

# Reduced Emissions for Deforestation and Degradation: A Critical Review

Marc Hufty

Development Studies

Graduate Institute of International and Development Studies, Geneva, Switzerland

marc.hufty@graduateinstitute.ch

Annie Haakenstad

Development Studies

Graduate Institute of International and Development Studies, Geneva, Switzerland

annie.haakenstad@graduateinstitute.ch

## Abstract

“Reduced emissions from deforestation and forest degradation” (REDD) is emerging as a major new climate change mechanism that could deeply impact the financial, social and institutional dynamics of deforestation, conservation, and development in many developing countries. It has the potential to influence global forest governance in a socially acceptable way. The mechanism as it stands needs much improvement to avoid the pitfalls of earlier forest governance mechanisms. The research, at this stage, is not sufficient to improve it. Most of the literature is fairly slanted towards technical issues and the prospective design of the scheme or normative opposition to it. Despite this copious amounts of scholarly and advocacy work, there is too little attention focused on the social and governance dimensions of the proposals.

## Author’s Note

Forests are crucial in the struggle for sustainable development. Not only do they have a role in the preservation of global ecological systems, but moreover they are especially important for supporting the livelihoods of local populations. When forests were first addressed in the context of climate change, they were assessed in mostly financial and technical terms. We think there is a need to insert a social perspective into the debate, taking into account the lessons learned from many years of intervening in developing countries’ forests. Engineers who have designed REDD as a brilliant, but top-down, scheme for tropical forests conservation seem to have forgotten such lessons. Without addressing deforestation, climate objectives cannot be reached. But further, drawing from years of work on forests, we see that without considering the impacts on local societies and the lessons learned from development aid REDD cannot succeed. This paper is part of the effort to ensure REDD will prevail in social terms.

**Keywords:** Reduced emissions, deforestation, forest degradation, tropical forests, environmental governance, social impacts.

## 1. Introduction

Forests cover 29% of the terrestrial surface (Schmitt et al., 2008) and provide vital ecosystems services (MEA, 2005a). They also store 50% of terrestrial organic

carbon and contain much of the Earth's biodiversity. Tropical forests contain 50% of terrestrial biological diversity over 6% of the world's surface (Wilson, 1992). But globally, sustainable forest management remains insufficiently competitive compared with more destructive uses of forests (van Dijk & Savenije, 2009); 13 million hectares are lost annually to deforestation (approximately the size of the United Kingdom) (FAO, 2010), 97% of which takes place in tropical countries (Nabuurs et al., 2007). Deforestation is responsible for 18% of global CO<sub>2</sub> emissions (Stern, 2006), adding as much carbon to the atmosphere as the transport sector. Moreover, deforestation inflicts high biodiversity losses (MEA, 2005b) and triggers the loss of key ecosystem services (Elmqvist et al., 2010). There is widespread agreement on the need to halt deforestation.

Direct and underlying causes of deforestation are known (Geist & Lambin, 2001). They are traditionally divided into proximate causes (infrastructure expansion, logging, conversion of land for agriculture and ranching, extractive industries, etc.) and underlying factors (economic aspects, such as the global demand for timber, soybeans or meat, as well as policy-related, institutional, technological, socio-cultural, demographic, et cetera). These causes are interlinked; for example, a road built for logging will attract settlers, who may clear-cut forests to ready land for agriculture.

Many mechanisms aimed at curbing deforestation are already in place, some more successful than others. Protected areas already cover 13.5% of the world's forests (Schmitt et al., 2008). If well managed, they can constitute an effective tool against deforestation (Bruner, 2001; Hayes, 2006), especially when they involve multi-user or indigenous governance systems (Chhatre & Agrawal, 2009; Nelson & Chomitz, 2009). Other governance mechanisms, such as those led by the Food and Agriculture Organization (FAO), the United Nations Forum on Forests (UNFF), the World Bank, the International Tropical Timber Organization (ITTO) and the Forest Stewardship Council (FSC), have proven useful under certain conditions, but are manifestly insufficient if the global deforestation rate is considered (Humphreys, 2006). These programs lack an effective process of governance for forests at the global level, something weakly promoted by developed countries and fiercely opposed by developing countries under the principles of national sovereignty<sup>1</sup> and differentiated responsibility. This has resulted in segmented, fragmented, underfunded, incoherent, or "non-binding" instruments.

Two mechanisms have been particularly debated and tested in the context of the climate and biodiversity global governance processes. One prominent approach has been the forest-related carbon sink projects pursued under the Kyoto Protocol's Clean Development Mechanism. These projects harness the carbon market to compensate developed countries' excess carbon emissions with tree plantations in developing countries. The projects' contribution to mitigating climate change seems very modest, and they have been criticized for promoting large monoculture tree plantations (Kill et al., 2010), as well as involving problems of additionality, leakage

---

<sup>1</sup> Depending on the ideological lens employed, claiming sovereignty can be justified as an effort to thwart a neo-colonial attempt to control forest resources in the vein of Dependency Theory (see Fearnside 2009), or as an endeavor to preserve internal inequalities by enhancing the domination of national elites over natural resources, a view indigenous peoples often advance (e.g. Goldtooth 2010). Either way, the impact has been the same – evoking sovereignty has barred global governance structures from conserving forests.

and permanence (Plantinga & Richards, 2008). The other prominent approach is payments for ecosystem services (PES), which are payments to communities, individuals, or governments for safeguarding and maintaining ecosystem services like clean water (Gómez-Beggethun et al., 2010; TEEB, 2010; Wallace, 2007; Wunder et al., 2008).<sup>2</sup> They are considered beneficial for the involved partners (Tacconi et al., 2009) but unlikely to replace other conservation instruments (Wunder, 2006). They must be carefully designed to avoid focusing excessively on one resource (e.g. water) or reproducing and even strengthening power asymmetries and social inequalities (Kosoy & Corbera, 2010).

In the context of United Nations Framework Convention on Climate Change (UNFCCC) negotiations, “avoided deforestation” was not originally included in its implementation agreement, the Kyoto Protocol. Controversial forest and other land issues were left out for a variety of reasons including the apparent complexity of managing deforestation and forest degradation (Morgan et al., 2005; Skutsch et al., 2007), fear of a possible flood of credits into the carbon markets (Silva-Chavez, 2005; Vera Diaz & Schwarzen, 2005) and possible negative biodiversity impacts (Greenpeace, 2003). At the 11<sup>th</sup> Conference of the Parties in 2005 in Montreal, developing countries<sup>3</sup> proposed a mechanism called “Reduced Emissions from Deforestation and Forest Degradation” (REDD).<sup>4</sup> Portrayed as a “win-win” for developing and developed countries alike, the mechanism has gained momentum and support. It became a widely discussed subject in view of post-Kyoto arrangements (after-2012) and is one of the few consensual solutions agreed to by the UNFCCC negotiators in Copenhagen (COP-15, 2009) and Cancún (COP-16, 2010). It has also generated an abundant literature, including academic papers,<sup>5</sup> reports and advocacy papers. This is noteworthy for a mechanism that remains experimental, only due to start after 2012. Is there a chance that REDD will be the first successful attempt to manage forests at global scale (Grainger & Obersteiner, 2010)?

## 2. REDD: Nuts and Bolts

The basic idea of REDD is “to generate a significant level of compensation or economic incentive to outweigh the income generated through deforestation”

---

<sup>2</sup> A classic example is the New York watershed management plan for the Catskills, which disburses funds in upstream communities in the Catskills to assure water quality to downstream users in New York City (see Isakson, 2002).

<sup>3</sup> It was proposed by Papua New Guinea and Costa Rica in 2005. (UNFCCC, 2005).

