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The International Forestry Review

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  Book
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  HOLMGREN, J., JOYCE, S., NILSSON, M. and OLSSON. H. 2000. Estimating stem volume and basal area in forest compartments by combining satellite image data with field data. Scandinavian Journal of Forest Research 15: 103–111. Is correct.

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FOREWORD

This special issue "REDD and the Evolution of an International Forest Regime" is based on the presentations and discussions developed at the international workshop entitled "International Regime, Avoided Deforestation and the Evolution of Public and Private Forest Policies in the South" held in Paris in November 2007. This event took place within the framework of a 3-year research project (ACI *Sociétés et Cultures dans le développement durable*) on the international forest regime and tropical forest policies, funded by the French Ministry of Research and headed by CIRAD.[*] The workshop was organised by CIRAD jointly with IDDRI[**], CIFOR[***] and GIP-ECOFOR[****], all of whom have provided financial support for this publication along with the Commonwealth Foundation.

The first paper summarises, and is a continuation of, the main debates which took place during the workshop. It is complemented by the contribution of M.-C. Smouts, which is a transcription of her oral presentation given at the meeting on international regimes. The remaining papers are based on presentations made during the workshop, with some additional contributions from authors who were unable to attend the event.

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CIRAD

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[**] Institut du Développement Durable et des Relations Internationales (www.iddri.org)
[***] Center for International Forestry Research (www.cifor.cgiar.org)
[****] Groupement d'Intérêt Public - Ecosystèmes forestiers (www.gip-ecofor.org)

SUMMARY

Summary of the Proceedings of the International Workshop "The International Regime, Avoided Deforestation and the Evolution of Public and Private Policies Towards Forests in Developing Countries" held in Paris, 21-23rd November 2007

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On hundred and forty participants from all over the world gathered for this workshop a few days prior to the 13th Conference of Parties (CoP 13) of the United Nations Framework Convention on Climate Change held in Bali in December 2007.

Several observations led to the organisation of this workshop. Forest policies implemented in heavily forested tropical countries appear to be converging in terms of objectives and types of natural resource management. Such convergence might result from the adoption of a certain number of instruments, including (i) forest concessions in order to organise production within objectives established by sustainable resource management; (ii) transnational normative tools such as forest certification which is gradually imposing itself through markets; and (iii) the prospect of an avoided deforestation mechanism established through negotiations that were opened at the UN Conference on climate change. Along with a number of institutions (such as United Nations Forum on Forest and International Tropical Timber Organisation) and international agreements (e.g., International Tropical Timber Agreement and the 2007 Non-Legally Binding Instrument on All Types of Forest) which act as vectors for different forest management principles (conservation, participation, sustainable logging, etc.), all these elements could be analysed as part of the emergence or consolidation of an international forests regime. For purposes of the workshop, international forest regime concept has been proposed by M.-C. Smouts, based on definitions proposed by Le Prestre (2002): "A regime is generally understood as a set of interrelated norms, rules and procedures that structure the behavior and relations of international actors so as to reduce the uncertainties that they face and facilitate the pursuit of a common interest in a given issue area"[1]. Regimes are international social institutions in that they constitute "persistent and connected sets of rules and practices that prescribe behavioral roles, constrain activity and shape expectations" (*idem*).

The workshop attempted to assess this regime's effectiveness in a context wherein the role of forests within broader global environmental changes is increasingly emphasised.

The main issues tackled by the workshop's participants were as follows:

- What elements could allow us to identify the emergence of an international forests regime?
- Are the public policies of heavily forested developing countries (such as Brazil, Bolivia, Central African countries, Indonesia and Malaysia) converging? If so, what is the role and impact of the supposed international regime and especially private tools (*e.g.*, certification and voluntary agreements) in the construction and evolution of forest- and environment-related policies, and how might this role be interpreted?
- What divergence can be observed between policies in different countries and what are the reasons for these differences? How do collective representations and other national variables influence these choices?
- Will the increasing role of forests in the international environmental debate – especially payments to countries as a function of reducing deforestation (a.k.a. avoided deforestation) – contribute to consolidating an international regime? What is the

[1] Le Prestre P. G. (2002) "Studying the effectiveness of the CBD", in: Le Prestre (ed.), Governing Global Biodiversity, Aldershot, Ashgate Publishing Company, p. 88

governments' real capacity to reduce deforestation rates, particularly in political and social terms? How can one evaluate the costs of reducing deforestation through "payments for environmental services"?

Through both presentations and debates, participants' responses converged on several issues, notably the following:

- The notion of "regime" is vague at best; whilst certain elements of a regime can be identified beyond doubt, they remain dispersed and heterogeneous, hence the overlapping of different regimes such as for biodiversity, logging and timber production, forests and climate change, and indigenous peoples. However, there is no hierarchy between these regimes and their respective actors tend to be relatively uninformed or disconnected with issues discussed in other regimes. Yet activities of these same actors take place in different regimes, sometimes resulting in contradictory interests. The notion of "regime" does not allow us to take account of the complexity of the interdependence between these different debates. However, despite its weaknesses, the concept of regime remains the only one that recognises the existence of networks of actors and exchanges that take place at the international level on issues related to tropical deforestation and whose complexity is only increasing with time.
- In order to assess the effectiveness of a regime, one must share a certain number of evaluation criteria. Yet major disagreements remain as to the hierarchy of such criteria, as witnessed by debates on industrial logging, forest management, local people's rights and reducing poverty. It thus appears that the international regime – whose process of evolution certain elements point towards – is not particularly effective in solving a certain number of major issues such as deforestation.

1. Towards a Regime Based on the Convergence of Public Policies?

- The national policies of many heavily forested countries display elements of convergence through the adoption of instruments such as forest concessions, management plans, instruments to verify legality, decentralisation, community forestry as well as private international tools such as forest certification.
- However, this convergence is limited to certain components only. For example, despite a general adoption of the rhetoric of people's participation in forestry, implementation has been uneven across countries. This is mainly because public policies continue to be characterised by national collective choices and local political routines – which are also subject to variation, notably as a function of national political contexts.
- In Southeast Asia, choices concerning forests are shaped by industrial demand which today is turned towards the growth of the pulp sector and of cash crops. In Indonesia, attempts to decentralise forest management have only increased confusion. As a result, viable alternative management options have failed to establish themselves amidst the ruins of the old industrial logging system which had turned Indonesia into the world's plywood champion prior to the industry's current situation of near-collapse.
- In Brazil, until recently forests did not constitute a sector which would have led to genuine "forest policies" per se. Instead, they were characterised by a double issue dominated by access to land and promotion of national interests. The latter was recently reinforced with the renewal of a nationalistic discourse denouncing alleged attempts to internationalise the Amazon through a rhetoric based on World Public Goods – which many would want tropical rainforests to be part of. The forthcoming establishment of logging concessions in public forests in the Amazon could signal the emergence of a new representation of forests as a resource to be managed for timber, and a redefinition of forest sector policy consistent with this view.
- It is in Africa – notably in the Congo Basin and certain West African countries – that collective choices have remained the most stable from a historical viewpoint. Since colonial times, forestry remains a sectorial issue dominated by the role of logging and its corollaries such as sustainable logging, taxation (how to capture economic rent) and the timber industry. In the past few years, however, some actors have increasingly questioned this sectorial system by tackling the issue from a community forestry perspective and more recently still by emphasising the indigenous dimension, notably in the Democratic Republic of Congo. The largely successful complaint lodged by "Pygmy" groups against the World Bank and taken up by its Inspection Panel has been powerfully relayed by large international NGOs. The issue of "indigenous peoples" which had largely been ignored in Central Africa is gradually replacing conservation as the principal vector of contestation of the industrial logging system.
- However, these representations are still far from being engraved in stone. Changes in political regimes or the entry of well resourced, influential, new economic actors can reshape the discourse around forests and in the process modify the trajectory of national policies. For example, the increasing importance of agro-industrial Asian companies in Central Africa could eventually displace highly selective timber logging as the pre-eminent practice which has characterised the sub-region for decades, and set in motion profound changes in the structure and nature of forest sector policies in individual countries. In the face of such powerful factors of change, achieving policy convergence can be difficult or superficial at best.

2. Towards a private regime based on voluntary market agreements such as certification?

- Non-governmental organisations are playing an increasing role in the international debate on forests and are greatly contributing to shaping an emerging regime. Their influence is visible both through (i) their lobbying activities and the pressure they place on large cooperation and development organisations such as the World Bank, and (ii) the elaboration and implementation of voluntary instruments such as certification. Their direct influence on developing countries may sometimes be limited, *e.g.*, in Africa, but they can also have a more important impact by galvanising international opinion or through their implication in participative instruments of policy elaboration such as in Brazil.
- In Africa and Brazil, the NGO "front" is anything but homogenous. At the risk of oversimplifying, certain movements favour community forestry and indigenous peoples' rights, whilst others work together with the private sector to improve logging practices; others still battle for a stricter preservation of forests which is fairly incompatible with the development of a very active timber sector based on small-scale logging subject to little regulation – which in practice is embodied in the concept of community forestry.
- The role of NGOs has been particularly emphasised in the implementation of forest certification. The role of certification has notably been emphasised as having undoubtedly established a global reference for sustainable management, despite relatively modest results in terms of total surface area certified in tropical forests.
- After a period of reluctance, the private sector now seems amenable to adhere massively to certification schemes initially spearheaded by NGOs. In the Congo Basin, the private sector first committed itself rather timidly to a unilateral strategy of corporate responsibility through the creation of a code of conduct. However, external procedures to evaluate company practices quickly proved necessary to give credit to the efforts of the private sector. Several instruments have been set up or are being reviewed, notably Forcoms, Pan African Forest Certification scheme (PAFC - based on norms set up by ITTO and the African Timber Organisation) and FSC (Forest Stewardship Council). Nowadays, the sector has established an ambitious target of reaching 10 million hectares of certified forests (out of a total of 53 million ha) under PAFC and especially FSC schemes by 2012.
- Paradoxically, at the very moment when forest certification is starting to be implemented in tropical regions, it is being heavily criticised by NGOs (among others) which had initially supported the scheme. In Central Africa and Indonesia, the norms that enable certification to be obtained are established by private certification organisations without any significant local participation, which poses questions in terms of local appropriation and even of the very credibility of certification. Meanwhile, it appears as if certain NGOs fear that certification – which many of them support in principle – might actually legitimate an industrial logging model which they are more than reluctant to accept.
- The growing role of non-state entities (notably NGOs and the private sector) in elaborating and implementing forest policies is not necessarily a sign of the emergence of private forest systems at the expense of public regulation. The distinction between a voluntary market-based instrument and public policy instruments appears increasingly blurred as some countries such as Cameroon are discussing on whether to adopt forest certification to guarantee the legality of exported timber, and others are thinking of using FSC to help legislation evolve. A future step might involve tax cuts for certified permits or concessions, as is already the case in one country of Central Europe.
- Forest certification as an instrument has played a structuring role whose impact goes well beyond merely calculating the extent of certified surface areas. It has induced changes in the way forests are represented and has influenced public policies. Certification remains a fragile construction whose limits have often been emphasised – which gives it a complementary role within a range of public policy measures. However, it enables to improve the economic value of standing timber stocks and contributes to fighting against increasing pressures from markets that are less sensitive to sustainable resource management issues. Moreover, it helps limit growing conversion of forests into pastures or cash crops such as soy and oil palm.

3. Towards a Regime Based on Remunerating Environmental Services within the REDD mechanism (Reducing Emissions from Deforestation and Forest Degradation)?

- The fight against climate change has pushed the tropical forest issue up high on the agenda of international environmental negotiations. The international forests regime might even be formalised one day as part of the climate regime, just like the debate on climate change was formed around international agreements (notably Kyoto and agreements on the climate convention) and market-based instruments (such as the international Emissions Trading Scheme and the Clean Development Mechanism). The reference in the final declaration of the Bali conference to an international mechanism known as REDD aimed at rewarding "avoided deforestation and degradation" only makes this even more plausible.
- The ability of this mechanism to reduce deforestation remains subject to debate, especially given the complexity of factors underlying deforestation

rates. Many economic policies and extra-sectorial factors (*e.g.*, interest rates, currency exchange rates, agricultural policies, relative prices, world demand in biofuel and animal products) have uncertain and context-dependent consequences on the evolution of forest cover. The issue of political economy and thus the way in which states might react to contradictory incentives and pressures has been put forward. These include mid-term financial incentives to reduce deforestation, but also the short-term political and social costs involved in fighting practices that lead to deforestation. Many "methodological questions" still need solving, such as the choice and construction of a reference scenario (a reference based on passed deforestation or the construction of a scenario predicting future deforestation), and the way in which to tackle the "degradation" issue. These are likely to rely less on technical solutions than political choices and arbitrations inasmuch as adopted rules will create winners and losers in what appears to be a new type of rent which no heavily forested country wants to be excluded from.

- The risk of a backlash effect on the emissions trading scheme has been mentioned with the possibility of a massive influx of REDD carbon credits on the existing carbon market which is already concerned with maintaining the "price signal" of the avoided CO_2 tonne at a sufficiently high level. The solution put forward by several participants is that firm quantitative targets in reducing emissions in industrialised countries will enable a greater absorption of new credits. However, others have expressed doubts whether this will happen and even if it did, whether it would solve the problem. Moreover, a large proportion of these credits from the REDD mechanism might well not be additional (*i.e.*, they might simply originate from inappropriate or manipulated reference scenarios). In this case, they would only be "hot air" whose effect on the carbon market would be comparable to injecting a great deal of fake currency in a monetary circuit. For this reason, proposals have been made to isolate the REDD mechanism from the Kyoto-based carbon market by relying on funds rather than carbon credits.
- The architecture of REDD and certain of its potential consequences have led to criticisms from NGOs which focus on promoting the rights of local and indigenous peoples. Many of them fear that the state will only increase its control on forests at the expense of community forestry, notably by implementing stronger conservation principles that could exclude local populations from fortress forests perceived as money-making carbon reservoirs. Calculating the opportunity cost of renouncing deforestation – such as the amount of compensation to be paid to a farmer who stops clearing forests to extend his fields – is key to estimating the cost of reducing deforestation. Yet the reliability of such a calculation has given rise to many a debate on the relevance and use of such exercises. The real cost of reducing deforestation on the long term is obviously much greater than the annual value of the production to which an economic agent must renounce. Implementing such a programme capable of integrating a large number of agents and providing them with production alternatives whilst ensuring that they honour their contracts surely has additional costs which economists refer to as transaction costs. The ethical considerations of such a programme also need to be borne in mind, since it could stick poorest farmers into their current poverty level and increase their vulnerability to food market hazards.
- However, the REDD mechanism could play a key role in the international regime to fight climate change. It would be the first step towards integrating developing countries into the process of adopting quantified objectives for the reduction of future emissions, which in turn would confirm the path engaged on with the Kyoto Protocol which had been questioned by the US administration. Moreover, it could also contribute to strengthening and formalising the international forests regime which continues to be characterised by the absence of an official agreement.
- The architecture and rules of the REDD mechanism remain open and will be subject to discussions among scientists as well as technical and political negotiations which could result in very different outcomes. The unconditional remuneration of governments through "Kyoto-style" carbon credits based on a reference level of deforestation (whether passed or anticipated) is not the only option on the table. The idea of a world fund to fight deforestation has also been mentioned. Such a fund would enable to finance policies and measures which all would agree on to say that they are necessary and potentially effective in reducing deforestation. These might include modifying agricultural policies to improve their ecological components; reforming the functioning of control bodies (to fight corruption); and reforming land tenure systems in forested areas. A fund would also have the advantage of being able to pay local actors rather than just governments through large-scale programmes of payments for environmental services aimed at farmers, companies and local communities.
- However, the question of a sustainable and sufficiently large financial source to maintain this fund going is a recurring problem with this kind of policy instrument. Shortly before the Bali Conference, Norway announced it would allocate approximately US$ 500 million a year to fighting deforestation. Yet it remains uncertain whether many other countries might have the will and the means to follow Norway in its footsteps – any more than they have the will to raise the amount of funds earmarked for official development assistance – a small proportion of which already goes to fighting tropical deforestation. Only the prospect on an international tax for this fund could

solve the problem. The proposal made at Bali by the French Minister of Ecology, to tax international financial transactions to create resources to fight climate change goes in this direction. However, like other proposals, it has yet to be implemented.

- Finally, it is also necessary to change models of individual and collective consumption: forests are converted to respond to increasing demands for beef consumption which in turn fuel soy production that merely serves as cattle fodder; demand for palm oil and sugarcane is stimulated by demand for biofuels; and increasing paper consumption leads to clearing degraded forests in Indonesia so as to plant fast-growing species. Certification labels and economic instruments alone cannot save the world's tropical rainforests.

PAPERS

The issue of an International Forest Regime

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Regime theory is a theory of international cooperation. It is a theory that describes how national strategies based on the optimization of individual interests are converted into international strategies based on the optimization of collective interests. It analyzes this transformation *via* the concept of regime.

A SHORT HISTORICAL BACKGROUND

Regime theory took shape in the early 1980s in a highly specific political and intellectual context. The political context was that of the Reagan years and the rising wave of neoliberalism that was, already, reflected by a profound crisis in multilateralism as well as in international organizations. A need therefore arose to consider new modes of international cooperation that differed from those that were codified by international law or emanating from intergovernmental organizations. The notion of regime takes into account the fact that there are international social norms that are not set out as legal obligations but that nevertheless weigh on the behavior of states. The intellectual context was characterized by the liberal neo-institutionalist trend in vogue at the time in the United States. This current took root in economic theory with names such as Ronald Coase, Oliver Williamson, etc. I cannot go into detail about its main arguments, I will simply recall that it stemmed from a reflection on the market's role in international regulation, given the different types of market imperfections, and considers that due to the asymmetrical distribution of information among economic agents, perfect competition and true prices can never be said to exist, and so organizations are necessary. In fact, since no individual agent alone can put into play all the procedures required to obtain all the information necessary to make economic decisions, institutions are needed to reduce the cost of transactions due to market imperfections. Once created, these institutions have structural effects. They modify the way in which actors define their interests and they modify the very functioning of the market.

This so-called new institutionalist approach was introduced into American political science by the great political sociologists March and Olson. It was very much in fashion in the United States in the early 1980s. Regime theory was simply the transposition to international relations of the vocabulary, approach and arguments of the neo-institutionalist current in economics.

WHAT IS A REGIME?

I will privilege the definition given by Philippe Le Prestre, who in his major work on the evolution and implementation of the Convention on Biological Diversity, provides a useful synopsis of the various definitions given for the past 20 years.

"A regime is generally understood as a set of interrelated norms, rules and procedures that structure the behavior and relations of international actors so as to reduce the uncertainties that they face and facilitate the pursuit of a common interest in a given issue area" (Le Prestre 2002). Regimes are international social institutions in that they constitute "persistent and connected sets of rules and practices that prescribe behavioral roles, constrain activity and shape expectations" (Keohane *et al.* 1993).

