural lands dominated by agribusiness	Small	Medium- and large-scale farmers	Secure, clear rights	Good
Pasture lands dominated by extensive cattle ranching	Small	Medium- and large-scale ranchers	Relatively secure rights but contested in new frontiers	Relatively good
Forest–agriculture mosaics under diversified land uses	Relatively small—forest scattered in agricultural lands—but stable	Peasants and migrant colonists	Secure; rights can be relatively clear through *de facto* regimes	Relatively good
Frontier areas with dominance of logging	Relatively large, but decreasing	Timber companies, informal loggers and migrant peasants	Insecure	Relatively poor
Areas beyond the agricultural frontier with local populations	Large and relatively stable	Indigenous people and other traditional smallholders	Insecure, though progress in collective titling	Poor

Source: Adapted from Chomitz (2007)

noteworthy that total annual deforestation for Latin America as a whole shrunk from about 5 million ha in 2005 to 4 million ha in 2010 (FAO 2010). These data, however, mask the trends of secondary forest regrowth, which are particularly significant in some landscapes in Mesoamerica, mainly in Costa Rica, El Salvador and the Pacific regions of Panama and Nicaragua (Kaimowitz 2008). There are some trends of forest regrowth in some specific landscapes in South America also, although it is less advanced (Grau and Aide 2008).

In Mesoamerica, decreasing deforestation rates and, in some cases, forest transition trends are related to broader processes of rural–urban migration, and occasionally significant migration flows to the USA with increased remittances supporting local rural economies (Rigg 2006). In contrast, in South America, the rural population tends to decrease mainly as a result of more rapid urbanisation and greater migration from rural areas to the cities (Carr *et al.* 2009), although these trends are less dramatic in a few countries (e.g. Bolivia, Colombia, Paraguay and Peru). Despite urbanisation and migration into cities, some degree of migration continues into rural tropical lands, particularly in the Andean Amazon countries and Brazil. In some cases, urban residents are often not completely absent from rural areas but remain members of multi-sited households and continue to participate in rural–urban networks (Padoch *et al.* 2008).

There is an increasing tension in the public policies applied by the governments in the region. Some policies increase pressures on forests, such as those supporting the development of the agribusiness sector and large-scale investment in infrastructure development (e.g. through the Initiative for the Integration of Regional Infrastructure in South America, or IIRSA). Other policies lead to forest conservation, such as those allocating forests for conservation, recognising tenure rights of indigenous and other local people and applying stricter environmental laws. The former policies tend to promote the expansion of more competitive agriculture linked to export markets, whilst the latter tend to protect forests and local people's forest-dependent livelihoods. The evident tensions between these policies indicate a strong need for greater harmonisation of policies based on a clear understanding of the resulting trade-offs.

Paths of landscape development

Changing policies and market environments have influenced the development of tropical forest landscapes in Latin America by providing different opportunities to different actor groups. This has resulted in competition both for land and for forest resources—either for management or extraction—between groups and has affected land use patterns. The main characteristics associated with the 5 type of landscapes mentioned in the introduction are summarised in Table 2.

Each landscape identified above represents a specific development path and each is linked to specific ways in which natural, human and financial resources are deployed by actors with diverse social and economic goals. These landscapes should be conceived more as part of a continuum rather than as defined types with distinct boundaries. Furthermore, these landscapes change over time, with competition between actors and land uses, for example, between loggers and indigenous people, cattle ranchers and smallholders in forest–agriculture mosaics, or agribusiness development taking place over grazing lands. Factors exogenous to these landscapes such as market

and policy changes, as well as endogenous conditions linked to land tenure, power relationships and particular socio-ecological interactions, contribute to defining each landscape change. Often, national policy has favoured agribusiness, cattle ranching and industrial logging at the expense of smallholders and indigenous people. Public policies need to address the specific challenges emerging on these landscapes to deal with their social and economic development needs, whilst ensuring long-term sustainable management of land and forest resources.

Social and ecological outcomes across landscapes

The development of disparate landscapes has very different social, economic and ecological outcomes (Table 3). For example, agribusiness development leads to higher deforestation rates, but contributes to significant economic growth and tends to concentrate income among a few medium- and large-scale landholders. Cattle ranching leads to low-productive land uses, because it is often developed through extensive production systems, thus demanding much land and creating few jobs. Peasant agriculture tends to create jobs and local income and often leads to more complex land use mosaics; in some cases, it may lead to wide deforestation depending on population density or demand for specific crops. Indigenous territories protect local livelihoods, but generate few economic benefits and are often located far from markets and social infrastructure. Finally, public production forests are often allocated under concessionary rights, which tend to do less harm to the forests, but concentrate the incomes among a few family groups and timber companies, and do not necessarily lead to forest conservation in the long run.

