

S O C I A L E C O L O G Y W O R K I N G P A P E R 1 4 3

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Climate Change Mitigation in Latin America: A Mapping of Current Policies, Plans and Programs

Lisa Ringhofer, Simron J. Singh, Barbara Smetschka (2013):

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Social Ecology Working Paper 143
Vienna, Juny 2013

ISSN 1726-3816

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The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 283093 – The **Role Of Biodiversity In climate change mitigation** (ROBIN) (<http://robinproject.info/>).

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Executive Summary

With growing climate change concerns, the concept of REDD/REDD+ as an approach to reconciling forest conservation with productive activities has taken centre stage in international forest conservation debates. The operational principles underpinning REDD+ however are far from new. Especially Latin American countries have a long track record in integrated conservation and development projects, and some (e.g. Costa Rica and Mexico) also have a history of ecosystem payment schemes. At the same time, Latin America and Caribbean forests are home to some 40 million indigenous people, many of whom have traditionally performed an important role as forest custodians. In light of these aspects, Latin America undoubtedly plays a vital role in current REDD+ debates.

Most Latin American countries are currently developing national REDD+ strategies, which either incorporate pre-existing forest conservation programs and/or pilot carbon and biodiversity schemes. Progress in REDD+ strategy design, however, varies considerably between the countries. Costa Rica, Mexico and Brazil are considered the 'REDD+ leaders'. All three of them faced similarly high deforestation rates in the past, which have triggered their governments to take substantial action. Also, Costa Rica took the lead in the region in setting up payment schemes for ecosystem services as part of their mainstream forest policy. Mexico took similar measures, yet contrary to Costa Rica, could fall back on substantial experience in community-based forestry programs. Brazil's experience in forest conservation, on the other hand, is far more recent, decentralized and, to a certain degree, fragmented. Brazil though has set up a growing range of diverse REDD+ pilot projects on the ground, incorporating a variety of stakeholders.

Bolivia, Ecuador, Panama, and Guyana are classified as the 'REDD+ latecomers'. Bolivia and Panama both have quite a well set-up institutional setting for forest policy. Bolivia looks back on almost two decades of decentralized forest management, giving more weight to municipal governments and civil society. Ever since the presidency of Evo Morales, indigenous organizations have been strengthened, thereby providing an effective platform for REDD+ negotiations. Bolivia's government though firmly opposes market mechanisms for financing REDD and takes a firm stand against industrialized countries. Ecuador's commitment to the forest sector seems somewhat ambiguous: On the one hand, it was the first country to modify its constitution in 2008, providing specific rights to nature. On the other hand, though, mounting criticism concerns the government's intransparent policy of civil society participation, which has generated growing opposition from especially indigenous groups. Whereas Bolivia, Ecuador, and Panama have all suffered from high deforestation rates in the past (and continue to do so), Guyana's position is different. With its small land area and low population density, it has enjoyed historically low deforestation rates. Driven by a neoliberal policy framework, forests play a pivotal role in the Guyanese economy. Guyana has been an active player in REDD+ debates and has set up a functioning REDD infrastructure. However, the country lacks the necessary experience in a wide stakeholder consultation for REDD+ to be successful. Finally, Suriname falls within the category of 'REDD+ stragglers'. Although the country's forests are currently among the least threatened in Latin America, the country is now in the formulation stage of drafting a revised REDD readiness proposal, as their initial document was rejected on grounds of too limited stakeholder involvement.

Introduction

Forests play a vital role for maintaining life on Earth. Besides supplying fundamental global and national ecosystem services, forests equally provide a livelihood for millions of forest dwellers around the world. The importance of forest conservation has been further underlined ever since the wake of global climate change concerns and its potential contribution to climate regulation has since generated enormous scientific and professional interest. Various actors, policies, programs, and projects have since emerged on various scale levels in order to use the potential of forests in the combat against climate change. In light of this, this report aims to provide a state-of-the-art review on current approaches to climate change mitigation (CCM) in the forest sector in Latin America. The concept of REDD/REDD+ as an attempt of linking reducing emissions from avoided deforestation and degradation to international carbon markets will be a recurrent theme throughout the report. The paper is structured along the following lines: A first section provides a short overview of the international forest and climate change framework. What then follows is a discussion of forest and CCM on the regional level in Latin America. Finally, the third section provides insights into country-specific CCM policies, plans and programs. Since a detailed discussion of all countries in the region would go beyond the scope of this paper, a focus is put on the ROBIN project-relevant countries of Costa Rica, Mexico, Brazil, Ecuador, Bolivia, Panama, Guyana, and Suriname.

1. Forests and Climate Change: The International Framework

The 1980s marked a clear scientific consensus about the anthropogenic nature of climate change and the issue has since become a concern for the international political agenda. The 1988 conference ‘The Changing Climate’ in Toronto exhorted the industrialized countries to reduce CO₂ emissions by 2005 by 20% as compared to 1987 levels. The same year the Intergovernmental Panel on Climate Change (IPCC) was set up which attributed rising CO₂ levels to increased fossil fuel consumption along with land-use change caused by deforestation and forest degradation. Slowly, the intricate relation between forest conservation to combat global warming became evident.

As preparatory meetings for the 1992 UNCED conference in Rio¹ progressed, a broad split emerged between the ‘North’ and the ‘South’, both reluctant to countenance substantial CO₂ reductions on their part. Against this backdrop an attempt was made by the Intergovernmental Negotiating Committee to define common goals, tasks and responsibilities for confronting the climate change issue. This draft text was signed by more than 150 countries and gave way to the establishment of the UNFCCC (United National Framework Convention on Climate Change) in 1994, providing the basis for the ensuing Conferences of the Parties (COPs) in the following years.

The legally binding 1997 Kyoto Protocol, an international agreement linked to the UNFCCC, was adopted at COP3. It imposed GHG emissions reductions targets on industrialized countries of an average 5.12% in relation to 1990 emission levels. With the exception of the

¹ The so-called Rio Conference was considered a landmark that triggered international negotiations on climate change and emphasized the key role of forests. The main documents related to forests that emerged from Rio were *Agenda 21* that includes combating deforestation and biodiversity conservation, and the *Statement of Forest Principles* that stresses the importance of sustainable forest management for future generations.

US, the protocol was signed and ratified by 187 Parties to Kyoto. The protocol contained three particular GHG reduction mechanisms: (1) Emissions Trading or ‘cap-and-trade’, the Clean Development Mechanism (CDM)², and (3) Joint Implementation (JI). While the rules for implementing the Kyoto Protocol were developed in the years following COP3, one of the key stumbling blocks was whether emission reductions from deforestation and land-use change in developing countries would be allowed under the CDM. Finally due to political and methodological concerns it was decided to exclude deforestation altogether, permitting only afforestation and reforestation projects (A/R) in developing countries (Lauterbach, 2007). For these, 14 different baseline and monitoring methodologies have since been approved (UNFCCC, 2008). Such projects, however, only generate temporary credits and have played a rather insignificant role on the carbon market so far, accounting for less than 1% of all CDM projects.³ Other activities permitted under the CDM were forest management, cropland and grazing.

In recent years carbon and the forest debate have gained increasingly more momentum in climate change policy discussions, since the regulatory role of forests as carbon sources and carbon sinks has increasingly been recognized. A recent study by Lewis et al. (2009) reveals that tropical trees absorb almost one-fifth of the CO₂ released by the burning of fossil fuels, with a substantial impact on the rate of climate change. The Fourth Assessment Report by the IPCC highlights a disturbing increase in GHG emissions between 1970 and 2030. Since 1970, GHG emissions have increased by about 70%, whereas CO₂ levels in the atmosphere have grown by 80% (IPCC, 2007). Of the several stabilization paths drawn by the IPCC the most benign trajectory in terms of climate change effects is that CO₂ equivalent gas levels in the atmosphere should not exceed 445-490 ppmv. This implies the ambitious goal that by the year 2050, GHG emissions should be reduced between 50 to 85% in comparison with the year 2000.

1.1 An evolving REDD Agenda

Against this backdrop and the inherent need for a post-Kyoto regime, experts started to see a real opportunity in linking reducing emissions from avoided deforestation and degradation to international carbon markets. The concept of REDD (*Reducing Emissions from Deforestation and Forest Degradation*) seemed to combine these two goals - tackle the second largest source of GHG emissions at comparably low costs while and at the same time also curbing unsustainable levels of global degradation (UNEP, 2008). The first REDD-type proposal ‘compensated CO₂ reduction’ was put forward by Brazil in 2003 at COP9. Not long after in 2005, Costa Rica and Papua New Guinea, which had formed the Coalition of Rainforest Nations, kick-started the REDD debate by bringing together several parties to discuss voluntary action on forests by developing countries. The dialogue centred on relevant scientific, technical and methodological issues and the exchange of relevant information and experiences. After intense negotiations in December 2007, the Bali Action Plan was adopted initiating a process to build a new post-Kyoto international climate regime. The great

² The most debated of these mechanisms has been the CDM. Since 2004, 1,894 projects have been registered worldwide through the CDM. The CDM allows industrialized countries to reduce their emissions outside of their own borders through voluntary projects implemented in developing countries. They thereby earn certified emission reduction (CER) credits that count towards meeting the Kyoto targets.

³ This decision may also be attributed to the scientific uncertainty around the contribution of deforestation and land-use change to the climate debate at the time. Since then a growing body of evidence (e.g. the Stern Report, 2007) has demonstrated the importance of forests as CO₂ sinks, and their destruction to account for about one-fifth of global CO₂ emissions (see Hall, 2012).

achievements of Bali were the unanimous agreement on a need for a long-term global action and the final softening of the old North-South dichotomy that had hitherto somewhat impeded a global response to climate change.

The REDD concept was expanded to REDD-plus (REDD+) to - in addition to reducing forest removal - also cover activities that lessen forest degradation and strengthen carbon stocks through regeneration and rehabilitation. The 2009 Copenhagen Accord, a product of COP15 in Copenhagen, re-emphasized the need to ‘provide positive incentives to such actions through the immediate establishment of a mechanism including REDD+’ (UNFCCC, 2010: 6) and a process of obtaining international funding commitments for REDD+ was started. In addition, a consensus was agreed on for the need for a three-phased implementation of a national REDD+ scheme involving (1) the participatory preparation of national REDD+ strategies, (2) the development and implementation of specific policies and measures, and (3) full UNFCCC compliance with compensations for reduced emissions and removals of carbon (La Viña, 2010). In December 2010, COP16 was held in Cancún where clearer financial commitments to REDD+ were achieved. Developed countries agreed to establish a Green Climate Fund (GCF) with the World Bank as interim trustee to guarantee a quick start for preparing national and sub-national frameworks and strategies. It was agreed to undertake detailed studies on the drivers of deforestation, and develop monitoring, reporting and verification (MRV) methodologies for emissions sources. The results were presented in December 2011 at COP17 in Durban and further elaborated at COP18 in Doha. However, there are still various issues yet to be clarified, especially in terms of finance mechanisms and methodological issues around setting reference emission levels.

To support the efforts and dialogue on the inclusion of REDD provisions in a post-2012 climate regime, the UN-REDD program was established. The program, a collaborative program involving the FAO, UNDP and UNEP, has two components. One is to assist developing countries in preparing and implementing REDD strategies and the other is to support the development of normative solutions and standardized REDD approaches. It is joined by the World Bank’s Forest Carbon Partnership Facility (FCPF) and the Forest Investment Program (FIP) to support developing countries to become ‘REDD ready’ and fund activities in nine pilot countries, including three in Latin America: Bolivia, Panama, and Paraguay.

Three Bottlenecks: Financing, Scale, and Baseline

Maybe the most hotly debated theme under discussion for REDD is the question of finance. Basically there are two approaches that could even be combined in different ways: Markets and funds.⁴ Market mechanisms have the advantage of including also the private sector and given the enormous amount of resources needed to reduce worldwide deforestation, this inclusion has proven quite essential. At the same time, market-based funding permits a greater flexibility in capturing funds and consequently, faster implementation timeframes (Colini Cenamo et al., 2009). The main questions revolve around the magnitude of financial resources necessary for effective emissions reduction.⁵ The other option for financing REDD is through

⁴ During the 1990s only the USA favoured market approaches as a solution for climate change, while the EU was more inclined to taxation of GHGs. This has changed since, as the EU runs the biggest emission trading system (ETS) worldwide and most of the BINGOs (e.g. WWF, CI, CARE, Greenpeace), which originally opposed carbon trading, today support it at least in some way (Seiwald, 2011).

⁵ According to Stern (2007), the financial volume necessary ranges between five and fifteen billion dollars per year. Other estimates indicate the need of US\$17 – 33 billion per year to reduce deforestation by 50% by 2030

funds or the traditional official development assistance (ODA). However, these options seem to be out of fashion recently, even though critique on carbon trading is growing. The main arguments for this option are two-fold: First, it would block the offset possibility for the industrialized Annex 1 countries of the Kyoto Protocol, and second, this option would raise financial means that are independent from the amount of saved carbon (Seiwald, 2011). As of June 2011, a total of US\$2,529 million had been allocated to REDD-specific funds, yet less than 10% had been disbursed at that stage. The support comes from the Amazon Fund in Brazil (40%), the UN-REDD Program (5%), the Congo Basin Forest Fund (7%), the Forest Carbon Partnership Facility (FCPF, 15%), the Forest Investment Program (FIP, 23%) and the World Bank and Australia's International Forest Carbon Initiative (IFCI, 9%) (Hall, 2012).

Another issue of great importance for REDD is the scale of implementation. Currently there are three different levels proposed: A national approach, a subnational approach and a hybrid system or nested approach (see Angelsen et al., 2008), all of which have their pros and cons. National REDD schemes, where securing and distributing resources and the implementation of activities are direct responsibilities of national governments, may lack equity and fair distribution mechanisms of generated financial means. A subnational approach, on the other hand, can fall back on previous experience with CDM projects and be efficient in fundraising and implementation of activities. However, it might suffer from activity shifting elsewhere as it cannot control deforestation and degradation outside the boundaries of project areas. The most likely approach for many countries is hence the nested approach, where the implementation of subnational projects and activities are permitted under national accounting and monitoring. As long as a robust and trustworthy accounting exists for all transactions at the subnational scale, it is possible to track each ton transacted, avoiding double-counting and still allowing for the integration of projects within a national strategy (Colini Cenamo et al., 2009). The main challenges in supporting a nested approach, however, lie in getting the right level of coordination and harmonization of the two other scales.

A third issue of debate concerns the best way of establishing baseline scenarios of national deforestation levels. There currently exist two approaches: (1) Through historical deforestation rates considering the average of previous deforestation and projecting it to a future baseline scenario or (2) through projections and modeling of simulated deforestation based on the analysis of presumptions and socio-economic parameters (e.g. population growth, infrastructure construction, governance policies, etc.). The challenge is really how to harmonize different deforestation and forest conservation scenarios in various countries without generating perverse incentives. If only countries with large historic rates of deforestation benefit, the result could be counterproductive. Also, the adoption of a historical baseline could fail to reflect a possible scenario of pressure over a country's forests in the future (Guyana, for instance, has historically low deforestation rates).⁶

Some of the operational challenges for REDD+ are the aspects of additionality, leakage, and permanence. Additionality refers to activities that are additional to 'business as usual'. For this there is an inherent need for rigorous reference scenarios or emission baselines, and obtaining these may be quite complex. Leakage means the shift of deforestation activities to

(Eliasch, 2008 in Colini Cenamo et al., 2009).

⁶ Current proposals seek to reconcile these two approaches, proposing that besides reduction targets, countries should also be compensated for maintaining their forest carbon stocks (e.g. Moura-Costa, 2009).

other areas and comes in two forms: Activity-shifting (primary) leakage and market (secondary) leakage. Activity-shifting leakage occurs when a project directly causes CO₂ emissions to be shifted to another location, canceling out some or all of the project's carbon benefits. Market leakage, on the other hand, occurs when a project changes the supply-and-demand equilibrium, causing other market actors to shift their activities. For example, if a project constrains commodity supply, market prices may rise and other producers may increase their activities in response (Colini Cenamo et al., 2009). Permanence refers to the longer-term sustainability of reduced deforestation or emissions reduction achieved through REDD+. A range of factors could undermine these gains. Cash payments, for example, play a critical role in determining conservation behaviour. Similarly, any interruption in project funding or other administrative or political changes (e.g. change in forest policy) could also compromise permanence (Hall, 2012: 66).

Summary

The international climate change debate gained momentum in the early 1990s with the establishment of the UNFCCC in the aftermath of the 1992 Rio Conference. The probably best-known legally binding document linked to the UNFCCC was the 1997 Kyoto Protocol that contains specific GHG reduction programs, ignoring however emission reductions from deforestation and land-use change. The alarming increase of CO₂ levels in the atmosphere in recent years, as highlighted by the IPCC Fourth Assessment Report, gave way to the evolving concept of REDD. First put forward in 2003, it links reducing emissions from avoided deforestation and degradation to international carbon markets. REDD soon expanded to REDD+ to also cover activities of sustainable forest management and a consensus was reached on the need for implementing national REDD+ schemes based on participatory multi-stakeholder processes. The UN-REDD program has been set up to support (financially and technically) the efforts of developing countries to become 'REDD ready'. To date, the main challenges for implementing REDD policies and programs are (1) the question of finance, (2) the scale of implementation (i.e. a national, subnational or a nested approach), and (3) the difficulty with establishing correct baseline scenarios.