The advantage of the notion of regime and what explains its success is its malleability. All sorts of practices, all sorts of "nonbinding but authoritative" arrangements, as they call them, can constitute a regime; everything that has to do with custom or soft law enters into a regime.

Advocates of the regime approach tend to see regimes everywhere. Since practically all areas of international life are the object of international discussions and declarations, it is always possible to find a set of broadly recognized principles that emerge from these encounters.

There are all kinds of international regimes in all kinds of areas. Some are regulatory in nature, that is the simplest case: rules of action are clearly spelled out and the conditions of their application are provided for: the Antarctica regime, the regime protecting the ozone layer, the regime for trade in endangered species, etc. Others instead emphasize procedures to follow to reach collective choices; still others are mainly programmatic in nature, aiming to generate common projects. Regimes vary enormously in terms both of actors and binding obligations. Each regime applies to a specific issue area and has its own dynamics. Each regime corresponds to a particular configuration of interests, knowledge and power.

For this reason the study of regimes has engendered a plethora of literature discussing whether the definition of regimes was precise enough, how regimes come about how to recognize them when they do, etc. For 20 years, regime research was a sort of cottage industry in the discipline of international relations. The fad has somewhat died out, and the question now is to know what impact regimes have on the actors' behavior and how they help solve the urgent problems facing us, such as the vanishing of tropical forests, the topic of our discussion today.

I will touch on three types of questions: 1) how do regimes come about and how to recognize them when they exist? 2) what are the criteria of a regime's effectiveness? 3) and lastly, the question of the boundary of regimes and interactions between regimes.

HOW DO REGIMES COME ABOUT?

Regarding the origin of regimes, there are three major theoretical approaches, which I will outline roughly at the risk of caricaturing them. There is the realist approach, which is the state-centered approach. This approach views the most powerful actors as being the ones to impose their interests and determine the rules of the game. It views the game of international relations as inherently conflictual, making it pointless to seek to pursue common interests. The definition of rules, norms, and procedures is tied to the distribution of power on the international scene. The machine is based on the engagement of a dominant player, a hegemon, a state or a group of states that ensures what has been called "hegemonic stability" even if this means assuming a certain cost for that.

In this approach, the function of the regime is not to maximize the common good but to share out the costs and benefits associated with cooperation.

The second approach is based on rational choice. In this approach, international relations are not a zero-sum game or a problem of distributing power and the costs and benefits of cooperation. The international game can be a positive-sum game if the actors are aware that a problem exists, if they have a clear vision of their identity and their interest, and if they have the skill required to implement solutions. In this case, the actors cooperate to take action to solve the problem. The common good and individual interests are bound to intersect. Cooperation in a given area can result in mutually advantageous arrangements. In this approach, the regime's function is to help actors maximize their interests on a rational basis and thus achieve the common good.

The third approach, the one I prefer, is a constructivist approach. This approach emphasizes the social construction of reality as opposed to the ideology of power and the ideology of rational choice. This approach gives considerable importance to non-state actors. It stresses perceptions, knowledge and communication; the role of science and epistemic communities; the logics of a two-level game, i.e. the need for states to maintain an equilibrium between domestic imperatives and the requirements of the international sphere.

In this approach, the function of the regime is to encourage actors to express their own conceptions of their own interests, prompt states to alter their perceptions through a learning and socialization process and in the long run give rise to a discourse that reflects a common perception of the issue area.

HOW DO WE KNOW THAT A REGIME EXISTS?

From everything that has just been said, it appears obvious that the notion of regime is a very hazy notion under which very different things are placed. The result is that in assessing the effectiveness of a regime, there are very different sets of criteria, each reflecting a particular conception of the regime.

The regime approach is supposed to be a theory of cooperation between states. But one of the major weaknesses of this theory is that it is tautological. If you look at Krasner's definition, the best known, there is a regime when actors' behavior and expectations are influenced by it: International regimes are "sets of implicit or explicit principles, norms, rules and decision-making procedures around which actor's expectations converge in a given area of international relations" (Krasner 1983).

That means that regimes are defined as a set of norms that guide the behavior of actors and that this behavior is explained by the existence of a regime. This reasoning is completely circular, and it assumes that all the problems are resolved: if regimes are, by definition, that towards which expectations converge, they cannot explain how the reciprocal engagement is constructed in a cooperative social game that will foster this convergence.

Furthermore, by definition, regimes are necessarily successful. As long as there is a regime, it's a good thing, as if the regime was an end in itself. No one looks into the nature of the cooperative order that has been institutionalized. This approach to international relations tends to be very conservative.

To escape this circular reasoning, we have to distinguish the question of a regime's existence from the question of its implementation and compliance. But there again I totally agree with Philippe Le Prestre in his analysis of the CBD (Convention on Biological Diversity), when he believes that it's the structure of the regime that should be taken into account, its content, in other words the content of the arrangements constructed between actors, the type of behavior that they recognize as acceptable, and what according to the regime constitutes a cooperative attitude and what constitutes an attitude of defection.

A regime is defined by norms of behavior: it exists when actors can no longer make their decisions in a totally independent manner. That doesn't mean that actors' behavior will be in compliance with what is contained in the regime, but that there is a sort of overarching law with respect to which they are bound to define themselves, and that they may have a certain price to pay if they openly stray from it. In short, they are no longer totally free to do whatever they

like; transgression can be costly.

A regime can be proven to exist when it can be shown that participants refer to principles, rules, procedures, and that when they don't obey them and the principles are violated, the others react. This sets off a whole cycle of protestation, apologies and justifications.

The existence of a regime does not boil down to restrictions imposed on the autonomy of the participating actors. A regime also implies procedures and modes of interaction that rely on the socialization of actors rather than on conflict, constraint, the use of force and sanctions.

To sum up, there can be regimes that are totally ineffective. I tend to believe that this is the case for the international forest regime.

WHAT ARE THE CRITERIA OF EFFECTIVENESS*?*

Criterion number 1, the most obvious, is the resolution of the problem at hand. A regime is effective when it contributes significantly to solving the problem that brought it about: for instance, protection of the ozone layer. It's too simple, and especially, too rare.

Another criterion of effectiveness is implementation. For a regime to be effective, it has to be implemented: implementation can be measured by the way in which the provisions of the regime are translated into legislative or public policy measures. With these implementation criteria, we come back to criterion number 1: the solution to the problem is directly linked to the respect of the contracted obligations.

There is another criterion, that of compliance: a regime's effectiveness is measured by the degree to which actors adhere to the provisions of the regime and follow its procedures. A regime is effective if it leads to the internalization of behavior norms in a given area and the strengthening of desire for cooperation in this area.

It must be admitted that such cases are rare. The great weakness of the regime theory is to be based on the postulate that there are lasting behavior norms known to the actors and considered by them as legitimate for forming a framework within which they will seek to attain their objectives. This postulate is disproved every day. I don't mean that the mechanisms of international exchange are completely unpredictable, but in the international game like in other social games, the rules are never set in stone, they are constantly being developed and altered as actions are carried out.

So we lower our standards for a regime's effectiveness criterion and we say: a regime is effective if it helps to improve the situation a little. The current situation may not be perfect, but it's better than if there were no regime.

What's more, the secondary impacts of regimes should also be taken into account: the increase in knowledge, the initiation of learning processes, the strengthening of civil society, the increased awareness of actors, etc.

In short, a regime is considered effective if its existence brings about changes in behavior, if it helps institute policies that would not have come about if there had been no regime.

How can a regime be made more effective?

That raises the question of implementation mechanisms. Regimes generally do not provide for sanctions. There can be financial incentives, via compensation funds, but it's rare. It is the very existence of a regime that is supposed to encourage actors to comply with the rules.

On the other hand, regimes often provide for compliance monitoring mechanisms, in other words state support for the provisions of the regime, its spirit and its procedures. These are essentially mechanisms by which the participants in a regime gather, exchange and verify information pertaining to their action and their performance in the given issue area. This frequently involves the obligation to make country reports on the measures taken to respect the arrangements that were made; sometimes, monitoring mechanisms by NGOs are expressly provided.

The question of assessing the impact of regimes raises considerable difficulties. There is a vast body of literature discussing what variables to take into account, what assessment criteria to apply, what methods to use. But it is usually more of an academic debate, more a task that researchers set for themselves than a serious guideline for action.

It is very hard to know whether the relations between actors would have been different if regimes had not been set up; it is very hard to determine what is due to the regime and what is attributable to changes in domestic or international context.

The last problem and perhaps the most significant one for the subject at hand:

THE QUESTION OF A REGIME'S BOUNDARIES AND INTERACTIONS BETWEEN REGIMES

To me this is the most important question and the one that best reveals the weaknesses of regime theory. I have already indicated several drawbacks, but I believe this one is the most damning.

The regime approach to international cooperation implies a totally decentralized and incremental management of issue areas. An international regime applies to a certain type of issue area and then we look at how the actors make their arrangements in a particular area without worrying what is going on in other issue areas. For each regime, there is a specific number and type of actors, a particular dynamics, a specific timing and more or less binding arrangements.

The proliferation of regimes raises the question of the harmonization of aims and obligations. When we think regime, we think of specific regimes and we study them in isolation. But it's their interaction that needs to be studied.

There is a dual integration problem: vertical and horizontal. Vertical, because the question of harmonizing local needs and international needs must be posed; horizontal, because actors' activities are part of multiple regimes of which the relative impacts are difficult to untangle. The norms and functions associated with the various regimes are not integrated; they can even be contradictory. Furthermore,

objectives included in each regime are not always precise. There are not always clear indicators of what one is seeking to achieve; objectives change over time; and mainly, most of the time, a regime's objectives do not address the fundamental causes of the problem at hand.

The notion of regime does not help to take into account the complexity of the world. It ends up breaking down international life into little individual segments, whereas in a globalized world all these regimes form a system. In my opinion, it is these complex systems of interdependence that should be studied.

In conclusion, with regard to forests, there's a proliferation of particular regimes that pertain more or less specifically to forests. David Humphreys describes them in detail in his most recent book: a regime for the CBD, for protected areas, indigenous and tribal people, sustainable and management, trade liberalization of forest products, etc. (Humphreys 2006). There is an accumulation of a huge number of scattered and competing aims and principles. At the same time, no regime tackles the fundamental cause of forest destruction: the ever-growing consumer thirst for wood, meat and fuel that exerts more and more pressure on the resource to convert land.

We have everything we need in terms of rules, norms and procedures to have an international forest regime, but as David Humphreys stands: "In the absence of a forest convention, the consensus on forest-related issues is fragmentary and incomplete" (Humphreys 2006). Humphreys describes the situation perfectly when he writes "the international forests regime is disconnected and multicentric; it has developed at different speeds and in different directions rather than strategically and holistically along a common front."

One couldn't imagine a better conclusion to this short presentation on regimes or a better introduction to the issue of tropical deforestation.

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The politics of 'Avoided Deforestation': historical context and contemporary issues

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SUMMARY

This paper outlines the ideas and political debates that contributed to the December 2007 decision of parties to the Framework Convention on Climate Change to explore ways of reducing emissions from deforestation in developing countries, what is referred to here as 'avoided deforestation' (AD). Although the decision reflected international concern at anthropogenic climate change and deforestation (especially in the tropics), the concept of AD, and contemporary debates on this subject, need to be understood in a broader historical context. International political disagreements on the distribution of the world's natural, financial and technological resources and on global social inequalities are now enmeshed with international forest and climate politics. The paper discusses two variants of an international AD; carbon trading and ODA. It then explores some of the political controversies that are likely to arise when agreeing the fine details of an international mechanism for AD.

Keywords: baselines, carbon trading, equity, inequality, opportunity cost

Les politiques de « déforestation évitée «: contexte historique et questions actuelles

D. HUMPHREYS

Cet article souligne les idées et les débats politiques ayant contribué à la décision de Décembre 2007 par les acteurs de la convention encadrant le changement climatique d'explorer des avenues pour réduire les émissions liées à la déforestation dans les pays en voie de développement, ce à quoi on réfère ici sous le nom de « déforestation évitée» (AD). Bien que la décision reflétait le souci international du changement climatique et de la déforestation anthropogène, et ce particulièrement dans les tropiques; le concept de AD, et les débats actuels à ce sujet, doivent etre compris dans un contexte historique plus large. Les désaccords de la politique internationale quant à la distribution des ressources naturelles, financières et technologiques du monde, et aux inégalités sociales globales, sont maintenant mélés aux politiques internationales sur les forêts et le climat. L'article examine deux variations d'une AD internationale: le marché du carbone et l'ODA. Il explore ensuite certaines des controverses politiques à même de surgir lors des processus d'accord sur les détails précis d'un mécanisme international de AD.

La política de la 'Deforestación Evitada': contexto historico y temas contemporáneos

D. HUMPHREYS

Este artículo explica las ideas y los debates politicos que contribuyeron a la decision, en diciembre del 2007, por parte de los participantes del Convenio de Naciones Unidas contra el Cambio Climático (UNFCCC) de explorar formas de reducir las emisiones causadas por la deforestación en países en vías de desarrollo, lo que se llama aquí la 'deforestación evitada'. Aunque la decisión demostró la preocupación internacional por el cambio climático y la deforestación antropogénicos, sobre todo en el trópico, el concepto de la deforestación evitada y los debates actuales sobre el tema deben entenderse dentro de un contexto histórico más amplio. El desacuerdo politico internacional sobre la distribución de los recursos naturales, financieros y tecnológicos y sobre las desigualdades sociales a nivel mundial están ahora enredados en la política forestal y climática internacional. El estudio examina dos variantes de deforestación evitada, el comercio del carbono y la ayuda al desarrollo internacional, y luego analiza algunas de las polémicas políticas que probablemente surgirán a la hora de acordar los detalles exactos de un mecanismo internacional para la deforestación evitada.

INTRODUCTION

Although the thirteenth conference of parties to the United Nations Framework Convention on Climate Change (FCCC) in Bali (3-15 December 2007) made no progress on the politically contentious question of legally-binding targets for greenhouse gas emission reductions in a post-Kyoto Protocol it did witness progress in other areas. Delegates agreed the Bali Action Plan (United Nations 2007a) and a decision on 'Reducing emissions from deforestation in

developing countries: approaches to stimulate action' which invited parties to reduce carbon emissions from forest degradation 'on a voluntary basis' in order to enhance forest carbon stocks in developing countries (United Nations 2007b). This decision was the result of a two year dialogue following the eleventh conference of parties to the FCCC in Montreal in December 2005 when the governments of Papua New Guinea and Costa Rica submitted a proposal for reducing greenhouse gas emissions caused by deforestation. The proposal noted that realising the objective contained in Article 2 of the FCCC, namely 'stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system' (United Nations 1992a), will be 'more difficult and costly unless both industrialized and developing countries actively contribute to emissions reductions from all major sources' (United Nations 2005).

The underlying premise of the decision is that incentives should be put in place to encourage developing countries to reduce their rate of deforestation; countries that succeed in this should be financially compensated. This idea has become known as 'avoided deforestation'. Avoided deforestation (AD) may be defined as the incentivizing of forest conservation through valuing the carbon that is stored in forests in order to prevent deforestation that would otherwise occur. AD is also known as 'reducing emissions from deforestation' (RED) and has been further broadened to include forest degradation: 'reducing emissions from deforestation and degradation' (REDD). The expression 'avoided deforestation' is used throughout this paper. Two main approaches to AD have emerged.

The first, a market-based approach, was proposed by Papua New Guinea and Costa Rica at the Montreal meeting of 2005 (United Nations 2005). By avoiding deforestation developing countries would create credits that could be sold to developed (Annex I) countries in a global carbon trading scheme. A market-based AD scheme would thus bring together the suppliers of the carbon sink functions of forests (in this case developing countries with carbon credits to sell) with those who demand the service (Annex I countries who have exceeded their emissions allowance and thus need to buy carbon credits). One variant of a market-based scheme is for AD credits to be traded under a post-Kyoto protocol, which would integrate AD credits into the existing tradable emission permits system. Alternatively a separate protocol on AD could be negotiated. For developing countries the advantage of a market-based approach is that it will draw in all Annex I countries. However the earnings that developing countries would receive would not be predictable, and would depend on fluctuations in the international price of carbon.

While a market-based approach to AD is favoured by many countries, in particularly the 39 countries that have formed themselves into the Coalition of Rainforest Nations, a second approach has also emerged. Brazil, which opposes including AD in a carbon trading mechanism, favours international public funding-based approaches, both bilateral official development assistance (ODA) and a multilateral fund made up of voluntary donations from developed states. Deforestation targets would also be voluntary. Individual countries would negotiate with the fund's administrators for the money they would receive for holding down deforestation below an agreed level. As the world's largest tropical forest state Brazil is a powerful actor in international forest politics, and it has proved adept at using this power to leverage forest-related funding from international donors. Brazil's preference for an ODA approach to AD thus reflects its own self interests; Brazil would expect to be one of the prime beneficiaries of such an approach. While supporting a market-based scheme the Coalition of Rainforest Nations do not rule out ODA. Costa Rica has proposed establishing an Avoided Deforestation Carbon Fund (ADCF), while noting that a fund will work only if developed countries commit to regular, long term replenishment of the fund.

The possibility of bilateral ODA deals for avoided deforestation is garnering support. In 2007 the governments of two South American countries offered major AD deals. The government of Ecuador stated that it would desist from deforestation in order to exploit its Amazonian oil fields if it were to receive international assistance. President Rafael Correa commented 'Ecuador doesn't ask for charity but does ask that the international community share in the sacrifice and compensates us with at least half of what our country would receive, in recognition of the environmental benefits that would be generated by keeping this oil underground'. The sum mentioned was $350 million per annum (Environment News Service 2007). The same year the government of Guyana offered to protect its entire expanse of rainforest if the British government would undertake to provide the country with the resources needed to achieve sustainable development and lift its population out of poverty (Howden 2007).

Proponents of market-based approaches argue that relying on ODA would favour the established 'forest powers', such as Brazil and Indonesia, that have most forest cover and which can therefore drive the hardest bargains with donors. They also argue that experience shows that ODA will not generate sufficient long-term predictable funding to incentivize large scale AD on a worldwide scale. Amongst the donor governments to advocate the market-based approach is the United Kingdom which has argued that because tropical forest governments can raise finance from logging concessions to fund schools and hospitals, 'the challenge …is to change the economic incentives facing the government: to make it more rewarding to preserve forests than to cut them down. In the end, the only way we are going to do that is through a global carbon trading scheme. Such a scheme would deliver hundreds of millions of pounds to developing countries, to invest in cleaner development and protect the world's forests' (Department for International Development 2007). The World Bank has endorsed the idea of an expanded international carbon trading scheme that would include credits for AD.

THE IDEATIONAL ORIGINS OF AVOIDED DEFORESTATION

This section will trace the ideas that have contributed to the concept of 'avoided deforestation'. There are several ideational roots. First, and most obviously, AD originates from international concerns about anthropogenic climate change and deforestation. According to the Intergovernmental Panel on Climate Change deforestation, much of it in the tropics, contributes to approximately 18% of annual global carbon dioxide emissions (IPCC 2007).