<sup>4</sup> The initial discussion was about “avoided deforestation” (AD), which would have covered slowing deforestation rates in existing forests. In 2005, the discussion turned to “Reduced Emissions from Deforestation in Developing Countries”, with only one “D” (RED). Gradually, the idea of including forest degradation was accepted and the acronym gained a second “D” (Reduced Emissions from Deforestation and Forest Degradation). This was confirmed at Bali (UNFCCC COP 13) in 2007. The “Bali Action Plan” (Paragraph 1b.iii) also mentioned the role of conservation, sustainable management and carbon stock enhancement, an innovation that was dubbed REDD+. The debate on whether or not to include CDM’s afforestation and reforestation (creating or re-creating a forest) in REDD is still ongoing.

<sup>5</sup> For 2010 alone, we have compiled over 60 papers in international peer-reviewed journals such as *Science*, *Global Environmental Change*, *Ecological Economics*, *Environmental Science and Policy*, *Climatic Change*, *International Environmental Agreements*, *The Journal of Environment and Development*, etc. We therefore do not pretend to cover the entire literature base, but a selected sample.

(FoEI, 2008, p. 9). Influential reports have presented avoided deforestation as a cost effective mitigation option for climate change and a potential development opportunity since it would provide additional financial resources for national governments and local communities to invest in health, education and sustainable development (Chomitz et al., 2007; Eliasch, 2008; Lubowski, 2008; Murray et al., 2009; Stern, 2006).

While the prospective costs of deforestation's contribution to climate change have been estimated between \$1 and \$2 trillion USD annually (Eliasch, 2008; Lubowski, 2008; Tavoni et al., 2007), the annual costs for halving emissions from forests could be in the range of US\$7 to \$33 billion, sums developing countries would receive for their efforts (Eliasch, 2008; Kindermann et al., 2008; Torres et al., 2010). The message emanating from this body of work is that by preventing deforestation, global carbon emissions could be reduced significantly and at a lower cost, while simultaneously accomplishing important development objectives (Eliasch, 2008; Nepstad et al., 2009; Stern, 2006; Sohngen & Sedjo, 2006).<sup>6</sup>

The mechanism's design will be crucial and there are high expectations amid heated debates. In general, REDD can be seen as continuous with PES, with several specificities, such as scale and the focus on the carbon stocking function of trees, while PES may address different services and often focus on water. Indeed, while being more specific, proposals for REDD are based largely on experiences related to PES programs (perceived as highly promising) and the carbon offset market (not seen as very promising). However, the manner in which this basic idea will be applied under the REDD mechanism has been highly disputed and intensely negotiated. Many points of contention remain (Alvarado & Wertz-Kanounnikoff, 2007; Angelsen, 2008; Densham et al., 2009; FoEI, 2008; Karsenty & Pirard, 2007), which can be summarized as follows.

## 2.1 Funding

Several funding models have been proposed (Karsenty, 2008), including a specialized public fund (Brazil's proposal in 2006, also discussed by the Stern Review) (Grasl et al., 2003; Hoogeveen et al., 2008; Viana, 2009) and a private, carbon market-based approach (ICF International, 2009; Loisel, 2008). A third option is to include both public and private funds in a hybrid or "basket" approach (Thies & Czebiniak, 2008). Other concerns have involved prospects for long-term funding, phases of implementation, distribution and safeguards, and sensibility to carbon market variations (Brown et al., 2009; Minang & Murphy, 2010). Under the current negotiations, it appears that the framework would use a hybrid approach, with capacity-building funds available for start-up and financial links with the carbon market for scale-up (Minang & Murphy, 2010; UNFCCC, 2010; Verchot & Petkova, 2009).

## 2.2 Scale

Different scales for implementation have been suggested as well. Under currently agreed terms, countries would report to an international funding

---

<sup>6</sup> To keep things in proportion, official development assistance from OECD countries is expected to reach US\$126 billion in 2010 (OECD, 2010).

mechanism (UNFCCC, 2010), although the financial mechanism and the reporting system still have to be designed (COP-16, 2010). The mechanism would mainly follow a national or country-driven approach: states will be responsible for the implementation of REDD within their borders according to the principle of national sovereignty (Anderson & Richards, 2001; Plantinga & Richards, 2008; UNFCCC, 2010). This national model demonstrates another difference between REDD and PES. The latter is mostly oriented toward local and regional projects or carbon sinks, financed by the market-based mechanisms of the Kyoto protocol. REDD would, in certain versions, allow compensations for the maintenance of protected forests. Concrete REDD projects would nevertheless be “sub-national” (Santilli et al., 2005), and projects would be established on a small scale at the outset rather than immediately implemented nationwide. This combination is called the “nested” approach (Angelsen et al., 2008; Pedroni et al., 2009).

The scale of REDD raises issues such as leakage, additionality, permanence, scope, baseline, and monitoring, as well as effectiveness, capacity, and governance (Angelsen et al., 2008; Pedroni et al., 2009; Densham et al., 2009). The national approach poses problems for countries with weak governance capacities or institutions (Plantinga & Richards, 2008), while a purely sub-national approach would risk leakage and raise questions of additionality and permanence (see below). Further questions, such as the relationship between a REDD carbon market and existing carbon markets, the question of which specific entities should manage REDD funds and coordinate the many funds recently created (e.g. the Oslo-Paris REDD Partnership), and under what monitoring system this would occur, remain open.

### **2.3 Leakage, Additionality, and Permanence**

Leakage is a situation in which deforestation avoided in one area results in deforestation in another, whether within or between countries (Plantinga & Richards, 2008), which could severely undermine the effectiveness of REDD (Schwarze et al., 2003). Additionality is the idea that reduction in deforestation should be greater than what would have occurred otherwise. A related concern is permanence, the maintenance of forests and their carbon sequestration capacities over time (Dutschke & Angelsen, 2008). Insurance policies, temporary crediting, shared liability, long-term accounting, buffering and pooling of credits have been proposed to combat the possibilities of accidents like fires or pest invasion or incidences of deforestation once credits have been distributed (Dutschke & Angelsen, 2008; Olander et al., 2009).

### **2.4 Scope**

The activities and forests eligible for financing are debated. The model presently accepted by UNFCCC parties is an enlarged version of REDD (“REDD+”) that includes activities such as conservation, reforestation, afforestation and other forest enhancement activities rather than simply deforestation and forest degradation. As FAO currently defines plantations as forests, a country could theoretically increase its forest area through plantations while deforesting its standing old-growth forests. This would distort some of REDD’s environmental co-benefits, including those linked to biodiversity conservation and sustainable development (van

Noordwijk & Minang, 2009). As an answer to this concern, Paragraph 2(e) of the Annex I (Guidance and safeguards) of the Decision adopted in COP 16 states that REDD actions should be consistent with the conservation of natural forests and not used for their conversion (UNFCCC, 2010).

## 2.5 Baseline

Another concern in designing REDD has been determining the “baseline” or “a level of emissions that would occur in the absence of a forest carbon policy and is used as a reference case for quantifying mitigation performance” (Olander et al., 2009, p. 32). Since baselines serve to assess the effectiveness of programs and allocation of emissions reduction credits, they have been a source of contention (Olander et al., 2007). The use of historical deforestation to project deforestation rates (Sathaye & Andrasko, 2007; Schlamadinger et al., 2005), or the use of “business-as-usual” projections (Soares-Filo et al., 2006) have been critiqued as perverse incentives encouraging adverse selection since those nations historically responsible for deforestation emissions are selected and rewarded rather than those who have historically left their forests intact (Plantinga & Richards, 2008).