2. Forests and CCM in Latin America

Forests are a vital part of Latin America's ecosystems. Whereas Mexico's and the Caribbean's forests cover about one third of their respective land areas, Central America's forest cover accounts for 43.9%. Just under half of South America is forested, accounting for 21% of the world's total (FAO, 2006 in Hall, 2012). Between 2000 and 2005, Central America has lost around 1,426,000 hectares of forest (or about 1.3% per year), while 4 million hectares of forest are lost every year in South America. Deforestation rates in South America account for about a third of the world's total annual deforestation rates, that is 13 million hectares per year (FAO, 2010).

Since forests are extremely important for maintaining the world's terrestrial forest carbon balance, Amazonia - the world's largest remaining area of tropical rainforest - occupies a critical position in maintaining this equilibrium. The nine Amazonian countries have lost almost one million km² of forest, or about 16% of their original cover (WWF, 2009 in Hall, 2012: 4). From 1990-2005 Amazonia was responsible for over one-quarter of the world's

forest loss, which, due to its high carbon density, translates into 46% of worldwide carbon emissions over the period. Even though the rate of deforestation in Brazil has been falling in recent years – it dropped by 47% between 2009 and 2010 – the country has committed to an 80% cut in deforestation by 2020 (Hall, 2012). Forests also perform a key social role in supporting livelihoods of millions of forest dwellers. The Amazon forest alone contributes up to US\$ 1 billion a year towards the incomes of local populations. According to FAO (2010) estimates, around 10 million people are officially employed in forest management and conservation. This phenomenon is increasingly important in Latin America as individuals and communities are becoming increasingly engaged in forest governance (Hall, 2012).

In view of protecting forests and mitigating the effects of climate change there are basically two approaches: The expansion of protected areas and making forests more sustainable in order to minimize forest loss and resource degradation.⁷ As concerns conservation, the Amazon basin plays the most important role. One-fifth of Brazil's Amazon is protected in 300 federal- and state-administered 'conservation units' managed by the National System of Conservation Units (SNUC). Likewise, Colombia protects some 70% of its national rainforest, and Ecuador 80%. Following the 1992 Rio Conference, many international conservation NGOs like WWF and Conservation International (CI) have expanded their influence in Latin America and helped to professionalize environmentalism and construct a base for grassroots support.⁸ Apart from setting aside protected areas, the range of non-destructive approaches and technologies to ensure forest preservation ranges from extractivism, agroforestry, permaculture, sustainable timber production and ecotourism (Hall, 2012).

2.1 Latin America and REDD+

REDD+ offers quite some potential for combining forest preservation with sustainable development opportunities in Latin America. The region has indeed been a major player in the global climate change debate and some of its countries are at the forefront of the internationally growing REDD debate. There currently exist several hundred REDD-type projects in the region with the aim of carbon sequestration and biodiversity preservation, many of which form part of a broader sustainable development agenda. Latin America has been a pioneer in testing and implementing Payment for Ecosystem Services (PES) schemes in developing countries, and these experiences are of high value to regional REDD+ policy design.

All Latin American countries except for Venezuela, Uruguay, Belize and French Guiana are currently developing REDD+ strategies, programs and pilot projects. Since they are all at different stages of the process, Hall (2012) has attempted a categorization of the different Latin American countries in terms of their 'REDD readiness' and has come up with a distinction of countries as 'leaders', 'latecomers', and 'stragglers'. The presentation in figure 1 largely reflects his categorization.⁹

⁷ Commercial agriculture (including livestock) is the most important driver of deforestation in Latin America leading to around 2/3 of total deforested area. Timber and logging activities account for more than 70% of total degradation in Latin America (Kissinger et al., 2012).

⁸ However, these international NGOs have also been critiqued for practicing 'conservation imperialism' (see Chapin, 2004).

⁹ El Salvador and Nicaragua have since submitted a REDD+ Readiness Preparation Proposal to FCFP.

Figure 1: REDD+ leaders, latecomers and stragglers (adapted from Hall, 2012)



The most advanced countries in forest conservation and sustainable management policy are Costa Rica, Mexico and Brazil. All three countries were faced with high deforestation rates in the past and have since taken quite substantial action. Costa Rica took the lead in Latin America in setting up PES programs as a mainstream policy to combat deforestation. Mexico took similar measures, yet contrary to Costa Rica, could fall back on substantial experience in community-based forestry programs. Brazil's experience in forest conservation, on the other hand, is far more recent, decentralized and, to a certain degree, fragmented. Brazil though has set up a growing range of diverse REDD+ pilot projects on the ground, incorporating a variety of stakeholders. The second group is termed the 'latecomers' and includes those countries, which have taken active steps in setting up their own national REDD+ strategies. These are Ecuador, Bolivia, Panama, Peru, Paraguay, Colombia and Guyana. Finally, the 'stragglers', as Hall (2012) calls them, are those, which are still at a relatively early stage in developing their REDD+ proposals. These are Argentina, Chile, Suriname, Guatemala, Nicaragua, El Salvador and Honduras.

2.2 REDD+ and Indigenous Peoples

Forests are home to more than 60 million indigenous people worldwide, many of which derive their livelihoods directly from the forest. According to Verner and Kronik (2010), in Latin America and the Caribbean some 40 million members of 640 indigenous groups have traditionally performed important roles as forest custodians. Hence, their contribution to slowing deforestation and forest degradation is indeed vital.¹⁰ The positions of indigenous organizations on REDD however differ. Some groups vehemently oppose the idea of treating forests mainly as carbon storage, and they reject any form of forest carbon trading. Others

¹⁰ Broad-based evidence from Brazil and other forest areas show that indigenous lands (which occupy a fifth of the Amazon) are considerably effective in slowing and/or halting forest loss. The indigenous Kayapó provide such an example, as they have successfully defended their lands against loggers, cattle ranchers and settlers (Nepstad et al., 2009).

accept that there could be benefits, and demand that indigenous peoples' positions are included in international and national processes.

The main critique of the opponents of REDD is its potential to expel various forest peoples from their traditional lands, on the one hand, and growing competition over benefits that may lead to increased inequality and conflict, on the other hand. It is feared that governments could again favour a 'fences and fines' approach, which does not only mean that strict rules on forest conservation are imposed on local people, but that it may also mean the eviction of indigenous and other poor communities from such carbon protected areas. The introduction of REDD further bears some potential for conflict; not just due to an expected increase in encroachment of outsiders but also due to the fact that the increased value of forests and the anticipated benefits from REDD schemes will undoubtedly generate more conflicts over boundaries between communities or among local landholders and forest owners. Adding to these concerns, the Indigenous Environmental Network (2009 in Seiwald, 2011) claims that REDD allows historical polluters to engage in business-as-usual and triggers an accelerated loss of culture through the abandonment of subsistence activities and the availability of cash. Finally, fears of oil extraction due to contracts with oil companies have also been raised (Castro Diaz, 2008: 6).

On the other hand there are those indigenous organizations that see REDD as providing an opportunity to considerably expand forest protection. Their concerns mainly revolve around strengthening their position throughout all stages of REDD development and become active players in international and national negotiation processes. Yet despite the widespread consent that REDD can only be a successful political process with the effective participation of indigenous peoples (especially in countries with a vast indigenous population), the crucial challenge remaining is how to operationalize participation concepts so that a real space for influencing decision-making at various levels can be created. While some recommendations for national participatory processes are available (e.g. the common consultation guidelines from UN-REDD and FCPF), the success of such concepts strongly depends on how indigenous peoples are organized and their political relationship with national government as well as between indigenous umbrella organizations and individual indigenous communities.¹¹

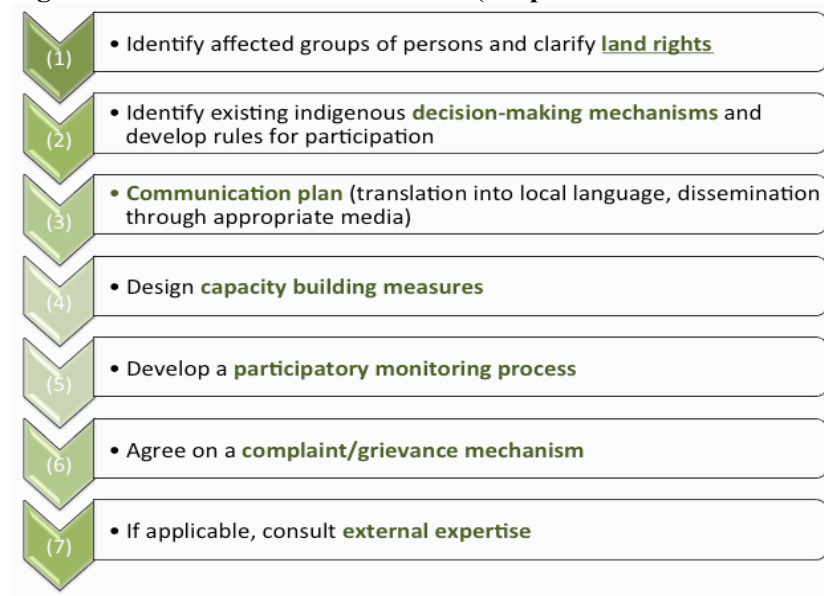
One possible approach to establishing a consensus between indigenous peoples and other relevant actors (officially recognized in the 2010 Cancún Agreement) is the mutual development of country-specific social safeguards in order to ensure that REDD+ does not lead to community displacement and a reduction in their access rights to forest resources.¹² The principle of Free Prior and Informed Consent (FPIC) is one such important social safeguard for REDD+ as it gives stakeholders the ability to challenge, accept, or refuse project implementation. FPIC has been designed to guarantee that no activities impacting the local level take place without the free, prior and informed consent of the affected indigenous population. The Center for People and Forests (RECOFTC) has published a useful manual for

¹¹ In Colombia, for instance, the national REDD readiness working group is composed of selected indigenous leaders with voting rights, while Ecuador and Bolivia have roundtables in which indigenous umbrella organizations and other interested parties participate. Costa Rica, on the other hand, has been severely criticized for failing to include indigenous peoples in their REDD preparation process.

¹² The REDD+ Social and Environmental Standards of the Climate, Community and Biodiversity Alliance (<http://www.climate-standards.org>) as well as Care International provide guidance on the specific criteria and indicators that can be adapted to various context levels.

FPIC trainers and practitioners on the core elements of FPIC and the various steps involved so as to ensure indigenous participation as an iterative process¹³ (see figure 2):

Figure 2: The core elements of FPIC (adapted from the Center of People and Forests, 2013)



Especially Brazil has been hailed as a good example for addressing this issue in a multi-stakeholder process among different NGOs (e.g. IPAM, IDESAM, ISA) and the national indigenous organization FUNAI. Despite the lack of nationally recognized guidelines for operationalizing the principle of FPIC, REDD+ Social and Environmental Principles have been developed in a multi-stakeholder process, many of which explicitly target indigenous issues. One example of concrete implementation of FPIC as an iterative process has been the Suruí Carbon Project, which has been committed to indigenous planning and implementation processes.¹⁴

Summary

Due to its vast forest resources, Latin America plays a key role in the global climate change agenda and various countries in the region have been at the forefront of REDD+ debates. There currently exist several hundred REDD-type projects in the many Latin American countries with the aim of carbon sequestration and biodiversity preservation, many of which form part of a broader sustainable development agenda. The region has also pioneered the implementation of Payment for Ecosystem Services (PES) schemes in developing countries, whose lessons are of high value to current REDD+ policy designs. Hall (2012) has categorized the different countries in the region in terms of their ‘REDD readiness’, defining Costa Rica, Mexico and Brazil as the so-called ‘leaders’, followed by the ‘latecomers’ Ecuador, Bolivia, Panama, Peru, Paraguay, Colombia and Guayana, and finally the

¹³ http://www.recoftc.org/site/uploads/content/pdf/FPICinREDDManual_127.pdf

¹⁴ A multi-stage FPIC process was conducted in a total of 14 villages, starting from first contact with clan representatives and leading to the participatory development of the concept. Particularly significant was the fact that it gave the Pater-Suruí sufficient time for internal consultation and scope to develop their own decision-making mechanisms.

‘stragglers’ (Argentina, Chile, Suriname, Guatemala, Nicaragua, El Salvador, and Honduras). REDD+ in Latin America is also intricately linked to indigenous concerns. While viewpoints to REDD+ may differ among different indigenous groups, there is general consensus on the importance of active indigenous participation throughout all stages of policy and program design. The principle of FPIC is one such method for stakeholders to challenge, accept, or refuse certain policy and program designs.

3. Country-specific CCM Policies, Plans, and Programs

This section provides more detailed country-specific information in terms of the forest policy context and deforestation, national/sub-national programs and projects, and the current stage of REDD+ preparations. The countries I focus on are those of relevance for the ROBIN project: Costa Rica, Mexico, Brazil, Ecuador, Bolivia, Panama, Guyana and Suriname. The first three countries described are the ‘leaders’ in terms of forest conservation and PES scheme experience. What then follows are the ‘latecomers’ Ecuador, Bolivia, and Guyana and Suriname finally as a ‘straggler’ in the adoption of REDD+. The matrices annexed, which are classified according to Hall’s (2012) categorization described in the previous chapter, deliver more relevant policy, program and project information also of the other countries in the region.

3.1 The REDD+ Leaders

Costa Rica, Mexico and Brazil are classified as REDD+ pioneers due to their long-standing experience in forest conservation programs with a PES element. These programs have mostly been state-induced in response to high deforestation rates in the past. Today, all three countries already implement at least some pilot REDD+ projects on the ground, with Brazil having the largest individual REDD+ project portfolio with some 30 sub-national forest carbon projects underway in 2011 (see Hall, 2012: 71-72).

3.1.1 Costa Rica

In 1950, more than half of Costa Rica was covered by forest. This though changed during the 1960s and 1970s when Costa Rica became one of the countries with the highest deforestation rates in the world (3.9% per year). In 1985, its national forest cover had fallen to 24% (Kleinn et al., 2005). Forest conversion was driven by rapid expansion of the road system, cheap credit for cattle, and land titling laws that encouraged deforestation. Growingly concerned about rapid deforestation, the government began to offer incentives for timber plantations, primarily in the form of tax rebates. The system comprised a number of forest accreditations, the most significant being the Forest Protection Certificate (Certificado para la Protección de Bosque, CPB) in 1995, which supported forest conservation rather than timber production. With these measures, the country managed to increase its current forest cover to 51%.¹⁵ This early forest conservation experience paved the way for Costa Rica’s national PES program,

¹⁵ Guidance was provided by the two important strategic forestry sector planning instruments, the National Forest Development Plan and the National Biodiversity Strategy.

which in fact constitutes the world's first economic incentive system in return for environmental services (Hall, 2012: 72).

Even if deforestation has now been literally halted, and the country is now considered a net reforestation state with a rate of +0.54% annually (Westholm et al., 2009), deforestation activities have not stopped completely. One of the main current drivers are unsecure land tenure rights. Due to uncertain property rights, small-holders who obtain logging concessions are often prone to log as soon as possible, not knowing if they will still have access to timber the next year (Ibarra and Hirakuri, 2007). Other drivers of deforestation include the limited institutional and governance capacity, a general lack of resources for monitoring and law enforcement, as well as complex procedures for receiving logging concessions (Costa Rica, 2008).

The National Policy Context

Costa Rica's history of active engagement in international climate change discussions is somewhat reflected in its relatively well-developed set of policy documents on climate change mitigation and adaptation.¹⁶ This progress includes the recognition of the importance of climate change in its National Development Plan (2010-2014), and its National Climate Change Strategy (Estrategia Nacional de Cambio Climático – ENCC) of 2008.

The ENCC was designed by the Ministry for Environment, Energy and Telecommunications (MINAET), which is the focal point for climate change issues in Costa Rica. It addresses both, the national and the international level. On the national agenda, the mitigation strategic component focuses on becoming a c-neutral country, with its specific objective to become a carbon neutral economy¹⁷ by the year 2021 that also enhances the competitiveness and sustainability of the economy (MINAET, 2008: 9). Costa Rica's CCM actions include (a) *emission reductions by source* (i.e. energy, transportation, agriculture and land-use), (b) *carbon sinks enhancement* through reforestation and natural forest regeneration, as well as avoided deforestation, and (c) *carbon markets* development at the local and international level through PES schemes. Internationally, Costa Rica seeks to play an important role in the worldwide climate change debate. With Costa Rica being the only Latin American member in the worldwide Climate Neutral Network (CN Net), the country is part of an international network that seeks an exchange of ideas, successful experiences, best practices in reducing GHG emissions, and actions towards a zero emissions society. As of November 2012, Costa Rica was still in the process of elaborating an action plan to support the implementation of its ENC.

¹⁶ Costa Rica is also a member of the Central American Integration System (SICA), the institutional framework for the integration of Central American states, and of the Central American Commission for Environment and Development (CCAD), a committee which brings together environmental ministries of SICA member states. Under the auspices of SICA and CCAD, a regional climate change strategy has recently been developed (CCAD and SICA, 2010 in Hall, 2012).

¹⁷ Besides the Maldives, Costa Rica, is the only developing country to make carbon neutrality an explicit government objective.