Second, the idea of AD has a clear rationale in environmental economics; deforestation takes place because the public goods that forests provide are undervalued in markets. Valorizing forest public goods provides an economic incentive for their conservation. Because forestland is often worth more when it is cleared forest owners need incentives that value standing forests, thus discouraging deforestation to clear land for other uses, such as agriculture, palm oil plantations and urban settlements. As the government of Bolivia, a supporter of a market-based AD scheme has argued, 'the environmental services that forests ecosystems provide to the atmosphere by sequestering and fixing GHG [greenhouse gasses], must be recognised by the international community and valued' (United Nations 2006, p.10). AD, so the argument goes, would represent good economic value for all countries, as it would prevent the economic and ecological costs that carbon emissions from tropical forests would impose on present and future generations. According to proponents of environmental economics, forest owners should be paid for the environmental public goods (or the positive externalities) that forests provide. Environmental economics holds that when an environmental public good has economic value, and where buyers and sellers can be brought together in a market, then the resource can be conserved (for example, Pearce 2003). The economic case for AD was given support by the UK government's Stern Review on the economics of climate change which recommended that one strategy for tackling climate change was action on 'non-energy emissions, such as avoiding deforestation' (Stern 2006, p.xii). The review argued that curbing deforestation '*is a highly cost-effective way of reducing greenhouse gas emissions'* (Stern 2006, p.xxv, emphasis in original).

Third, the idea of AD reflects a neoliberal approach to environmental governance. The expression neoliberalism refers to the idea that the common public good can be realised not by the state setting targets and enforcing compliance through legislation (laws passed by a legislature) and regulation (rules or orders made by an executive), but instead through voluntary measures, market-based policies, a reduced role for the state and an enhanced role for the private sector (Harvey 2005, Saad-Filho and Johnston 2005). The neoliberal approach to environmental governance has become increasingly more common over the last twenty years. For example, the non-state, market-based emphasis of the Forest Stewardship Council reflects neoliberal precepts. Corporate social responsibility (CSR), including the principles agreed by some major global corporations in the UN Global Compact, has neoliberal origins with its emphasis on voluntary, private sector standard-setting. Market-based mechanisms feature prominently in the Kyoto flexibility mechanisms, in particular tradable emission permits. The Bali decision on AD also reflects neoliberal precepts; it emphasises voluntary rather than legally binding commitments, and it opens up political space for the private sector to participate in an AD scheme through market trading (United Nations 2007b, para. 1).

So although the concept of AD is a relatively new one in international forest and climate change politics – dating back only to the Papua New Guinea/Costa Rica proposal of 2005, and given intellectual support from the Stern review of 2006 – it both draws from, and is consistent with, more established ideas in contemporary political and economic discourse. Furthermore, in one major respect it has antecedents in far longer running international political debates that date back to the 1960s. In the remainder of this section it will be argued that the Bali decision on AD represents the latest iteration in a long series of negotiations on global economic inequalities, and in particular the demands of many developing country governments for a redistribution of economic resources in order to address global inequalities. These demands have become increasingly entwined in international forest politics since the early-1990s.

In the 1960s many economic theorists in the developing world argued that the global economy should be seen as a system of centres and peripheries. According to the dependency school, and in particular the work of Andre Gunder Frank, a global class relationship, a legacy of the colonial era, has evolved; the developed economies of the centre exert an exploitative relationship on the developing economies of the periphery. The concepts of centre and peripheries should not be seen as fixed; they are relative entities, with the position of a country in the structure of the global economy changing over time. Broadly speaking, however, the countries of the centre may be envisaged as the developed countries (the North), while the peripheral countries are the developing countries of Latin America, Africa and Asia (the South). According to this view, peripheral countries are dependent on the centre for capital investment and manufactured products, while the centre exercises an exploitative relationship over the periphery by structuring international economic relations in its own interests through international financial and economic organisations (Frank 1971, Galtung 1971, Wallerstein 1979).

The analysis of the dependency school was an important intellectual influence when the newly independent countries of the South formulated their foreign policy in the immediate post-colonial era. Dependency analysis suggested two different political strategies. The first was delinking. According to the Argentine economist Raúl Prebisch, a proponent of the dependency school, peripheral countries could only escape unequal relations with the centre if they concentrated on inward oriented development rather than competing directly with the centre (Di Marco 1972). Prebisch was the founding secretary general of the United Nations Conference on Trade and Development (UNCTAD)

from 1964 to 1969. His theoretical approach to development was favoured by Samir Amin (1977), who argued that peripheral countries should not compete with the centre, but should sever those economic relations that favour the centre over the periphery. To Amin delinking should be seen as submitting external economic relations to the exigencies of internal development rather than the logic of a global economic system dominated by the developed countries.

Delinking and inward-oriented development proved difficult to achieve, and in the 1970s an alternative political strategy was elaborated, namely the demands for a New International Economic Order (NIEO). The NIEO idea was articulated by the Non-Aligned Movement (NAM) and the developing country caucus in the UN, the Group of 77 (G77), which advocated a macro-level restructuring of the global economic system to yield a fairer distribution of the world's economic and natural resources. The G77 and NAM sought to use the control of developing countries over their natural resources as bargaining leverage with the developed countries. In exchange for continuing to supply natural resources to the countries of the North, the countries of the South sought financial and technology transfers from North to South, a reversal of declining terms of trade, and external debt relief or forgiveness. The NIEO debate led to the creation under the auspices of the UNCTAD of several international commodity organisations including the Association of Natural Rubber Producing Countries, the International Cocoa Organization and the International Sugar Organization. Only one UNCTAD-sponsored commodity agreement related to forests, namely the International Tropical Timber Agreement of 1983. This agreement, and the successor agreements of 1994 and 2005, remain the only international commodity agreements with a conservation mandate.

Although UNCTAD-inspired international commodity organisations have helped developing countries to gain some limited financial and technical assistance, these countries were unsuccessful in their demands for a NIEO. Attempts by the G77 to link the supply of natural resources and commodities to the North in exchange for the supply of manufactured products and advanced technology failed because developing countries had little to offer the North in exchange for what they were demanding. The South simply did not have the economic power to leverage substantial concessions from the North (Renninger 1989). Although the South had a strong moral argument – most of the world's population lies in the South while most of the world's wealth is owned by interests in the North – the developed countries were unwilling to surrender relative advantages in international trade and finance in order to help other countries. In retrospect it is clear that the South's commodity-related negotiating power peaked with the oil crisis of 1973-4. But this crisis also illustrated divisions within the South, with the oil producing states using the enhanced bargaining leverage provided by the oil crisis not for the benefits of a united South but for its own self interests. By the early-1980s the NIEO debate had waned.

INTERNATIONAL FOREST POLITICS SINCE THE 1992 UNCED

Although the NIEO-related concerns of developing countries receded into the background in international diplomacy they never disappeared. Increasing international concern at global environmental degradation has ushered in a new phase in North-South relations that has given a new lease of life to the concerns the G77 voiced in the 1970s. This became apparent during the negotiations for the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. During the UNCED forest negotiations it was clear that the G77, led by Malaysia, wished to establish a bargaining linkage between forest conservation on the one hand, and NIEO demands such as external debt relief and the reversal of declining terms of trade on the other. The G77 noted that payments from developing to developed countries through debt servicing and repayment exceeded ODA transfers from developed to developing countries, resulting in net South to North financial transfers. The negotiating strategy of the G77 was summed up by the Malaysian prime minister, Mahathir bin Mohamad shortly before the UNCED; 'If it is in the interests of the rich that we do not cut down our trees then they must compensate us for the loss of income' (Mahathir 1992). Mahathir urged the developing countries to speak 'with one clear strong voice in Rio', arguing for a 'real advance on the critical issues of finance and technology' (Mahathir 1992).

The UNCED forest negotiations may be viewed crudely as a price negotiation in which the North pressed the South to implement strong forest conservation policies in the form of a global forests convention, while the G77 responded by introducing its economic concerns, arguing that all issues be settled in a comprehensive package. The G77 argued for a global forest fund and for technology transfers to help developing countries achieve sustainable forest management. The G77 also introduced the concept of 'compensation for opportunity cost foregone'. The concept of opportunity cost has its origins in economic rationalism; utility maximizing forest owners will rationally opt for forest conservation if can receive a financial sum that makes it at least as beneficial for them to conserve their forests as to cut them down. The concept echoes Mahathir's view that tropical forest countries should be financially compensated if they are to agree to conserve rather than develop their forests (Humphreys 1996). The G77 also introduced the concept of 'common but differentiated responsibilities' arguing that the onus of tropical forest conservation should not lie solely with the South, but also with the North which has historical responsibility for much tropical deforestation through its unsustainable consumption of tropical forest products.

The enhanced value that the developed countries now attach to tropical forest conservation has provided the governments of heavily forested developing countries with enhanced bargaining leverage relative to the NIEO debate of the 1970s. The G77 made it clear during the UNCED forests negotiation that it would not agree to binding conservation measures unless it received economic concessions from the

North in return. In effect the G77 raised the price of forest conservation during the UNCED forest negotiations, a price that the North was unwilling to pay.

The result of these negotiations was the non-legally binding Forest Principles (United Nations 1992b). The agreement of this 'soft law' instrument represented a politics of the lowest common denominator between the developed states, who wanted a global forests convention, and the anti-convention developing states. The G77 managed to insert many of its broader concerns into the Forest Principles, such as 'the importance of redressing external indebtedness, particularly where aggravated by the net transfer of resources to developed countries' (para. 9(a)), 'new and additional financial resources' (para. 10) and the 'transfer of environmentally sound technologies' (para. 11). The Forest Principles also asserted that the 'agreed full incremental cost of achieving benefits associated with forest conservation … should be equitably shared by the international community' (para. 1(b)). However the developed states refused to agree to mentions of 'compensation for opportunity cost foregone' and 'common but differentiated responsibilities' in the Forest Principles, although the latter principle was negotiated into the FCCC (Articles 3.1 and 4.1) where it serves as a legal shorthand that the Annex I countries, which have historically emitted most greenhouse gasses, bear a heavier responsibility for tackling climate change than the developing countries.

The UNCED forest negotiations did not, therefore, focus exclusively on forests, and saw protracted deliberations on broader economic concerns of salience to the developing countries. This pattern has continued in the post-UNCED era. When the Intergovernmental Panel on Forests (IPF) was created in 1995 the G77 insisted that one of its five programme areas be devoted to 'International cooperation in financial assistance and technology transfer'. The G77 argued that 'environmentally sound technologies should be available to developing countries at affordable terms and without the stringency of intellectual property rights' (Mwakawago 1997). Developed country delegations responded by appending 'as mutually agreed' to claims from the G77 for technology transfer 'on concessional and preferential terms' (United Nations 1997, para 73). Caveated phrasing such as this is appended to language in international negotiations when a state or set of states does not wish to agree to substantive wording that might create a legal obligation. A similar pattern of interaction could be observed in the Intergovernmental Forum on Forests (IFF) which was created to replace the IPF with a three year life span in 1997. At both the IPF and IFF the developed states rejected G77 calls for a global forests fund (Humphreys 2006).

The United Nations Forum on Forests (UNFF), which replaced the IFF in 2001, created an ad hoc expert group to address the twin issues of finance and technology (United Nations 2004). This group reported to the UNFF in 2004 which then tried to negotiate a resolution on finance and environmentally sound technologies. Developed states argued that developing countries should explore alternative sources of funding to ODA, while the G77 responded that other sources have not materialized to the degree necessary to conserve forests, and that developing countries remain dependent on ODA. The negotiations broke down without a resolution. In 2007 the UNFF agreed a *Non-legally binding instrument on all types of forests*. The instrument, which includes the principle of 'common but differentiated responsibilities', aims to achieve four global objectives, one of which is to 'Reverse the decline in official development assistance for sustainable forest management and mobilize significantly increased, new and additional financial resources from all sources for the implementation of sustainable forest management' (United Nations 2007c, para.5). However once again developed states vetoed any language suggesting developed states had a legal responsibility to supply finance and technology to developing countries.

Various international forest negotiations have thus failed to resolve the issues of finance and technology to the satisfaction of developing countries.

This trend is by no means limited to forests; the developing countries regularly introduce finance and technology to international negotiations on other environmental issues, such as biological diversity, desertification and climate change. The Bali FCCC decision on AD needs to be understood within this context. It also reflects a broader developing country disillusionment with the UNFF, which is limited in what it can achieve; the UNFF has no budget for the implementation of forest policy and has failed to catalyse the provision of new resources. Some developing countries believe that there are more opportunities for realising financial gains from the FCCC compared to the UNFF.

The debate on AD needs to be understood as part of a protracted North-South disagreement on global economy inequalities. This is made clear in the statements of the developing countries that support the idea. In 2006 eight member states of the Coalition of Rainforest Nations (Bolivia, Central African Republic, Costa Rica, Dominican Republic, Nicaragua, Papua New Guinea and Solomon Islands) argued that developing countries require financial mechanisms and technical support 'to effectively and significantly reduce emissions from deforestation' (United Nations 2006, p. 26). The Deutsche Gesellschaft fűr Technische Zusammenarbeit (GTZ) has argued that an effective AD scheme will require substantial North-South financial transfers, at a minimum $10 billion per annum (2007).

The argument so far can be summarised thus. The AD proposal is an approach to forest and carbon sink conservation that fits comfortably into the logic of environmental economics and neoliberalism. It is a new semantic that reflects the historical grievances of the developing countries, home to almost all of the world's tropical forests, at the unequal distribution of the world's financial and technological wealth. Since the rise of forest conservation as an international political issue developing countries have persistently introduced these concerns into international forest negotiations, though with limited success. With no legally binding regime on forests, the efforts of the developing countries to secure stronger commitments on finance and technology have gravitated towards the two main forest-related multilateral agreements, the Convention

on Biological Diversity and the FCCC. Developing countries have also invoked the principle of 'common but differentiated responsibilities', noting the different historical contributions of countries to the composition of the atmosphere. To the developing countries, it is the developed countries that should assume most responsibility for addressing global environmental degradation, in particular anthropogenic climate change.

The notion of AD has the potential to restructure international forest and climate politics. When emissions from deforestation are included then Indonesia and Brazil become the world's third and fourth largest emitters of carbon dioxide, after the United States and China (*Economist* 2006). A global emphasis on AD will further increase international pressure on these countries to reduce deforestation. But it will also provide these countries with the possibility of earning new resources.

However, the role of the FCCC and Kyoto in international forest policy is a controversial one. Critics claim that an AD scheme administered by the FCCC will lead to a narrow emphasis on one forest-related public good – climate regulation – at the expense of others, such as biodiversity habitat, watershed services, soil conservation, and socio-cultural values. While other public goods may benefit from an AD scheme they need not necessarily do so. Against this it can be argued that Article 2.1(a)(ii) of the Kyoto protocol includes the concept of sustainable forest management, which embraces all forest-related public goods. Furthermore, it might be argued that in principle there is no reason why a post-Kyoto protocol could not contain a commitment to forest public goods other than carbon.

Having so far discussed the broader political context within which the debate on AD has emerged and played out the next section will discuss some of the political issues that may arise when negotiating the fine details of an international AD scheme. The section considers baselines, leakage, permanence, additionality, indigenous peoples and local communities, equity and effectiveness.

CONTEMPORARY POLITICAL ISSUES

Baselines

Any developing countries participating in an AD scheme will need to agree – for example, with donors or the secretariat of any AD carbon trading scheme - a baseline. The baseline is the background (or business-as-usual) rate of deforestation that would take place in the absence of policies to protect forests, and against which AD should be measured. In addition to the methodological and technical issues that will inform baseline measurement there is a potential political problem; developing countries may bargain for generous baselines before agreeing to participate.

The case of the European Union's Emissions Trading Scheme (ETS) is illustrative of the problems an international AD scheme might face in agreeing baselines. In order to establish the ETS scheme the EU allocated permits to the largest polluting businesses. The EU was accused of agreeing generous baselines by overestimating the past pollution levels of these firms in order to win their participation in the scheme. Furthermore, firms that had taken measures to reduce their emissions levels prior to the implementation of the ETS scheme were not rewarded. The ETS scheme, it can be argued, not only rewarded polluters but, by agreeing generous baselines, meant that these polluters had sufficient pollution allowances to cover future short-to-medium term pollution. These firms had less of a need to buy permits for pollution over and above the agreed baseline, and thus had less incentive to invest in clean technology in order to reduce future pollution. Against this it can be argued that more stringent baselines would have attracted fewer firms and would thus have been less effective over the long term.

How baselines are agreed thus has a bearing upon both participation and effectiveness. Similar lines of argument will inform any AD scheme. A tropical forest country will have more incentive to participate in a global AD scheme when its baseline (estimated future rate of deforestation) is generous, as the country may then be able to claim a higher level of avoided deforestation then has actually been achieved. In such circumstances countries could gain financially, as they would generate additional carbon credits for sale to polluting Annex I states. In environmental terms this is clearly self-defeating. First, the developing country would also have less of an incentive to take proactive AD policies in the future. Second, lenient baselines would lead to an oversupply of AD credits, which could depress the price of credits worldwide. Annex I countries would thus be able to purchase credits at a lower price than if more accurate baselines had been used, and they would consequently have less incentive to cut down on their pollution at source. Generous baselines will thus reduce the incentives both to avoid deforestation in developing countries and to reduce carbon emissions in Annex I countries.

It seems clear that the overall effectiveness of any AD scheme will be maximised according to two variables: the accuracy of deforestation baselines (which should ensure that any AD credits created are based upon actual, rather than illusory, avoided deforestation); and the number of countries that participate. What the argument presented above suggests is that maximizing effectiveness may involve a trade off between these two variables. Agreeing baselines for any market-based AD scheme will not therefore be a simple matter of statistical analysis of historical, and projected future, deforestation. Any single baseline methodology will involve winners and losers, and agreeing baselines could be a politically fraught process involving negotiation, concession and compromise.

A further criticism of AD is that it would not compensate countries that have successfully reduced their rate of deforestation in the past (in much the same way that the EU's ETS scheme did not reward firms that had reduced their pollution prior to the implementation of the scheme). Countries with relatively low deforestation rates, such as some of the Congo Basin Forest Partnership countries, could lose at the expense of countries with higher deforestation rates.

India has proposed that as well as compensations for AD, a second mechanism for 'compensated conservation' could be established to reward countries that have historically taken measures to conserve their forests (Alvarado and Wertz-Kanounnikoff 2007, p.17). Other countries that might expect to benefit from 'compensated conservation' are Costa Rica (which has a strong protected areas policy) and China (which in recent years has undertaken significant reforestation).

Leakage

The Intergovernmental Panel on Climate Change defines leakage as 'the unanticipated decrease or increase in GHG [greenhouse gas] benefits outside of the project's accounting boundary' (IPCC 2000). For example, an AD project to conserve forests that were under threat of clearance might displace deforestation to another space outside the project's boundary. The carbon dioxide thus emitted would be considered leakage. As well as spatial leakage there is also temporal leakage, namely the displacement of deforestation to the future as the result of AD policies taken today. Leakage over time and space has the clear potential to undermine the effectiveness of an international AD scheme, although it will only become an international political issue when leakage takes place between countries (something which would, in any case, be difficult to prove). An historical example of leakage (though not one that involved AD) concerns the 1989 logging ban in Thailand which resulted in some Thai timber companies engaging in illegal logging in Burma and Cambodia. This case suggests that the risk of leakage is likely to be most severe when deforestation is avoided through denying forest access to large, well organised business corporations who have the capability to relocate to other countries where forestland is more easily available for clearance.