## 2.6 Monitoring

A consensus has emerged that emissions reductions should be measurable, reportable, and verifiable (Verchot & Petkova, 2009), but verifying how much carbon is in fact sequestered and the effective reduction of deforestation is difficult. Lack of transparency (Anderson et al., 2009), over- or under-estimations (Balzter & Shvidenko, 2000), and the cost and accuracy of current technologies (Anderson et al., 2009; Murray et al., 2009) are limiting factors. Monitoring deforestation and degradation and evaluating the carbon sequestered have greatly improved with remote sensing (DeFries et al., 2006; Gibbs et al., 2007). Still, many questions remain, such as who should certify REDD schemes, on what basis, with which techniques, and whether the capacity of developing countries to undertake the program’s technical requirements and enforce restrictions is sufficient, even with capacity-building activities (Westholm et al., 2009).

Most of the expansive, fast-growing body of literature has been dedicated to these questions, but it remains mainly prospective as relatively few field cases are available for early empirical assessment. In 2007 the UNFCCC called upon parties and international organizations to promote REDD through capacity-building and demonstration activities. Consequently, UNDP, UNEP, and FAO created a program (UN-REDD) to help countries prepare themselves for implementing REDD. To this end, the World Bank also administers the Forest Carbon Partnership Facility (FCPF). This support has prompted the involvement of many new actors of different natures (NGOs, private firms, research networks) in REDD activities and the rapid emergence of REDD experiments at the sub-national level. Wertz-Kanounnikoff and Metta Kongphan-Apirak studied over one hundred pioneer REDD projects underway and differentiated between REDD-readiness activities (65 cases of legal and institutional preparation of national strategies) and “demonstration activities” (44 projects implemented on a field level) (2009). Of the latter, half are located in Indonesia, the country with the highest amount of greenhouse gas emissions sourced from deforestation, and they all are local and pioneer experiments. One year later,

Cerbu et al. surveyed 79 preparedness activities (national level) and a hundred demonstration activities (sub-national level), in 40 countries, most of which took place in Brazil (17) and Indonesia (22) (2010). The survey concluded that a bias exists for activities in Latin America to the detriment of Africa.

Factors such as prior experience, the quality of partnerships, the perceived threat to forests and biodiversity, and the quality of governance determine where projects are established. Clearly, the number of REDD projects are growing rapidly, a rush that could be harmful for the eventual social and even environmental impacts. Additionally, the concentration of projects in specific regions could be detrimental to future design. If success is highly dependent on specific conditions, reproducibility upon scale-up and across different nations might not be feasible.

### 3. Governance and Social Aspects

The review of literature and research on REDD reveals a clear gap on two issues: governance and social impacts. While governance and social aspects have been addressed in several studies and papers regarding REDD, systematic, and evidence-based arguments are still lacking.

Governance includes the design of the mechanism at all levels, norms-setting procedures, related legal and informal institutional arrangements, and interactions between involved state and non-state actors. Additionally, governance encompasses horizontal (within a given level of government) and vertical (across levels of government) links with other issue areas (e.g. biodiversity, finance, trade, etc.), existing policies and institutions at the international, national, or local levels (Forsyth, 2009; Minang & Murphy, 2010; UNFCCC, 2006). In general, governance of forests is notoriously bad (Hoogeveen et al., 2008). During the last 10 years, efforts to slow deforestation rates globally have had little success (Pfaff et al., 2004). Estimates contend that deforestation rates will continue in all geographic areas (Sathaye et al., 2007).

Much of the literature covering the governance of REDD relates to comparing the effectiveness, efficiency, and fairness of the different proposed mechanisms like scale (Clarke, 2010; Kaimowitz, 2008; Viana, 2009), funding designs (Dooley et al., 2008; Viana, 2009; Hoogeveen et al., 2008; Clarke, 2010), monitoring systems (Luttrell et al., 2007; Peskett & Harkin, 2007), national forest policies, (Funder, 2009), state and non-state actors, and barriers and opportunities on the local scale (Scriven, 2009). While it appears that much of the 'what' related to governance may have been resolved, the majority of the 'how' is yet to be thoroughly investigated.

Government competence at the national level will be a key factor in the success of REDD (Peskett et al., 2008). A significant concern is the problem of sending large sums of money to governments with poor track records, low institutional and governance capacities and weak commitments to transparency, accountability, and participation (Peskett et al., 2008; Ebeling & Yasue, 2008; Westholm et al., 2009). Some see REDD as an opportunity to strengthen forest governance, institutions and capacities (TNC, 2009; Olander et al., 2009). Others have questioned the capacity of REDD to produce such co-benefits (Bullock et al., 2009; Hall, 2008; Livengood & Dixon, 2009; REDD Monitor, 2009).

Investing in governance institutions, engaging the local communities and addressing their needs has proven crucial to reducing deforestation in protected areas (Madeira, 2008). PES programs can be seen as indicating some of the effects of REDD, and the evidence thus far suggests that these programs have a bias against the poorest of the poor, although it is not clear whether this is due to correlation with other targeting criteria of the programs or to barriers to participation linked to poverty (Muñoz-Piña et al., 2008; Pagiola et al., 2007). Conflict over local and community land tenure, restricted access to forest resources, and unfair distribution of carbon revenues have been identified as possible consequences of poorly designed forest carbon programs (Olander et al., 2009). The effectiveness of PES schemes, conversely, have been shown to depend on an array of factors that enhance the role of the poor, such as community involvement, institutional and economic drivers, and resources for surveillance and policing (Mertens et al., 2004). Ensuring co-benefits could thus result in more efficient and effective programs (Durbin, 2007; Olander et al., 2009). A comprehensive, integrative approach with strong stakeholder participation may be more likely to address downfalls in REDD programs, as well as ensure success by preventing carbon emissions. In effect, legitimacy is a condition for effectiveness.

In addition to governance, another central challenge for realizing REDD objectives is to ensure that social needs are met and sustained alongside the conservation of forests. The reduction of the biodiversity of forest areas, for instance, is a critical concern for REDD. Biodiversity is already under threat, as the Millennium Ecosystem Assessment recorded in 2005. The assessment concluded that poor countries have made little progress in reaching the Convention on Biological Diversity (CBD) objectives of conservation and sustainable use of biodiversity. Loss of biodiversity deprives people of ecosystem services worth US\$250 billion annually worldwide (MEA, 2005) and ecosystem services and other non-marketed goods are estimated to account for 47% to 89% percent of the GDP of the poor (TEEB, 2009). Poor people are most critically dependent on well-functioning natural environments for their survival (Angelsen & Wunder, 2003).

The need to seek synergetic solutions for diverse social-environmental challenges is recognized in the report “The Economics of Ecosystems and Biodiversity” (TEEB, 2008, p. 16). The TEEB study concludes that investing in the restoration and maintenance of the Earth’s ecosystems (valued at several trillion dollars) from forests and mangroves to wetlands and river basins can have a key role in countering climate change while providing ecosystem services necessary for the sustenance and vibrancy of human life. The TEEB findings recognize that enhancing the resilience of ecosystems and maintaining the planet’s biodiversity are key elements in mitigation and adaptation agendas, and are culturally and socially valuable to diverse groups of peoples (TEEB, 2010). If REDD were designed to contribute to the conservation of biodiversity and ecosystem services by protecting vast areas of standing forest, it could contribute to guaranteeing long-held cultural practices and social benefits.