These landscapes are not static, as mentioned earlier, because of the intense competition between actors, who are variably favoured by global factors and by national and subnational

Box 1. Examples of development trends defining landscape types

Rapid market-driven growth of agribusiness: Development of large-scale intensive agriculture is not new in Latin America, but it is currently growing to an unprecedented scale in savannahs and tropical forestlands, where there is a relative abundance of land suitable for mechanised agriculture (Grau and Aide 2008). The epicentre of this expansion is Mato Grosso in Brazil, although it has also taken place in lowland Bolivia, northwest Argentina and Paraguay (Grau *et al.* 2005, Pacheco 2006) because growing demand for soya bean motivated governments to promote the agribusiness sector. Other factors that propelled this expansion were related to relatively low land prices, particularly in the new agricultural frontiers in the forest margins, and the availability of cultivars suited to the *cerrado* soils developed in Brazil (EMBRAPA SOJA 2008).

Expansion and modernisation of traditional ranching: Cattle raising is practised widely in tropical Latin America in the context of available cheap land and scarcity of labour (da Veiga *et al.* 2004). Medium- and large-scale traditional cattle ranching dominates in many landscapes in the Brazilian Amazon (e.g. southern Pará, northern Mato Grosso and Rondônia, and in the south of the Amazonas state) (Margulis 2004), and there is a gradual adoption of semi-intensive production systems in those areas with better connections to infrastructure where land becomes scarcer. This is particularly the case in southern Pará and the Transamazon in Brazil (Walker *et al.* 2000). The expansion of cattle-ranching activities is also a common feature in the rural lands in Andean Amazon countries and Mesoamerica (Etter *et al.* 2008).

Slow growth of small-scale agriculture: Small-scale agriculture has evolved in the rural tropics in Latin America, embraced by smallholders with production systems ranging from shifting cultivation, to more stable agricultural systems mixing annual (e.g. rice, cassava, maize) and perennial crops (e.g. coffee, cocoa) and livestock production, although in some cases more specialised systems have been implemented (Walker *et al*. 2002, Pichón *et al*. 2002). Smallholder agriculture has stabilised in many old colonisation areas (e.g. Bragantina and Transamazon in Pará, Rondônia and northern Santa Cruz in Bolivia), and it is still expanding in new frontier lands (e.g. Bolivia's northern Santa Cruz, Peru's Madre de Dios and Ucayali regions, Colombia's Caquetá and Guaviare provinces and Ecuador's Sucumbíos).

Large-scale commercial logging on public lands: The system of forest concessions is still active in some countries with available public production forest, such as Peru and Bolivia, and in Guatemala with social concessions, although it has ceased in countries whose public production forests have shrunk over time. Brazil has begun to grant some public forests as concessions in the Amazon basin after a process of tenure-rights clarification. Concession logging has been promoted by national natural resource authorities—often with the support of multinational conservation institutions—as a means to promote sustainable management of national production forests, generate national revenues and prevent clear-cutting.

Resurgence of traditional agro-extractive economies: Governments have made progress in attending to several claims for land, which has led to the formal recognition of collective ownership rights by indigenous people over the lands they have traditionally occupied (Roldan 2004). For example, most notably, social claims from indigenous peoples resulted in the delimitation and titling of indigenous lands across many countries in Latin America, and demands from agro-extractive populations led to the creation of 'extractive reserves' in Brazil. Land tenure recognition contributes to securing the access to forest resources of local populations that depend on these resources to make a living, although they still face many institutional and legal barriers to benefiting from formal timber management (Pacheco 2009).