National/Sub-National Programs and Projects

Costa Rica's National PES Program (PSA)	Since 2007 - ongoing Over 8,000 beneficiaries covering 10% of the country The first national system of payments for ecosystem services!
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Project overview: Being the earliest national system of payments for environmental services, the PSA program was launched in 1997 and makes flat rate payments to farmers and forest owners to encourage conservation, reforestation and sustainable management (Hall, 2012: 73). It was introduced following the introduction of Forest Law 7575 in 1996,¹⁸ which changed the rationale for payments from support for the timber industry to the provision of environmental services. From 1997 to 2003 some 375,000 hectares were covered in 5,500 PES contracts at an approximate cost of US\$96 million. By 2005 this had increased to 500,000 hectares and over 8,000 beneficiaries, covering 10% of the entire country. It is estimated that the PSA program prevented the loss of 720 km² of forests in biodiversity priority areas between 1999 and 2005 and it is estimated that the whole program has avoided the emission of 11 million tonnes of carbon in the same period (Karousakis, 2007).

Funding: Financing is provided by the National Fund for Forest Finance (FONAFIFO), which has negotiated various financing agreements with government agencies, private companies and individual users. FONAFIFO receives 3.5% of revenues from a carbon tax, and payments from beneficiaries, as well as some support from the World Bank, and the Global Environmental Facility (GEF).

Current developments: The system has now moved from voluntary to compulsory arrangements. To further reduce deforestation rates it is proposed to expand the current PSA program, with economic incentives being provided also for forest regeneration and improved management of secondary forests. Protected areas should be guarded against illegal logging and sustainable timber production be boosted. Costa Rica is currently implementing projects aimed at further developing existing schemes, such as the second generation PES scheme Ecomarkets II, which is financed by GEF and the World Bank. The focus here is on institutional strengthening of the forestry sector and further developing markets for ecosystem services (Costa Rica, 2008 in Westholm et al., 2009).

Critique: The PSA program has been criticized for not benefiting smallholders, but rather focusing on large-scale landowners (World Resources Institute, 2005). Since secure land tenure is the foundation that defines who receives payments, the landless and those with insecure tenure are generally excluded. Also, the program excludes some traditional land uses such as grazing, which makes it impossible for poor families to participate without replacement activities. High transaction costs is another factor that makes participation difficult for poor families and smallholders, as well as a lack of credits and capital for changing land management practices.

¹⁸ The Forest Law 7575 recognizes the following four environmental services provided by forest ecosystems: mitigation of GHG emissions, hydrological services, biodiversity conservation, and the provision of scenic beauty for recreation and ecotourism. Under the law, landowners are compensated for providing ecosystem services with funds administered through FONAFIFO (Pagiola, 2008).

Besides this large-scale national PES program, there also exist other climate change mitigation initiatives at lower scale levels. One nationwide program launched in 2007 was the promotional ‘*A que sembrás un árbol*’ campaign. It mobilized various sectors of society to plant a total of 4.5 million trees in 2007 and 7 million in 2008 (this represents about 1.5 trees per capita). Inspired by Wangari Maathai’s¹⁹ idea, official government sources claim that this initiative has made Costa Rica the country with the highest tree/capita ratio in the world, with an avoided carbon emission of 2.3 million. The campaign, however, has been severely criticized for private profit making. The organization Coecoceiba, the local branch of Friends of the Earth, claims that up to 70% of the trees planted in the campaign have been exotic species which grow quickly in plantations but will be cut down within a few years, totally defeating the objective of providing lasting carbon sinks. Another rather well known rain forest preservation and restoration project that was approved by the CCB standards (www.climatestandards.org/projects/) in October 2009 is the Pax Nature Foundation *Pax Natura Foundation's Bosque Lluvioso Rio Costa Rica Project*. The project is a collaborative effort of the Government of Costa Rica, The National Biodiversity Institute (INBio), FONAFIFO and FUNDECOR. With a total cost of US\$10 million and a project duration of 10 years, it anticipates a CO₂ offset of 1,614,887 Co₂e.²⁰

Current Stage of REDD/REDD+ Readiness

Despite its rather successful control of deforestation and low deforestation rate, the country has enormous interest in taking on an active role in the REDD debate.²¹ Costa Rica’s National Readiness Plan was approved in 2010 and the country is still in the set-up process of its REDD+ strategy (2011-2014), with the financial support of FCPF. The main actors involved in REDD+ strategy developments are various government ministries (MINAET and Ministry of Agriculture and Livestock, MAG), the National Forest Office (ONF), and (to a lesser extent) Costa Rica’s Associations of Indigenous Developments (ADI).

Costa Rica has already quite an array of important baseline documents available. In collaboration with the FAO a National Forest Monitoring and Assessment was conducted in 2001, together with a pilot study for the National Forest Inventory in the same year. According to Kleinn et al. (2001) the inventory assessed a number of variables such as land tenure, erosion, crown cover, disturbance, timber exploitation and land use. According to Westhold et al. (2009: 55), however, the forest inventory cannot estimate the changes of carbon stocks in the forest. Also, no estimates on biomass exist. Satellite-based forest cover inventories have also been performed by the National Forest Finance Fund (FONAFIFO) every five years since 1997. Other institutions involved in remote sensing studies are the national research centres CATIE and ITCR.

As for Westholm et al. (2009) the main challenges for Costa Rica to become REDD ready are (1) data and information challenges (changes in carbon stock due to deforestation and forest degradation are not sufficiently available; current estimates are based on extrapolated measurement data from individual sample plots), (2) technical challenges (problems with the

¹⁹ A Kenyan activist and Nobel Peace Prize Winner who advocated the planting of trees to substantially support rural livelihoods, improve soil quality and combat climate change.

²⁰ For more information see www.paxnatura.org.

²¹ Costa Rica may not be considered a typical REDD country, as it rather aims to maintain and further develop its national forest program with the REDD funding (i.e. through up-scaling of the existing PSA scheme into the Ecomarkets II program; its main aim is to improve the monitoring of forest cover).

usefulness of satellite images due to clouds and haze; these images only deliver retrospective information, while real time monitoring is merely conducted in areas where the PSA scheme is operating), and (3) the effective inclusion of indigenous and local communities in all stages of the REDD preparation process (Costa Rica has a long history of centralized and top-down planning with generally little wider consultation, see Hall, 2012: 74-75).

Summary

The Costa Rican government is seen as a pioneer in tackling its historically high deforestation rates with offering incentives for timber plantations in the form of tax rebates. This experience that goes back to the 1970s paved the way for the country's national PES program (PSA), in fact the world's first economic incentive system implemented in return for ecosystem services. Launched in 1997, the PSA makes flat rate payments to farmers and forest owners to encourage conservation, reforestation and sustainable management. Costa Rica also has a relatively well-developed set of policy documents on climate change mitigation and adaptation and its National REDD+ Readiness Plan was approved in 2010. The country is currently in the set-up process of its REDD+ strategy (2011-2014) with the financial support of FCPF. Whereas Costa Rica already has various documents available for becoming REDD ready (e.g. baseline documents), the main challenges ahead mainly concern the effective inclusion of indigenous and local communities in all stages of the REDD preparation process.

3.1.2 Mexico

Forests play a vital role in Mexico. They cover 30% of the national territory and are the third largest source of national emissions. They also provide a livelihood for about 12 million people, including some five million indigenous inhabitants (Hall, 2012: 75).²² Similarly to Costa Rica, Mexico faced high deforestation rates in the past (and continues to do so), mainly driven by forest conversion for pasture and agriculture, while forest degradation is said to be caused by over-exploitation, illegal logging, forest fires, grazing, and shifting agriculture.

Mexico has a long history of community-based forestry and grassroots movements, both a legacy from the Mexican Revolution of 1910-1918, when community-based forest governance was established. Forest governance was in tune with the collective, traditional customs of the *ejido* system²³ – communal land for landless peasants – and the indigenous *comunidades*. Mexico's grassroots movements were further strengthened after the centralized government ruling from 1940 to 1970 had introduced industrial timber concessions on communal lands. During this period the forestry sector was dominated by state and private timber enterprises that were subsidized by public investments and protected from foreign competition. Massive popular protests, however, eventually led to the set-up of community forest enterprises starting in the 1960s and 1970s, which are characterized by decentralized

²² Roughly 80% of forest areas are common property owned by indigenous and community groups; only 15% are in private hands and merely 5% are state-owned (Corbera, 2010).

²³ The *ejido* system had been a cornerstone of indigenous and peasant rights in the Mexican agricultural system.

management and the delivery of local benefits.²⁴ To date, there are some 2,300 such commercial enterprises in the country (many of which are based on government-approved management plans) where timber is legally logged.

The National Policy Context

Mexico has a relatively well-established institutional capacity and considerable experience in implementing forestry programs. Strong grassroots movements also had an impact on the national policy environment concerning forests. In 1986 the Forest Law put an official end to private forestry concessions. In 1992, a reform of Article 27 of Mexico's constitution changed the law to allow land under communal property to be sold while permitting peasants to claim full property rights. In 2001, the National Ecology Institute of the Environment Secretariat was established in order to conduct research into environmental management policy. Also during the same period, the National Forestry Commission (CONAFOR) was set up and both institutions started to strongly promote the idea of market-based incentives in return for forest conservation. In 2003, the Mexican Forestry Fund was initiated within CONAFOR, which would receive its financial contributions from a levy on water tax payments as well as the indigenous people's department (Hall, 2012).

In 2005, the Inter-Ministerial Climate Change Commission (Comisión Intersecretarial de Cambio Climático, CICC) was established.²⁵ Its main task is the coordination and formulation of policies on climate action, in particular through the National Climate Change Strategy (Estrategia Nacional de Cambio Climático, ENACC) presented in May 2007. The strategy, placed within the framework of the 2007-2012 National Development Plan, formulated climate change mitigation opportunities in two sectors: (1) Energy and (2) vegetation and land-use. Following the publication of ENACC, the various government departments participating in the CICC began to prepare the Special Climate Change Program (PECC).

The Mitigation Working Group (GT-MITIG) proposes mitigation policies, strategies, and actions to the CICC for the short (2012), medium (2020), and long term (2050). It also works to integrate its activities and work plans with other similar initiatives and identifies possible synergies and means for collaboration between the Working Group and the various other CICC stakeholders. Likewise, the Mexican Committee for Emission Reduction and Greenhouse Gas Capture Projects (COMEGEI) began working in 2004. It is coordinated by Semarnat's Under-Secretary's Office for Environmental Planning and Policy (SEMARNAT). COMEGEI is responsible for promoting, communicating, and assessing CDM projects.

National/Sub-National Programs and Projects

In 2004, a national system of carbon payments was introduced as part of a wider program of 'Payments for Carbon, Biodiversity and Agroforestry Services' (PSA-CABSA), merging 2006 with the 'Program of Payments for Watershed Services' (PSAH) to form a unified PES system under the *Pro-Arbol* umbrella (Corbera, 2010 in Hall, 2012). The program pays landowners to develop a carbon sequestration project to sell this service on the market. Initially the government also paid for the carbon sequestered by the projects. The PSAH program will be examined more in detail.

²⁴ As an interesting footnote, in many areas with a high concentration of community forest enterprises deforestation rates have decreased (e.g. in Guerrero and parts of Oaxaca).

²⁵ The Commission is composed of the Mexican Ministers of Foreign Affairs, Social Development, the Environment and Natural Resources (chairman of the Commission), Energy, the Economy, Agriculture, Livestock, Rural Development, Fisheries and Food, and Communications and Transportation.

Payments for Hydrological Services (PSAH)	Since 2003 - ongoing Numerous small-scale projects all over the country PSAH pays a fixed amount for water services
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Project overview: Mexico's countrywide PSAH scheme invests earmarked water use fees into conservation of forest cover in priority areas for enhancement of hydrological resources. The program is meant to catalyze the introduction of local schemes based on contributions from local water users that can be financially sustainable in the long term. It is managed by CONAFOR and during set-up enjoyed expert advice from the Costa Rican FONAFIFO, the Mexican National Institute of Ecology (INE), the Economic Research and Higher Education Centre (CIDE) and the University of California at Berkeley. The World Bank also provided financial and technical support.

The PSAH pays landowners a fixed amount per hectare for the water services provided by the forest on their land. The beneficiaries commit to leaving the forest intact and sign five-year contracts. Beneficiaries are mainly communities and *ejidos* with communal forests that have at least 80% crown cover, since these forests make a large contribution to the provision of water downstream. Most of these communities already conserved their forest prior to the program, and initially most payments have been made to forest areas assigned to conservation purposes. Braña Varela (2007) showed that from 2003-06 PSAH allocated 4, 11, 7 and 6% of the payments, respectively, to areas with a high deforestation risk. This somewhat shows that PSAH has contributed in only a limited way to the reduction of deforestation.

Additionality: PSAH specifically target *ejidos* and communities that have maintained forest cover over time to benefit from the products or services provided by these forests. The fact that the communities still have forests to be considered by these programs means that the forests are not at immediate risk of deforestation. Various studies on the effect of PES programs in Mexico confirm that most communities and *ejidos* would have conserved their forests anyway, even in absence of such payment schemes (e.g. Karousakis, 2007).

Leakage: It must be mentioned that in Mexico there are no specific requirements for avoiding leakage (Bennecker and McCall, 2009). However, in most cases PSAH contracts specify that the removal of trees from a community's forested area, even outside of the area for which payments were being made, constitutes a contract violation. Intra-property leakage, however, not always takes place. Some communities invest the benefits from timber sales in activities (e.g. in ecotourism), thereby promoting forest conservation. Other communities apply the regulations on forest use established under the program to the entire community forest area and expect to be rewarded for their conservation efforts under future payment schemes as well.

Permanence: The PSAH program does not require a long-term commitment from the beneficiaries, as contracts are signed up for a five-year period only. This is the period for which agricultural land requirements are planned and not beyond. Also, another argument against longer-term contracts is fear of property loss or forest user rights (Bennecker and McCall, 2009). However, the fact that project areas tend to be rather small (appr. 50 hectares

of forest) and tree products can still be harvested even beyond the contract period may be seen as a supporting factor for permanence.

Critique: The major constraint relates to remaining barriers of participation, especially for the most marginal groups who have less access to information and capacity to formalize applications (often related to lack of complete documentation in relation to land register) and less lobbying power with the local CONAFOR office. A second aspect concerns the absence of local intermediaries and facilitators. One of the illustrative cases that reflect the lack of facilitators is the Sierra Gorda Biosphere Reserve.

Community Forestry Program (PROCYMAF)	Since 2003 - ongoing PROCYMAF has strengthened community forestry management institutions Quite promising in the fight against deforestation!
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Project overview: The Community Forestry Program PROCYMAF supports communities to organize, plan land-use options and implement activities that generate economic benefits. Activities often build on existing management initiatives. Communities sell timber and other products on the market and regulations on forest use guarantee sustainable use and conservation of the forest. The program is hailed as promising in the fight against deforestation, since various studies (e.g. de Jong et al., 2008) show that deforestation rates in communities and *ejidos* with forest management activities are lower than in unmanaged areas. Therefore, PROCYMAF has contributed significantly to the strengthening of existing community forest management institutions and has promoted the creation of these institutions where they did not previously exist. The program is also said to have managed that communities now value the forest much more; this has led to a reduction in pressure on the forest for alternative activities.

Additionality: Similarly to PSAH, PROCYMAF also mainly targets *ejidos* and communities that have maintained forest cover over time to benefit from the products or services provided by these forests. The fact that the communities still have forests to be considered by these programs means that they have maintained forest stock over time and that the forests are not at immediate risk of deforestation.

Leakage: Similarly to PSAH, PROCYMAF also lacks any specific requirements for avoidance of leakage. Some communities invest the benefits from timber sales in sustainable activities, thereby promoting forest conservation. Other communities apply the regulations on forest use established under the program to the entire community forest area and expect to be rewarded for their conservation efforts under future payment schemes as well.

Permanence: Under PROCYMAF communities receive funds for planning, training and investments based on one-year contracts only. Hence, the program beneficiaries require no long-term commitments. Similarly to PSAH, however, the fact that the project areas are rather small and tree products can still be harvested beyond the project period may have a positive impact on permanence.

Critique: According to a World Bank Project Performance Assessment Report in 2010, the ratings given for PROCYMAF may be summed up as ‘moderately satisfactory’. The main conclusions were as follows: (1) Improved stewardship of natural resources as probably the main program contribution, (2) the limited ability of the program to wipe out rural poverty in Mexico due to its limitation to communities with abundant forests and no land conflicts, and (3) no quick fixes exist for building community capacity and institutional arrangements to manage and conserve forests. Concerning the latter finding, however, the broad-based participation in land zoning exercises and the significant survival rate of the forest enterprises established by the program may in fact be the best evidence of substantial capacity development and sustainable institutional arrangements.

Current Stage of REDD+ Preparations

Following Mexico’s long-standing history in community forestry and especially PES, the country is well equipped for embracing REDD+. It has been active in regional REDD developments and participates in the FCPF. The national REDD formulation is done at CONAFOR by a REDD Coordinating Group (GT-REDD+). Over 70 civil society representatives advise this group, illustrating a rather high level of inclusion and participation during the formulation process. A Readiness Preparation Proposal was finalized in 2011 with a grant from the FCPF and a REDD+ strategy (ENREDD+) being provided in May 2012. The proposal has evolved beyond its original design which was more akin to a PES program, and is now based on multi-sectorial strategies embedded in the context of rural sustainable development. However, there is still a need to establish a national accountability system, a baseline reference scenario and MRV methodologies. The biggest challenges for REDD+ are building transparency and accountability, since non-compliance by communities in past PES schemes has tended to go unpunished. Also, another challenge lies in the difficult consultation process with the large number of indigenous people and *ejido* representatives in the country (Hall, 2012: 79).