Aligning social and environmental goals to promote human well-being has always been and still is the weak link in implementing sustainable development and biodiversity conservation (GBO, 2010), and REDD is no exception. The appeal of REDD for many of its advocates has been the prospect of significant “co-benefits” for indigenous people and other forest dwellers in terms of development and



livelihoods (Brown et al., 2008), but fears about local rights, unfairness, impacts on development, land use, livelihoods and food production have driven critiques of REDD (Griffiths, 2007). Whether conservation and social goals can be achieved simultaneously is debated (Newmark & Hough, 2000; Adams et al., 2004; Barrett et al., 2005). Many authors have recorded how local and indigenous people have suffered under previous conservation schemes, whether due to forced resettlement from protected areas (Adams & Hutton, 2007; Agrawal & Redford, 2009; Bray & Velazquez, 2009; Colchester, 1997; Dowie, 2009; Krueger, 2009; Schmidt-Soltau, 2003), inadequate compensation for limitations on natural resource access (Peters, 1998; Shyamsundar & Kramer, 1996), or the exacerbation of local conflicts (Agrawal & Gibson, 1999; Koch, 1997). Moreover, evidence from benefit-sharing schemes based on forest taxes or other revenues that were intended to be pro-poor have not been particularly successful (Bond et al., 2009); these revenues have often not reached the intended beneficiaries (Bandyopadhyay et al., 2008; Egbe, 2001; Frost & Bond, 2008), or have had only modest impacts on livelihoods (Bond & Mayers, 2009; Porras et al., 2008). Given this history, many questions and concerns related to the impacts of REDD have emerged, but most recent literature is composed of preventive denunciations and policy recommendations.

In responding to these concerns, research relies primarily on projections or hypotheses for the scheme, economic modeling, historical examples from PES or other conservation-development projects, or the few empirical examples existing to date, notably the Noel Kempf Project in Bolivia (Densham et al., 2009; Griffiths, 2007; TNC, 2009). Because of these methods and the limited information available until now, much of the work related to these concerns simply raises many more questions than answers.

## 4. Gaps in the Literature

The narrow breadth of literature covering the design of REDD means we are still speculating about how REDD will be governed and what prospective effects it will produce in terms of development, livelihoods, human rights, and equity. These issues are critical, as an estimated 1.6 billion people, 60 million of whom are indigenous people, depend on forests for their survival (CBD, 2009; WB, 2004). But as the literature stands now, much more information is needed in order to design REDD properly in these terms; little attention has been given to the social dimension of any of the proposals being made to address climate change and forest protection. Among the main social issues requiring investigation are rights, development and equity.

### 4.1 Rights, Local and Indigenous Peoples, and Land Tenure

Widespread concerns relate to the impact of REDD on local and indigenous people's rights, most particularly their right to land (Butler, 2008; Castro Diaz, 2008; Griffiths, 2007; Peskett et al., 2008). Funder hypothesizes that the implementation of REDD could be good or bad for local peoples, either solidifying recognition for their right to land or ignoring and abusing such rights (2009). According to its promoters, the Noel Kempff project in Bolivia demonstrated that REDD can reinforce and augment certain customary property rights (TNC, 2009). However, most of the literature questions this assertion. Weak land rights can potentially create

or exacerbate local conflicts and leave local people open to manipulation (Mayers et al., 2006). Cotula and Mayers lay out the complexity and variability of land tenure issues that REDD will affect, emphasizing the past failures of benefit-sharing schemes associated with forests (2009). Similarly, Bond et al. look at PES schemes worldwide and observe their potential for weakening land and resource rights (2009). The risk is that REDD schemes may result in governments, companies, conservation NGOs or speculators carving up forest lands, along with forest protection approaches that marginalize rather than empower forest people through the recentralization of forest governance (Phelps et al., 2010; Sikor et al., 2010).

Another worry is that REDD may lead to what have been known as “land grabs” (Castro Diaz, 2008; Griffith, 2007; Peskett et al., 2008; Robledo et al., 2008). Land grabs and the re-zoning of forest land by external actors without the participation of local people have been directly observed (Griffith, 2007). Castro Diaz demonstrates how indigenous people have been left out of negotiations related to REDD projects (2008). The recent case of Papua New Guinea further illustrates the importance of clear and enforced land rights (Melick, 2010; Mongobay, 2010; Palmer, 2010). Weak land tenure and associated problems also potentially play a negative role in poverty alleviation, for if payments depend on owning land, it is likely that they will not go primarily to poor people, even if they go to poor areas (Kerr et al., 2004; Grieg-Gran, forthcoming).

## 4.2 Development

There is a general hope that REDD funds could contribute to providing the resources needed for economic growth and development (Olander & Murray, 2007). According to Patanayak et al., protecting forests in Brazil could equilibrate the distribution of income, health and education in favor of rural residents (2009). For example, watershed PES schemes have demonstrated significant potential for impacting poverty (Bond & Mayers, 2009; Bond et al., 2009; Porras et al., 2008). But this enthusiasm is tempered by many interrogations based on earlier experiences. Several issues must be addressed regarding the injection of large sums of money into national economies. Implementing the program on a large scale implies opportunity costs and a reorientation of economic activities based on forest exploitation (Chomitz, 1999; Chomitz et al., 2007; Grieg-Gran, forthcoming). The dependence on one source of revenue, comparable to external aid, has been highlighted, as well as the danger of provoking “Dutch disease” (the distortion of an economy due to high dependence on one economic sector) (Peskett et al., 2008). The possible impacts on internal prices for food or energy could produce depressive macro-level employment effects (Bond et al., 2009) and be detrimental to the poorest communities. Ebeling & Yasue correlate Human Development Indicators (HDIs) with areas likely to benefit from REDD schemes and find that the program will most likely not target the regions with the direst human development needs (2008). Griffiths foresees an unequal imposition of costs for the protection of forests onto local communities and indigenous peoples, underlined and enforced by inequitable and abusive contracts; he notes that the socioeconomic situation has sometimes worsened under these programs (2007).

One of the most spectacular gaps in the related literature is an almost complete absence of interconnection between REDD and the abundant

development literature. One reason may be the divide among technical domains. Since most of the REDD literature concerns forestry, finance and technical issues, its authors tend not to be development experts. It appears that for some authors, REDD would emerge in a virgin world where everything is to be reinvented, whereas many of the issues facing REDD implementation are in fact well-known development problems. Building on the lessons learned in development over the last 50 years would probably avoid much disappointment and resource waste.

### 4.3 Equity

Closely linked to the issue of poverty alleviation are concerns related to equity and whether REDD will instigate capture and control by the elite, to the detriment of those with less power and resources, as has been the case with other conservation schemes (Balint & Mashinya, 2006; Fritzen, 2007; Kellert et al., 2000; Thompson & Homewood, 2002). Sommerville et al. hypothesize that REDD will benefit the elite more than the non-elite and that the failure to consider fairness and distribution issues can undermine PES or other conservation projects (2009). Cotula & Mayers observe that as the value of the standing forest increases, powerful actors look to gain power over these carbon-based assets, often to the detriment of the less powerful, arguing that elite capture and misappropriation of the funds are potential byproducts of REDD funding (2009). Opportunity and transactions costs have also been linked to inequity and the perception of fairness of distribution (Adhikari, 2005; Kumar, 2002). Bond et al. question the possibility that local peoples can participate as equals in selling carbon, emphasizing the potential for divergence in equity of payment levels and other terms due to negotiating capacity (2009).

## 5. Conclusion

The literature suggests major gaps in the way REDD is studied. The first and most salient gap is the absence of sustained analysis on the social impact of implementing REDD over the long term. This gap stems from the fact that most of the empirical studies conducted so far focus on how to make REDD work to reduce deforestation and channel funds to developing countries rather than the problems that such mechanisms, even if fulfilling the two aforementioned objectives, would pose from a social perspective. Conversely, the literature that does emphasize the potentially adverse social impact of REDD tends to be rather normative, condemning REDD as a dangerous and manipulative tool rather than objectively assessing its positive and negative contributions and proposing means to adjust it. If REDD is to become a socially acceptable large-scale mechanism for fighting climate change, managing forests and transferring resources, lessons must be learned from both earlier experiences (forest governance mechanisms, carbon sinks, PES) and from experimental REDD projects implemented thus far.