Permanence

Whether avoided deforestation will be permanent will depend to a large measure on the agreed rules of any AD scheme and in particular whether those countries that are rewarded for AD will also be liable for subsequent deforestation. One possible mechanism for liability would be a provision that countries that benefit from payments from AD should then agree to refund any money they have received (for example, to a bilateral donor or multilateral fund) should deforestation later increase (Deutsche Gesellschaft fűr Technische Zusammenasbeit (GTZ) 2007). While such a provision would act as an incentive to ensure that avoided deforestation is permanent, politically it would almost certainly deter many developing governments from participating. Once gain it seems clear that agreeing the details of AD is likely to avoid a trade off between effectiveness and participation.

Additionality

AD payments will yield the lowest additional conservation benefits when money is targeted at secure well managed forests. In order to maximise additionality, and also to be most cost effective, AD should target forests that are most under threat, particular those that lie along or near to a major deforestation front. However, this brings with it the risk of perverse incentives. As the London-based Overseas Development Institute has noted, ensuring additionality carries with it the risk that 'the main "winners" could turn out to would-be developers or degraders, e.g., large-scale and capital rich plantation crop or cattle farmers, rather than forest conserving communities' (Richards and Jenkins 2007, p.4). An international AD scheme could incentivize businesses to acquire forests and then plan to develop them in order to qualify for AD payments. The owners of the best conserved forests will receive nothing under such a scheme unless, ironically, they announce that they have plans to fell the forests.

Indigenous peoples and local communities

A further dimension of political conflict concerns the public proprietorial claims made against forests. Three such claims may be identified. The strongest claim in international law is that forests are a sovereign national resource of the state; this was affirmed in the 1992 Forest Principles (United Nations 1992, para 1(a)) and 2007 'Non-legally binding instrument on all types of forests' (United Nations 2007c). The principle of sovereignty is frequently invoked in international forest negotiations by developing states. A second claim is that forests are, in some respects, a global common; all peoples and states have a stake in them. This claim has no standing in international law, although it was floated by some developed world delegates in the corridors at the UNCED in 1992. The third claim is that in many developing countries indigenous peoples and local communities have traditional tenure rights over their forests. According to this view these peoples and communities should be seen as the rightful custodians over forests, and focusing solely on intergovernmental relations between North and South, or developed and developing countries, thus omits an important political dimension of forest use.

Indigenous peoples' groups have been critical of AD as an idea that will privilege global and national level control over forests at the expense of the local level. The Forests Peoples Programme (FPP) argues that AD projects could result in increased government interference in local customary land tenure systems and increased state control over forests, with most of the financial benefits flowing to national treasuries rather than benefitting local people. The FPP is sceptical of the World Bank's support for incorporating AD in a global carbon trading scheme, arguing that this would increase Bank involvement in forests at a time when the Bank has yet to introduce strong safeguard policies to protect the rights of indigenous peoples and local communities. The FPP has cautioned against the implementation of AD projects without prior appraisal of their effects on social and livelihood issues and rights (Griffiths 2007).

In September 2007 the United Nations Declaration on the Rights of Indigenous Peoples was adopted by the UN General Assembly. The declaration endorses the principle of free prior, informed consent: 'States shall consult and cooperate

in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them' (United Nations 2007d, Article 19). This principle holds that indigenous peoples should give their consent to any development projects that affect their traditional lands; consent should be freely given, prior to implementation, and informed by a full understanding of the effects on peoples and their lands. The tension between the concept of national sovereignty, which privileges the state, and free, prior and informed consent, which favours indigenous peoples and local communities, is based on two different, although not necessarily irreconcilable, proprietorial claims and is one of the key political conflict lines that will inform AD projects and the distribution of benefit from them. Many indigenous peoples' groups also argue that social values, as well as forest environmental values other than the carbon function, will not factor into a market-based AD scheme. In response it may be argued that much depends on the local context, and if designed with the full involvement of local groups AD projects could lead to significant benefits flowing to local communities.

Equity

The principle of intergenerational equity, which holds that environmental harms and risks should not be passed onto future generations, is central to the concept of AD. However, AD schemes could violate the principle of intragenerational equity, which holds that all people of the present generation have an equal claim to the world's ecological space, including the atmospheric commons (Dobson 2003). One criticism that has been made of the idea of AD is that it could serve as a mechanism for developed states in effect to buy ecological space for carbon sequestration in a developing country in order to continue polluting. The World Rainforest Movement has previously claimed that poor developing countries are pressured into accepting reforestation projects under the Kyoto Protocol's Clean Development Mechanism in order to earn foreign exchange This generates inequities between different groups of people in the present generation and, so it is claimed, constitutes a new form of colonialism; 'ecocolonialism' (Lohmann 1999). An international AD scheme could perpetuate the unequal use of ecological space by developed countries and, so the argument goes, would violate the intragenerational equity requirement that there should be fair use of ecological space between different countries and groups in the present.

CANAN INTERNATIONAL AVOIDED DEFORESTATION SCHEME BE EFFECTIVE?

The effectiveness of AD may be assessed in different ways. One approach is to consider whether an AD scheme will lead to more countries participating in international forest conservation initiatives in general, and within the FCCC in particular. It has been argued that a market-based AD scheme has the potential to do this, providing that it can raise predictable and significant new and additional resources to incentivise the participation of developing countries.

Another approach is to assess whether an AD project will do what it claims to; avoid deforestation. According to the logic of the market, an AD scheme will only be effective in avoiding deforestation if the compensation forest owners earn for forest conservation is greater than the most financially lucrative opportunity cost foregone. Where this is not the case, in other words where a forest owner or government may earn more from deforestation and conversion to another land use than from an ODA deal or from selling carbon credits, then the rational market outcome will be deforestation. The likely effectiveness of AD as a policy measure will vary from space to space and over time, and will depend crucially on whether the expected price per hectare earnings from ODA or from carbon credits will exceed the estimated per hectare earnings from other global 'commodities' (which, essentially, is how carbon credits should be seen). As argued above, establishing an international AD scheme is likely to involve some degree of trade off between the number of countries that are willing to participate and the effectiveness of the scheme in avoiding deforestation.

An important consideration is whether maintaining existing global forest cover can achieve climatic stability through fixing in trees carbon that is emitted from the burning of fossil fuels. Here a more fundamental problem appears. Burning fossil fuels releases into the atmosphere carbon that was previously stored underground for millions of years in an inert state and which did not form part of the carbon cycle. If one bears in mind that since the dawn of the industrial revolution some 250 years ago two major biophysical changes have taken place to the global environment - the excavation and burning of fossil fuels from the Earth's crust; and large scale deforestation across almost all major forest regions – then if forests are to play a role in climate change global forest cover should first be returned to its extent prior to the industrial revolution. Only then, with global forest carbon sink capacity restored to pre-industrial revolution levels, will it be possible for forests to play a role in offsetting emissions from fossil fuel burning through the afforestation of new areas.

What this suggests is that while ODA avoided deforestation deals are certainly desirable from a conservationist standpoint, in that they will prevent deforestation that may otherwise have taken place, the case for using forest conservation as the basis for *additional* emissions into the atmosphere from Annex I countries in an international market trading scheme is more problematic. Furthermore, any AD scheme can only be expected to 'buy time' by slowing the rate of change of atmospheric warming, and should be seen as just one of a portfolio of policies for addressing anthropogenic climate change, the most significant of which should be significant and sustained cuts in anthropogenic greenhouse gas emissions. It is achieving this that will be the most important challenge that parties to the FCCC will face.

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The architecture of proposed REDD schemes after Bali: facing critical choices

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SUMMARY

Rules governing the REDD (Reductions of Emissions from Deforestation and Degradation) scheme have yet to be established. Different national interests compete within the debate on baselines in order to maximize expected gains. The scheme could have a deleterious impact on the carbon market through massive hot air creation (fake emission reductions), and ultimately on the current international climate change regime derived from the cap-and-trade architecture adopted by the Kyoto Protocol. The political economy of avoided deforestation is frequently overlooked as is the issue of additionality, although both of them are more critical with deforestation at national level than they could be with project-based CDM. An alternative REDD architecture which relies on a special fund would not only allow protection of the carbon market against massive flooding by non additional credits, but could also help finance potentially efficient policies and measures. Sustaining long-term adequate funding is still an issue to be addressed on a multilateral basis.

Keywords: REDD, avoided deforestation, forest degradation, additionality

Architecture des projets de REDD proposés après Bali: faire face aux choix critiques

A. KARSENTY

La règlementation gérant la REDD (Réduction de émissions provenant de la déforestation et de la dégradation) a encore besoin d'être établie. Plusieurs intérêts nationaux font concurrence dans le débat sur les lignes de base, désirant maximiser les gains espérés. Le projet pourrait avoir un impact désastreux sur le marché du carbone de par une création énorme d'air chaud (fausse réduction d'émissions), et ensuite sur le régime international du changement climatique actuel dérivé de l'architecture cap-and- trade adoptée par le protocole de Kyoto. L'économie politique de la déforestation évitée est fréquemment ignorée, ainsi que la question de l'additionalité, bien qu'elles soient toutes deux plus critiques pour la déforestation au niveau national qu'elles ne pourraient l'être pour des CDM basés sur des projets. Une architecture alternative de REDD dépendant d'un fond spécial pourrait non seulement permettre la protection du marché du carbone contre une avalanche de crédits non-additionnels, mais aussi aider à financer des mesures et des politiques potentiellement efficaces. Le soutien d'un financement adéquat à long terme demeure une question qui doit être addressée sur une base multilatérale.

Arquitectura de planes de REDD propuestos después de la conferencia de Bali: decisiones críticas

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Todavía no se han establecido las normas que regulan el plan de REDD (Reducción de Emisiones por Deforestación y Degradación). Dentro del debate sobre las pautas necesarias, los diferentes intereses nacionales compiten para maximizar sus benficios esperados. El plan podría incluso tener un efecto perjudicial sobre el mercado del carbono mediante un potenciamiento masivo del fenómeno de 'hot air' (compra de derechos a emisiones), y en última instancia sobre el régimen internacional actual sobre el cambio climático derivado de la estructura de topes y comercio adoptado por el Protocolo de Kioto. A menudo no se tiene en cuenta ni la economía política de la deforestación evitada ni el tema de la adicionalidad, aunque ambos desempeñan un papel más importante en cuanto a la deforestación a nivel nacional que tendrían en un mecanismo de desarrollo limpio (CDM) basado en proyectos. Una arquitectura alternativa de REDD, que dependería de una financiación especial, no solamente permitiría la protección del mercado de carbono contra una inundación masiva de créditos no adicionales, sino que también fomentaría la financiación de políticas y medidas potencialmente eficaces. El sostenimiento de una financiación adecuada a largo plazo sigue siendo un tema que debe ser tratado a nivel multilateral.

INTRODUCTION

Forests are back at the top of the international climate change agenda, with the intense discussions around the 'avoided deforestation' scheme, now called REDD (Reductions of Emissions from Deforestation and Degradation). The objective of such a scheme is to create incentives for developing countries to curb or limit deforestation and forest degradation. The principle was accepted at the 13th Conference of Parties of the UNFCCC held in December 2007 in Bali. However, whilst the principle has been acknowledged, the scheme and its implementation rules have yet to be established. Many difficult and controversial issues are to be addressed in the coming years or months, such as whether to link the issue with Kyoto's derived carbon markets and schemes (such as the European Trading Scheme and the Clean Development Mechanism), the use and design of baselines, ways of addressing degradation and the question of potential non permanence. Outcomes of these debates and expected decisions will be critical in shaping the emerging international forestry regime. Furthermore, as the quantities of carbon credits at stake are potentially very high, they could also have a negative impact on the carbon market and ultimately on the current international regime which focuses on combating against climate change derived from the cap-and-trade architecture adopted by the Kyoto Protocol[1].

After a brief summary of the debates related to forestry and CDM around 2000 and of the reasons for its partial failure, we will explain how challenging it is to determine a correct reference against which "reduction of deforestation" should be assessed. We will briefly review the main proposals for REDD architecture and show the limitations of those which propose to reward countries for a result against a baseline of past or anticipated deforestation. We shall then pay attention to the "avoided degradation" issue and how to deal with it. The second part of the article will raise the issue of the political economy of REDD and the proposed incentives, and will draw upon lessons learnt from decades of experience with official development assistance. We will argue that an architecture based on an international fund for tackling deforestation is preferable to a market-based one as it prevents the carbon market from flooding and allows for supporting policies and structural measures to be adopted inside and outside the forest sector, including payment for environmental services schemes. Finally, we will examine the impact of REDD debates on international strategies of some forest-rich developing countries which are demanding remuneration for their standing forests; in the case of such a scenario, tropical forests might become the international public goods which some stakeholders are looking for. We will end with a call for a principle of responsibility *vis-à-vis* the world's forests for both industrial and developing countries and their citizens.

REDD: REDESIGNING THE REJECTED 2000 CDM PROPOSAL

The experience of including afforestation and reforestation in the Clean Development Mechanism of the Kyoto Protocol offers key insights into the challenges of expanding coverage to include avoided deforestation in a post-Kyoto agreement. The eligibility of land use, land-use change and forestry (LULUCF) projects under the Clean Development Mechanism (CDM) was one of the most controversial issues at the Sixth Conference of the Parties in November 2000 hale at the Hague. The compromise position proposed by President Pronk (Decision 1/CP.6) prior to the suspension of CoP6 was to (1) designate avoided deforestation and combating land degradation and desertification in non-Annex I countries as adaptation activities eligible for funding through the Adaptation Fund but not through the sale of carbon credits; (2) allow only afforestation and reforestation projects in the CDM, with measures to address non-permanence, social and environmental effects, leakage, additionality and uncertainty.

The additionality of an emission reduction CDM project can be assessed by comparing the project's activities with a reference scenario consisting of the course of host-country activities that would occur in the absence of the financial incentives. If a proposed CDM project and its emission reductions would not have occurred under the reference scenario, then they could be considered additional. Implementing the additionality requirement needs defining the reference scenario. The reference scenario is a counterfactual hypothesis representing the "best guess" regarding the future course of events.

Looking back at the failure of afforestation/reforestation CDM: temporary credits and additionality

To address the non permanence issue[2], a specific asset has been designed for A/R projects: the temporary credits or tCERs (which expire after 5 to 9 years) (Dutschke *et al.* 2004) or the long-term expiring credits or lCERS, valid for the crediting period but delivered by segments alongside growing trees. However, such credits have a price value which is only a fraction of the value of "permanent credits" and need to be replaced when they expire, at the end of the commitment period for tCERs or at the end of crediting period (up to 30 years or twice -20 years) for lCERs. According to Chomitz and Lecoq (2004), the value of expiring credits is

[1] Under the Kyoto scheme, participant countries and/or industries (those concerned) are granted maximum emissions targets. If they do not use all their emission allowances, they can sell the ones left over to a third party which can fulfil one portion of its own objectives through this "carbon credit" purchase..

[2] In the energy sector, a non-emitted ton of carbon dioxide is considered "definitively non emitted". Yet this poses a problem in some cases such as afforestation projects: a tree plantation can still be destroyed by fire, and carbon released into the atmosphere, after its promoter has been credited with carbon credits. This difference prevents the two types of activities from being treated in the same way.

25% of permanent credits under certain hypotheses (e.g., a 6% discount rate). According to Dutschke *et al.* (2004), "*A tCERs with a fixed validity period of 5 years will be worth between 14 and 38 percent of a permanent CER. An lCER with a validity period of 60 years, on the other hand, would nearly reach the value of a CER*".
Currently, negotiated prices are all around US$4 for TCER CO_2 in projects supported by the World Bank BioCarbon Fund[3]. But private investors are reluctant to buy such credits for several reasons, including the following:

- There are numerous permanent credits available at a moderate price on the CDM market;
- They prefer to buy permanent credits at a cheaper price today because (i) they know that temporary credits will eventually be replaced, and (ii) providing investors are anticipating higher prices of emission permits in the future;
- Afforestation/reforestation credits are banned from the European Trading Scheme; and
- If companies are only looking to be considered as "carbon neutral", it is easier and faster to buy carbon offsets on the voluntary market.

As a result, the afforestation/reforestation CDM has failed: to this day, only one project was successful out of the 1132 registered as part of other activities, as shown by CDM statistics of the UNFCC[4]. One must add that until now industrial plantation projects have been rejected by the CDM executive board, notably for lack of additionality (Vance 2005, Michaelowa and Rawat 2007), and that small-scale projects have to bear the length of the approving process and the high transaction cost entailed by expertise and monitoring. Despite claims from the private sector that additionality criteria are too constraining and are a disincentive from a business perspective, they remain in force.

Why additionality is even more difficult to assess at national level than at project level

In this paper, we will not address the issues of monitoring deforestation and degradation from a technical perspective (remote sensing, inventories, etc.) even though we are aware that such issues themselves are far from being resolved, as pointed out by Grainger (2008) and that forest cover statistical production is not free from political influence (Grainger 2007). Instead, we will question the additionality of 'deforestation reduction against a baseline', which is critical from a genuine emission reduction perspective. In economic evaluation, setting a baseline project to assess the net effect (*i.e.* excluding factors external to the project) amounts to comparing two situations, one 'with' the project and one 'without' the project; and never a 'before' versus 'after' comparison which does not allow to disentangle the specific impacts of the project and the external events and dynamics taking place at the same time.

Additionality is difficult to assess at project level, despite clear and limited boundaries of the planned activity and a knowledge of historical data related to the area. The investor is the main economic agent concerned; he is supposed to provide a financial profile and detailed project characteristics, including financial returns which might be compared to existing benchmarks. At national level, knowing 'what would have occurred' in terms of deforestation without the REDD incentive is much more challenging. At least two critical factors can be mentioned:

- The number of variables at national level: deforestation is a result of numerous idiosyncrasies, both human and natural (such as climate), rather than the consequence of a single project undertaken by an individual or a company
- Political influence of interested governments and the role of state diplomacy which plays key roles in setting baselines

We will examine this issue of baselines in the specific case of REDD. Since we do not know so far whether REDD 'rewards' to countries in the form of carbon credits fungible with those of Kyoto (such as those from CDM) or other types of credits (including money), we will refer to such assets as 'REDD credits' and we will discuss of the nature of such credits in a further section.