Summary

Forests cover around 30% of Mexico’s national territory and are the third largest source of national emissions. Similarly to Costa Rica, Mexico faced extremely high deforestation rates in the past and partly continues to do so. The country has a long history of community-based forestry and grassroots movements, both a legacy from the Mexican Revolution of 1910-1918. Strong grassroots movements also had an impact on the national policy environment concerning forests. In 1986 the Forest Law put an official end to private forestry concessions. In 1992, a reform of Article 27 of Mexico’s constitution changed the law to allow land under communal property to be sold. Mexico has a relatively well-established institutional capacity and considerable experience in implementing forestry programs. In 2004, a national system of carbon payments was introduced as part of a wider program of ‘Payments for Carbon, Biodiversity and Agroforestry Services’ (PSA-CABSA), merging 2006 with the ‘Program of Payments for Watershed Services’ (PSAH) to form a unified PES system under the *Pro-Arbol* umbrella. The program pays landowners to develop a carbon sequestration project to sell this service on the market. Another well-known program is the Community Forestry Program PROCYMAF that supports communities to organize, plan land-use options and implement activities that generate economic benefits. Mexico is well equipped for REDD+. A Readiness Preparation Proposal was finalized in 2011 with a grant from the FCPF and a REDD+ strategy (ENREDD+) being provided in May 2012.

3.1.3 Brazil

Dominating the Amazon Basin, Brazil lost 2.8 million hectares of its tropical forest a year from 1990 to 2005, accounting for 5% of global GHG emissions and making it the world's fourth largest polluter after China, the US and Russia (UNFCCC, 2008). Since 2004, however, the peak of deforestation, the rate of forest clearing in Brazil has fallen by almost 75%. According to Kissinger et al. (2012) this is mainly a result of the 2006 voluntary moratorium between private industry and NGO's on soy produced on land cleared in the Amazon. After the moratorium was announced, sanctions on illegal loggers were enforced, monitoring capabilities strengthened, and the Bank of Brazil's gave its veto of agricultural credit for soy farmers seeking to plant in newly cleared forest. While soybean profitability has since returned to pre-2006 levels over the past four years, rates of deforestation still continued to decline, suggesting that policy interventions and incentives have influenced the agricultural sector.

The National Policy Context

Major recent environmental policy initiatives on deforestation, according to May and Millikan (2010 in Hall, 2012: 81) are (1) the implementation of the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAM), (2) the development of sophisticated remote sensing capacity led by INPE, (3) protected area expansion in the Amazon,²⁶ (4) the approval of the Public Forests Management Law in 2006, (5) the strengthening of environmental state-level monitoring and control capacity, and (6) the introduction of a Sustainable Development Plan for the paving of the BR-163, the 'soybean highway' linking Cuiabá with Santarém. In 2010, Brazil's National Policy for Climate Change became law. One of its targets is to reduce emissions from Amazon deforestation by 80% until 2020. Interestingly, some claim that this target has already been achieved, while others question the correctness of the data (e.g. Fearnside, 2008).

National/Sub-National Programs and Projects

By the end of the 1990s, only a handful of PES-type programs had emerged, comprising voluntary carbon sequestration projects based on reforestation and conservation of degraded forests, as well as the so-called ecological value-added tax in a few states (Hall, 2012: 80). Since the year 2000, however, Brazil has a growing portfolio of REDD+ projects both at federal and state levels (most are concentrated in the Amazon region). At the federal level, the probably best-known program is *Proambiente*, Brazil's first major venture into PES for small farmers. On the sub-national level, *Bolsa Floresta* is probably the most widely known program. In recent years, the country has built up its REDD+ project portfolio with some 30 sub-national forest carbon projects underway.

	2000 - 2010
PROAMBIENTE	Direct beneficiaries: 4,200 families Brazil's first major venture into PES!

²⁶ In the Brazilian Amazon, two-thirds of the area under official protection, excluding indigenous reserves, is dedicated to sustainable forest management, while the remainder is fully protected. Forest loss in protected areas accounted for 8% in the period from 2002 to 2007 and many of the ecological crimes registered in conservation units occurred in strictly protected areas (ISA, 2008 in Hall, 2012).

Project overview: Proambiente was Brazil's first venture into PES for small farmers, consisting of 11 sub-projects in nine Amazonian states. Launched in 2000 by a coalition of civil society groups in the Amazon, the cash incentive program should reward those who practiced environmentally sustainable forest management. The ecosystem services eligible for cash returns were the reduction and avoidance of deforestation, biodiversity and soil conservation, fire management and recovery of hydrological functions, and riverine forest (Hall, 2012: 82). Faced with various constraints, in 2004 the program was transferred to the Ministry of the Environment under the new administration of President Lula da Silva. Payments to farmers followed clearly structured stages: (1) The preparation of sustainable development plans and resource use plans, (2) the negotiation of community agreements, (3) the verification of activities for ecosystem service provision through external monitoring, (4) the certification of activities, and (5) the disbursement of monthly payments (US\$ 95/month/household). The total number of beneficiaries was some 4,200 rural families. While it has probably missed its (ambitious) goal of becoming a model for national PES policy, it has nevertheless triggered the set-up of a number of state-level schemes in Amazonas, Pará, Acre, Mato Grosse and Amapá. The scheme was formally closed in 2010.

Funding: Funding was provided by a special fund managed by the Ministry of the Environment. It was hoped that cross-sector collaboration would provide support for rural credit and agricultural extension (Ministry of Agrarian Development, MDA), certification (government agricultural research agency, EMBRAPA) and monitoring of carbon stocks (Ministry of Science and Technology, MCT). Throughout its implementation though, the scheme was beleaguered with lacking consistent financial support from the federal government to cover all project costs. The program administrators rather had to rely on foreign funding or ad-hoc agreements with individual ministries.

Benefits and critique: Some of the benefits, according to Bartels et al. (2010) have been improved farmer livelihoods and the adoption of environmentally sound practices (even in the absence of rigorous quantitative measurements), strengthened human and social capital at community level, and more influence in policy-making. In addition, the scheme has undeniably been instrumental in underlining the importance of PES and therefore laid the groundwork for subsequent REDD+ programs and projects. Apart from these achievements, *Proambiente* has also been the target of much criticism. First, Hall (2012: 83-84) mentions its inappropriate loan provision criteria, coupled with inadequate field support throughout its 10-year duration. Also, concerns were raised regarding the role of political bias when project sites were selected, as apparently areas were favoured which could be sure of the Workers' Party support. Other issues of concern raised were the absence of a baseline for change indicators as well as inefficient monitoring procedures.

	Since 2007 - ongoing
BOLSA FLORESTA	Direct beneficiaries: 7,000 families
	The world's largest operational REDD+ scheme!

Project overview: Initiated by the government of Amazonas in 2007, it is underpinned by the state's climate change law. For the time being, *Bolsa Floresta* is the largest operational REDD+ scheme in the world (Viana, 2010 in Hall, 2012) and administered through the Sustainable Amazonas Foundation in partnership with the state environmental secretariat. The program covers over 10 million hectares with a total investment of US\$ 11 million by 2010, benefitting over 7,000 families. Financial assistance and infrastructure support is given to

forest dwellers, which sign a contract on ‘zero deforestation’. The first project within the program has been in the Juma Reserve (see below for a more detailed description). It is anticipated that by 2016 *Bolsa Floresta* will have sequestered 3.6 million tonnes of CO₂e.

Funding: A US\$ 40 million trust fund has been set up with donations from the state government, Bradesco Bank and private companies such as the Marriot Hotel chain and Coca Cola.

JUMA RESERVE	Since 2007 - ongoing
	Direct beneficiaries: 370 families
	The first REDD+ project to gain CCBA gold status!

Project overview: The project consists of the creation and implementation of a Sustainable Development Reserve in Novo Aripuanã municipality, in the South of Amazonas State, Brazil. So far, the program has benefitted around 370 families. Located in a region under strong pressure of land use, the Juma Reserve is a state protected area with a total area of 589,612 hectares comprised of Amazon forest. Juma was the first Brazilian REDD+ project to gain CCBA gold status certification (see Colini Cenamo et al., 2009). For establishing a baseline reference, the model used for the next 40 years (Sim Amazonia I) incorporates presumptions such as population growth, construction of infrastructures and other parameters to estimate future deforestation rates for the project area. It should be noted that the primary driver of deforestation is the paving of existing roads for improved access, and in this context this project is located between interstate BR-319 and BR-230, and is crossed by highway AM-174. The future paving of these highways will likely increase deforestation pressures in the area.

Leakage and permanence: No negative impacts are expected on carbon stocks outside the project area, once strategies are adopted to avoid population migration and land use changes. In fact, the project’s implementation is hoped to generate ‘positive leakage’, once it takes actions to reduce deforestation also outside the project boundaries, in the areas surrounding the Reserve (Colini Cenamo et al., 2009). In order to ensure permanence, a credit buffer of 10% was established. Also, it is foreseen to set up a permanent fund with the aim of guaranteeing the necessary flow of resources to assure the implementation of the project even after the completion of the crediting period.

Main challenges: Being the first project of its kind in Brazil, the major challenges during its inception phase were a proper baseline design, defining proper project boundaries, an estimation of carbon stocks and the use of effective monitoring strategies. Now at the implementation stage the major challenges are related to efficient resource allocation, continuous adjustment to changing project realities as well as logistical shortcomings.

Other smaller sub-national REDD+ initiatives include the *PSA-Carbono Program*, a recent REDD+ scheme that started in 2011 and is currently implemented in the states of Acre and Pará, aiming to strengthen conservation, reduce GHG emissions, and promote sustainable production. It is part of a much wider scheme of adding economic value to forest resources and includes incentive payments for certified, sustainable production systems. The Amazon Fund, KfW and SkyTV provide support of this initiative. Another program is the *Transamazon Highway Farmers* targeted at small farmers along a stretch of the Transamazon Highway in the state of Pará. This initiative is supported by a large variety of state and civil

society institutions. The program aims to develop alternative, non-destructive agrarian systems and land-use practices, together with a PES system. It is still at an early stage of implementation and will initially benefit some 350 farming households. Furthermore, the *Sao Felix do Xingú (SFX)* is a REDD+ pilot scheme in southern Pará with a focus on efficient emissions reduction rather than poverty alleviation or promotion of social justice. It is still in a planning stage. Moreover, the *Headwaters of the River Xingu Project (CCSX)* is located in southwest Mato Grosso around the headwaters of the river Xingu and operational since 2008. It was developed by *Aliança da Terra*, an association of landowners, together with IPAM and Woods Hole Research Centre (WHRC) and aims to reduce deforestation and promote sustainable land use in an area surrounding the Xingu indigenous reserve, an area of intensive soybean cultivation and cattle ranching (Hall, 2012). Finally, the *Northwest Mato Grosso Project (NWMT)* is still at an early planning stage.

Current Stage of REDD+ Preparations

Whereas the national REDD+ preparations of Costa Rica and Mexico have emerged from a long tradition of centralized forest conservation planning since the 1980s, Brazil's experience is far more recent, decentralized and fragmented. The groundwork for REDD+ was laid during the 1990s with the development of forest protection and 'protective conservation' initiatives especially in the Amazon (Hall, 2012: 79-80). Brazil's national REDD+ strategy is largely developed independently of the UN-REDD program or the World Bank's FCPF or other major donors.

Summary

Brazil's substantial annual forest loss from 1990 to 2005 makes it the world's fourth largest CO₂ polluter after China, the US and Russia. The country's various environmental policy strategies on deforestation include the implementation of the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAM), sophisticated remote sensing capacity development initiatives led by INPE, the expansion of protected areas in the Amazon, the approval of the Public Forests Management Law (2006), the strengthening of environmental state-level monitoring and control capacities, as well as the introduction of a Sustainable Development Plan for the paving of the BR-163, the 'soybean highway' linking Cuiabá with Santarém. Also, Brazil's National Policy for Climate Change that aims to reduce emissions from Amazon deforestation by 80% until 2020 became law in 2010. Brazil has a growing number of REDD+ projects both at federal and state levels with some 30 sub-national forest carbon projects underway mostly in the Amazon region. The probably best-known program at federal level is *Proambiente*, Brazil's first major venture into PES for small farmers. *Bolsa Floresta* is possibly the most influential program at the sub-national level. Other smaller-scale sub-national programs are the *PSA-Carbono* REDD+ scheme implemented in the states of Acre and Pará, the *Transamazon Highway Farmers* that targets some 350 small farming households along a stretch of the Transamazon Highway, the *Sao Felix do Xingú* in southern Pará, the *Northwest Mato Grosso Project* (still in a planning stage), and the *Headwaters of the River Xingu Project* located in southwest Mato Grosso. Brazil's national REDD+ strategy is largely developed independently of the UN-REDD program or the World Bank's FCPF or other major donors.

3.2 The REDD+ Latecomers

This category includes those countries that have already taken active steps in setting up their own national REDD+ strategies. Strategy development has largely been undertaken with technical and financial assistance from one or more external institutions, such as the FCPF of the World Bank or the UN-REDD program. In Hall's (2012) classification system, those countries demonstrating much greater commitment than others to ensuring a viable REDD+ strategic policy and program framework are considered within the category of 'latecomers'. These countries are Bolivia, Ecuador, Paraguay, Guyana, Peru, Panama, and Colombia. The following will provide some more details on the project-relevant countries Bolivia, Ecuador, Panama, and Guyana.

3.2.1 Bolivia

Bolivia's forests play a key role in climate change mitigation, since more than half of the country's land surface (53% or 57 million hectares) is still covered with forests. Today's deforestation rate is about 150,000 hectares per year, or 0.26% (FAO, 2008), with a concentration of forest loss in the Amazon, in transition areas, Chiquitano dry forests, sub-Andean and Chaco regions. Deforestation has accelerated substantially since the 1980s and figures today are among the highest per capita losses worldwide. Forest loss and degradation contribute almost 80% of the country's GHG emissions, probably the highest proportion in Latin America (Hall, 2012: 96). Until the mid-1980s, Bolivia's deforestation rate was only moderate, with national and regional colonization programs being the main driver. However, a change in national politics (from an economy based on import substitution to an export-led economy following structural adjustment policies) led to a rapid agricultural frontier expansion, largely driven by the growing importance of soybean production. Likewise, settler agriculture and cattle ranching also increased in recent years. The conversion of forests for agricultural purposes has largely been concentrated in the department of Santa Cruz, with some new 'development points' also in the departments of Pando and Beni. Other direct causes of deforestation comprise slash-and-burn agriculture of migrants and colonists, forest fires ('*chaqueo*'), infrastructure development and, but of less importance, mining (Westholm et al., 2009: 38). Moreover, land tenure structures have also impacted deforestation in Bolivia, since the process of regularizing land rights has increased competition for land (Pacheco, 2005). Underlying drivers of deforestation have been the weak structures in forest governance, low land prices and legal and illegal logging which leads to additional colonization and deforestation.

The National Policy Context

Since the 1990s, Bolivia's environmental, and in particular forest, policy sector has been marked by major decentralization efforts coupled with a series of structural reforms in order to increase effective forest use and management.²⁷ Various environmental laws were introduced to regulate forest protection. These include the Popular Participation Law of 1994 that gives municipal governments and indigenous civil society a greater voice in local politics through the set-up of so-called Community and Land-based Organizations (OTBs)

²⁷ Before the early 1990s, all national forests were state owned and leased to private companies through 'use concessions'; hence the main focus was on short-term profit gains. The consequence was uncontrolled exploitation of 37% of the national forest area by private companies, principally in the departments of Santa Cruz, Beni, and La Paz (Bolivia, 2009: 8).

(Ringhofer, 2010). Also, the Agrarian Reform Law of 1996 has since facilitated land demarcation and titling processes. Moreover, the Forest Law 1700 also introduced in 1996 brought with it various reforms: The need for producing long-term sustainable forest management plans, land use classification for protection and sustainable production, the introduction of fees for forest use, the set-up of local community associations to foster participation in forest governance, and the introduction of a national system for sustainable forest management (SIRENARE) as well as a National Forest Development Fund (FONABOSQUE).²⁸

In 1995, the National Climate Change Program (PNCC) was created as the operational branch of the formerly known Vice Ministry of Biodiversity, Forest Resources and Environment (now called the Vice-Ministry of Environment, Biodiversity and Climate Change). In 1996, the PNCC formulated its first National Action Plan on Climate Change for the energy and forest sectors, prepared the GHG emission inventory, and initiated the National Implementation Strategy of the UNFCCC. In 1998, Bolivia formulated the National Program of Combined Implementation (PRONIC), which seeks technical assistance and financing in order to undertake projects aiming to reduce GHG emissions in cooperation with Annex I countries of the Kyoto protocol. In 2000, the National Implementation Strategy of the UNFCCC (ENI) was approved by the Inter-Institutional Climate Change Council. ENI defines the responsibilities of the implementing institutions of the UNFCCC and activities to address climate change for a time period of 10 years. Bolivia has also incorporated crosscutting climate change policies and programs into the 2010-2014 National Development Program and issued its o the National Mitigation Strategy 2006. Bolivia is part of the nine participating countries in the Pilot Program for Climate Resilience (PPCR). This is the first program developed by the Strategic Climate Fund (SCF) of the World Bank and aims at providing incentives for scaled-up action and transformational changes in integrating climate resilience into national development planning (Bolivia, 2008).²⁹ Forestry and land use change account for 60% of Bolivia’s GHG emissions and thus have a high potential for carbon capture.³⁰ For the forestry sector, the National Mitigation Strategy of 2006 therefore identified the need for various mitigation actions such as the enforcement of sustainable forest management, environmental service development including ecotourism, promote zero tillage agriculture, and improved agroforestry.