Whereas forest conservation mechanisms have often required important legal reforms, most notably with respect to land apportionment and distribution, there is little material on how such reforms affect the human rights of both indigenous peoples (with non-formal entitlements to their traditional land) and other sectors of the population (with property and social rights, including access to unemployment benefits in case of relocation or professional re-orientation from forest-based activities to other sectors). Earlier experiences would suggest that if REDD were to

fulfill the expectations of both developing (regarding funding) and developed countries (regarding cheaper emission reductions), such results would come at the price of considerable social costs. The extent to which such costs may be worth bearing in light of the potential benefits from the implementation of REDD is a matter requiring empirical assessment.

The second gap concerns the link between the operation of REDD schemes and governance structures. The lion's share of the literature focuses on those mechanisms that would be effective in making REDD work from the perspective of emissions reduction and financing. Some authors also mention the difficulties arising from implementing a complex system in countries and/or regions with a substantial governance deficit, but such difficulties are seldom, if ever, studied empirically. The experience of other forest-related mechanisms is typically brought to bear to shed light on the link between REDD and governance. However, the particular features of those other forest-related mechanisms make such assessments difficult to transpose. Only through an empirical assessment of ongoing REDD projects will it be possible to understand the link between REDD and governance structures.

Based on the unprecedented crisis of climate change and the apparent consensus of the UNFCCC parties on this mechanism, REDD could be the first successful attempt to govern the forests at a global scale and to do so in a socially acceptable way. But with the mechanism as it stands, and with insufficient research to improve it, REDD could also constitute a missed opportunity to address these issues. There is still time to address these shortcomings and design REDD appropriately.

## Bibliography

- Adams, W.A. & J. Hutton. 2007. People, Parks and Poverty: Political Ecology and Biodiversity Conservation. *Conservation and Society* 5 (2): 147-183.
- Adams, W.M., R. Aveling, et al. 2004. Biodiversity Conservation and the Eradication of Poverty. *Science* 306 (5699): 1146–1149.
- Adhikari, B. 2005. Poverty, Property Rights and Collective Action: Understanding the Distributive Aspects of Common Property Resource Management. *Environment and Development Economics* 10 (1): 7–31.
- Agrawal, A. & C.C. Gibson. 1999. Enchantment And Disenchantment: The Role Of Community In Natural Resource Conservation. *World Development* 27 (4): 629–649.
- Agrawal, A. & K. Redford. 2009. Conservation And Displacement: An Overview. *Conservation and Society* 7 (1): 1-10.
- Alvarado, L. & S. Wertz-Kanounnikoff. 2007. Why are we Seeing REDD? An Analysis of the International Debate on Reducing Emissions From Deforestation and Degradation in Developing Countries. *Analyses* n°02/2007. Iddri
- Angelsen A. & S. Wunder. 2003. *Exploring the Forest-Poverty Link: Key Concepts, Issues and Research Implications*. Bogor: CIFOR.
- Angelsen, A (ed). 2008. *Moving Ahead with REDD: Issues, Options, and Implications*. Bogor: CIFOR.
- Angelsen, A., C. Streck, L. Peskett, J. Brown & C. Luttrell. 2008. *What is the Right Scale for REDD? The Implications of National, Subnational, and Nested Approaches*. CIFOR Infobrief 15.
- Balint, P.J. & J. Mashinya. 2006. The Decline of a Model Community-based Conservation Project: Governance, Capacity, and Devolution in Mahenye, Zimbabwe. *Geoforum* 37 (5): 805–815.
- Balzter H. & A. Shvindenko. 2000. Map Accuracy Report – Siberia Forest Cover Map. *Siberia Working Note 58*. Laxenburg: International Institute for Applied Systems Analysis.
- Bandyopadhyay, S., J.C. Guzman & S. Lendelvo. 2008. *Communal Conservancies and Household Gain in Namibia*. Washington, D.C.: World Bank.

- Bond, I. & J. Mayers. 2009. Fair Deals for Watershed Services: Lessons from a Multi-country Action Learning Project. *Natural Resource Issues* no. 13. London: IIED.
- Bond, I., M. Grieg-Gran, S. Wertz-Kanounnikoff, P. Hazlewood, S. Wunder & A. Angelsen. 2009. Incentives to Sustain Forest Ecosystem Services: A review and Lessons for REDD. *Natural Resource Issues* no. 16. London, Bogor, Washington: IIED, CIFOR and WRI.
- Bray, D.B. & A. Velazquez. 2009. From Displacement-based Conservation to Place-Based Conservation. *Conservation and Society* 7 (1): 11-14.
- Brown, C., L. Loisel, C. Peskett, C. Streck & D. Zarin. 2009. *Reducing Emissions from Deforestation and Forest Degradation (REDD): An Options Assessment Report prepared for the Government of Norway*. Washington: Meridian Institute.
- Brown, D., F. Seymour & L. Peskett. 2008. How do we Achieve REDD Co-benefits and Avoid Doing Harm. In Angelsen, A. *Moving Ahead with REDD: Issues, Options and Implications*. Bogor: CIFOR: 107-118.
- Bullock, S., M. Childs & T. Picken. 2009. *A Dangerous Distraction: Why Offsetting is Failing the Climate and People*. London: Friends of the Earth.
- Butler, R. 2008. Conflict in Papua New Guinea between Government and Landowners over REDD Carbon Trading. Retrieved on Nov. 17, from <http://news.mongabay.com/2008/1117-png.html>.
- Cerbu, G.A. et al. 2010. Locating REDD: A global survey and analysis of REDD readiness and demonstration activities. *Environ. Sci. Policy*. In Press.
- Castro Diaz, E. 2008. Climate Change, Forest Conservation and Indigenous Peoples Rights. Paper Prepared for the Global Forest Coalition for the International Expert Group Meeting on Indigenous Peoples and Climate Change, Darwin, Australia, 2-4 April.
- CBD (Secretariat of the Convention on Biological Diversity). 2009. *Sustainable Forest Management, Biodiversity and Livelihoods: A Good Practice Guide*. Montreal: CBD Secretariat.
- Chhatre, A. & A. Agrawal. 2009. Trade-offs and Synergies between Carbon Storage and Livelihood Benefits from Forest Commons. *Proceedings of the National Academy of Sciences* 106 (42): 17667-17670.
- Chomitz, K. 1999. *Evaluating Carbon Offsets from Forestry and Energy Projects: How Do They Compare?* Policy Research Working Paper. Washington: World Bank.