MAIN PROPOSALS RELATED TO REDD ARCHITECTURE

Historical reference

The initial proposal presented by Papua-New-Guinea PNG and Costa Rica in 2005[5] was to adopt a historical reference, i.e. the average of past deforestation converted into carbon emissions. However, such a proposal has serious weaknesses. Forest transition theory (Angelsen 2007), which often begins with massive deforestation, shows that's it is unlikely that such high rates of deforestation are maintained over time. Behind forest transition theory, there is the increasing marginal cost of deforestation of landlocked areas. Hyde, and others, (Hyde *et al.* 1991, 1996, Hyde 1998) has greatly contributed to this debate on the causal relationship between the frontier of the economic rent and deforestation. Of course, such a frontier evolves with relative prices and decisions such as public road building can move the profitability perimeter of deforestation. But when remaining forests tend to concentrate in mountainous highlands, as is the case in several Asian countries including

[3] http://www.undp.org/energy/docs/cdmchapter7.pdf
[4] http://cdm.unfccc.int/Statistics/index.html
[5] http://unfccc.int/resource/docs/2005/cop11/eng/misc01.pdf

Borneo the decline in terms annual deforested area is unavoidable: the only uncertainty is to determine when the inflexion point will be reached and what will be the pace of the slow-down. Countries having massively deforested in the past are likely to mechanically benefit from REDD credits and could enjoy a high probability of being rewarded, without any adjustment of public policies vis-à-vis the forest.

Such a historical baseline, despites Brazil's support, is not viewed favourably by countries with vast expanses of forest, relatively low deforestation rates and which are still waiting for a development wave which would extract them for widespread poverty. Typically is the case of Congo Basin countries, in which limited rates of deforestation[6] has little to do with 'early efforts' of preserving forests: instead, low deforestation is linked to poor transport infrastructure, high timber extraction costs, low population densities in rural forested areas and limited attractiveness for large agricultural investments (due to unclear property rights and obstacles to 'smooth' business).

Predictive scenarios

Several researchers have suggested baseline scenario, *i.e.* predicting deforestation rates on a given period under a "business as usual" scenario. Chomitz *et al.* (2007) suggest computing a "*normative reference level based on standardized estimate of the rate of increase of agricultural production, adjusted for an estimate of the rate of increase in agricultural productivity as well as the mean carbon content of forestland at the agricultural margin*" (2007: 206). However, they also noticed significant correlations in the Brazilian Amazon between deforestation rates and beef price at farm gate; and also with rainfall. The linkage between agricultural prices and deforestation rates in open economies of forested and developed countries is well-known (Kaimowitz and Angelsen 1998). The recent situation of Brazil is worth mentioning: after a sharp decline in deforestation rates (between 30 to 50%) in the Amazon, some argue that the recent – and worldwide - increase in agricultural commodities prices has fuelled a revival of high deforestation rates in the Amazon, and especially in Mato Grosso where soy beans crops are expanding (Box 1).

Prices of agricultural commodities have increased sharply, and more deforestation has ensued, without any policy change from Brazilian Government which had previously presented low deforestation rates as the direct result of policy-making. Policy efforts have been effective, especially those related to the creation of new conservation areas, as pointed out by Taravella (2007). Yet they are only one factor among many explaining variations in deforestation rates over time. Persson and Azar (2007) point out the high variability of deforestation rates in Brazil, especially when compared with industrial emissions, which are much more predictable than the erratic variation in inter-annual deforestation rates.

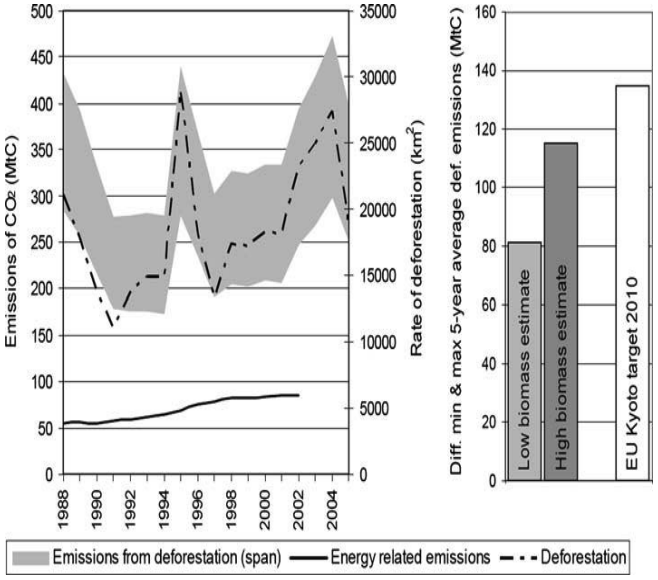
Such high variability reflects the sheer number of parameters involved in the deforestation – not only prices,

BOX 1 *Behind the reversal trend in deforestation in the Brazilian Amazon*

Deforestation rates in the Brazilian Amazon for the period between 2005 and mid-2007 were the lowest on record, according to figures released by INPE, Brazil's National Institute of Space Research. Preliminary estimates show that between August 1, 2006 and July 30, 2007, some 11 000 square kilometres of rainforest were cleared, a 31 percent drop from 2006. But, just some months after celebrating its success in achieving a reduction, Brazil's Government has announced a record rate of deforestation in the Amazon. During the last five months of 2007, about 7 000 square kilometres were lost. The major part of this deforestation has been registered in the State of Mato Grosso (53.7%).

The then Brazilian Environment Minister Marina Silva said the rise in the price of commodities, such as soya, could have influenced the rate of forest clearing. Some environmental NGOs and research institutes support this explanation. For instance, the Brazilian Forum of NGOs and Social Movements (FBOMS) has released in 2005 a report that links the increase in deforestation rates, specially in the State of Mato Grosso, with the soya surface expansion. According to official data available (IBGE 2004, 2006) only in the Mato Grosso State the soya covered a surface of 3 million hectares in 2003. In 2004 this surface has increased to 5.1 million hectares and to 5.8 million hectares in 2006.

FIGURE 1 *Deforestation and energy related emissions in Brazil (source: Persson and Azar 2007)*



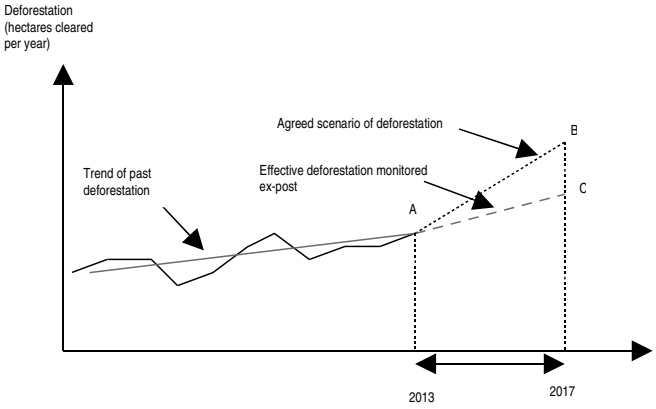
[6] The annual deforestation rate for Central Africa has been estimated at 0.21 ± 0.05 % for the period 1990-2000 (Brown et al. forthcoming).

but also real interest rate, currency exchange rates, etc. – and their complex interactions, as analysed by many researchers (Angelsen and Kaimowitz 1999, Geist and Lambin 2001, Kanninen *et al.* 2007). This also suggests that single parameters – such as the rate of increase of agricultural production coupled with productivity, as suggested by Chomitz *et al.* (2007) – are not sufficient proxies to predict deforestation in a given commitment period of a few years (currently 5 years under Kyoto agreement). Moreover, prices of agricultural commodities are volatiles since they are shaped by anticipation and speculation, just like oil and many other primary resources (notably on the Chicago commodities market), as well as the economic growth pace of emerging countries[7]. Such factors are not predictable, neither are they the outcome of the current debates (which are critical for the fate of forests in many countries) about the importance to be given to the use of biofuels in industrial countries. Setting 'business as usual' scenarios for a given 5 year period is therefore not only challenging; they are more likely to resemble 'random scenarios' than anything else.

Annual adjustments of such scenarios to take account of changes in the markets and environmental factors would certainly lead to more accurate previsions. But, will it still be a scenario or something else? They would essentially force experts to disentangle an embedded array of factors, isolating what can be the net impact of policies and measures effectively taken by the authorities to tackle deforestation (i.e. stringent law enforcement, removal of agricultural subsidies, etc.) and external factors such as (involuntary) changes in market prices for agricultural commodities, drought episodes causing forest fires (as well as abnormally high rainfalls). From a negotiation perspective, such a formula would be very difficult to handle since countries would not get a precise idea of the baseline before the commitment period (and even until the end of this one, since evaluations are easiest to make ex-post rather than ex-ante). Frequent revisions of baselines would also multiply the opportunities for political pressures during the negotiation process, which would seriously undermine the credibility of the mechanism. In this respect, is unlikely that countries will accept the idea of having a group of independent experts in charge of disentangling, year after year, external factors from measurable policy impacts. Here, sophistication of expertise is likely to conflict with national interests of countries negotiating for the best situation for themselves, in order to maximize expected gains without having to adopt policies and measures that are too costly, both socially and politically.

Some countries proposals are very likely to create 'hot air' mechanically. More precisely, the PNG proposal, followed by COMIFAC one, to adopt a "development adjustment factor"[8] reflecting future national development needs. This would altogether lead to more deforestation and more REDD credits. Below is a possible situation:

FIGURE 2 *Example of possible rewarding for "avoided deforestation" under futures baseline scenario and 'adjustment factor'*



Surface area [ABC]: "avoided" deforestation (against the scenario) opening rights to REDD credits

Persson and Azar (2007:1290) noticed, in reference to the so-called "Compensated Reduction" proposal (Santilli *et al.* 2005), that "*countries that historically have had low rates of deforestation (e.g., Peru, Bolivia) could be given targets above recent deforestation rates, to promote participation. This would effectively* create *hot air*". The COMIFAC proposal is an example of this hypothesis in which more emissions from deforestation can go hand in hand with more emissions allowances sold to industrialised countries

Sophisticated proposals do not change the basic baseline problem

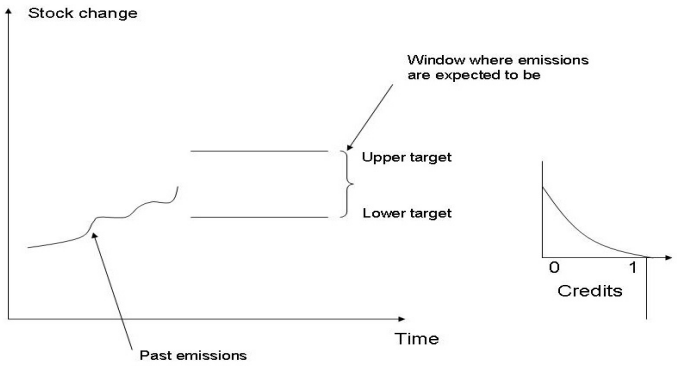
Discounting limited reductions against predicted margins

Schlamadinger *et al.* (2005) have proposed a smart formula intending to reconcile incentives and environmental integrity. They suggest that the target should be set as an upper and lower bound between which future emissions from deforestation are expected to lie. Emissions reductions below the upper bound will be credited but at a discounted rate. The closer one gets to the lower bound, the less credits are discounted, and below the bound they are fully credited.

But even though such a formula could mitigate in some cases the *amount* of potential 'hot air' generated by the mechanism, it does not modify the *likeliness* of such 'hot air' which will depend only on the targets set (especially the "lower target" in this case). No accounting system is able to prevent for (i) unexpected changes altering the previsions in one way or another, (ii) manipulated baselines (i.e. high levels of deforestation rates predicted) resulting from ill-conduced negotiation processes. In such cases, it is likely that political pressures would focus on raising the lower target of emissions as much as possible in order to maximize

[7] See "Wall Street Is Betting on the Farm", New-York Times, 19 January 2007.
[8] http://unfccc.int/resource/docs/2007/sbsta/eng/misc02.pdf p. 40

FIGURE 3 *Schlamadinger et al. (2005) corridor and discounting proposal for REDD baselines*



chances of being rewarded with undiscounted credits.

The Carbon Stock Approach

The Centre for International Sustainable Development Law (CISDL) submitted a proposal to the UNFCCC (Prior *et al.* 2007), suggesting that tradable carbon credits could be issued to finance activities to protect forests in host countries. This proposal can be considered as a 'cap-and-trade' approach which provides both for deforestation and degradation:

- the amount of carbon stocks that exist in a country's forests are calculated prior to the crediting period;
- the forest area is divided in two parts: a "reserve" that must not be degraded, and the remaining area that is expected to be converted in the future for development needs;
- only forest conservation within the area outside the reserve can result in the issuance of tradable carbon credits; and
- the loss of carbon due to *force majeure* events (e.g. fires, flooding) should not result in less carbon credits being issued.

The originality of such an approach lies in its ability to use the case of *force majeure* in case of natural phenomena impacting on deforestation rates (although it should also be extended to human phenomena because events such as international price variations could also be considered as *force majeure* from a national perspective). However, one could argue that setting the size of the reserve would raise similar problems to the negotiation of a baseline[9]. Besides, it has been acknowledged by Prior *et al.* (2007:9) that: "*Reserve will be difficult to agree upon and in effect is similar to a future baseline assessment at a future point in time*". They also specify that: "*The authors recognize that establishing the reserve will be a difficult issue. However, it is not expected to be any more difficult than establishing national baselines that must take into account historic as well as future deforestation rates, or Annex I Parties' quantified emission limitation and reduction commitments*" (2007:16). If we move away this issue of national baseline which we already discussed, we have to pay attention to the second argument, *i.e.* the comparison with negotiated national Annex 1 emissions targets which require some attention.

- First, REDD is proposed as an asymmetrical regime in which countries can gain but never lose, since there is no sanction or compensation required if deforestation lies beyond the baseline set. By contrast, Annex 1 countries are committed to stay below their emission targets, otherwise they face penalties[10]. And if their forest carbon stock decreases, countries must balance putting more efforts into reducing emissions in other sectors. Moreover, if a country is unable to fulfil its reduction targets domestically, it is allowed to get emission credits through CDM schemes (or buying from an Annex 1 country that has reduced its emissions levels more than expected), thus restoring the balance. Developing countries with deforestation rate greater than expected would not have to face such constraints of balance: overall emission of all countries joining REDD schemes can be higher at the end of the commitment period than at the beginning, while a significant quantity of credits could have been distributed to a handful of those countries.
- Secondly, the emissions profile of industrial countries is closely linked to economic growth, except during the rare years of recession, or even the rarer ones of economic collapse, such as the former USSR in the early 1990s. As such, the general trend is that of an *increase* in emissions, as the Western World has enjoyed an uphill economic growth trend since the Second World War. By contrast, deforestation and economic growth have a more complex relationship, as shown by the forest transition theory and the annual variability of deforestation trends in a country such as Brazil (see figure 1), given the numerous variables that influence changes in deforestation rates.
- Thirdly, Annex 1 countries' targets set in reference to 1990 levels have been chosen deliberately to grant hot air to a key actor such as Russia, which was (along with Ukraine) supposed to be the 'credit seller'(and as such, provided with an incentive to engage in the agreement) while the USA was expected to be the 'big buyer' of the former USSR's hot air. However,

[9] In addition, monitoring full carbon stocks in hundreds of millions of hectares of tropical forests would require extended monitoring devices, human means and probably a big amount of money to maintain the entire system on a sustainable basis.

[10] As stated by the Kyoto Protocol Compliance Mechanism, the non compliant Party has to make up the difference between its emissions and its assigned amount during the second commitment period plus and additional deduction of 30%. http://unfccc.int/kyoto_protocol/compliance/introduction/items/3024.php

the subsequent change in US administration brought about changes in the course of history. This is a good demonstration of the ability of a negotiation process to allow for massive quantities of hot air in order to provide incentives to countries that would otherwise be reluctant to engage in such agreements. One could suspect that since involvement of developing countries in setting national emissions targets is at stake (for those numerous countries which are willing to extend the Kyoto architecture beyond current committed countries – Ximena Rubio Alvarado and Wertz-Kanounnikoff 2007), the calculus is to give an incentive to such countries at the price of generating potentially significant amounts of hot air. At the risk of destabilizing a fragile carbon market (if credits are fungible with those of Kyoto) while it is recognized that, so far, Kyoto agreement have reached limited results in regard of reduction efforts needed (Prins and Rayner 2007).

HOW TO DEAL WITH "DEGRADATION"?

The mention of degradation at CoP 13 derived from the willingness of Africa's Congo Basin countries to be rewarded for 'early efforts' made by most of them to implement compulsory management plans. COMIFAC preparatory documents mentioned the possibility of being gratified in proportion to their forest surface area covered by management plans[11], implicitly assuming some strong hypotheses:

- The 'business as usual' baseline would be unregulated logging (despite the compulsory character of forest management plans (FMPs) in all COMIFAC countries);
- Strict implementation of FMPs would result in lower carbon emissions than unregulated current selective logging (at a rate of 3 m^3 commercial timber volume per hectare on average in DRC, 10 m^3 in Cameroon and 10-12 m^3 in Gabon for concessions located in distant areas).

Evaluating carbon emissions from degradation would require extensive on-the-field monitoring, since remote sensing is not suitable for this (Foody 2002). But beyond this technical difficulty (and its financial implications), there are a couple of points worth being mentioned:

- FMPs are not designed to ensure biomass recovery but a minimal recovery of volumes of commercial species; in most cases, the felling cycle is too short (30-35 years) to allow reconstitution of the initial standing volume (Sist *et al.* 2003a), especially in primary or primary-like forests[12]. Reduced Impact Logging (RIL) could improve the situation, but in countries where logging intensity is relatively high (such as Indonesia), RIL only is unable to recover initial volumes of commercial species. It is therefore difficult to argue that such improved logging is not a form of "degradation", even though this does not mean that such practices are automatically unsustainable (Karsenty & Gourlet-Fleury 2006);
- In countries with very selective harvest methods, such as in the Congo Basin hinterland, the implementation of management plans introduces limitations on harvest of some species according to their recovery profile provided by inventories (often the most valuable species). Loggers are also encouraged to shift toward abundant less-used species (LUS). From an economic perspective this generally means a greater volume harvested per hectare to compensate for the lower commercial value of such LUS. But any increase in harvests automatically leads to an increase in damages (and carbon emissions), even with RIL methods, since this entails more roads, skid trails, timber parks, etc. Thus, implementation of FMPs could lead to *more* carbon emissions when hyper-selective logging (a threat to biodiversity conservation) is the current practice.
- FMPs are the core of a new generation of forest laws in most tropical countries. In countries where forest concessions are the dominant form of forested land use (such as in the Congo Basin), non-compliance with this basic legal requirement should be easy to sanction through the threat of ending the concession contract. From a political standpoint, it would be difficult for governments to say that the "business as usual" scenario will be unregulated logging.
- According to Laporte *et al.* (2007), even the very selective harvest one can find in DRC (3 m^3 per hectare) emits around 10 tons of carbon per hectare (around 37 T of CO_2) when taking damages into account. Thus, it would be easy to demonstrate that strict forest conservation (assuming zero emissions) is a better scenario (at least from a carbon emissions perspective) than logging, even with adequate FMP and RIL implementation. Conservation organizations supporting the development of concepts such as "conservation concessions" (Niesten and Rice 2004) will find through such "avoided degradation" schemes the financial means they currently lack for compensating governments and stakeholders for the opportunity cost of non-logging. In DRC, if REDD credits are valued at only US$ 15 per ton of CO_2, this means a valuation of US$ 555 per hectare. Providing a 30-year rotation, this is equivalent to a US$ 18.5 per hectare for a concession (not discounted). If temporary credits are to be used, and providing a value between

[11] http://unfccc.int/files/methods_and_science/lulucf/application/pdf/gabon_english_pdf_230207.pdf

[12] Forest having being formerly exploited at very low intensity to extract some high-value trees specimens.