National/Sub-National Programs and Projects

Noel Kempff Mercado Climate Action Project (NK-CAP)	30-year pilot project: 1997 to 2026 Partners: GOB, AEP, BP-America, Pacificorp, TNC, FAN The largest deforestation avoidance project at the time!
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²⁸ Hall (2012: 97-98) notes that while these reforms have undeniably contributed to the transfer of large forest areas to indigenous and community groups, he also sees the poor technical capacity of governmental forest institutions, corruption and the limited integration of indigenous groups into the forest governance structure as perpetuating problems.

²⁹ UNDP Bolivia (2011) has published *Tras las huellas del cambio climático* en Bolivia that bundles the expertise of more than 200 national and international institutions and experts. It also operates the virtual platform on climate change: www.cambioclimatico-pnud.org.bo.

³⁰ Emission from forestry and land use change in Bolivia almost doubled between 1990 and 2000 to 51,772 Gg in 2000. Projections show an average annual increase of 1.47% of CO₂ emissions from forestry and land use change between 2001 and 2015, reaching 32 million tones of CO₂ in 2015 (Bolivia, 2008).

Project overview: The NK-CAP started operating in 1997 for a period of 30 years as a pilot project under the US initiative for Joint Implementation (Hall, 2012: 98). Located in the northeastern section of the Department of Santa Cruz in the Province of Velasco, its main objective is to incorporate forest areas adjacent to the Noel Kempff Mercado Park that are threatened by forest concessions and deforestation. Between 1996 and 1997, the project acquired three concessions from logging firms in order to create one expanded protected area. With a project area covering 642,184 hectares, NK-CAP has been hailed as one of the world's first large-scale REDD projects, as it addresses the drivers of both Ds in REDD: *Deforestation* from conversion to agriculture by local communities and *degradation* from logging activities in timber concessions.

Project partners and funding: The project comprises a stakeholder consortium involving the project investors American Electric Power Company (AEP), BP America, and PacifiCorp, the project developers The Nature Conservancy (TNC) and Fundación de Amigos de la Naturaleza (FAN), and the Government of Bolivia (GOB) as country partner. In return for carbon revenue, the three energy companies AEP, BP America, and PacifiCorp have been guaranteed 51% of future certified offsets created over the 30-year project lifetime. These investors have assumed the risk that the estimated quantity of verified carbon benefits might not be fully realized. The GOB pledged support for the project plan, closed the timber concessions, expanded the park, and received 49% of the carbon benefits, which it agreed to use to fund community development, park management and other activities (TNC, 2009).

Additionality: Additionality is measured along the following four questions: Were project activities required and regularly enforced by law? Would project activities have been financially possible otherwise? Were the project activities common practice? Were business-as-usual emissions the same or lower than the with-project scenario? All four questions could be answered with 'no', thereby establishing a degree of additionality. First, the project was not required by Bolivian law to be implemented. Despite the adjacent national park, no expansion was either planned or required. Secondly, a feasibility study prior to the project showed that the GOB lacked the necessary funds and the political will to stop the forest concessions. Then, the funds provided by the project have hence enabled changes to the status quo by financing the buyout of timber concessions, expanding the park and fostering community development activities. Finally, the project has resulted in fewer emissions as compared to the baseline.

Leakage: From avoided deforestation: The biggest leakage risk for activity shifting has been due the expansion of subsistence agriculture along the border areas of the park. Therefore, the project promotes an extensive community development program including a variety of educational workshops and campaigns, technical and legal assistance in securing land tenure and the design of a sustainable management plan for ancestral lands.³¹ Finally, no market leakage is expected since the main threat to deforestation lay in subsistence agricultural

³¹ Perhaps the most successful aspect of the avoided deforestation leakage prevention program was the legal designation of a 360,565 hectares indigenous ancestral territory for border communities (Tierras Comunitarias de Origen, TCOs), which officially granted them property rights. Communities helped design the Bajo Paragua Native Communal Land Natural Resources Management Plan for the lands adjacent to the project and sustainable forestry activities undertaken in the TCO are lessening pressure to deforest within project boundaries.

expansion and not in commercial agriculture. From avoided degradation: The main leakage risk is that concessionaires themselves would relocate, but continue their activities elsewhere (so-called activity-shifting leakage) One of the key project activities, therefore, has been the closing of sawmills and the purchasing and retiring of harvesting equipment from concessionaires by project developers as part of the overall concession buyout (for more detailed calculations see TNC, 2009).

Permanence: Permanence of carbon benefits generated by the project is safeguarded by legal, financial and institutional means. The project area has been incorporated into a National Park, as legally designated by the GOB in a binding legal document (Supreme Decree #24457), with effective protection under the auspices of the National Service of Protected Areas (SERNAP) and FAN Bolivia as the project administrator. Also, the GOB has a financial stake in the project’s success and continuity, as it is entitled to 49% of the project’s carbon benefits. Finally, an endowment fund has been set up to provide financial assistance for the protection and management of the expanded Noel Kempff Mercado National Park. Even after project completion in 2026 these funds will be earmarked for the sustainable use and benefit of the national park.

Benefits and critique: First in terms of carbon benefits, a TNC report of 2009 states that from (a) reducing emission from deforestation, 763 hectares were saved over the 1997-2005 verification period, corresponding to 371,650 t CO₂e. From (b) reducing emissions from degradation, a total of 468,474 m² of timber slated for harvest were protected over the 1997-2005 verification period, corresponding to an avoided emissions of 791,443 t CO₂e. The total carbon benefits from NK-CAP are expected to reach 5,838,813 t CO₂e over the 30-year project lifespan. Second in terms community development benefits include organizational empowerment, capacity building, improvement of basic services, and development of income generating activities. Finally in terms of biodiversity benefits, Halloy (1994) claims that there are many species present in the expansion area, which were not present in the original park area, including 64 species of birds, the maned wolf and marsh deer.

Not surprisingly, the NK-CAP has aroused a lot of controversy. The project has been accused of apparently exaggerating its carbon sequestration achievements and been labelled as a ‘carbon scam’ (Densham et al., 2009). It has also been criticized for its poor record in involving locals in the design and implementation, its failure to having prevented widespread leakage and of its small impact on alternative income generation.

Carbon Sequestration through Deforestation (FECAR)	21-year crediting period: 2008 to 2029
	Partners: GOB, FECAR, CETEFOR, Cetefor-Sicirec, Vlaams Gewest
	Bolivia’s only CDM project!

Project overview: Located in the Department of Beni, Province of José Ballivian, Municipalities of Rurrenabaque and San Borja, this small-scale project aims to reforest a portion of the land owned by 137 farmers and 3 communal areas covering an area of 247 hectares and implement 70 hectares of silvipastoral systems on land of the same farmers (the settlers are organized into syndicates of 20 to 60 farming families). This is done through introducing an integrated farming system based on permanent agroforestry systems in order to improve land use practices (reduce traditional slash-and-burn practices) and increase local livelihoods through income generating measures (i.e. sustainable crop and timber production). Approved in June 2009, it is Bolivia's only A/R CDM project (Locatelli et al., 2010).

Project partners and funding: The project partners are the GOB, which acts as the host organization. The other national partners are the community organization FECAR (Federación de Comunidades Agropecuarias de Rurrenabaque), the private foundation CETEFOR (Fundación Centro Técnico Forestal), and the association Cetefor-Sicirec (Asociación Accidental Cetefor-Sicirec, an association between CETEFOR and the private company Sicirec Bolivia Ltd.). The Flemish Government Vlaams Gewest acts as the international partner.

All reforestation activities are financed by Cetefor-Sicirec. Cetefor-Sicirec uses funds from the Dutch based investment company SICIREC Group BV and the sale of CERs to the Flemish Government. Sicirec Group BV obtains funds from timber and carbon markets. The farmers in the project also provide in-kind contributions.

Additionality: It is estimated that the project contributes to the following net anthropogenic GHG removals by sinks in the 21-year crediting period:

- Estimated total: 91,165 removals by sinks (t of CO₂e)
- Annual average: 4,341 tonnes of CO₂e

Leakage: There is no displacement of households due to the project, since only a small portion of the farmland is reforested. Project rather reduces the risk of migration from the area to nearby forest areas due to better land use practices. Nowadays there is a tendency of depreddating the farm lands through inefficient land use practices, once productivity becomes very low due to soil degradation farmers move to nearby forest areas. The already mentioned approach of 'integrated farm management' is aiming at efficient land use practices on the entire farm, considering current and future needs of the farmer family. Sustainable crop and timber production will generate income in the short, medium, and long term, which lowers the current risk, farmers move to other places.

For pastureland, leakage through activity shifting likely occurs since cattle will be displaced to areas outside the project boundary. The methodology for calculating leakage as provided in AR-AMS0001/version 04.1 is used, with data obtained from studies done in the area, for the average grazing capacity of land. The project therefore foresees the following: Most of the cows will be moved to an area of the grassland stratum inside the project boundary that will be converted into a silvipastoral system. In addition, a rotation system for grazing will be introduced which avoids over- and under grazing, improving total production. Finally, as no fertilizer is used to enhance tree-growth, no leakage due to such use is anticipated.

Critique: After three years of project implementation, the main concerns raised by different stakeholders have been cattle invasions from neighbouring farms, doubts raised concerning the fertility of eligible land, and the difficulties with pest control on the newly established farm systems. In a recent study done by Corbera & Friedli (2012: 206), they criticize the generally limited availability of empirical evidence that CDM A/R projects really contribute to carbon sequestration (their study also examined the FECAR project): “Projects often rely on inaccurate carbon accounting methods that deem their actual mitigation benefits rather uncertain. Socio-economic assessments are non-existent or lack detail, casting doubt on projects’ contribution to local and socially transformative development“.

Besides these large-scale initiatives, there also exist smaller-scale forest protection and biodiversity projects. One is called the *Los Negros Project*, where farmers are paid to protect 2,800 hectares of native vegetation and cloud forest bordering the Amaboró National Park, securing regular water supplies for downstream irrigators. The model is replicated and financed by the Bolivian NGO Fundación Natura Bolivia (see Hall, 2012: 98). Furthermore, the *Carbon Sequestration and Recovery of Degraded Areas through Community Forestry in Colonization Areas of Nor Yungas* benefits a total of 270 local families and consists of two sustainable agro-forest greenhouses with a production capacity of 20,000 plants that have been set up to improve local livelihoods, with the added benefit of carbon sequestration. Moreover, the *Reforestation Median Sub-Basin Central Strip of Pirai River* project benefits some 244 local families through the reforestation of 46 hectares in the area, a reduction of high degradation and soil erosion levels and the production of a greenhouse containing 66,500 plants of various species. Finally, the *Protection of the Bolivian Amazon Forest* is a CCB-project approved in March 2012 by the CCB standards (more information on www.climatestandards.org/projects).

Current Stage of REDD/REDD+ Readiness

Bolivia is one of the nine founding members of the UN-REDD program and had a US\$ 4.7 million grant approved in March 2010. The country’s work program centres on institutional capacity strengthening of public entities, enhancing civil society abilities to implement activities, and incorporating pilot projects into its program (Hall, 2012: 99). Bolivia is quite advanced when it comes to monitoring land use change and degradation with satellite images; however the observations derived from analyzing these images need to be complemented with field data (Bolivia, 2008). To date, no comprehensive biomass inventory covering all Bolivian forests exists, however, some pilot activities (e.g. within the frame of NK-CAP) combining remote sensing and biomass measurements are underway.

Various authors emphasize the country’s suitability for incorporating REDD+ as an incentive for deforestation control and sustainable forest management (e.g. Hall, 2012, Westholm et al., 2009, Robertson & Wunder, 2004). First of all, the country has several years of experience with PES schemes (various small-scale biodiversity and watershed protection projects in the past) and can draw upon 15 years of experience with the on-going NK-CAP project. Moreover, Bolivia has been praised as a positive example of recognizing indigenous peoples’ land rights and rights to collective ownership, even if implementation has been slower than expected. There also exist mechanisms for involving relevant stakeholders. The political position of indigenous peoples in Bolivia is exceptionally strong compared to most countries (Kissinger et al., 2012).

Despite these achievements, there still remain several challenges. These, according to Westholm et al. (2009: 42), include (1) data and information challenges (lack of necessary field data and large discrepancies between sources – e.g. FAO data does not correlate with data used in Bolivia’s national communication to the UNFCCC), (2) technical challenges (problems with the usefulness of satellite images due to clouds and haze, limited access to state-of-the-art technology for monitoring forest degradation), and (3) institutional challenges (weak real-time monitoring capacities and diverging land claims due to the lack of a transparent nationwide cadastre). Adding to these are likely tensions between central and local authority, given its history of centralized rule and its subsequent decentralization efforts. In addition, Bolivia’s ‘anti-capitalist’ stance (Hall, 2012: 99-100) expressed through its opposition to market mechanisms for financing REDD may lead to serious tensions between government authorities and other stakeholders.

Summary

Bolivia’s deforestation has accelerated substantially since the 1980s and figures today are among the highest per capita losses worldwide. This mainly owes to a change in national politics (from an economy based on import substitution to an export-led economy) that triggered the rapid expansion of the agricultural frontier driven largely by soybean production. Since the 1990s, Bolivia’s forest policy sector has undergone major decentralization efforts and various environmental laws (e.g. the Popular Participation Law of 1994, the Agrarian Reform Law of 1996, the Forest Law 1700) were introduced in an effort to increase forest use and management. Bolivia’s carbon sequestration pilot project, the Noel Kempff Mercado Climate Action Project, started operating in 1997 for a period of 30 years. Located in the northeastern section of the Department of Santa Cruz in the Province of Velasco, its main objective is to incorporate forest areas adjacent to the Noel Kempff Mercado Park that are threatened by forest concessions and deforestation. It has been criticized by some observers for exaggerating its carbon sequestration achievements and its poor record in involving locals in the design and implementation. Bolivia, being one of the nine founding members of the UN-REDD program, has been hailed as very suitable to incorporate REDD+ in its environmental policy scheme. First, it has almost two decades of experience with carbon sequestration projects and other PES schemes. Moreover, the country compares positively in terms of recognizing indigenous peoples’ land rights and mechanisms in place for effective stakeholder participation. On the other hand though, Bolivia’s opposition to market mechanisms for financing REDD may lead to serious tensions between government authorities and other stakeholders.

3.2.2 Ecuador

Ecuador is one of the world’s most biodiverse countries; with a total surface of 26 million hectares, Ecuador has around 10 million hectares of ecologically native forests left (de Koning et al., 2011). However, a study based on information collected for the period 1990 to 2000, Ecuador’s annual deforestation rate was estimated at 198,000 hectares, being the fifth largest in Latin America and the Caribbean, after Haiti, El Salvador, Nicaragua and Guatemala (Bertzky et al., 2010).³² Around 90% occurs in the rainforest areas of Esmeraldas

³² It should be noted however (see Hall, 2012: 93-94) that obtaining accurate deforestation data is somewhat problematic due to lacking a fully comprehensive forest inventory (though currently under preparation).

province and the Amazon. The country faces many conflicts due to the somewhat unclear structure of land ownership. Three-quarters are owned by the state, with more than two-thirds being in officially protected areas and public forests. A third of the national territory belongs to a total of 14 indigenous peoples.³³ Hence, there is a significant overlap between lands claimed by indigenous groups, peasant communities, and individual settlers (Hall, 2012: 94). The main drivers of deforestation are the advance of the agricultural frontier (mainly in the tropics), shrimp farming and the expansion of industrial monoculture such as palm oil plantations. Also, the large-scale oil exploration in the Amazon Oriente by Texaco triggered substantial deforestation between 1964 and 1990. According to Ecuador's communication to the UNFCCC, deforestation and land-use change were responsible for 69% of the country's total CO₂ emissions in 1990. This compares proportionally with Brazil (Hübenthal et al., 2011).

According to the First National Communication to the UNFCCC, land-use change and forestry were responsible for 69.5% of all CO₂ emissions in 1990. Of these, 74% were emitted from the conversion of forests and meadows into other uses and the remaining 26% from changes occurring in forests and other wooden biomass (Bertzky et al., 2010). The main mitigation measures identified according to the official communication in this sector are sustainable forest management of native forests, productive and protective commercial forest plantations and the promotion of agroforestry and sylvo-pastoral systems.

The National Policy Context

Ecuador's experience with PES schemes is far more recent as compared to Costa Rica or Mexico. Still though, despite a slow start, the country has been moving fast to address its forest sector issues. Ecuador ratified its constitution in 2008, recognizing the importance of nature. Some have since revered it as the world's first eco-constitution, while others have questioned the seriousness of the state's environmental commitment (see Brand et al., 2009).³⁴ The constitution includes specific mandates for biodiversity protection, climate change mitigation and the regulation of environmental services. Another document that specifically aims at reducing deforestation rates by 30% until 2013 as well as decrease the country's ecological footprint is the National Plan for a Good Life (*Plano Nacional para el Buen Vivir*). Moreover, the National Ministry of the Environment (MAE) is implementing a Forest Governance Model that includes several initiatives such as a National Forest Assessment, a deforestation baseline, a new Forest Law (*Lei de Bosque*) and a Strategy for Sustainable Forest Development.