- Chomitz, K.M., P. Buys, G. De Luca, T.S. Thomas & S. Wertz-Kanounnikoff. 2007. *At Loggerheads. Agricultural Expansion, Poverty Reduction and Environment in the Tropical Forests*. World Bank Policy Research Report. Washington: World Bank.
- Clarke, R.A. 2010. Moving the REDD Debate from Theory to Practice: Lessons Learned from the Ulu Masen Project. *Law, Environment and Development Journal* 6 (1): 38-60.
- Colchester, M. 1997. Salvaging Nature: Indigenous Peoples and Protected Areas. In Ghimire, K. & M. Pimbert (eds). *Social Change and Conservation*. London: Earthscan: 97-130.
- Cotula, L. & J. Mayers. 2009. Tenure in REDD – Start-point or Afterthought? *Natural Resource Issues* no. 15. London: IIED.
- DeFries, R., F. Achard, S. Brown, M. Herold, D. Murdiyarso, B. Schlamadinger & C. de Souza. 2006. Reducing Greenhouse Gas Emissions from Deforestation in Developing Countries: Considerations for Monitoring and Measuring. *Global Terrestrial Observing System* no. 46. Rome: FAO.
- Densham, A. et al. 2009. *Carbon Scam: Noel Kempff Climate Action Project and the Push for Sub-national Forest Offsets*. Amsterdam: Greenpeace International.
- Dooley, K., I. Leal & S. Ozinga. 2008. *An overview of Selected REDD proposals*. London: FERN.
- Dowie, M. 2009. *Conservation Refugees. The Hundred- Year Conflict between Global Conservation and Native Peoples*. Cambridge: MIT Press.
- Durbin, J. 2007. Voluntary Markets: How to Achieve Co-benefits for Climate, Biodiversity, and People. Presentation to Poverty and Environment Partnership Meeting, November 20, Washington.
- Dutschke, M. & A. Angelsen. 2008. How do we Ensure Permanence and Assign Liability? In Angelsen, A. (ed). *Moving Ahead with REDD: Issues, Options and Implications*. Bogor: CIFOR: 77-86.
- Ebeling, J. & M. Yasue. 2008. Generating Carbon Finance through Avoided Deforestation and its Potential to Create Climatic, Conservation and Human Development Benefits. *Philosophical Transactions of the Royal Society B*. 363: 1917–1924.
- Egbe, S.E. 2001. The Concept of Community Forestry under Cameroonian law. *Journal of African Law* 45: 25–50.

- Eliasch, J. 2008. Climate Change: Financing Global Forests. *The Eliasch Review*. London: Earthscan / James & James.
- Elmqvist, T. et al. 2010. Biodiversity, ecosystems and ecosystems services. In Kumar, P. (ed) *The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations*. London: Earthscan. Chapter 2.
- FAO (Food and Agriculture Organization). (2010). *Global Forest Resource Assessment*. Rome: FAO.
- Fearnside, P.M. 2009. Science and Carbon Sinks in Brazil. *Climatic Change* 97: 373-378.
- FoEI (Friends of the Earth International). 2008. *REDD Myths: A Critical Review of Proposed Mechanisms to Reduce Emissions from Deforestation and Degradation in Developing Countries*. Amsterdam: FoEI.
- Forsyth, T. 2009. Multilevel, multiactor governance in REDD+: participation, integration and coordination. In Angelsen, A. (ed). *Realising REDD+: National Strategy and Policy Options*. Bogor: CIFOR: 113-124.
- Fritzen, S. A. 2007. Can the Design of Community-driven Development Reduce the Risk of Elite Capture? Evidence from Indonesia. *World Development* 35 (8): 1359–1379.
- Frost, P. & I. Bond. 2008. The CAMPFIRE Programme in Zimbabwe: Payments for Wildlife Services. *Ecological Economics* 65 (4): 776–787.
- Funder, M. 2009. Reducing Emissions from Deforestation and Degradation (REDD): An Overview of Risks and Opportunities for the Poor. *Danish Institute for International Studies REPORT* no. 21.
- Gibbs, H.K., S. Brown, J. O. Niles & J.A. Foley. 2007. Monitoring and Estimating Tropical Forest Carbon Stocks: Making REDD a Reality. *Environmental Research Letters* 2 (4): 045023.
- Goldtooth, T.B.K. 2010. Why REDD/REDD+ is not a solution. In Carbon Trade Watch. *No REDD: A Reader*. 11-23. Accessed Dec. 14, 2010, [www.carbontradewatch.org](http://www.carbontradewatch.org).
- Grainger, A., & M. Obersteiner. 2010. A framework for structuring the global forest monitoring landscape in the REDD+ era. *Environ. Sci. Policy*. In Press.
- Greenpeace International. 2003. *Sinks in the CDM: After the Climate, will Biodiversity go down the Drain ?!* Amsterdam: Greenpeace International.



- Grieg-Gran, M. (forthcoming). Equity Considerations and Potential Impacts on Indigenous or Poor Forest-dependent Communities. CIFOR Working paper series.
- Griffiths, Tom. 2007. *Seeing "RED"? "Avoided Deforestation" and the Rights of Indigenous Peoples and Local Communities*. Forest Peoples Programme.
- Hall, R. 2008. REDD Myths: A Critical Review of Proposed Mechanisms to Reduce Emissions from Deforestation and Degradation in Developing countries. Issue 114. Amsterdam: Friends of the Earth International.
- Hayes, T.M. 2006. Parks, People, and Forest Protection: an Institutional Assessment of the Effectiveness of Protected Areas. *World Development* 34 (12): 2064-2075.
- Hoogeveen, H. et al. 2008. *Designing a Forest Financing Mechanism: a Call for Bold, Collaborative and Innovative Thinking*. Medford: Fletcher School of Law and Diplomacy, Tufts University.
- ICF International. 2009. *Fostering Carbon Market Investments in REDD*. The Meridian Institute.
- Isakson, R. 2002. *Payment for Environmental Services in the Catskills: A socio-economic analysis of the agricultural strategy in New York City's watershed management plan*. Proyecto Pago por Servicios Ambientales en las Américas. San Salvador: PRISMA.
- Kaimowitz, D. 2008. The Prospects for Reduced Emissions from Deforestation and Degradation (REDD) in Mesoamerica. *International Forestry Review*. 10 (3): 485–495.
- Karsenty, A. 2008. The Architecture of Proposed REDD Schemes after Bali: Facing Critical Choices. *International Forestry Review* 10 (3): 443-457.
- Karsenty, A. & R. Pirard. 2007. Changement Climatique: faut-il récompenser la « déforestation évitée »? *Natures Sciences Sociétés* 15 (4): 357-369.
- Kellert, S.R., J.N. Mehta, S. A. Ebbin, L.L. Lichtenfeld. 2000. Community Natural Resource Management: Promise, Rhetoric, and Reality. *Society and Natural Resources* 13 (2): 705–715.
- Kerr, S., L. Lipper, S. P. Alexander, Pfaff, R. Cavatassi, B. Davis, J. Hendy & A. Sanchez. 2004. Will Buying Tropical Forest Carbon Benefit The Poor? Evidence from Costa Rica. *ESA Working Paper* no. 04-20.
- Kill, J. et al. 2010. *Trading Carbon: How it Works and why it is Controversial*. Fern.