15 to 25 % of permanent credits, this means a range of US$ 3 - 4.6 per hectare, potential REDD subsidies for additional conservation in primary-like forests has to be compared with opportunity costs of the conservation of unlogged forest. For Cameroon, we estimated this at around € 14.5 (US$ 21 according to February 2008 exchange rates) per hectare (Karsenty, 2007), which is probably amongst the highest levels within Congo Basin countries because of fiscal structure. Thus, in a significant number of cases, the financial leverage brought by "avoided degradation" activity will not be enough to fill the gap without the mobilisation of additional funds.

WHICH CREDIT UNITS?

So far we have evoked only REDD credits, since disagreements still exist between countries and some Parties[13] about the nature of these credits. Brazil does not support tradable (fungible) credits on the Kyoto-derived carbon market, officially to prevent industrial countries bearing historical responsibilities of carbon emissions from escaping domestic efforts of reduction through buying REDD credits. Concerns about a possible 'flooding' of carbon market by REDD credits are growing (Leach 2008), but many (such as Chomitz *et al*. 2007:198), following the arguments of the Stern review, suggest that new carbon credits could be absorbed through more stringent commitments in Annex I countries. This argument could stand – even though one could be doubtful about the automaticity of such an adjustment – if one were sure that REDD credits were genuinely additional – or at least a very large proportion of them were. Otherwise, it would have the very same effect as injecting forged money into a financial circuit, whilst CO_2 emissions would continue increasing.

If REDD credits were tradable with CDM and the market of inter-Annex 1 countries, the same permanence issue as A/R CDM will re-emerge. Will a country having being rewarded for reduced deforestation in a first commitment period be forced to make a 'refund' if he oversteps its target for the subsequent period? One obvious solution would be to use the same temporary credits already in force for the A/R CDM credit. Such temporary credits are also suggested not only for addressing non-permanence risk, but also to mitigate the one of market flooding. But, it is acknowledged that, for CDM, temporary credits are one of the causes of the failure of 'forestry-CDM', since the market is unwilling to buy them. More generally, this brings us back to a well-known paradox about economic incentives: the fact of discounting assets expected by the agent can prevent undesirable effects from taking place, such as market flooding and non permanence; but it will also discourage the recipient from engaging in the implementation of socially and politically costly measures. In such a case, it is likely that the governments' efforts will focus more on negotiating the rules and baselines than on implementing such costly measures to curb deforestation.

Using money instead of carbon credits would avoid the risk of market flooding, but not the risk of non-permanence – except if REDD rewards are stringently caped to mimic temporary credits.

TAKING SERIOUSLY THE POLITICAL ECONOMY OF 'AVOIDED DEFORESTATION'

Everything is taking place as if many economists and climate specialists alike assumed all too readily that Governments act 'neutrally' and in favour of the common interest of their own country and population. Another rather odd vision, especially when referring to many developing countries, pictures a supposed ability that omnipotent governments would have to accelerate or slow down deforestation as they like for strategic purposes. Such an argument is still evoked when debating on the reference period to be adopted for the baseline: some fear that if the reference were set up at the beginning of commitment period, some Governments would voluntarily increase deforestation rates 'to degrade their baseline', but would reduce their deforestation rate once within the commitment period in order to maximize the amount of REDD credits they would receive. Such a view of governments of developing countries as calculating 'car drivers' able to use the accelerator and the brakes of deforestation rate at their will is not very realistic. Various interests are represented in governments, and contradictions are frequent between ministries of agriculture, mines, transport, energy, and forestry. Furthermore, the capacity and 'credibility' (Rodrik 1989) of governments are variable but most often limited. Even the Brazilian government seems unable to contain the effects of recent agricultural price increases on the pace of deforestation, despite commitments by the Ministry of Environment.

Will governments modify their macro-economic policies (currency exchange rates, interest rates, investments in infrastructures, etc.) to curb deforestation in order to seek REDD credits? This is doubtful, but even if a government decided to do so, the potential impact of some measures on deforestation would be uncertain. Kaimowitz and Angelsen (1999) stated that "*Generally, it is hard to find any-clear-cut relationship between macroeconomic variables and policies and deforestation*". Moreover, as Kanninen *et al.* (2007:22) pointed out, "*Rising agricultural output prices and reduced input prices render agriculture more profitable, and lead to expanded areas under production. Other macroeconomic factors with significant potential to impact upon deforestation include external debt, foreign exchange-rate policy, and trade policies governing sectors linked to deforestation (mainly agriculture and cattle ranching) and forest degradation (mainly timber extraction). The net impacts of such policies on forests are however, highly variable. For example, a devaluation or currency depreciation will stimulate exports,*

[13] Reluctance vis-à-vis inclusion of REDD into the carbon market is perceptible within the European Commission.

and the deforestation impact depends on whether or not export crops are suitable for cultivation on cleared forest land".

The case of land tenure and land use

Even some policies unanimously regarded as positive, such as improving the security of land tenure (through land titling or other procedures) can have different or perverse impacts over time. Land titling can give landowners access to credits (thanks to the collateral of the titled land itself) which can be used on the short term to expand crops against forest cover (Kaimowitz 1996). On the long term, secure land tenure is a good way of promoting reforestation (which is not accounted in most REDD proposals) and maintaining forest cover on the secured land, as shown in the example of China (Hyde *et al*. 2003). A committed government could, however, be hesitant to undertake a land titling reform – which is potentially conflicting as it implies choices between groups and individuals for full ownership recognition – only for being rewarded under the REDD scheme for the future commitment period. Such structural reforms and changes, with important social and economic consequences, have little chance of being undertaken as a result of potential REDD credits incentives.

Well before deforestation became the global concern it is nowadays, numerous economists had shown the potential economic gain that developing countries could derive from improved land tenure security in terms of agricultural development. Evolutionary land right theorists would show that when social costs of conflicts about land were growing with changes (including population growth), the corresponding social demand for land security would lead to institutional change, such as land titling programmes[14]. But in some regions, such as Sub-Saharan Africa (SSA), land conflicts have continuously increased (and associated social costs also) without corresponding induced institutional change[15], despite collective gains emphasized by the theory (Platteau 2000). One can suspect the same scenario will happen again with the so-called REDD incentives. If political costs of reforming are too high, and if governments are not fully committed toward the nation's collective interests, future REDD credits will not weigh significantly in the balance, especially inasmuch as they are postponed in time and discounted (as such and because of systems adopted to address non permanence and uncertainties in baseline settings).

However, some policies are known to be efficient against deforestation, such as applying existing stringent laws to prevent deforestation. Why are such laws not already applied? This is obviously a governance issue, with vested interests of government officials, fear of social and political costs, or simply incapacity to implement land use regulations. Are payments to governments likely to change this? Here again the problem lies in the gap between private interests of politicians and collective interests of the nation in the name of whom they claim to speak. Many politicians take advantage of the *status quo* and fail to act effectively to improve collective welfare.

Overlooking lessons about aid and development?

Climate analysts and negotiators are often little informed of debates and lessons drawn from decades of mitigated results about aid and development. A general statement by two experts in the field is worth quoting in full: "(…) *Alesina and Dollar (2000) look at the relationship in general between official finance and policy reform. One aspect of their paper is quite relevant to aid and reform: they ask whether or not there is any tendency for increases in finance or decreases in finance to lead policy change… In only a handful of cases does policy significantly improve in the following three to five years, and in just as many cases policy significantly worsens. The most striking fact here is that in general policy is quite persistent. Large changes in policy are the exception, not the rule. Analytically, aid can be expected to have two opposing effects on the incentive for a government to reform.* ***If aid is linked to reform there is some favourable substitution effect****: if the government agrees to reforms it will receive more aid. Offsetting this effect is the* ***income effect: the more aid the government expects to receive, the less necessary it is to implement those reforms which are politically costly***" (Collier and Dollar 2004 – emphasis added)

Such statement highlights a critical issue for the architecture of the REDD debate: linking financial reward to reform can be an effective way of pushing governments to make reforms. Conversely, whilst governments have good chances of receiving REDD credits thanks to their negotiating favourable baseline settings, the likeliness of their undertaking costly reform is limited. Reducing deforestation is without doubt socially and politically costly and will need early funding to launch reforms, compensate the potential 'losers' and maintain efforts over time. This requires linking financial terms to agreed conditionalities regarding reform contents and measures implemented rather than 'unconditional rewards to governments for reduced deforestation against a baseline'. In other terms, it is necessary to move away from most current REDD proposals and focus instead on using more traditional and flexible instruments such as financial facilities *(funds)*.

THE CASE FOR AN INTERNATIONAL FUND TO TACKLE DEFORESTATION

Besides preserving the carbon market from flooding with numerous non additional REDD credits, a Fund designed to support reforms and specific measures to tackle deforestation

[14] Platteau (1992) analysed critically this evolutionary theory of land rights and institutions.
[15] According to Österberg (2002) only 3 to 8 % of lands are titled in SSA.

and degradation offers several advantages over the carbon-market REDD architecture. Only a Fund can contribute to implementing policies and measures to curb deforestation and degradation without having to compute the quantities of carbon saved – a calculation which is often impossible to evaluate or even to impute to a given public policy (Pirard and Karsenty, in press).

Critical reforms and processes, such as rural land tenure reforms, change in agriculture patterns in forested areas (with sustainable intensification), creating economic alternative for forest users, public-private partnership for monitoring forest crimes, radical change in forest services governance, large scale PES programmes, etc., require both financial means and political will. Unconditionally rewarding governments for reducing deforestation against a baseline does not guarantee that such policies will be agreed upon and implemented. Yet, in order to help the negotiation process, it might be necessary to keep a window open for rewarding governments (with money rather than carbon credits, to avoid negative impact on carbon markets) provided they effectively adopt tangible measures such as enforcing law implementation. A performance index could be envisaged in this respect. In any case, however, the bulk of the funds should be directed towards structural policies & measures, field programmes and PES schemes to curb deforestation and degradation. It is critical to address such issues in a holistic way: the launching of a large PES programme cannot be sustainable without also addressing land tenure issues (this could be the major outcome of such a PES scheme: making land rights clarification an urgent necessity if one wants to generalize conservation contracts), as well as working simultaneously on agricultural practices to foster sustainable intensification.

Sustaining incoming financial flows

Despite its flexibility, the traditional weakness of the Fund – just like development aid – is 'donor fatigue', especially when concrete results are delayed or inexistent. The Norwegian government announced that by the end of 2007 it would devote more than US$ 500 million a year for a 5-year period to fight deforestation. However, such unilateral voluntary commitments are unlikely to be numerous. Sustaining the financial flow into such a Fund seems critical inasmuch as only long-term efforts are likely to succeed in curbing deforestation. Politicians and personalities have suggested some mechanism to maintain the flow of funds earmarked for mitigating climate change. At CoP 13, the French Minister of Sustainable Development suggested a tax on international financial transactions, derived from the so-called 'Tobin Tax' (*Libération*, 13 December 2007). Early 2008, Prince Charles "called for a public-private partnership of banks, insurance companies and pension funds alongside international financial institutions to provide financial incentives to combat deforestation taking place on a massive scale" (Reuters, 15 February 2008). In particular, he suggested that proceeds from the planned auctioning of emissions permits under the European Union's Emissions Trading Scheme could be used to provide long-term incentives for sustainable forestry in developing countries (*idem*).

Such a call will probably take time before reading wide international consensus, especially as international taxation schemes are at stake. Yet it seems the most reasonable way to construct an appropriate instrument.

The Forest Carbon Partnership Facility of the World Bank: a promising tool?

At CoP 13, the World Bank officially launched a new prototype fund for 'avoiding deforestation and degradation'. As mentioned on its website, "The proposed FCPF would assist developing countries in their efforts to reduce emissions from deforestation and land degradation (REDD). It would have the dual objectives of building capacity for REDD in developing countries, and testing a program of performance-based incentive payments in some pilot countries, on a relatively small scale, in order to set the stage for a much larger system of positive incentives and financing flows in the future"[16]. This Fund also has a double window structure – a "readiness mechanism" aiming at helping 20 developing countries to "arrive at a credible estimate of their national forest carbon stocks and sources of forest emissions, as well as assist the countries in defining their reference scenario based on past emission rates for future emissions estimates" and a "carbon finance mechanism" for which a "few countries would be selected to participate in this mechanism through which the Facility would implement and evaluate pilot incentive programs for REDD based on a system of compensated reductions".

In a presentation at Chatham House in December 2007[17], World Bank staff was more precise about concrete actions supported by the FCPF in order to tackle deforestation and degradation; these include:

- Removing subsidies leading to deforestation and degradation;
- Improving forest law enforcement;
- Securing rights for indigenous peoples and other forest dwellers;
- Devolving forest management to local communities;
- Forest certification;
- Conservation concessions;
- Strengthening the protected area network;
- Direct payments for environmental services;
- Improving fire prevention and suppression;
- Forest management plans for more rational use of forest resources;
- Reduced impact logging;

[16] http://carbonfinance.org/Router.cfm?Page=FCPF&FID=34267&ItemID=34267&ft=About
[17] http://www.chathamhouse.org.uk/files/10798_171207bosquet.pdf

- Reforestation of degraded lands to meet timber and energy needs;
- Alternative livelihood programmes; and
- Intensifying agriculture and promoting agroforestry.

In fact, once analysts begin to think about concrete means to tackle deforestation, they reach the conclusion that a coordinated set of policies and measures implemented through coherent field programmes are urgently needed. Moreover, without 'early money' that only a Fund can deliver, such measures are unlikely to be implemented. In this respect, the FCPF could play a decisive role in collaborating with governments to set up appropriate policies and measures, on the one hand, and large-scale PES programmes targeting rural communities, individual farmers and companies on the other. Rather than spending vast sums of money to fund foreign expertise to establish unlikely baselines, 'readiness money' could go into field programmes designed to tackle deforestation whilst keeping to poverty reduction objectives and fairness vis-à-vis local users of forest resources

BOX 2 *Supporting sustainable forest management and certification development: a role for the FCPF?*

One might consider a linkage between environmental service payments and 'avoided deforestation and degradation' actions supported by the FCPF. Financial rewards could be given to concessionaires who decide to comply with the law and commit themselves to independent auditing based on performance, such as forest management certification. One could consider that a concessionaire who invests in independent auditing to obtain certification places himself under scrutiny and invests in its "reputation". This is certainly a long and difficult element to acquire yet it can be lost very easily, as anyone knows. Compliance with law is the first requirement for internationally-recognized certification schemes, and it works as an ally for the forest service with respect to law enforcement.

One way of encouraging independent forest certification for its various positive impacts, would consist in reducing forest taxation for certified concessions. Governments may be reluctant to adopt such a measure, however, since their revenues would fall as the total area of certified forest land increased, unless these losses were compensated by an ad hoc Fund such as FCPF.

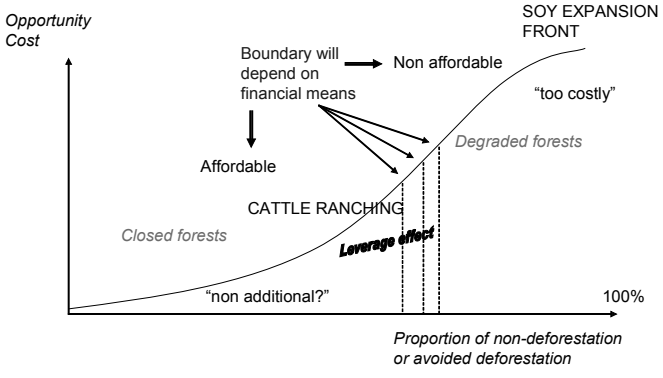
Compensating local stakeholders more critical than rewarding governments

One of the major advantages of the Fund option is that it allows channelling money to local stakeholders whilst most carbon-market REDD architectures imply rewarding the national government at the end of the commitment period and leaving payments of local stakeholders to governmental discretion. Brazilian states such as Mato Grosso and Amazonas have launched ambitious PES programmes, also known as REDD projects, in order to compensate farmers who agree to reduce deforestation (ICV 2007). However, this does mean the additionality issue is automatically resolved with such PES schemes since, as Persson and Azar (2007:1296) point out about such programs in Brazil: "*If compensation were to go out only for lands where forests are thought to be threatened by destruction, problems with creating baselines for deforestation and a risk of moral hazard, i.e., landowners claiming and threatening to clear land that would otherwise not have been cleared, would arise. If compensation on the other hand were to go out to all private land owners, the financial compensation offered would likely be too small to affect land-use patterns in any significant way*".

One can illustrate such a remark through the figure below: the leverage effect of such PES programmes is likely to be limited to the cases where the forest is effectively threatened and when the opportunity cost of keeping the forest is not too high. Yet on the other hand, some equity considerations will also take place: as noticed by Wunder (2007), the economic rationale, which is to pay only for threatened forest (additionality criteria), would exclude many traditional communities unable or unwilling to deforest. On the other hand, large landowners who could afford to slow down their deforestation rate (assuming no moral hazard), would benefit extensively from such payments. One must add that in Amazonas, few landowners comply with the obligation of keeping 80% of the forest on their properties. Ethical and legal considerations could not be neglected: paying landowners having cleared more land than allowed only for incentivising them to comply with the law is debatable, as pointed out by scholars from the Goeldi Museum in Belém[18].

This issue also raises the question of the cost of avoiding emissions from deforestation, which the Stern review claims to be smaller than in other sectors (Stern 2006:540).

FIGURE 4 *Additionality versus affordability for REDD/PES schemes*



[18] O Estado de Saõ Paulo, 30 October 2007.

At what cost?

In a document presented at the Bali Summit, Laporte *et al.* (2007) tried to estimate the costs of curbing deforestation in DR Congo by 50%. Having estimated that rural households emit approximately 15.5 tons of carbon per year for 0.62 ha of clearing, they simulated the carbon price needed for compensating households would range from US$ 300 to 1 000 per year. They concluded that the annual price of carbon would need to be between US$ 19 and 65, which appears to be cheap for achieving large reductions. But is such apparent 'good news' credible? First, for people in a survival mode living in remote areas, such modest financial compensations are unlikely to cover the welfare losses associated with 50% of land clearing reduction in a subsistence economy that is only partially merchandised[19]. In addition, if households have to buy more imported food products to compensate a 50% loss of arable land, they will have to face a risk of inflation and, unless a permanent revision mechanism of compensating payments is designed and implemented, households will rapidly end up worse off (which would probably lead them to resume forest clearing).