The Ministry of Environment (MAE) oversees Ecuador's commitments to UNFCCC and other climate change related actions and is the Designated National Authority on climate change and, in particular, on CDM in Ecuador. Within MAE a Climate Change Unit was set up in 2000 and as of October of 2009 MAE also has an Under Secretary of Climate Change whose main focus is to promote adaptation and mitigation actions and strengthen national capacity at all levels on the subject of climate change. Funds are provided by the GEF, the World Bank, and UNDP, among others. MAE has also been in charge of designing and

³³ These territories cover about 31% of the country's mainland area, 26% of which are located in the Amazon region and the remainder in the Andean region. These areas store more than half of the country's biomass carbon, and almost 80% of the biomass carbon in the Amazon region (Bertzky et al., 2010).

³⁴ The provision of inalienable rights for *Pachamama* – Mother Earth is based on the indigenous notion of *Sumak Kawsay* (,the good life'). Despite this provision, however, the government is involved in the controversial Yasuni National Park proposal that aims to defer oil extraction in exchange for international payments.

executing the National Strategy for Climate Change 2012-2025 (ENCC), which is comprised of a Climate Change Mitigation Plan and a Climate Change Adaptation Plan.

National/Sub-National Programs and Projects

The Socio Bosque Program (PSB)	20-year contracts with beneficiaries
	Partners: GOE through MAE
	Combines ecosystem conservation with poverty alleviation!

Project overview: The Ecuadorian Socio Bosque Program (PSB) is a national conservation agreement scheme implemented by the Government of Ecuador (GOE), aiming to conserve more than 3 million hectares of native forest, *Páramo* (high altitude grassland) and other native vegetation types of Ecuador, thereby conserving carbon stocks and securing co-benefits. Launched in 2008 as part of the Forest Governance Model, it was designed to complement traditional command-and-control conservation policies (Hall, 2012: 95). The program has the dual objective to combine ecosystem conservation with rural poverty alleviation, as it transfers direct economic incentives to rural families and local and indigenous communities that voluntarily commit to comply with clearly agreed conservation actions. Contracts with private and communal landholders are provided on a 20-year basis after which they can be renewed (de Koning et al., 2011). The design principles of PSB are simple and transparent: The incentives received are calculated on the basis of the area size put under conservation. For the first 50 hectares of conservation area, the incentive is US\$30 per hectare and year, from 51 to 100 hectares, the incentive decreases to US\$20 per hectare and year, and from 101 to 500 hectares, the incentive paid is US\$10 per hectare and year. Similar to rural development programs, applicants must submit an individual or community social investment plan, which should clearly reflect the use of the incentive. By September 2012, a total of 1,474 agreements with individuals and 92 agreements with communities were signed, covering a total of 881,933 hectares of forest for conservation. As it is part of a clear government policy and has generated nationwide participation of local and indigenous communities and individual farmers, it has been considered a substantial part of Ecuador’s national REDD+ strategy.

Partners and funding: The PSB is operated by MAE, which has set up an implementing team for the program with staff in the central office in Quito and different outreach offices in the country. All program costs are covered by public funds, which are designated by the National Secretary for Planning and Development (SENAPLADES) on an annual basis. The total budget from 2008 to 2010 amounted to US\$8.5 million, of which around 70% were directly used for incentive payment, 15% for monitoring and the remainder for covering other operational costs. In the longer term it is envisaged to be financed also through international donor and market-based finance within the REDD+ framework (de Koning et al., 2009).

Critique: Critics blame the program for not reaching the poorest of the poor since they often lack the means and understanding on how to participate.³⁵ Equally so, in the midst of unclear land ownership structures, those without officially titled land (e.g. various indigenous groups) cannot join the program. Also, MAE claims that due to the high number of small land areas under conservation, a more extensive field monitoring system would be needed. The initial

³⁵ According to Seiwald (2011), the indigenous Shuar, known as quite reluctant and rebellious, have received special conditions from MAE. This has led to many disagreements and rupture with other indigenous organizations in the country.

idea of using satellite imaging has not quite materialized for all sites (cloud and haze interference on certain images). Finally, another critical issue is the low incentive level, as one hectare of forest may bring US\$ 1,500, but one *Chanul* tree may be worth up to US\$300 (Seiwald, 2011: 65). This also raises the concern whether environmental ‘additionality’ is really given.

Current Stage of REDD/REDD+ Readiness

With the financial support of the UN-REDD Program (US\$ 4 million), Ecuador’s National REDD+ Strategy, aiming at simultaneously contributing to climate change mitigation and to managing Ecuador’s forests in a sustainable manner, is currently under development. With the strategy, MAE starts an effort to regulate and harmonize different REDD-type pilot projects in Ecuador.³⁶ The strategy consists of six components: Forest Information, Forest Control, Sustainable Forest Management, Reforestation/Afforestation, Legalizing of Land Ownership and the implementation of PSB. The MAE has headed two initiatives since 2009 to establish a national baseline scenario. The National Forest Assessment collects data on the carbon stocks stored in nine distinguished forest classes and a historical deforestation map is elaborated. These are necessary steps to establish a reference scenario for emissions from deforestation (Seiwald, 2011).

Some of the main challenges are the lack of a transparent policy of civil society participation in the design and implementation phases of the strategy. As a result, GOE is faced with growing, especially indigenous opposition led by the national indigenous confederation CONAIE. For REDD+ to be successful, however, there is an inherent need for a strong legal, financial and institutional framework around the national strategy. In light of the recent political split between national authorities and the indigenous sector (more than 60% of national forests are in indigenous hands) REDD+ increasingly turns into a complex issue of debate.

Summary

Ecuador, one of the world’s most biodiverse countries, has the fifth largest deforestation rate in Latin America. There exists a significant overlap between lands claimed by indigenous groups, peasant communities, and individual settlers, which has caused many conflicts over land in the past. Ecuador has far less experience with PES schemes than other countries in the region, however, has moved substantially to address its forest sector issues. First, it ratified its constitution in 2008 to now include specific mandates for biodiversity protection, climate change mitigation and the regulation of environmental services. Second, the National Plan for a Good Life also specifically aims at reducing deforestation rates by 30% until 2013. Third, the National Ministry of the Environment is implementing a Forest Governance Model that is operationalized by the national Socio Bosque Program. Praised by many as straightforward and transparent, this incentive-based national conservation scheme has also been criticized for benefitting large landowners rather than reaching smallholders. Ecuador’s National REDD+ strategy is currently under development with the financial support of the UN-REDD program. The main constraints for an enabling national REDD+ environment, however, are related to

³⁶ There exist about 10 such private initiatives with carbon sequestration goals that are currently either designed or in early implementation stages. Half of them involve conservation in indigenous territories such as those of the Cofán, Achuar, Kichwa and Shuar (Hall, 2012: 95).

the recently growing indigenous opposition to carbon sequestration programs led by the national indigenous confederation CONAIE.

3.2.3 Panama

Panama is one of the world's most biodiversity-rich countries in the region and part of the Meso-American Biological Corridor project, with forests occupying 58% of the national territory. Some 45% of its forest cover is still intact, with more than two-thirds set aside in 70 officially protected areas. In fact, 98% of national forests are under public ownership. Annual deforestation rates of 1.6% (calculated for the period 1990-2000) constitute one of the highest in Latin America and the Caribbean, after Haiti and Central America. These forest losses are largely concentrated in Comarca Ngöbe-Bugle and the provinces of Darién, Panamá and Colón with respective forest cover losses of 12.02%, 11.5%, 5.9%, and 4.9% between 1992 and 2000 (Parker et al., 2004). Interestingly according to current calculation of land use changes for the period 2000-2008, initial estimates suggest that the overall deforestation rate in the country has decreased in recent years (see ANAM and FAO sources, in Adelson, 2009). The main drivers of deforestation, according to Hall (2012: 100) are „a familiar mix of extensive cattle ranching, agribusiness, land speculation, small-scale farming and infrastructure development“. It is estimated that more than 40% of the national territory has been deforested for inadequate and unsustainable agricultural (incl. agribusiness) activities. From an FAO baseline calculation in 2000 (see Adelson, 2009), by 2020 the area classified as forest and woodland in Panama will have decreased by 28%, permanent pasture will have increased fractionally and permanent crops will have remained the same.

The National Policy Context

National forest policy is coordinated by the National Environmental Authority (ANAM), which was set up in 1998. Within the National Environmental Strategy, a 'Sustainable Forest Model' developed by ANAM provides several measures for tree cover conservation and improved sustainable management capacities. A number of laws have been implemented that aim at reversing the deforestation process. Among them is Law 24 and 23 1992 that promotes and regulates reforestation activities in Panama, the Forestry Law of Panama for protection, conservation, improvement and rational use of natural resources and Law 58 that created the Certificate for Forestry Incentives (CIF).

Sustainable forest management measures are institutionally coordinated with the National Climate Change Program and its climate change committee (CONACCP). The Program is responsible for the realization of vulnerability studies to climate change for the agricultural sector, coastal and water resources, as well as for possible climate change mitigation scenarios. Panama is also currently in the final stage of developing a National Climate Change Strategy which includes a national climate change mitigation strategy, and adaptation strategy to climate change as well a program fostering national scientific research on climate change. Panama is also part of the following regional initiatives on deforestation and climate change: The Regional Strategic Program for Management of Forest Ecosystems (PERFOR), the Regional Climate Change Strategy for Central America, and the Central American Forest Program (PROCAFOR). Moreover, the project Forests and Climate Change in Latin America (PBCC) financed by the FAO and the Dutch government was developed specifically to

support the seven Central American countries in developing the mitigation potential for forests to climate change and the opportunities offered by the CDM mechanism.³⁷

National/Sub-National Programs and Projects

CO₂ Olusa & Futuro Forestal S.A.	5-years 2007 – 2012 as CCB project
	Partners: Commercial project – Futuro Forestal S.A. Obtained CCB gold status upon approval!

Project overview: This five-year private sector CCB project (gold status 2007-2012) already started in 1995 when the private firm Futuro Forestal (a reforestation and forest service company based in Panama and currently extending its operations to Nicaragua) offered reforestation and management services to its international clients interested in fostering the development of carbon sinks. The international brand “CO₂OL” was established and registered in 1998 to create a tool to enhance the promotion of climate related environmental services. The project is located on the pacific coast of Panama (Las Lajas, Province of Chiriquí, and El Pito, Province of Veraguas). Since being a CCB project, its main focus has been on reforestation with mixed native species plantations, especially teak. The project creates a mixture of temporary Certified Emission Reductions (tCERs), for both the regulatory and voluntary markets, through sustainable reforestation in the tropics. Its three main activity areas centre on (1) carbon emission reduction through sustainably managed commercial timber plantations; (2) carbon emission reduction through reforestation for protection and extraction purposes in areas which are passed on to local communities in charge of managing and protecting them to ensure permanency of carbon storage, as well as (3) carbon emission reduction through protection of existing secondary forest areas that are part of the land that Futuro Forestal has acquired for the implementation of its reforestation services. These areas of standing secondary forest are protected due to their ecological value and state of development.

Project partners and funding: CO₂OL-USA is a partner with Futuro Forestal. CO₂OL-products are offered to Futuro Forestal’s international investors as a stand alone concept for carbon sequestration and biodiversity enhancement (CO₂OL-Basic) as well as a component of Futuro Forestal’s investment products that focus on the sustainable production of timber from fine, tropical hardwoods (CO₂OL-Invest). Project sponsors are mainly private individuals and companies with environmental concerns, seeking profitable and sustainable investment opportunities and/or carbon sequestration investment opportunities to mitigate their own CO₂, or other Greenhouse Gas, emissions.

Additionality: The additionality concept of the project is based upon the premise that converting low productivity grasslands into diverse multi-species forest plantations for the purposes of ecosystem rehabilitation, habitat protection and timber production directly leads to a net anthropogenic reduction of carbon emissions. This project would not be undertaken without the additional revenue expected from the sale of ecosystem services, specifically carbon credits as tCERs.

³⁷ The publication series *Central American Series on Forests and Climate Change* provides insights into the mitigation potential of forests and the legal and institutional framework for each Central American country (see http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/006/AD444s/AD444s00.htm).

Current Stage of REDD/REDD+ Readiness

As one of the founder members of the UN-REDD program along with Bolivia and Paraguay, Panama has a strong interest and commitment to setting up a REDD+ strategy. Its national readiness plan was approved in October 2010 and the country was awarded a preparation grant of US\$ 5.3 million for 2010-2012 (Panama, 2010). The main tasks for getting REDD+ ready are the design of an accurate and updated database on deforestation and land-use change, technical and institutional capacity building and trainings, the set up of an effective monitoring and verification system, and the harmonization with existing development and poverty alleviation plans. Panama has a clear inter-institutional coordination set-up for REDD+, with ANAM being the focal point, supported by CONACCP and the close involvement of the Confederation of the Indigenous Peoples (COONAPIP), since the 11 indigenous congresses will be responsible for the implementation of the REDD strategy (Panama, 2010).

In September 2012 under the auspices of ANAM a first REDD+ National Working Committee workshop was held in order to foster a participatory structure for stakeholders to engage with REDD+ issues. With the objective to start groundwork for a National REDD+ strategy, such workshops are planned to now take place every two months.

Summary

With its rich biodiversity, Panama's plays an important role in the Meso-American Biological Corridor project. Faced with high deforestation rates (despite FAO sources indicating an overall decrease in forest loss in recent years), the government, under the coordination of the National Environmental Authority, has developed a Sustainable Forest Model and passed several laws to reverse this trend. The possibly best-known carbon sequestration project is the five-year private sector CCB project 'CO₂OL' located on the pacific coast of the country. The project with a focus on reforestation of especially teak and other native species creates a mixture of temporary Certified Emission Reductions for the regulatory and voluntary market. As one of the founding members of the UN-REDD program, Panama shows strong commitment to setting up a REDD+ strategy. It has particularly been praised for its clearly structured institutional framework for REDD+ as well as the active involvement of the Confederation of the Indigenous Peoples in all stages of REDD+ strategy development. The main challenges ahead are the lack of a properly designed baseline and the limited technical and financial capacities for monitoring forest cover changes.

3.2.4 Guyana

Guyana is the smallest and least populated country in South America, with about 87% of the country's land area still covered with forest. Its tropical rainforest areas cover some 18.5 million hectares containing some 8,000-plant species, half of which are endemic (Environmental News Service, 2011). The country has historically low deforestation rates (about 0.3% per year), however, deforestation has increased substantially over the past years. This correlates with the information provided by a report commissioned by the Guyana Forestry Commission in January 2011, which calculates actual deforestation rates during 1990 and 2009 at a mere 0.02%, confirming that in 2010 the rate of deforestation in the country rose to 0.06%. In 2009, the national government signed a four-year US\$250 million agreement with the Norwegian government to preserve the country's forests.³⁸ Under this framework various forest-based measures have been agreed on and by some it has been hailed as a blueprint for other countries to follow.

Hall (2012) claims the country's vicinity to Brazil has a major impact on Guyana's deforestation levels. First, the expansion of agricultural and commercial logging and forest penetration of farmers and miners from Brazil have increased pressures on national forests. Second, the tightening of environmental controls in Brazil may lead to a displacement or 'leakage' into Guyana. According to the 2011 report (see above), mining accounted in fact for 91% of deforestation in 2009, with a majority (85%) being observed in the state forests. Deforestation levels are also clustered around existing road infrastructure and navigable rivers.

The National Policy Context

Forestry is one of the key sectors of the country's economy. The sectoral GDP contribution has been growing over the past ten years from 2.3% in early 1990s to about 4% in 2010. The sectoral growth is mainly due to the increase in primary production for plywood production and exports, however, there has now been a shift from primary commodity production to value-added products. The Guyana Forestry Commission (GFC) is in charge of responsible for advising on issues related to forest policy, forestry laws and regulations as well as for the administration and management of all State Forest land (www.forestry.gov.gy). A National Forest Plan (NFP) provides the framework for implementing the new Forest Policy. The GFC also closely collaborates with the country's Amerindian population. They constitute 9% of the country's population and occupy 14% of the land in titled and untitled villages (Guyana, 2010). Under the 2006 Amerindian Act, they enjoy collective rights and protected areas can only be set up with the free and prior consent of the indigenous community. In mid-2009 Guyana's Low Carbon Development Strategy (LCDS; www.lcds.gov.gy) was launched. The strategy outlines the country's vision to promote economic development, while at the same time mitigating climate change. Since then, the strategy has triggered intense nationwide consultation meetings and awareness raising campaigns.

³⁸ In December 2012 Guyana was approved to receive an additional \$45 million USD from the Government of Norway for its climate services in maintaining extremely low levels of deforestation. This would contribute to the nation's Low Carbon Development Strategy (LCDS).

National/Sub-National Programs and Projects

IWOKRAMA	Since 2008
	Partners: Canopy Capital, Global Canopy Programme, 16 local communities One of the largest initiatives in CCM and sustainable forestry!

Project overview: In March 2008, the UK-based private equity firm Canopy Capital purchased the rights to future ecosystems payments generated by the 371,000 hectares Iwokrama reserve (Hall, 2012). Under this deal, Canopy Capital aims to help finance the rainforest-protected area for five years in return for ‘ownership’ of forest ecosystem services and a claim in any future profits. The new saleable asset would involve carbon values and possibly rainfall, water storage, soil conservation, biodiversity, climate buffer and watershed values (Griffiths, 2010). The main project activities entail (1) addressing the role of climate change and forests through a series of community workshops, (2) community development and outreach programs (through the participatory set-up of the community-based North Rupununi District Development Board – NRDDDB, which is involved in several community development initiatives); (3) sustainable forestry, and (4) eco-tourism.