- Kindermann, G., M. Obersteiner, B. Sohngen, J. Sathaye, K. Andrasko, E. Rametsteiner, B. Schlamadinger, S. Wunder & R. Beach. 2008. Global Cost Estimates of Reducing Carbon Emissions through Avoided Deforestation. *Proceedings of the National Academy of Sciences* 105 (30): 10302.
- Koch, E. 1997. Ecotourism and Rural Reconstruction in South Africa: Reality or Rhetoric. In Ghimire, K. & M. Pimbert (eds). *Social Change and Conservation*. London: Earthscan: 214-238.
- Kosoy, N. & E. Corbera. 2010. Payments for Ecosystem Services as Commodity Fetishism. *Ecological Economics* 69 (6): 1228-1236.
- Krueger, L. 2009. Protected Areas and Human Displacement: Improving the Interface between Policy and Practice. *Conservation and Society* 71 (1): 21-25.
- Kumar, S. 2002. Does Participation in Common Pool Resource Management help the Poor? A Social Cost-benefit Analysis of Joint Forest Management in Jharkhand, India. *World Development* 30 (5): 763-782.
- Livengood, E. & A. Dixon. 2009. REDD and the Effort to Limit Global Warming to 2°C: Implications for Including REDD Credits in the International Carbon Market. Report by KEA3 for Greenpeace International.
- Loisel, C. 2008. Linkage between Forest-based Mitigation and GHG markets. *Idées pour le débat* No. 19. Paris: IDDRI.
- Lubowski, R.N. 2008. The Role of REDD in Stabilising Greenhouse Gas Concentrations: Lessons from Economic Models. *Infobrief* 18. Bogor: CIFOR.
- Luttrell, C., K. Schreckenberg & L. Peskett. 2007. The Implications of Carbon Financing for Pro-poor Community Forestry. *Forestry Briefing*. Vol. 14. Overseas Development Institute.
- Madeira, E.M. 2008. Policies to Reduce Emissions from Deforestation and Degradation (REDD) in Developing Countries: An Examination of the Issues Facing the Incorporation of REDD into Market-based Climate Policies. Resources for the Future Report.
- Mayers, J., A. Bila, S. Khaukha, K. Opoku & W. Simwela. 2006. Forest Governance and Social Justice: Practical Tactics from a Learning Group Approach in Africa. *International Forestry Review* 8 (2): 201-210.
- MEA (Millennium Ecosystem Assessment). 2005a. *Millennium Ecosystem Assessment Synthesis Report*. Washington: World Resources Institute / Island Press.

- MEA (Millennium Ecosystem Assessment). 2005b. *Ecosystems and Human Well-Being: Biodiversity Synthesis*. Washington: World Resources Institute / Island Press.
- Melick, D. 2010. Credibility of REDD and Experiences from Papua New Guinea. *Conservation Biology* 24 (2): 359-361.
- Mertens, B., D. Kaimowitz, A. Puntodewo, J. Vanclay & P. Mendez. 2004. Modeling Deforestation at Distinct Geographic Scales and Time Periods in Santa Cruz, Bolivia. *International Regional Science Review* 27 (3): 271-296.
- Minang, P.A. & D. Murphy. 2010. *REDD after Copenhagen: the Way Forward*. International Institute for Sustainable Development.
- Mongabay, 2010. Papua New Guinea strips communal land rights protections, opening door to big business. [http://news.mongabay.com/2010/0630-hance\\_png\\_amendment.html](http://news.mongabay.com/2010/0630-hance_png_amendment.html)
- Morgan, J., C. Maretta & G. Volpi. 2005. Tropical Deforestation in the Context of the Post 2012 Climate Change Regime. In Moutinho, P. & S. Schwartzman (eds). *Tropical Deforestation and Climate Change*. Belem and Washington: Amazon Institute for Environmental Research, and Environmental Defense: 101-110.
- Muñoz-Piña, C., A. Guevara, J.M. Torres & J. Braña. 2008. Paying for the Hydrological Services of Mexico's Forests: Analysis, Negotiations and Results. *Ecological Economics* 65 (4): 725-736.
- Murray, B., R. Lubowski & B. Sohngen. 2009. Including Reduced Emissions from International Forest Carbon in Climate Policy: Understanding the Economics. Nicholas Institute Policy Brief 09-02. Duke University.
- Nabuurs, G. J., O. Masera, K. Andrasko, P. Benitez-Ponce, R. Boer, M. Dutschke, E. Elsiddig, J. Ford-Robertson, P. Frumhoff & T. Karjalainen. 2007. Forestry. Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.
- Nelson, A. & K.M. Chomitz. 2009. Protected Area Effectiveness in Reducing Tropical Deforestation: a Global Analysis of the Impact of Protection Status. Evaluation Brief 7. Washington: World Bank.
- Nepstad, D., B.S. Soares-Filho, F. Merry, A. Lima, P. Moutinho, J. Carter, M. Bowman, A. Cattaneo, H. Rodrigues & S. Schwartzman. 2009. The End of Deforestation in the Brazilian Amazon. *Science* 326 (5958): 1350.

- Newmark, W.D. & J. Hough. 2000. Conserving Wildlife in Africa: Integrated Conservation and Development Projects and Beyond. *BioScience* 50 (7): 585–592.
- Organization for Economic Cooperation and Development (OECD). 2010. ODA: What are the expected aid levels for 2010? Accessed Dec. 14, 2010, [http://www.oecd.org/document/35/0,3343,de\\_34968570\\_35008930\\_44987043\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/35/0,3343,de_34968570_35008930_44987043_1_1_1_1,00.html)
- Olander, L.P., B.C. Murray, M. Steininger & H. Gibbs. 2007. Establishing Credible Baselines for Quantifying Avoided Carbon Emissions from Reduced Deforestation and Forest Degradation. Nicholas Institute Working Paper WP 07-05. Duke University.
- Olander, L.P., W. Boyd, K. Lawlor, E.M. Madeira & J.O. Niles. 2009. International Forest Carbon and the Climate Change Challenge: Issues and Options. Nicholas Institute Policy Brief. Duke University.
- Pagiola, S., A.R. Rios & A. Arcenas. 2007. Can the Poor Participate in Payments for Environmental Services? Lessons from the Silvopastoral Project in Nicaragua. *Environment and Development Economics* 13: 299-325.
- Palmer, C. 2010. Property rights and liability for deforestation under REDD+: Implications for “permanence” in policy design. *Ecological Economics*. In Press.
- Pedroni, L., M. Dutschke, C. Streck & M.E. Porrúa. 2009. Creating Incentives for avoiding further Deforestation: the Nested Approach. *Climate Policy* 9 (2): 207-220.
- Peskett, L. & Z. Harkin. 2007. Risk and Responsibility in Reduced Emissions from Deforestation and Degradation. Forestry Briefing 15. Overseas Development Institute.
- Peskett, L., D. Huberman, E. Bowen-Jones, G. Edwards & J. Brown. 2008. Making REDD Work for the Poor. A Poverty Environment Partnership Report.
- Peters, J. 1998. Transforming the Integrated Conservation and Development Project Approach: Observations from the Ranomafana National Park Project, Madagascar. *Journal of Agricultural and Environmental Ethics* 11 (1): 17–47.
- Pfaff, A., S. Kerr, R. Cavatassi, B. Davis, L. Lippper, A. Sanchez & J. Timmins. 2004. Effects of Poverty on Deforestation: Distinguishing Behaviour from Location. ESA Working Paper no. 04-19.
- Phelps, J., E. Webb and A. Agrawal. 2010. Does REDD+ threatens to recentralize forest governance? *Science* 328 (16 April): 312-313.