Beyond such considerations, one can argue that such estimates – following those of the Stern review for avoided deforestation – do not distinguish between the opportunity cost and the full implementation cost of coherent and large-scale PES programmes. Simply matching the (modest) annual revenues of rural households deriving from land clearing in forest frontier areas with a carbon price on international markets is insufficient in achieving effective changes in the field. There are many intermediate (and costly) steps that involve programme building as well as all the institutional arrangements to prevent leakages and unavoidable opportunistic behaviour of agents (which are not so blameable when households earn less than US$ 1 a day). In concrete terms, such schemes will require costly expertise, project design, management, monitoring and other various transaction costs. Furthermore, one can foresee that those prices will increase exponentially with *scaling up*: in order to be sustainable, such operations will need significant change in current extensive farming practices ('slash-and-burn') which cannot be achieved without carrying out comprehensive support programmes which would include subsidizing fertilizers, training, credit schemes, etc.

BEYOND REDD, WILL FORESTS BECOME INTERNATIONAL PUBLIC GOODS?

Whatever the outcome of the current debate about REDD architecture, world forests – and especially tropical ones – have taken a prominent place in the global change agenda. The fact that debates are focusing on financial compensations has generated new and evolving strategies from various large-forested Southern countries which could lead to some innovations in international relations regarding the status of some tropical forests.

Certain public declarations of developing country officials are calling for a generalization of financial claims for *standing forests*, *i.e.*, well beyond the concept of avoided deforestation. Yet, Indonesia wants to be paid US$ 5-20 per hectare not to destroy its remaining forests (Reuters, 8 October 2007). Moreover, the (former) Minister of DR Congo declared that "we are ready to contribute to climate equilibrium but we demand $3 billion [annually] for our forests to absorb the carbon dioxide emitted by industrial countries" (Xinhua, 2 October 2007). A few months earlier, Ecuador turned to the international community claiming that the country is willing to exploit oil reserves located beneath dense forest areas inside the 700,000-hectare Yasuní National Park unless they are compensated for foregoing oil revenue – a figure President Correa estimates at around US$ 350 million per year (ENS, 24 April 2007. Last but not least, *The Independent* newspaper dated 24 November 2007 announced – under the title "Take over our rainforest" that Guyana has offered to give its entire rainforest to a British-led international body in return for development aid and expertise from the UK.

Despite the fact that some countries such as Brazil still firmly assert the strict sovereignty of the Amazon forest against what it perceives as attempts to "internationalize the Amazon", other developing countries seem ready to forego their long-lasting claim to the full ownership and rights to use the natural resources as they see fit. If such a phenomenon were to be generalised, forests would tend to correspond more to the International Public Good (IPG) definition, *i.e.*, goods whose provision or associated benefits spill over national boundaries. The UNDP also specifies that such goods "*are non-excludable, and sometimes, also non-rival. They are there for all to consume*"[20]. So far, forests only display a few IPG characteristics, including some of the *services* they provide, such as carbon sinks and reservoirs and biodiversity reserves, but the *resources* they contain, such as timber, non-timber forest products and potential agricultural land, fall within national sovereignty instead and are subject to various local property rights. Only if forests were to be managed for rendering global services entirely remunerated by the international community rather than for the physical resources as they are today, then one could consider them as new IPGs.

Engaging on such a path could be tempting. Economists, after all, have long claimed that forests are destroyed because of 'market failures' which hampers the recognition and remuneration of their total economic value. However, there is a political (and financial) risk for potential 'buyers' who could be threatened as follows: "*if you don't pay me I will*

[19] The authors only acknowledged this implicitly in a footnote: "the calculation presented here is a simple representation of transfer based on cash income and probably underestimates the true value of forest for the households" (p. 24).

[20] http://www.undp.org/ods/r-whosegpg.html

let my forests get cleared". Such a risk is already foreseeable at local level with PES programmes, making it difficult to concentrate payments only on 'objectively threatened forests' as recommended by Alix-Garcia *et al.* (2003) in the name of efficiency. This could become a demand of developing countries at global level.

Yet financial rewards (to governments) for standing forests *without regard for policies carried out* would be extremely costly, of doubtful effectiveness and also questionable from a global justice perspective: countries with abundant tropical forests are often not the poorest or the least-endowed in alternative natural resources, and rewarding them in proportion to their forested surface area could be considered unfair in relation to other countries struck by aridity and extreme poverty, such as in the Sahelian region. To avoid such *impasses* one needs to call for a principle of responsibility at three levels:

- Environmental responsibility must not be addressed to Northern countries only: the reverse side of the coin of the (uncontested) sovereignty of developing countries on their forest resources should be the responsibility vis-à-vis the forests as global environmental service providers;
- Industrialized countries have the responsibility to reward genuine efforts of governments and local actors. This cannot be contemplated without using commonly agreed conditionalities and strong evaluation of public policies implemented as well as their impacts; and
- Citizens, especially those of industrialized countries, must be aware that appropriate economic instruments can contribute to solving the problem but will not be sufficient to rescue rainforests if in-depth change in consuming patterns are not carried out; the ultimate solution (still) remains in the collective choices and both collective and individual behaviour: forests continue to be converted for cattle ranch expansion as well as biofuel and pulp and paper production which – at the end of the day – boils down to the issue of ever-increasing consumerism.

CONCLUSION

Markets instruments are very effective tools for achieving specific goals, such as improving efficiency of economic agents, but they will probably be unable to change the socio-political context underlying tropical deforestation. A successful market-based REDD mechanism would need a collective capacity to agree upon a baseline which would either take the form of a reference period in the past or a scenario which could be used a convincing projection of the future trends of deforestation. Unfortunately, there is little chance that the future resembles the past; robust predictions of future deforestation seem unlikely given the complex interactions of factors commanding the pace of deforestation, especially as most of them lie outside the forest sector. The unexpected and sharp increase in deforestation in Brazil as a direct consequence of the worldwide sudden rise of food prices should remind us that scenario(s) should not be confused with predictions. Even if baselines are rejected in favour of agreed national quantitative targets of deforestation, disentangling the impact of genuine efforts by governments from random events – needed to assess the additionality of emission reductions – will be often impossible. The various methodological refinements proposed to attenuate those difficulties have failed to provide satisfactory ways of overcoming this fundamental stumbling block, and have introduced complexity within a scheme whose initial quality was simplicity.

There is also confusion about incentives. Governments are not mere economic agents adapting their behaviour to a relative price system, as is implicitly assumed in market-based REDD proposals. States' decisions and policies are influenced by more complex processes, especially when governments do not act according to the collective interests of their country. As for weak and failing states, the capacity of governments to adopt and implement policies capable of curbing deforestation is extremely limited. However, even a weak government has the ability to influence the international negotiation process and urge for rules which maximize its expectation of being rewarded, regardless of its policies and measures during the commitment period. This has definitively turned REDD negotiations into an issue of political economy, rather than a technical one which could be resolved through delegation to a narrow group of experts.

The risk of a market-based REDD scheme is that it could generate huge amounts of "non additional" carbon emission allowances which would flood the main carbon market and ruin collective efforts to maintain a sufficiently high price of emission permits in the energy and industrial sector. To prevent this risk, one should look at other REDD architectures in which rewards will not be based on emission allowances for Annex I countries. An international Fund aiming to support policies and measures needed to tackle deforestation and degradation would be a more appropriate tool – and the only solution should action be financed immediately rather than probably at the end of the second commitment period. Financial support should be targeted in priority towards local actors causing deforestation or protecting the forest. Structural measures targeting land tenure systems, agricultural organisation and practices, along with good governance, should be supported as providing long term collective benefits with respect to forest cover but also livelihoods, even though the short term impact on avoided deforestation might not be straightforward and easily quantified. Reducing deforestation is socially and politically costly. It will need early funding to launch reforms, to compensate potential 'losers' and maintain efforts over time. This will require linking financial terms to agreed conditionalities regarding reform contents and measures implemented. Such changes would have to be completed by large "payment for environmental services" schemes targeting local stakeholders. Their implementation will be challenging (additionality issue) and probably much

costlier than predicted by the Stern Review which considered only opportunity costs and overlooked implementation and monitoring costs of such programmes. Yet they probably represent the only possibility to curb deforestation in a way that is socially and economically acceptable to the populations of poor and developing countries.

Whatever the outcome of the current debate about REDD architecture, the international status of tropical forests is probably going to evolve. Large forested countries have already gone beyond "avoided deforestation" and are demanding financial rent for global services provided by standing forests – whatever the policies conducted. If such claims were satisfied in the future, it would bring tropical forests closer to the definition of International Public Goods. However, it would not guarantee more effective protection. Finally, one must be aware that appropriate economic instruments can contribute to tackling the deforestation problem but will not be sufficient to rescue rainforests if in-depth changes in collective and individual consuming patterns are not carried out at a global level.

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A three-fund approach to incorporating government, public and private forest stewards into a REDD funding mechanism

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SUMMARY

The role of tropical deforestation in global climate change is a strong justification for its inclusion in the UN's global climate treaty. In order to successfully address deforestation and forest degradation in developing countries, a compensation scheme must include the main actors involved in deforestation and provide incentives for forest stewards who protect forest carbon stores. Since each tropical forest country represents a different mix of public and private tenure of forested land, policies at the UNFCCC level will need to be sufficiently flexible to allow countries to tailor REDD programs to reflect these differences. At the same time, Parties need to negotiate a basic REDD structure that can apply to all countries as a framework under which to build their national programs. We propose an approach that will incorporate the three main actors of deforestation and forest protection in tropical regions: government, private forest owners, and public forest stewards (including indigenous people and others). These funds and the activities supported by them are envisoned to function most effectively under a combined market and non-market approach.

Keywords: deforestation, degradation, land tenure, forest stewards, market

Une approche soutenue par trois fonds pour incorporer le gouvernement, les gardiens des forêts publiques et privées dans un mécanisme de financement de la REDD

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Le rôle de la déforestation dans le changement climatique global justifie fortement son inclusion dans le traité global sur le climat des Nations-Unies. Il est nécessaire qu'un projet de compensation inclue les principaux acteurs engagés dans la déforestation et qu'il offre des avantages aux gardiens de la forêt qui protègent les réserves de carbone, pour faire face avec succès à la déforestation dans les pays en voie de développement. Du fait du mélange variable de la propriété publique et privée des terres forestières dans chaque pays de forêt tropicale, il est nécessaire que les politiques au niveau du UNFCCC soient suffisamment flexibles pour permettre aux pays d'adapter les programmes de REDD pour refléter ces diférences. Il faut en même temps que les parties prenantes négocient une structure de base de la REDD qui puisse s'appliquer à tous les pays comme un cadre à l'intérieur duquel ils peuvent construire leur programmes nationaux. Nous proposons une approche incorporant les trois acteurs principaux de la déforestation et de la protection de la forêt dans les régions tropicales: les gouvernements, les propriétaires forestiers privés et les gardiens des forêts publiques (en incluant les indigènes et autres). Il est envisagé que ces fonds et les activités qu'ils soutiennent vont fonctionner le plus efficacement dans le cadre d'une approche de marché et hors-marché combinée.

Metodología de incorporación del gobierno y de manejadores de bosque del sector público y privado en un mecanismo de financiación de REDD

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El papel que desempeña la deforestación tropical en el cambio climático global presenta una fuerte justificación para su inclusión en el tratado mundial sobre el clima de Naciones Unidas. Para encarar con éxito la deforestación en los países en vías de desarrollo, un plan de indemnización debe incluir los principales actores implicados en la deforestación y proporcionar incentivos para los manejadores de bosque que protegen los almacenes de carbono de las zonas forestales. Ya que cada país con bosques tropicales representa una mezcla diversa de tenencia pública y privada de tierras forestales, las políticas a nivel del UNFCCC tendrán que ser lo suficientemente flexibles para permitir a los países desarrollar programas de REDD adaptados para reflejar estas diferencias. Al mismo tiempo, todas las partes deben acordar una estructura básica de REDD que puede aplicarse a todos los países como marco dentro del cual pueden construir sus propios programas nacionales. En este artículo se propone un modelo que incorpore los tres actores principales de la deforestación y la protección forestal en regiones tropicales: el gobierno, los proprietarios privados de tierras forestales y los manejadores de bosque del sector público (incluyendo pueblos indígenas y otros). Se prevé que estos fondos y las actividades apoyadas por ellos funcionen de forma más eficaz dentro de un marco conjunto basado parcialmente en el mercado.

INTRODUCTION

The role of tropical deforestation in global climate change is now widely recognized in both scientific and climate policy circles. In much the same way that a growing scientific consensus around the role of human activity in climate change led policymakers to form the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, policymakers within the UNFCCC are now engaged in designing an international mechanism to Reduce Emissions from Deforestation and forest Degradation (REDD) in developing countries. This United Nations (UN) process, led by developing countries, is a response to the growing awareness that it will not be possible to avoid dangerous anthropogenic interference with the climate system while emissions from tropical deforestation continue at current rates, as well as the recognition that, under carefully designed programs, developing countries can meaningfully participate in the climate regime in a way that supports sustainable development.

The REDD process, in seeking to design a policy mechanism that will reduce deforestation and its associated Green House Gas (GHG) emissions, forays into the longstanding effort among conservationists to protect tropical forests from the pressures that drive their destruction. As the history of this conservation effort shows, deforestation is the result of a complex mix of drivers and incentives (or lack thereof), and there is no single approach that will address them all successfully. Stopping or reducing deforestation requires a basket of flexible approaches that addresses the different drivers and incorporates the agents of deforestation, removing or replacing the incentives to deforest, monitoring efforts to protect forest carbon reserves, enabling and rewarding forest stewards who succeed in reducing deforestation. In this paper we recommend an approach to distribute REDD funding to the main actor groups that must be included in a successful REDD regime, and link these funds to a mix of market and non-market financing options.

BACKGROUND

With the success of Papua New Guinea and Costa Rica, supported by several other tropical developing countries, in reviving the deforestation issue on the agenda of the UNFCCC in 2005, a productive 2 year process of analysis of scientific, technical, political and financial aspects of REDD ensued (e.g. Mouthinho and Schwartzman 2005, Santilli et al. 2005). The outcome of that 2 year process, initiated at the first joint Conference of the Parties/Meeting of the Parties (COP/MOP 1) in Montreal, and culminating at COP/MOP3 in Bali, was the UNFCCC decision that, among other achievements, placed REDD within the framework of negotiations on the post-2012 climate regime as an potential contribution to the continuing effort to meet the ultimate goal of the UNFCCC-avoiding dangerous interference with the climate system (UNFCCC 1992). The Subsidiary Body for Scientific and Technological Advice (SBSTA) was also tasked with building upon the progress since 2005 to provide more specific and substantive advice to the UNFCCC in 2009 on how REDD could be incorporated into the future climate regime structure.

The REDD decision agreed to in Bali includes a call for and guidance on "demonstration activities", to build capacity in developing countries for the future REDD mechanism as well as to test methodologies and approaches and inform the UN process. It also includes a request for the Secretariat to develop a web platform where experiences and lessons learned may be shared among Parties and relevant Observers (UNFCCC 1992). Through this common platform, Parties may gain information and guidance through the experiences of those participating in these "demonstration activities" to aid in their decision on how to incorporate REDD into the UNFCCC post-2012 framework.

The political progress made over the two and a half-year UNFCCC REDD process has already led to tangible results, even before a REDD mechanism is designed or implemented. Australia has committed $200 million to help developing countries to establish credible estimates of national forest carbon stocks, identify sources of forest emissions, and develop incentives for conserving forests and investing in sustainable forest management. Norway announced at the December 2007 conference in Bali that it is committing 2.7 billions dollars over 5 years to halting deforestation in developing countries. The government of Japan, through its Space Exploration (JAXA), launched the Advanced Land Observing Satellite (ALOS) which features a radar imaging sensor. Through a dedicated observation strategy, ALOS maps all land masses several times per year. As part of the mission JAXA's Earth Observation Research Center (EORC) supports an international science team within the "Kyoto & Carbon Initiative" to produce and analyze global, REDD-relevant data sets.[1] Further research and testing, along with clarification of the monitoring requirements for REDD, will be needed in order to assess the utility of this new data source for REDD monitoring and reporting.

Many philanthropic organizations have committed to supporting the REDD process through funding basic scientific research, supporting demonstration activities and regional capacity building processes, and supporting strong advocacy for REDD in the UNFCCC process and at the level of national governments. The *Design To Win* program, a consortium of philanthropic groups, is incorporating support for REDD into its plan for supporting efforts to combat climate change (http://www.hewlett.org/Programs/Environment/Energy/Publications/Design+to+Win.htm).

In addition, the World Bank has created the Forest Carbon Partnership Facility (FCPF), which has the dual objectives of building capacity for REDD in 20 participating developing countries, and testing a program of performance-

[3] (http://www.eorc.jaxa.jp/ALOS/kyoto/adv_panel.htm)..

based incentive payments in 5 pilot countries. The Readiness Mechanism will provide technical assistance to participating countries to aid them in developing estimates of national forest carbon stocks, as well as establish a reference scenario of emissions against which to measure future emissions reductions. The second stage of the FCPF, the Carbon Finance Mechanism, will include a few countries selected by the FCPF from the Readiness Mechanism. The Carbon Finance Mechanism will aim to provide incentives for successful REDD activities based on the carbon estimates and reference scenario developed during the Readiness phase (carbonfinance.org).

More recently, the FAO, UNDP and UNEP have united on the issue of REDD to create UN-REDD, a partnership which intends to leverage the relevant expertise and strength of each organization to support activities within countries to prepare for and participate in a future REDD regime.

Initiatives such as the FCPF and UN-REDD will be key in advancing the REDD policy process, as they will provide a testing ground for methodologies for monitoring and accounting of emissions and reduction of emissions from deforestation and degradation, as well as support countries in calculating the costs of REDD and identifying effective national and regional strategies for addressing the drivers of deforestation and degradation.

An important element of REDD readiness is the development of meaningful processes of consultation within and among the stakeholders whose livelihoods are based on forest land or products. Many tropical country governments have limited experience in designing participatory planning processes, yet civil society will have an important role in REDD program development.

In addition to recognizing the importance of the role of civil society the international REDD structure faces the challenge of being substantive enough to provide a unified framework for all participating countries, while maintaining enough flexibility to allow countries to adopt approaches targeting specific drivers and kinds of deforestation and degradation. A significant threat to the long term success REDD is for the international community to become too prescriptive in defining how reductions in emissions are achieved. The focus, rather, should be on the credible demonstration of these emissions reductions, the sustainability of these emissions reductions, and evidence that the REDD program is not expelling forest people away from their forestlands, nor causing negative impacts on biodiversity, water resources, or rural livelihoods. The argument that tropical nations should not be paid to implement their own laws, for example, could weaken REDD by penalizing those nations that have created laws and protected area networks that they are unable to implement/maintain because of budget constraints. The UNFCCC REDD structure should emphasize the principles and criteria of successful REDD (sustainable reduction in emissions, benefits for forest people and rural people, other conservation benefits), and the need to allow tropical nations the freedom to develop REDD programs that achieve these principles.