Project partners and funding: The project is quite a unique collaboration effort between business operations (i.e. Canopy Capital holds a 16% share) earning income from the forest and its natural assets, local community (at present 16 local communities are shareholders of 80%, and an alliance of 29 scientific institutions in 19 countries (under the umbrella of the Global Canopy Program) which hold 4% of the shares.

Critique: The major critique of the project comes from Griffiths and Anselmo (2010) who criticize the lack of prior consultation with the Amerindian groups in the area. Especially the Makushi found out about the project from the press once the agreement had already been made. Canopy Capital and its legal advisers admit that the deal was not adequately discussed with the implicated communities but just discussed and agreed with the Board of Iwokrama, which has one community representative. Canopy Capital and Iwokrama claim, however, that this secrecy was necessary for reasons of ‘commercial confidentiality’ (Griffiths, 2010).

The Guyana REDD+ Investment Fund (GRIF)

The Guyana REDD+ Investment Fund (GRIF) is a multi-contributor trust fund for the financing of activities identified under Guyana’s LCDS. Pending the creation of an international REDD+ mechanism, the GRIF represents an effort to create an innovative climate finance mechanism which balances national sovereignty over investment priorities while ensuring that REDD+ funds adhere to the highest internationally recognized standards for financial, environmental and social safeguards (www.guyanareddfund.org).

As per December 2012, a total of seven projects were either in their final stages of development or early implementation. These are (1) the Amaila Falls Hydroelectric Project, a flagship of Guyana’s Low Carbon Development Strategy, (2) institutional strengthening of the different national stakeholders involved in implementing LCDS, (3) Amerindian Land Titling to facilitate and fast track the Amerindian Land Titling process, (4) the set-up of an Amerindian Development Fund to support the socio-economic development of Amerindian communities and villages, (5) Micro and Small Enterprise Development and Building

Alternative Livelihoods for Vulnerable Groups in Guyana, (6) the Cunha Canal Rehabilitation Project as a climate change adaptation initiative, and (7) the establishment of a Biodiversity Research Centre to develop a self-sustaining scientific research centre at the University of Guyana.

Current Stage of REDD/REDD+ Readiness

Guyana has been hailed as quite an early champion of REDD+. The country's new overarching LCDS recognizes forests as Guyana's most valuable asset and places REDD+ at the centre of its national development strategy (WWF, 2010). As of May 2010, the LCDS Project Management Office and the Office of Climate Change were both established and are fully functional, working directly under the aegis of the Office of the President. In June 2010, Guyana signed a 'readiness' agreement for US\$200,000 with the FCPF to draw up comprehensive plans for the design and implementation of the country's REDD+ strategy. As of October 2012, a REDD Secretariat has been established and a National REDD Working Group (incl. governmental and non-governmental institutions) is to be formed in the near future. In terms of stakeholder consultation, numerous outreach events such as press conferences and media meetings have been organized by the national government. Multi-stakeholders field visits and meetings with Amerindian communities and other forest dependent groups took place in four different regions of the hinterland in the previous two years. Indeed, widespread consultation of indigenous and traditional communities has been underlined as a fundamental pillar for a successful strategy. Intricately linked to this aspect is the development of a robust Strategic Environmental and Social Assessment (SESA) during the preparation phase in order to identify the main environmental, social, and legal policy dimensions (Guyana, 2010). To date, the Terms of Reference have been drafted and adjusted to reflect the latest developments on mainstreaming with other activities.

Guyana has done remarkably well and is currently utilizing satellite images (LANDSAT and CBERS) and supplementary ground forest inventory assessments to determine its current forest cover. Specifically, the data available at present are satellite images and a national forest inventory from 1970, 1990 and 2000, as well as pre-harvest inventories of concessions. Preliminary work has been conducted in the establishment of a historic reference level for the country. The LCDS presents one scenario of possible future deforestation under a national development plan.³⁹ This, however, needs further refinement (Guyana factsheet, 2012). Guyana plans to monitor forest cover changes every 3-5 years. Additionally, a system for Independent Forest Monitoring (IFM) is currently being established and already quite advanced. In these efforts Guyana is receiving support from Norway, Australia, Conservation International, the International Institute for Environment and Development, and the Clinton Climate Initiative.

The main challenges for Guyana's REDD+ readiness are the limited public sector institutional capacity and the inherent need for fundamental improvements in forest governance. The Guyana Geology and Mines Commission that is supposed to control mining-induced deforestation, is known for its extremely limited enforcement capacity (WWF, 2010).

³⁹ Guyana's climate initiatives and its LCDS continue to receive international recognition. At the recently held Rio+20 Conference, the LCDS was presented by Guyana and Norway as the 2nd largest interim REDD+ mechanism in operation and the 1st national scale model for REDD+, providing a practical demonstration of green growth and moving towards a low-carbon economy (www.lcds.gov.gy).

Summary

Contrary to most other countries in the region, Guyana's deforestation rates have been historically low (although forest loss has been on the increase in some parts of the country nearby the Brazilian border). The country's main aim within the REDD+ debate, therefore, is to preserve its rich forest cover. Guyana's forest sector is well organized, with the Guyana Forestry Commission in charge of managing all State Forest land under the National Forest Plan. In 2009, the national government quite successfully introduced its Low Carbon Development Strategy in an innovative attempt to trigger economic development with a view on mitigating climate change. For financing the range of activities identified under this strategy, the Guyana REDD+ Investment Fund was set up. The Iwokrama project is probably the best-known carbon sequestration initiative in the country. Launched in 2008 with the support of the British equity firm Canopy Capital (who purchased their rights to future ecosystem payments), it has been criticized for not involving the local Amerindian people. With its Low Carbon Development Strategy, the country has been praised as an early pioneer for REDD+ and signed a readiness agreement in June 2010 for the further design of a national REDD+ strategy. More recently, a National REDD Working Group was formed and numerous outreach events and REDD+ promotional activities organized for reaching a wide range of stakeholders. The main challenges ahead mainly concern the limited enforcement capacity of the forest sector institution, the Guyana Geology and Mines Commission.

3.3 The REDD+ Stragglers

This category of countries, according to Hall (2012), entails those that are still at a comparatively early stage at developing their REDD+ proposals: Argentina, Chile, El Salvador, Guatemala, Honduras, Nicaragua, and Suriname. In mid-2012, they had not quite entered the formulation stage of a comprehensive national REDD+ strategy. The following will provide some more details on the ROBIN project-relevant country Suriname.

3.3.1 *Suriname*

Deforestation rates in Suriname have been historically low due to low population pressure and its relative remoteness. Indeed, 90% of its national forest cover is still intact, of which 2.3 million hectares of forest (13% of the total forest area) is formally protected while 4-5 million hectares is designated as production forest (FAO, 2010). Deforestation rates between 1990 and 2010 constitute a mere 0.1% per year, or around 18,000 hectares (Ramirez-Gomez, 2011).⁴⁰ Despite these low deforestation risks, however, pressures are growing and Suriname's status as High Forest Cover, Low Deforestation (HFLD) country is set to change due to various reasons. Besides the common threat of agricultural expansion with biofuel plantations, Suriname's ambitious infrastructure projects are providing additional sources of

⁴⁰ Ramirez-Gomez (2011) states further that approximately 44% of the deforestation between 2005-2009 was concentrated within the Gros Rosebel mines, 33% in Mindrinitie, 12% in Brownsweg, and 11% distributed along roads, rivers and around the savannahs of Zanderij. These areas were acting as centres of diffusion for deforestation.

deforestation. In recent years, the country has pursued economic growth politics and promoted the construction of a hydrodam and a major motorway to Brazil and other road improvements to facilitate access to the economic potential of the inlands. In addition, large-scale extraction of bauxite has intensified as besides the private companies (e.g. ALCOA/SURALCO, BHP Billiton), the national government has also set up the state mining enterprise ALUMSUR (Hall, 2012: 113). Large-scale gold mining has also expanded through international investment and become a fundamental pillar of the indigenous Maroon livelihood economy in many parts of the country’s interior.

The National Policy Context

In line with the 1987 constitution of Suriname all forests, except for those on privately owned land, belong to the state. The government grants land use rights such as timber harvesting and mining rights. The Forest Management Act of 1992 outlines the parameters for the sustainable and rational use of forest resources, and entails various regulations for forest production. In the first half of 2003, the Ministry of Natural Resources prepared the first coherent national forest policy document for the country. The objective of the policy is to enhance the contribution of the forests to the national economy and the welfare of the current and future generations, taking into account the preservation of biodiversity. More recently, ongoing efforts by multi-lateral and bilateral aid agencies (World Bank, DGIS/Netherlands, and UNDP) have led to significant institutional strengthening of the National Institute for Environment and Development in Suriname (NIMOS) and the Suriname Forest Control Foundation (SBB).

In 2011, the national government established a Climate Compatible Development Agency (CCDA) to help formulate a more structured approach to climate change matters. It is in charge of coordinating the country’s policies on climate change mitigation and adaption, as well as forest conservation. It further leads the country’s Climate Change Fund, charged with managing earmarked funds, and supports a Climate Compatible Knowledge Institute, which gives scientific support to climate efforts.

National/Sub-National Programs and Projects

Forest Carbon Stock Assessment Project	2009 - 2010 Partners: RGB, WWF, TBI, SBB, CELOS, BBS The first concerted effort in forest carbon assessment!
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In 2010 and 2011 a ‘Forest carbon stock assessment’ project was carried out by the Ministry of Physical Planning, Land and Forest Management (RGB) with funding of the World Nature Fund and TBI Suriname. The field coordination was carried by the Foundation for Forest Management and Production Control (SBB) and the Forest Service Suriname, the Centre for Agricultural Research in Suriname (CELOS), and the National Herbarium (BBS) were the project partners. Aidenvironment was contracted to increase the technical capacity of the participating institutes in order to develop an efficient monitoring system in compliance with IPCC criteria and to calculate a Carbon. Existing infrastructure of CELOS and SBB was used as a point of departure for forest monitoring and carbon stock assessment, using already available data and additional gathered data from tree measurements. Some forest dynamics sample plots managed by CELOS provide these additional tree measurement data (Arets, et al., 2011).

Current Stage of REDD/REDD+ Preparations

In spite of rather widespread evidence of growing deforestation pressures, Suriname initially had difficulties persuading potential donors of the ‘additionality’ to be obtained if it were to engage in REDD+. A draft readiness preparation proposal was presented to the FCPF in October 2009, but it came under close scrutiny from reviewers and had to be revised substantially. One of the major shortcomings criticized was the heavy dependence on government institutions for the planned REDD+ strategy design and implementation. This issue of concern and the lack of representation of civil society were also raised by civil society observers who stated that meetings were held in the capital city and attended by a limited number of indigenous and other forest-dependent groups. They further claim that the proposal does not identify specific steps to adhere to the free, prior and informed consent and UNDRIP. In fact, the association of Saramaka people, the largest Maroon group with some 55,000 members, made a strong protest to the World Bank on the grounds that indigenous groups had been effectively excluded from REDD+ consultations (Hall, 2012: 113-114).

For the resubmission of the REDD+ proposal in February 2013, the Suriname REDD+ project group has been set up in October 2012 and thus far conducted three meetings. The group, composed of nearly 35 different experts, from private sector, civil society, the government, indigenous and maroon communities and academia, needs to provide timely feedback in the proposal formulation process. Also, Suriname closely cooperates with its neighbouring Guyana in the climate change and REDD+ debate. Under this bilateral assistance framework, exchange visits mainly serve for Suriname to learn from the Guyana-Norway Partnership and its LCDS, for sharing information and experience on climate policies and strategy, as well as

Summary

Similarly to its neighbour Guyana, Suriname’s deforestation rates have been historically low, mainly as a result of low population density and its relative remoteness. In fact, Suriname’s forests are presently among the least threatened in South America. Even though deforestation risks are still relatively low, pressures are set to increase (mainly due to the expansion of biofuel plantations and some ambitious infrastructure projects being currently planned). The country’s forest sector is rather well set up. The Forest Management Act of 1992 quite successfully regulates sustainable forest production in the country, and more recently, some of the key institutions in the forest sector (e.g. the National Institute for Environment and Development in Suriname, and the Suriname Forest Control Foundation) have been involved in comprehensive institutional capacity development processes. In 2011, the Climate Compatible Development Agency was set up to coordinate climate change issues. Due to its status as HFLD country, Suriname has initially faced some difficulties in convincing REDD+ funders of the worthiness of its case for support. An initial draft REDD readiness proposal in late 2009 was rejected on various grounds, criticizing mainly the strong dependence on government institutions in implementing REDD+ and the extremely limited representation of civil society and the private sector. In light of these aspects, a Suriname REDD+ project group has been set up to ensure a wide range of different stakeholders on board.

3. Discussion and Conclusion

Ever since the wake of global climate change concerns, the vital role of forests and their potential contribution to climate regulation has generated enormous worldwide interest. The concept of REDD (now REDD+), which was first put forward by Brazil in 2003 at COP9, is an approach that helps maintain standing forests and sequester carbon from the atmosphere while providing benefits to compensate forest users. Despite a number of prevailing challenges in terms of financing its implementation and operational difficulties with establishing baseline scenarios, REDD+ has since taken centre stage in international climate change debates and triggered the set-up of different institutional support programs (e.g. the UN-REDD program).

The operational principles underpinning REDD+ in terms of reconciling forest conservation with productive activities and the strengthening of local livelihoods are far from new. Especially Latin American countries have a long track record in integrated conservation and development projects, with Costa Rica and Mexico also having a history of incorporating ecosystem payments for resource users in their conservation schemes. At the same time, Latin America and Caribbean forests are home to some 40 million indigenous people, many of whom have traditionally performed an important role as forest custodians. REDD+ as a political project will certainly fail if the views of indigenous organizations are not properly accounted for. In light of these aspects, Latin America undoubtedly plays a vital role in current REDD+ debates.

Most Latin American countries are currently developing national REDD+ strategies, which either incorporate pre-existing forest conservation programs and/or pilot carbon and biodiversity schemes. Progress in REDD+ strategy design, however, varies considerably between the countries. According to Hall's (2012) classification of countries, Costa Rica, Mexico and Brazil are considered the REDD+ leaders (see table 1). All three of them faced similarly high deforestation rates in the past, which have triggered their governments to take substantial action. Costa Rica took the lead in Latin America in setting up PES programs as a mainstream policy to combat deforestation. Mexico took similar measures, yet contrary to Costa Rica, could fall back on substantial experience in community-based forestry programs. Brazil's experience in forest conservation, on the other hand, is far more recent, decentralized and, to a certain degree, fragmented. Brazil though has set up a growing range of diverse REDD+ pilot projects on the ground, incorporating a variety of stakeholders. If we look at the state form present in these countries, we find Costa Rica and Mexico to follow politics largely based on neoliberal policies. In both countries, the state has established a largely centralized and rather top-down environmental policy framework, whereas Brazil's REDD+ policy-making and implementation has been largely driven by the sub-national state governments, especially those of Amazonas, Pará, Acre and Mato Grosso.

Table 1: Short comparative analysis between the REDD+ leaders

	Costa Rica	Mexico	Brazil
State form	Neoliberal	Neoliberal	Socialist
Forest sector	Historically high deforestation rates - state developed a Forest Credit Certificate Scheme in the 1980s ("a pioneer of early action")	Historically high deforestation rates - considerable experience in state-induced forestry programs	Historically high deforestation rates (esp. Amazon), with slightly decreasing deforestation since 2004
	Rather insecure land tenure rights - largely benefitting large landowners	Secure land property rights over land and forests (<i>ejido</i> system) and a long history of community-based forestry	Rather secure land property rights
	Forest sector quite well organized, FONFIFO fund for ecosystem payments	A relatively well-established institutional capacity and considerable experience in implementing forestry programs	Wide range of sub-national and federal policy initiatives on deforestation led by a well established stakeholder network in the forest sector
REDD+ policy environment	Can build on long experience with PES schemes	Besides CR, the country with the most comprehensive system of payments linked to forest (and watershed) conservation in LA.	Experience is more recent, fragmented and decentralized ('productive conservation initiatives') - political pressure from 'below'
	Quite centralized and top-down from the outset with little wider consultation	Emergred from a long tradition of centralized forest conservation planning since the 1980s	Leads the way in REDD+ demonstration activities on the ground (Amazonas, Pará, Acre, Mato Grosso)

Table 2 compares the ‘REDD+ latecomers’ relevant for the ROBIN project: Bolivia, Ecuador, Panama, and Guyana. Bolivia and Panama have both been founding members of the UN-REDD program and both have quite a well set-up institutional forest policy setting. Bolivia looks back on almost two decades of decentralized forest management, giving more weight to municipal governments and civil society. In the 1990s, many indigenous tribes were also granted territorial rights. Ever since the presidency of Evo Morales, indigenous organizations have been strengthened, thereby providing an effective platform for REDD+ negotiations. Bolivia’s government though firmly opposes market mechanisms for financing REDD (as voiced in Cancún in 2009) and takes a firm stand against industrialized countries. Ecuador’s commitment to the forest sector seems somewhat ambiguous: On the one hand, it was the first country to modify its constitution in 2008, providing specific rights to nature. At the same time, a rather innovative Forest Governance Model with the embedded incentive-based Socio Bosque Program have been designed and implemented. On the other hand, though, mounting criticism concerns the government’s intransparent policy of civil society participation, which has generated growing opposition from especially indigenous groups. Whereas Bolivia, Ecuador, and Panama all suffer from high deforestation rates, Guyana’s position is different. With its small land area and low population density, it has enjoyed historically low deforestation rates. Driven by a neoliberal policy framework, forests play a pivotal role in the Guyanese economy. Guyana has been an active player in REDD+ debates and has set up a functioning REDD infrastructure. However, the country lacks the necessary experience in conducting wide stakeholder consultations for REDD+ to be successful. Cooperating with the large Amerindian community (who enjoy collective land rights under the 2006 Amerindian

Act), for instance, will be vital for the country's REDD+ strategy to become a successful political project.