Table 3. Main social, economic and ecological outcomes in different types of landscapes

Type of landscape	Outcomes associated with landscape type			
	Pressure on forests	**Economic growth**	**Distribution of benefits**	**Access to services**
Agricultural lands dominated by agribusiness	High	Relatively high, mainly in soya bean frontiers	Income concentrated among few landholders	Good, improving with expansion of infrastructure
Pasture lands dominated by extensive cattle ranching	High	Medium, but varies depending on location with respect to markets	Income largely concentrated among large-scale landholders	Medium to good
Forest–agriculture mosaics under diversified land uses	Medium to high	Varies depending on market conditions of main crops produced	More equal, but social differentiation grows over time	Medium, but there are large variations
Frontier areas with dominance of logging	Low, but tend to grow linked to market integration	Large in forests with valuable timber species	Benefits largely concentrated among few timber companies	Relatively poor
Areas beyond the agricultural frontier with local populations	Low	Low, often timber tends to be the main source of cash income	Benefits from economic activities are more equally distributed	Poor

policies. This competition is also the result of structural conditions in frontier landscapes, which are associated with land tenure insecurity, uneven market powers and differentiated access to economic and institutional incentives. To promote agricultural development that places less pressure on forests resources and reduces poverty, policies should focus on:

- 'closing the frontier' to reduce land speculation and encroachment on public lands, mainly through land regularisation but primarily attending to the needs of the rural poor;
- managing the expansion of agribusiness, and redirecting it to already deforested lands, and facilitating the development of more inclusive business models with greater benefit sharing;
- stimulating the modernisation of cattle ranching as a way to increase land use efficiency of already occupied lands, whilst supporting more integrated systems of land use management;
- improving economic opportunities for smallholders and indigenous people by supporting their diversified land use and livelihood portfolios, and sources of income;
- promoting sustainable forest management in frontier areas through greater promotion of best practices by timber companies and greater integration of informal loggers.

Whilst state regulations are critical for promoting these changes, it is not clear to what extent REDD+ schemes will stimulate the transformational changes to make this happen. This is because the success of REDD+ will greatly depend on how it deals with the challenges arising from multiple actors' needs and landscape types. Thus, REDD+ can become a crucial mechanism, if resources are available, for supporting the emergence of some landscape types rather than others.

Implications for REDD+ design and implementation

The diversity of actors and landscapes represents a significant challenge in the design of effective and equitable REDD+ interventions (Angelsen 2008). A main message of this paper is that no 'one-size-fits-all' approach to REDD+ could possibly deliver both cost-effectiveness and social equity because diverse actors shape landscapes in multiple and complex ways, resulting in diverse development pathways. A summary of some of the aspects relevant to the REDD+ debate, such as opportunity costs, tenure and resource access, poverty and governance conditions, is given in Table 4.

Landholders linked to agribusiness have higher land use opportunity costs than indigenous people, whose opportunity costs are relatively low. The former tend to hold relatively large tracts of land under relatively secure conditions. In contrast, rights in frontier areas and particularly rights of smallholders and indigenous people are often informal and less secure. Finally, governance conditions tend to improve in landscapes that have a larger state presence, whilst in remote frontier areas, higher levels of conflict over resources are prevalent.

National policymakers have limited intervention options with which to directly influence land use decisions in forest landscapes. National REDD+ strategies will have to rely heavily on incentive- and disincentive-based policy instruments, such as conditional compensation transfers and improved enforcement of forest use and access regulations (i.e. command-and-control). These strategies have to be tailored, however, according to the landscape type.

Table 4. Landscape types and key REDD+ design issues

Type of landscape	Key characteristics with relevance for REDD+ design				
	Pressure on forests	**Opportunity costs**	**Tenure and resource access**	**Poverty/ well-being**	**Governance conditions**
Agricultural lands dominated by agribusiness	High	High	Relatively clear ownership often in a context of little developed land administration systems	Generally capitalised and comparatively well off	Often farmers are well organised and are politically influential
Pasture lands dominated by extensive cattle ranching	High	Low	Not formal ownership rights but tenures tend to be secure, although in some cases claims are shaky (land grabbing)	Some capitalised ranchers, but often medium-income levels	Local elites control local decision-making and are politically influential
Forest–agriculture mosaics under diversified land uses	Medium to high	Low to medium	Often no formal land ownership but tenure relatively secure	Both poor and comparatively wealthy groups	Strong local organisations in some regions, but often no voice
Frontier areas with dominance of logging	Low (but impacts on degradation)	Medium to high	Formal sector often engaged in concessions, but large informal (often illegal) sector	Capitalised timber companies, but poor people linked to the informal sector	Often disputes on forest access, and influential local elites
Areas beyond the agricultural frontier with local populations	Low	Low	Community use and access rights often well defined, but not always secure	Widespread poverty; little or no access to public services (few exceptions)	Local groups sometimes well organised, but often no voice

Four key design challenges emerge when considering REDD+ across actors and landscapes:

- identifying and targeting key actors and landscapes for REDD+ incentives;
- designing the optimal incentive mix to change the behaviour of these actors;
- embedding REDD+ interventions in existing institutional systems; and
- ensuring participation and benefit capture among poor stakeholders.