- Plantinga, A.J. & K.R. Richards. 2008. International Forest Carbon Sequestration in a Post-Kyoto Agreement. Discussion Paper 2008-11. Cambridge, Mass.: Harvard Project on International Climate Agreements.
- Porras, I., M. Grieg-Gran & N. Neves. 2008. *All that Glitters: A review of Payments for Watershed Services in Developing Countries*. London: IIED.
- Robledo, C., J. Blaser, S. Byrne & K. Schmidt. 2008. Climate Change and Governance in the Forest Sector. Washington: Rights and Resources Institute.
- Santilli, M., P. Moutinho, S. Schwartzman, D. Nepstad, L. Curran & C. Nobre. 2005. Tropical Deforestation and the Kyoto Protocol. *Climatic Change* 71 (3): 267-276.
- Sathaye, J.A. & K. Andrasko. 2007. Special Issue on Estimation of Baselines and Leakage in Carbon Mitigation Forestry Projects. *Mitigation and Adaptation Strategies for Global Change* 12 (6): 963-970.
- Sathaye, J.A., W. Makundi, L. Dale, P. Chan & K. Andrasko. 2007. GHG Mitigation Potential, Costs and Benefits in Global Forests: A Dynamic Partial Equilibrium Approach. *Energy Journal* Special Issue 3: 127-172.
- Schlamadinger, B., L. Ciccarese, M. Dutschke, P.M. Fearnside, S. Brown & D. Murdiyarso. 2005. Should we Include Avoidance of Deforestation in the International Response to Climate Change? In Murdiyarso, D. & H. Herawati (eds). *Carbon forestry: Who will Benefit?* Proceedings of Workshop on Carbon Sequestration and Sustainable Livelihoods, held in Bogor, Indonesia.
- Schmidt-Soltau, K. 2003. Conservation Related Resettlement in Central Africa: Environmental and Social Risks. *Development and Change* 34 (3): 525-551.
- Schmitt, C. B. et al. 2008. Global Ecological Forest Classification and Forest Protected Area Gap Analysis. Analysis and Recommendations in View of the 10% Target for Forest Protection under the Convention on Biological Diversity. Freiburg University Press.
- Schwarze, R., J.O. Niles & J. Olander. 2003. *Understanding and Managing Leakage in Forest-based Green-house-gas-mitigation Projects: Capturing Carbon and Conserving Biodiversity: The Market Approach*. London: The Royal Society.
- Scriven, Joel. 2009. REDDy? Agency in Protected Area Governance along Peru's Amazonian Frontier. Paper Presented at the 2009 Amsterdam Conference on the Human Dimensions of Global Environmental Change.

- Shyamsundar, P. & R.A. Kramer. 1996. Tropical Forest Protection: an Empirical Analysis of the Costs Borne by Local people. *Journal of Environmental Economics and Management* 31 (2): 129-144.
- Sikor, T., Stahl, J., Enters, T., Ribot, J., Singh, N., Sunderlin, W. and Wollenberg, L. 2010. REDD-plus, forest people's rights and nested climate governance. *Global Environmental Change* 20: 423-425.
- Silva-Chavez, G.A. 2005. Reducing Greenhouse Gas Emissions from Tropical Deforestation by Applying Compensated Reduction to Bolivia. In Moutinho, P. & S. Schwartzman (eds). *Tropical Deforestation and Climate Change*. Belem and Washington: Amazon Institute for Environmental Research, and Environmental Defense: 73-86.
- Skutsch, M., N. Bird, E. Trines, M. Dutschke, P. Frumhoff, B.H.J. de Jong, P. Van Laake, O. Masera & D. Murdiyarso. 2007. Clearing the Way for Reducing Emissions from Tropical Deforestation. *Environmental Science and Policy* 10 (4): 322-334.
- Soares-Filho, B.S., D.C. Nepstad, L.M. Curran, G.C. Cerqueira, R.A. Garcia, C.A. Ramos, E. Voll, A. McDonald, P. Lefebvre & P. Schlesinger. 2006. Modelling Conservation in the Amazon Basin. *Nature* 440: 520-523.
- Sohngen, B. & R. Sedjo. 2006. Carbon Sequestration in Global Forests under Different Carbon Price Regimes. *The Energy Journal*, Special Issue 3: 109-126.
- Sommerville, M., J. Jones, M. Rahajaharison & E.J. Milner-Gulland. 2009. The Role of Fairness and Benefit Distribution in Community-based Payment for Environmental Services Interventions: A case Study from Menabe, Madagascar. *Ecological Economics* 69 (6), 1262-1271
- Stern, N. 2006. *Stern Review on the Economics of Climate Change*. London: HM Treasury.
- Tacconi, L., S. Mahanty & H. Suich. 2009. Assessing the Livelihood Impacts of Payments for Environmental Services: Implications for Avoided Deforestation. Paper presented at the XIII World Forestry Congress, Buenos Aires.
- Tavoni, M. et al. 2007. Forestry and the Carbon Market Response to Stabilize Climate. Climate. Change Modeling and Policy Working Paper. Milano: Fondazione Eni Enrico Mattei.
- TEEB. 2008. *The Economics of Ecosystems and Biodiversity. An Anterim Report*. European Communities. Cambridge UK: Banson.
- TEEB. 2009. *The Economics of Ecosystems and Biodiversity for National and International Policy Makers*. European Communities. Cambridge UK: Banson.

- TEEB. 2010. *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB*.
- Thies, C. & R. Czebiniak. 2008. *Forests for Climate: Developing a Hybrid Approach for REDD*. Amsterdam: Greenpeace International.
- Thompson, M. & K. Homewood. 2002. Entrepreneurs, Elites and Exclusion in Maasailand: Trends in Wildlife Conservation and Pastoralist Development. *Human Ecology* 30 (2): 107–138.
- TNC (The Nature Conservancy). 2009. *Noel Kempff Mercado Climate Action Project: A Case Study in Reducing Emissions from Deforestation and Degradation*. Washington: TNC.
- Torres, A.B., R. Marchant, J.C. Lovett, J.C.R. Smart & R. Tipper. 2010. Analysis of the Carbon Sequestration Costs of Afforestation and Reforestation Agroforestry Practices and the Use of Cost Curves to Evaluate their Potential for Implementation of Climate Change Mitigation. *Ecological Economics* 69 (3): 469-477.
- UNFCCC. 2005. *Reducing Emissions from Deforestation in Developing Countries: Approaches to Stimulate Action*. UNFCCC: FCCC/CP/2005/MISC.1.
- UNFCCC. 2006. Background Paper for the Workshop on Reducing Emissions from Deforestation in Developing Countries, Part I: Scientific, Socio-economic, Technical and Methodological Issues Related to Deforestation in Developing Countries. Working Paper no. 1(a).
- UNFCCC. 2010. Outcome of the work of the Ad Hoc Working Group on long-term Cooperative Action under the Convention. [unfccc.int/files/meetings/cop\\_16/application/pdf/cop16\\_lca.pdf](http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf)
- van Dijk, K. & H. Savenije. 2009. Towards National Financing Strategies for Sustainable Forest Management in Latin America: Overview of the Present Situation and the Experience in Selected Countries. Forestry Policy and Institutions Working Paper 21. Rome: FAO.
- Van Noordwijk, M. & P.A. Minang. 2002. If we cannot Define, we cannot Save it. ASB Policy Brief No. 15. Nairobi, Kenya.
- Verchot, L. & E. Petkova. 2009. *The State of REDD Negotiations: Consensus Points, Options for Moving Forward and Research Needs to Support the Process*. Bogor: CIFOR.
- Viana, V. 2009. Financing REDD: Meshing Markets with Government Funding. IIED Briefing.

- 
- Wallace, K.J. 2007. Classification of Ecosystem Services: Problems and Solutions. *Biological Conservation* 139 (3-4): 235-246.
- Wertz-Kanounnikoff, S., M. Kongphan-apirak. 2009. Emerging REDD+: a Preliminary Survey of Demonstration and Readiness Activities. CIFOR Working Paper No. 46. Bogor: CIFOR.
- Westholm, L., S. Henders, M. Ostwald & E. Mattsson. 2009. Assessment of Existing Global Financial Initiatives and Monitoring Aspects of Carbon Sinks in Forest Ecosystems: the issue of REDD. Focali Report.
- Wilson, E. O. 1992. *The Diversity of Life*. Cambridge: Belknap Press of Harvard University.
- Wunder, S. 2006. The Efficiency of Payments for Environmental Services in Tropical Conservation. *Conservation Biology* 21 (1): 48-58.
- Wunder, S., S. Engel & S. Pagiola. 2008. Taking Stock: A Comparative Analysis of Payments for Environmental Services Programs in Developed and Developing Countries. *Ecological Economics* 65 (4): 834-852.