Table 2: Short comparative analysis between the REDD+ latecomers

	Bolivia	Ecuador	Panama	Guyana
State form	Socialist-indigenous	Socialist	Neoliberal	Neoliberal
Forest sector	Forest play a vital role in national politics / change in national politics in the 1980s led to increased deforestation	One of most biodiverse countries worldwide, but with fifth largest deforestation rate in LA	One of the most biodiversity-rich countries in LA, but with high deforestation rates	Small country, low population density, historically low deforestation rates (however, growing deforestation risks)
	Rather clear land ownership, various indigenous territories	Various conflicts due to unclear land ownership (considerable overlap between lands claimed)	Rather clear land ownership, various indigenous territories	Rather clear land ownership, 14% of land is owned by indigenous, major protected areas
	Shift from highly centralized forest sector to decentralized local forest management / various structural reforms in 1990s gave more weight to municipal governments and civil society (however, poor institutional capacity)	Much official state commitment to forest sector (but seriousness is increasingly questioned) - e.g. eco-constitution, Forest Governance Model, National Plan for a Good Life	Well embedded in regional Central American initiatives on deforestation and climate change - forest sector quite well coordinated by ANAM (passed a number of laws)	Forests are of high economic value, more than 2/3 are designated for specific purposes, major protected areas / major stakeholder groups involved in forest sector coordination
REDD+ policy environment	A founding member of the UN-REDD program - emerging REDD scheme prone to tensions between central and local authorities	Slow start, but moved quickly (Socio Bosque Program) - but general lack of transparent policy of civil society participation/unclear structure of land ownership remains	A founding member of UN-REDD, a clear inter-institutional coordination set up led by ANAM	Has been active in REDD+ strategy preparations: E. g. REDD infrastructure has been set up (Guyana Forestry Commission, a National REDD Working Group)
	Has 'anti-capitalist' stance in terms of financing REDD (opposes market mechanisms)	Growing opposition to REDD by strong indigenous groups (led by CONAIE)	Only limited experience with PES schemes	Lacks the experience of a wide stakeholder involvement in REDD+ design and implementation

Bibliography

Adelson, G. (2009). The past and present of Panamanian deforestation. *Restoration Ecology*. Retrieved November, 15th, 2012 from http://www.earthtrain.org/public_files/.

Angelsen, A., Streck, C., Peskett, J., Brown, J. & Luttrell, C. (2008) What is the right scale for REDD? In. A. Angelsen (Ed.), *Moving ahead with REDD: Issues, options and implications*. Bogor: CIFOR.

Arets, E., Kruijt, B., Tjon, K., Atmopawiro, V.P., van Kanten, R., Crabbe, S., Bánki, O.S., & Ruysschaert, S. (2011) *Towards a carbon balance for forests in Suriname*. Alterra report 1977, Wageningen: Alterra.

Bartels, W., Schmink, M., Amaral Borges, E., Pereira, A., Domingos Silva dos Santos Arcos, D. & H. (2010) Diversifying livelihood systems, strengthening social networks and rewarding environmental stewardship among small-scale producers in the Brazilian Amazon: Lessons from *Proambiente*. In L. Tacconi et al. (Eds.), *Payments for environmental services, forest conservation and climate change: Livelihoods in the REDD?* (82-105). Cheltenham: Edward Elgar.

Bennecker, C. & McCall, M. (2009) REDD strategies: A case study from Mexico. In European Tropical Forests Research Network (Ed.), *Forests and climate change: Adaptation and mitigation*. ETFRN News, Issue no. 50. (34-43). Wageningen: Tropenbos international

Bertzky, M., Ravilious, C., Araujo Navas, A.L., Kapos, V., Carrión, D., Chiu, M., Dickson, B. (2010) *Carbon, biodiversity and ecosystem services: Exploring co-benefits*. Cambridge: UNEP-WCMC.

Bolivia (2008) *Readiness Plan Idea Note (R-PIN)*. World Bank FCPF.

Braña Varela, J. (2007) Payment for environmental services in Mexico: Watershed protection. Presentation given at Workshop: *From mandates to actions: Advancing payments for ecological services in the Americas*.

Brand, U., Lander, E., Bullard, N., Mueller, T. (2009) (Eds.) *Contours of Climate Justice Ideas for shaping new climate and energy politics*. Critical currents 6, October 2009

Castro Diaz, E. (2008) REDD, forests and indigenous peoples' rights. *Forest Cover* (27), 5-6.

Colini Cenamo, M., Nogueira Pavan, M., Campos, M. T., Barros, A. C. & Carvalho, F. (2009) *Casebook of REDD projects in Latin America*. Manaus: IDESAM.

Costa Rica (2008) *Readiness Plan Idea Note (R-PIN)*: World Bank FCPF, FONAFIFO, Ministry of Environment and Energy.

Chapin, M. (2004) A challenge to conservationists. *World Watch Magazine*, November/December (World Watch Institute), 17-31.

Corbera, E. (2010). Mexico's PES-carbon programme: A preliminary assessment and impacts on rural livelihoods. In L. Tacconi et al. (Eds.), *Payments for environmental services, forest conservation and climate change: Livelihoods in the REDD?* (54-81). Cheltenham: Edward Elgar.

Corbera, E., & Friedli, C. (2012) Planting trees through the Clean Development Mechanism, *Ephemera: Theory and politics in organization*, 12 (1/2), 206-241. Retrieved November 10, 2012, from <http://www.ephemeraweb.org/journal/12-1/12-1corberafriedli.pdf>.

De Jong, B., Iglesias Gutiérrez, H.J.I., & Armando Alanís de la Rosa, J. (2008) *Advances in Mexico in preparing for REDD*. UNFCCC workshop on methodological issues relating to reducing Emissions from Deforestation and Forest Degradation in Developing Countries. Tokyo, Japan.

De Koning, F., Aguina, M., Bravo, M., Chiu, M., Lascano, M., Lozada, T., & Suarez, L. (2011) Bridging the gap between forest conservation and poverty alleviation: the Ecuadorian Socio Bosque program. *Environmental Science and Policy* 14, 531-542.

FAO (2006) *Global forest resources assessment 2005. Progress towards sustainable forest management*. FAO Forestry Paper 147, Rome: FAO.

FAO (2010) *Global forest resources assessment 2010: Key findings*. FAO Forestry Paper, Rome: FAO.

Fearnside, P. (2008) The roles and movements of actors in the deforestation of Brazilian Amazonia. *Ecology and Society*, 13 (1), 1-25.

Griffiths, T. (2010) Seeing "REDD"? Forests, climate change mitigation and the rights of indigenous peoples and local communities. In D. Roe & Elliott, J. (Eds.), *Poverty and biodiversity conservation*. 341-57.

Griffiths, T. & Anselmo, L. (2010) *Indigenous peoples and sustainable livelihoods in Guyana: An overview of experiences and potential opportunities*. Georgetown: Amerindian Peoples Association, Forest Peoples Programme and The North-South Institute.

Guyana (2010) *A low carbon development strategy: Transforming Guyana's economy while combating climate change*. Report prepared by the Office of the President, May 2010.

Guayana factsheet (2012) *REDD Readiness Progress Fact Sheet Guyana*. October 2012.

Hall, A. (2012) *Forests and climate change: The social dimensions of REDD in Latin America*. Cheltenham: Edward Elgar.

Halloy, S. (1994). *Study to determine the biological value of the area west of the Noel Kempff National Park as a basis for its inclusion in the park*. Technical Report.

Hübenthal, A., Starnfield, F., & Carrión, D. (2010) *The forests dialogue: Field Dialogue on REDD readiness in Ecuador*. Background Paper, Quito: Papallacta.

Ibarra, E., & Hirkuri, S. R. (2007) Institutional conflict and forest policy effectiveness: The case of the Costa Rican institutional reform. *Forest Policy and Economics*, 9(6), 591- 601.

IPCC (2007) *The Physical Science Basis. Contribution of working group to the fourth assessment report of the Intergovernmental Panel on Climate Change. Summary for policymakers*, Geneva: IPCC.

Karousakis, K. (2007) *Incentives to reduce GHG emissions from deforestation: lessons learned from Costa Rica and Mexico*. Paris: Organization for Economic Cooperation and Development (OECD) and international Energy Agency (IEA).

Kissinger, G., Herold, M., De Sy., V. (2012) *Drivers of deforestation and forest degradation: A synthesis report for REDD+ policymakers*. Lexeme Consulting: Vancouver Canada.

Kleinn, C., Ramírez, C., Holmgren, P., Valverde, S. L., & Chavez, G. (2005) *A national forest resources assessment for Costa Rica based on low intensity sampling*. *Forest Ecology and Management*, 210(1-3), 9-23.

Lauterbach, S. (2007) An assessment of existing demand for carbon sequestration services. *Journal of Sustainable Forestry* 25 (1), 75-98.

La Vinha, A. (2010) *The Future of REDD-Plus: Pathways of Convergence for the UNFCCC Negotiations and the Partnership*, London: Foundation for International Environmental Law and Development (FIELD), Working Paper, Retrieved December 12th, 2012, from <http://www.field.org.uk/news/new-paper-the-future-redd-plus>.

Lewis, S. and 33 co-authors (2009) Increasing carbon storage in intact African tropical forests. *Nature* 457, 19th February, 1003-7.

Locatelli, B., Evans, V., Wardell, A., Andrade, A., & Vignola, R. (2011) Forests and climate change in Latin America: Linking adaptation and mitigation. *Forests* 2, 431-450.

Moura-Costa, P. (2009) *Compensation for carbon stock maintenance in forests as an alternative to avoiding carbon flows*, Oxford Centre for Tropical Forests, Environmental Change Institute, University of Oxford, UK.

Motzejko, A. (2009) *Sustainability, climate change, and carbon sequestration in Panama*, MA Thesis: University of Bern.

Nepstad, D., Soares-Filho, B.S., Merry, F., Lima, A., Moutinho, P., Carter, J., Bowman, M., Cattaneo, A., Rodrigues, H., Schwartzman, S., McGrath D.G., Stickler, C.M., Lubowski, R., Piris-Cabezas, P., Rivero, S., Alencar, A., Almeida, O., & Stella, O. (2009) The end of deforestation in the Brazilian Amazon. *Science* 326, 1350-51.

Pagiola, S., (2008) Payments for environmental services in Costa Rica. *Ecological Economics* 65 (4), 712–724.

Pagiola, S., Rios, A. R. and Arcenas, A (2008) Can the poor participate in payments for

environmental services? Lessons from the Silvopastoral Project in Nicaragua, *Environment and Development Economics* 13, 299- 325

Pacheco, P. (2005) Decentralization of forest management in Bolivia: Who benefits and why? In C.J. Pierce Colfer & D. Capistrano (Eds.), *The politics of decentralization: Forests, people, and power*. London: Earthscan.

Panama (2010) *UN-REDD Joint Program Document: Panama*. UN-REDD.

Parker, Tracey, Julieta Carrión & Rafael Samudio. (2004) Environment, Biodiversity, Water, and Tropical Forest Conservation, Protection, and Management in Panama: Assessment and Recommendations. Section 118/119 Biodiversity and Tropical Forestry Assessment of the USAID/Panama Program. Submitted to USAID/Panama by Chemonics International Inc. Retrieved November 17th, 2012, from http://rmportal.net/library/VI/1/118_panama/view.

Parker, C., Mitchell, A., Trivedi, M. & Mardas, N. (2008) *The little REDD book*. Oxford: Global Canopy Foundation.

PNUD Bolivia (2009) *Tras las huellas del cambio climático en Bolivia: Estado del arte del conocimiento sobre adaptación al cambio climático Agua y seguridad alimentaria*. La Paz: ABBASE Ltda.

Ringhofer, L. (2010) *Fishing, foraging and farming in the Bolivian Amazon: On a local society in transition*. Dordrecht: Springer Netherlands.

Robertson, N., and Wunder, S. (2004) Fresh Tracks in the Forest: Accessing Incipient Payments for Environmental Service Initiatives in Bolivia, *mimeo*.

Sánchez, R., (2006) *Cobertura vegetal de la República del Ecuador, empleando información satelital*. Quito: CLIRSEN.

Seiwald, M. (2011) *REDD and Indigenous peoples: The programme Socio Bosque by the Ecuadorian Ministry of Environment in the context of the debates around development and climate change*, MA Thesis: University of Salzburg

Stern, N. (2007) *The Economics of Climate Change: The Stern Review*, Cambridge: Cambridge University Press.

TNC (2009) *Noel Kempff Mercado Climate Action Project: A case study in reducing emissions from deforestation and degradation*. The Nature Conservancy, 2009.

World Bank (2010) *World development report 2010. Development and climate change*, Washington D.C.: World Bank.

UNEP (2008) UNEP perspectives series. A reformed CDM. Retrieved December 14th, 2012, from <http://cd4cdm.org/Publications/Perspectives/ReformedCDM.pdf>.

UNFCCC (2008) *Reducing emissions from deforestation in developing countries: Approaches to stimulate action*, UNFCCC, Decision 2/CP 13-11, Conference of the Parties, 13th Session, Bali.

UNFCCC (2010) *Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009*, UNFCCC, New York: United Nations.

Verner, D., & Kronik, J. (2010) *Indigenous peoples and climate change in Latin America*. Washington DC: World Bank.

Westholm, L., Henders, S., Ostwald, M. & Mattsson, E. (2009) *Assessment of existing global financial initiatives and monitoring aspects of carbon sinks in forest ecosystems – the issue of REDD*. Focali Report, Gothenburg: University of Gothenburg.

World Resources Institute (WRI) in collaboration with United Nations Development Programme, United Nations Environment Programme, and World Bank (2005). *World Resources 2005: The Wealth of the Poor—Managing Ecosystems to Fight Poverty*. Washington, DC: WRI.

Wunder, S. (2006) The efficiency of payments for environmental services in tropical conservation. *Conservation Biology* 21(1), 48-58.

WWF (2009) *Keeping the Amazon forests standing: A matter of values*. Netherlands: WWF.

WWF (2010) *Lessons from REDD+ preparedness in Colombia, Guyana, Indonesia and Peru*. Report no. 8, June 2010.

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Umweltbelastungen in Österreich als Folge menschlichen Handelns. Forschungsbericht gem. m. dem Österreichischen Ökologie-Institut. Fischer-Kowalski, M., Hg. (1987)

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Environmental Policy as an Interplay of Professionals and Movements - the Case of Austria. Paper to the ISA Conference on Environmental Constraints and Opportunities in the Social Organisation of Space, Udine 1989. Fischer-Kowalski, M. (1989)

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Umwelt & Öffentlichkeit. Dokumentation der gleichnamigen Tagung, veranstaltet vom IFF und dem Österreichischen Ökologie-Institut in Wien, (1990)

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Umweltpolitik auf Gemeindeebene. Politikbezogene Weiterbildung für Umweltgemeinderäte. Lackner, C. (1990)

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Verursacher von Umweltbelastungen. Grundsätzliche Überlegungen zu einem mit der VGR verknüpfbaren Emittenteninformationssystem. Fischer-Kowalski, M., Kissler, M., Payer, H., Steuerer A. (1990)

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Umweltbildung in Österreich, Teil I: Volkshochschulen. Fischer-Kowalski, M., Fröhlich, U.; Harauer, R., Vymazal R. (1990)

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Ämtliche Umweltberichterstattung in Österreich. Fischer-Kowalski, M., Lackner, C., Steuerer, A. (1990)

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Verursacherbezogene Umweltinformationen. Bausteine für ein Satellitensystem zur österr. VGR. Dokumentation des gleichnamigen Workshop, veranstaltet vom IFF und dem Österreichischen Ökologie-Institut, Wien (1991)

Band 9

A Model for the Linkage between Economy and Environment. Paper to the Special IARIW Conference on Environmental Accounting, Baden 1991. Dell'Mour, R., Fleissner, P., Hofkirchner, W., Steuerer A. (1991)

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Verursacherbezogene Umweltindikatoren - Kurzfassung. Forschungsbericht gem. mit dem Österreichischen Ökologie-Institut. Fischer-Kowalski, M., Haberl, H., Payer, H.; Steuerer, A., Zangerl-Weisz, H. (1991)

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Gezielte Eingriffe in Lebensprozesse. Vorschlag für verursacherbezogene Umweltindikatoren. Forschungsbericht gem. m. dem Österreichischen Ökologie-Institut. Haberl, H. (1991)

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Gentechnik als gezielter Eingriff in Lebensprozesse. Vorüberlegungen für verursacherbezogene Umweltindikatoren. Forschungsbericht gem. m. dem Österr. Ökologie-Institut. Wenzl, P.; Zangerl-Weisz, H. (1991)

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