Targeting actors and landscapes: Clearly defining the target will determine the extent to which REDD+ can become an effective climate change mitigation measure. Targeting landscapes with dynamic forest cover change would seem to be a natural starting point for pilot action. However, economic (opportunity costs) and institutional (tenure regulation and security) conditions will not always be favourable for the effective delivery of REDD+ incentives on the ground. As a result, decision makers face trade-offs between the potential additionality and the feasibility of targeting early REDD+ action to forest frontiers. That said, the scale of interventions must likely go beyond frontier landscapes to minimise leakage into current low-pressure forest areas and consolidate land use dynamics in agricultural mosaics.

Differentiated incentives: Because landscapes are transformed by diverse, sometimes poor, actors with varying resource strategies, REDD+ policies will have uneven impacts on rural livelihoods. It is clear that land-asset distribution and deforestation patterns will determine how incentives and disincentives of a given REDD+ policy play out in terms of benefit distribution. However, the lack of consensus regarding what represents an equitable distribution of rewards or punishment probably represents the single most important obstacle for REDD+ at the national level (Ricketts *et al.* 2010). Interestingly, whilst a command-and-control-dominated REDD+ strategy would tend to disproportionately hurt those who have benefited from deforestation in the past, the same actors would become the prime beneficiaries of a compensation-based REDD+ approach (Börner *et al.* 2010).

Broader institutional systems: Smallholders at remote forest margins, who are generally poor, often have few land use alternatives to shifting cultivation. Without improved access to alternative technologies and income opportunities, command-and-control-based REDD+ could drive some farmers further into poverty, whereas conditional compensation-based REDD+ bears the risk of creating dependencies on external income streams as traditional land use strategies have to be abandoned. Even a careful balance of compensation incentives and command-and-control disincentives, as discussed above, may prove

insufficient to induce improved land uses. Thus, improved market access, extension services and technical assistance as land administration systems are public efforts that have to be undertaken in addition to REDD+ compensations.

Participation and benefit distribution: Ultimately, the success of REDD+ will depend on the ability of recipient countries' governments to negotiate a fair deal with all land users (Pascual *et al.* 2010). Rewards to forest stewards with a good track record, such as indigenous and traditional populations, may increase the perceived fairness of REDD+, but would tend to reduce cost-effectiveness as funds would be diverted from areas of high deforestation. This is one of the major trade-offs faced by REDD+ implementers. At the same time, widespread *de facto* tolerance of illegal forest cover change over many years probably means the compliance of large players will have to be subsidised to some extent. Political bargaining power varies considerably across actor groups. Whilst some smallholders are represented by strong multilevel organisations and indigenous groups are well organised in politically influential umbrella organisations, other traditional population groups such as extractivists often lack the means to influence the national policy debate. Equitable benefit sharing will thus also depend on the ability of social organisations to effectively involve their constituents in the development of national REDD+ strategies.

Conclusions

Important processes of landscape change are taking place in Latin America due to a greater influence of global markets and infrastructure development, which often lead to increased pressure on forest landscapes. At the same time, however, other policies are leading towards forest conservation, notably the recognition of land claims by indigenous people and other local communities and allocation of forest to conservation aims. These different dynamics have led to the persistence of competing demands for land with different outcomes in land use change, economic growth and people's livelihoods. REDD+ may play an important role in influencing which development paths will prevail in tropical forested landscapes. However, many difficult choices have to be made for REDD+ to work in practice, mainly to balance cost-effectiveness and equity, and to create the institutional conditions necessary to achieve the desired outcomes.

The diversity of trends discussed here indicates that it is reasonable to assume that a 'one-size-fits-all' approach will not work for REDD+ implementation. In some countries, targeting deforestation hotspots at the forest frontier may be feasible only after conflicting land claims have been settled and tenure is well delimited. Whilst REDD+ action must be well targeted, national strategies must remain inclusive and allow for benefits and costs to be shared by various stakeholder groups according to fairness criteria. REDD+ thus goes far beyond the compensation of land users' opportunity costs in high-pressure areas; it also requires addressing some of the underlying structural reasons for overexploitation of resources and underdevelopment in tropical forest areas. Early proponents of REDD+ may have widely underestimated its costs. The potential benefits, however, may extend far beyond climate change mitigation. This depends on whether or not there is enough political will to take the development of the world's forest margins seriously, and involve the diverse populations who depend on forest resources.

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