APPROPRIATE AND SUSTAINABLE FUNDING OPTIONS FOR REDD

Estimates of the finances needed to reduce or halt tropical deforestation vary (e.g. Stern 2006, Chomitz 2005, Nepstad *et al.* 2007, Laporte *et al.* 2007, Swallow *et al.* 2007, others) but there is general agreement that current and historical levels of traditional Overseas Development Aid (ODA) funding are grossly inadequate, and that any serious REDD effort will require the underpinning of new and significantly higher levels of long-term financing. Governments and stakeholders involved in the UNFCCC process to design a REDD mechanism are considering a variety of financing options, including voluntary funds, levies on emissions trading, and carbon market-fungible credits, in an effort to identify sources to meet the level of funding needed.

Funding options for potential REDD participant countries fall into two basic categories: market and non-market. Market approaches generally refer to a mechanism whereby participating developing countries are able to create and sell units of emission reduction to Annex I countries, who may purchase and use these as credit against their own emission reduction commitments. Non-market approaches generally refer to a voluntary or compulsory fund created by Annex I (developed) countries and distributed to participating developing countries to aid and reward their efforts to reduce emissions from deforestation and forest degradation. Several variations for how this type of fund could be distributed have been proposed, including proposals by the governments of Brazil and of Tuvalu (UNFCCC REDD Cairns workshop presentations). In addition, hybrid approaches have been proposed, such as the creation of a separate market for REDD activities, or a market-linked approach which would derive REDD funding from a levy on emissions trading (Ogonowski *et al*. 2007).

While a market-based approach offers the largest long-term source of funding for REDD, market financing will not be appropriate to cover all costs associated with a country's participation in a REDD mechanism. Most developing countries require a significant level of financial and institutional support for capacity building in the design, implementation, and monitoring of a national REDD program. This capacity-building funding should support the building and strengthening of the institutions that will manage the various aspects of a national REDD program and is a necessary non-market precursor to any successful REDD program. Foci for this funding may include the development of a deforestation/carbon accounting framework, a forest monitoring strategy, the development of an emissions reference scenario, and the strengthening and/or improved enforcement of forest protection laws. Without a successful capacity building phase, the vast majority of developing countries will be unable to participate meaningfully in a long-term REDD program that significantly and verifiably reduces emissions from deforestation and forest degradation. Since much of the activity associated with this capacity-building phase may not translate directly to emission reductions, funding outside of the market will be necessary to support these important steps.

The second stage of financing comes into play when countries have adequately prepared to reduce, monitor, account for, and verify emissions reductions. . It is at this stage that most of the discussion over market and non-market funding approaches become most relevant. Financing for this stage of REDD will need to represent a viable and long-term alternative to the income generated through activities resulting in deforestation and degradation.

In developing national programs, countries must account for both political and economic requirements. Here we suggest that in most cases there are three important actors which a REDD program that is both economically efficient and politically expedient must include. We draw on examples from Brazil and the Democratic Republic of Congo to illustrate this three-pronged approach to REDD since they present diverse economic and political conditions and are the two largest intact tropical forests.

THREE MAIN ACTOR GROUPS FOR REDD - GOVERNMENT, PRIVATE LAND OWNERS, AND PUBLIC FOREST STEWARDS

The issue of how to incorporate the various stakeholders that will both impact and be impacted by REDD, and how to insure equitable benefit distribution for all forest stewards that demonstrably reduce emissions from deforestation and degradation are two of the more difficult challenges of REDD. The UNFCCC will need to ensure that international policies do not create a perverse incentive to infringe on the rights of traditional forest communities, while also respecting the sovereignty of nations as they develop national REDD programs.

In seeking a comprehensive approach to address the drivers of REDD, countries will likely need to examine a combination of top-down and bottom-up approaches (Wunder 2007). Improved governance and enforcement of forest protection laws will need to be accompanied by more localized activities that incorporate the knowledge and capacity of forest-dependent communities and reward their role as forest stewards. Additionally, landowners making economic decisions regarding the management of their forested land must also be considered in the design of a national REDD mechanism. Since each tropical forest country represents a different mix of public and private tenure of forest land, policies at the UNFCCC level will need to be sufficiently flexible to allow countries to tailor REDD programs to reflect these differences.

According to White and Martin's 2002 report on forest tenure, about 75% of tropical forest lands are administered by governments. 4% are set aside as reserves for indigenous or traditional communities. Approximately 16% are privately held by indigenous or traditional communities, and around 8% are held privately by individuals or firms (White and Martin 2002). Ratios differ greatly among countries, however, suggesting that a funding approach that can be applied generally to all nations must encompass all of these actors.

In an effort to combine a common structure with a sufficient level of flexibility within that structure, we propose a common funding approach that delivers REDD benefits through three main funds: a Government fund: a Public Forest Stewardship fund; and a Private Forest Stewardship fund. The specific design and implementation of each fund must be tailored to the circumstances of each country but here we present the foundation of these three funds and show examples of potential implementation from Brazil and the Democratic Republic of Congo. While we believe that this approach will operate most efficiently and effectively when financed through a mix of market and non-market funding sources, the general approach could apply to a non-market approach as well.

The role of Government

A Government Fund is designated to provide direct support to government efforts to improve forest protection laws and enforcement, to support capacity building for monitoring and accounting of emissions reductions within government programs, and to provide services to forest stewards acting on government-managed lands.

As the Government Fund is initially likely to be heavily focused on capacity building support, it would require non-market based funding, especially in the initial stages of implementation. Countries must develop the institutions and policies that provide the foundation for controlling and reducing carbon emissions from deforestation and forest degradation, and it is likely that these investments will be financed by international aid agencies, bilateral agreements, an international mechanism that incorporates capacity building into its funding structure, and even by investors who hope to claim REDD carbon credits through the voluntary or future compliance market. As a country becomes successful at implementing REDD policies and demonstrating their effectiveness in lowering rates of carbon emissions from deforestation and forest degradation, it should be able to supply credits for a market-based instrument, and hence require less non-market funding over time. As this progress occurs, the Government Fund could transition from being primarily non-market funded, to gaining most of its funding from the market. At the beginning of a REDD program, measures of success may focus on a country's REDD capacity development, shifting to emissions reductions as this capacity improves.

Nepstad *et al.* (2007) present an example of such a fund, which includes a description of a "Government Fund" to compensate government programs and expenditures necessary for REDD, above and beyond current budget outlays. These expenditures comprise monitoring and management of sustainable use public forests, expansion of protected areas and supervision of indigenous lands. On sustainable use public forests, an example of which is timber concessions, the government must also assess the trade-offs between carbon emissions due to logging, which can be low under good forest management, and the economic returns to that activity. The fund also provides additional services

(education, health, technical assistance) to rural populations, and the expansion of existing systems for environmental licensing and monitoring of private land forests to the entire Brazilian Amazon region. Overall, Nepstad *et al.* (2007) estimate the additional funding requirements for the Brazilian government to implement an effective REDD program in the Amazon to reach a maximum of just under $200 million per year. This includes increasing the percentage of land under formal public management to approximately 60 percent, a dramatic increase in social forest reserves, including indigenous and extractive reserves and an increase in private land holdings to some 30 percent.

Forest dependent peoples

The Public Forest Stewardship Fund is envisioned to reward the stewards of public forested land that reduce deforestation and forest degradation on these lands. Public forest stewards are those who, by some traditional or legal agreement or terms, have obtained specific rights to use of government owned land. This could include for example, indigenous lands and extractive reserves (social forests) in Latin America or community forest land in Africa. The agreements are negotiated at varying levels of permanence and, in many cases, rather than outright land ownership these agreements are perceived more as recognition of some right to use of the land. Furthermore, these agreements may be more or less explicit in how forested land may be managed. But, most importantly, these Public Forest Stewards, whether Indigenous Peoples or traditional communities, have been shown to be extremely effective barriers to deforestation, even in the presence of potentially high economic rents on their land (Soares *et al.* 2006, Nepstad *et al.* 2004, 2006.).

The Public Stewardship Fund must provide a long-term stream of financial incentives for forest stewards to continue and improve their forest-conserving activities, even if there are legal restrictions on forest destruction and degradation. There is little historical evidence that central governments of developed or developing nations can implement forest conservation policy across vast forest estates using purely command-and-control approaches when these policies threaten the livelihoods of local residents, nor is there much evidence to suggest that forest-based societies and economies can stand up to deforestation-dependent economies over the long term. REDD policies will be most successful when they create enduring economic incentives for forest protection among forest-based communities as they develop and implement legal restrictions on the ways in which public forests can be used.

Since capacity building of these institutions takes time, and if some financial incentive can accomplish what weak governance cannot in terms of forest protection, the Public Stewardship Fund may act as an effective stopgap measure until government institutions can more effectively monitor and enforce their forest laws, leading to reductions in emissions from deforestation and forest degradation. Of course this raises the issue of acclimatizing certain individuals or groups to payments which could be terminated in the future as governments enforce their laws more effectively. A system of phased payments may be an option to avoid this outcome, where recipients are informed that payments will decline over time. For example, a graduated payment scheme might provide maximum economic incentives only to participants who exceeded legal requirements, while providing more modest incentives to forest communities who comply with forest conservation requirements. In this scenario participants would not be eligible for payments until they had met some management threshold of forest carbon protection, but upon exceeding that threshold could then be rewarded for emissions avoided both within and beyond the legal requirements. This concept could provide the incentive to meet and exceed weakly enforced forest protection laws, since the reward would include not only the potentially small increment above the requirement, but would also reward activities which met the requirement once the minimum compliance level was reached and surpassed.

Given the extraordinary range of indigenous and traditional peoples' claims on forest resources, levels of organization, dependence on forest-clearing activities, and cultural heritage, the design of the Public Forest Stewardship Fund will have to be conducted within each country through processes that engage and empower these rural populations. In this sense, REDD must be viewed as a potentially large, long-term economic incentive for policy development and social engagement that ultimately improves the ability of historically disenfranchised rural human populations to collectively identify and achieve the conditions that are necessary for sustainable, prosperous, forest-based livelihoods.

Private land stewards

The Private Stewardship Fund is designated to support emissions reductions achieved by stewards of privately-owned or controlled forests who are fully engaged in market-oriented production systems. The major cost incurred by private land stewards participating in a REDD program is associated with the foregone profits of deforestation-dependent activities. Since the legalities and realities of land tenure differ significantly among countries, the fund may be applied in a number of ways, but the main idea is that private landowners and de facto smallholders can be compensated for activities they undertake on their land to reduce emissions from deforestation and degradation. There may also be cases where the distinction between Private and Public land stewards is blurred, and in these cases the design of the two funds should be tailored with these issues in mind.

In the case of countries such as Brazil, where private landowners are required by law to protect certain levels of forest on their land, the issue of additionality may arise in the same manner as that discussed under the Public Forest Stewardship Fund. In that case, the same argument for providing incentives for compliance with the law may apply. In situations where the long-term status of such a law is not certain, or enforcement is known to be weak, adding

a graduated financial incentive for meeting and exceeding legal requirements may be the most effective solution at least in the short term, while capacity building within government institutions for forest monitoring and law enforcement is underway.

The Amazon comprises a variety of private land owners, from small scale producers, to formal settlers on 100 ha, to large scale 80,000 ha soy and cattle mega-production. The range of opportunity costs estimates and values across the agents must be carefully calculated, but yet remain flexible as changing incentives will continually alter the economic context in which private decisions are made.

In the African context, households, with varying degrees of land tenure and community relations, are the basis for the private land steward. In a recent report, Laporte *et al.* (2007) identified four million households in the DRC, with a range of 0.5 to 2 ha of clearing annually. Any program aimed at reducing emissions from these household must take into account the subsistence, income, and cultural values that clearing delivers, and offer an economically and socially viable alternative.

CONCLUSION

The three-fund approach to distribution of REDD proceeds/ benefits, as presented, is envisaged to operate under a combined market and non-market approach. Some of metrics for success that would be applied to these funds are conducive to market mechanisms and would operate most effectively when driven by the market. Other aspects of REDD undertaken through these funds cannot be easily related to tons of CO_2 emissions averted, or may be tied to emissions reductions that will take place several years in the future. Such activities may be better supported through a non-market approach. Non-market approaches may still be success-based, even if they are not always tied directly or immediately to emissions averted. Annex I countries, in reporting on emissions reductions to the UNFCCC or under the Kyoto Protocol, are not required to prove that activities that enable them to meet emissions reduction goals are additional. The goal is the reduction of overall emissions. The assumption is that under a national program, activities that bring emissions below an agreed baseline are additional. In many ways, the commitment of a developing country to reduce emissions from deforestation and degradation below an agreed level resembles a sectoral target. In this case, operating under a national baseline for deforestation emissions, activities which reduce emissions in this category or sector are assumed to be additional.

In developing national programs, countries must design REDD programs that are viable politically, economically, and socially. In a REDD system of financially constrained success-based incentives, whether market, non-market or a combination approach is used, governments may compete for REDD funds through maximizing both efficiency in reducing emissions and practical applicability, given the cultural and economic conditions of the country. Here we suggest that in most cases there are three important actor groups on the landscape that a REDD program that is both efficient economically and politically expedient must include.

In an effort to encompass the need for both a common structure and a significant level of flexibility within that structure, we propose a common funding approach that delivers REDD benefits through three main funds: a Government Fund: a Public Forest Stewardship fund; and a Private Forest Stewardship Fund. The specific design and implementation of each fund must be tailored to the circumstances of each country but here we present the foundation of these three funds. While we believe that this approach will operate most efficiently and effectively when financed through a mix of market and non-market funding sources, the general approach could apply to a non-market approach as well.

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REDD models and baselines

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SUMMARY

The article reviews some of the critical issues for including Reduced Emissions from Deforestation and forest Degradation (REDD) into a new global climate agreement. Four different REDD models (regimes) are discussed based on two dimensions: scale (national vs. project) and funding (market vs. funds). One of the most troublesome issues concerns setting national baselines (= emission quotas). Research provides few definite answers on how to do this, yet it has huge implications for the possible payments to developing countries. The paper argues that the expectations about the magnitude of such transfers are unrealistically high, and may reduce the prospect for reaching an agreement and increase the chances for 'hot air' from the South.

Keywords: climate change, deforestation, REDD, climate agreement, baselines

Modèles REDD et lignes de base

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Cet article résume certaines des questions critiques à l'inclusion des émissions réduites de la déforestation et de la dégradation forestière (REDD), dans un nouvel accord climatique global. Quatre modèles (régimes) REDD différents sont examinés en se basant sur deux dimensions: l'échelle (nationale/ du projet) et les finances (marché/ fonds). L'une des questions les plus difficiles concerne les lignes de base nationales (c.a.d les quotas d'émission). La recherche offre peu de réponses certaines sur cette question, bien qu'elle ait des implications énormes pour les payments possibles aux pays en voie de développement. L'article démontre que les prédictions quant à la magnitude des ces transferts sont démesurément élevées, ce qui risque de réduire les espoirs de parvenir à un accord, et d'accroître la probabilité d' "air chaud" en provenance du Sud.

Modelos y pautas de REDD

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El artículo examina algunos de los temas claves para la inclusión de la Reducción de Emisiones por Deforestación y Degradación (REDD) en un nuevo acuerdo mundial sobre el clima. Se analizan cuatro modelos diferentes de REDD, considerando las dos dimensiones de escala (nacional o basado en el proyecto) y financiación (por el mercado u otros recursos). El establecimiento de pautas nacionales, es decir cuotas de emisiones, es uno de los temas más problemáticos, y las investigaciones proporcionan pocas respuestas definitivas sobre cómo lograrlo, aunque tiene implicaciones fundamentales para los posibles ingresos de los países en vías de desarrollo. El artículo sugiere que las expectativas poco realistas sobre la magnitud de estas transferencias pueden reducir la posibilidad de lograr un acuerdo y aumentar la posibilidad de 'hot air' (compra de derechos a emisiones) de parte de los países del sur.

The coming of REDD

The issue of *Reduced Emissions from Deforestation and forest Degradation (REDD)* has undergone a major transformation over just 2-3 years. From being a too-difficult-to-handle issue in climate negotiations, it is now at the centre stage of the international climate debate and seen as a major opportunity and a low-cost option for limiting global warming.

The heightened REDD focus is partly due to the simple fact that we cannot afford to ignore the third largest greenhouse gases (GHG) emitting sector, responsible for about 1/5 of the global GHG emissions. Early resistance from environment and development NGOs has evaporated, as they have realized that "failing to address the issue of tropical deforestation is dangerously irresponsible" (Laurance 2007).

The influential Stern Review (Stern 2006) states that reducing deforestation is among the cheapest options at hand, although in the ensuing debate, the words 'cheap' and 'simple' have been mixed up. The main justification for the report's conclusion is the frequently very low value of agricultural production on cleared forest land, thus the compensation needed to stop deforesting activities is well

below most other mitigation measures. But, the challenges of implementing a system of international payment for environmental services (PES) are huge.[1]

Another influential recent report by the World Bank (Chomitz *et al.* 2007) argued, however, that while challenging, it is feasible to "mobilize global interests for forest conservation". One reasons for the cautious optimism is that recent proposals have a national level approach, which reduces earlier concerns with project level approaches such as leakage and possibly also high transaction costs.

The political changes in both the South and the North are also noteworthy. Brazil, the traditional sceptic of any inclusion of REDD in an international climate agreement, has softened its position due to domestic political changes. The fact that the main proposals in the debate have come from the South (including Brazil itself, Central African countries, and the Rainforest Coalition led by Papua New Guinea and Costa Rica) has also reduced their suspicion. More generally, REDD is now seen by many deforesting countries as a golden opportunity for increased financial transfers from North to South.

In the North, among several of the Annex I countries of the Kyoto protocol or groups within these countries, REDD is viewed as a golden opportunity to undertake cheap emission reductions abroad instead of costly ones at home in order to meet national GHG targets. Norway launched in late 2007 its 'rainforest billions' (NOK 15 billion or about USD 2.8 billion over five years). These were the result of a strong pressure on the government from an interesting coalition of environmental organizations on the one hand, and the political establishment and business interests on the other. While the former group strongly stresses that the REDD efforts should not be at the expense of domestic reductions, the latter clearly hopes that it will relax the demand for such reductions.[2]

Finally, the international climate negotiations have their own dynamics. The Marrakesh Accord (COP7 in 2001) agreed on the main principles for aforestation and reforestation (AR) projects in the Clean Development Mechanism (CDM). Avoided deforestation (AD) was not included, but with the AR principles settled, the time was ripe to move on to tackle the AD issues. In 2005 (COP11, Montreal), one therefore initiated a two year examination process on REDD. The last climate summit in Bali in December 2007 (COP 13) concluded that REDD should indeed play a role in a future climate regime. However, most of the hard issues remain to be solved and agreed on. Thus the road is long to an inclusion of significant REDD mechanisms into a new climate treaty.

The paper focuses on a few of the broad issues, such as key incentive and distributional issues and main dimensions for the architecture of a REDD agreement. Section 2 discusses why REDD is so hard, including the distribution game being played. Section 3 outlines two key dimensions of a future REDD regime: scale (national *vs*. project) and funding (market *vs.* funds), and discusses pros and cons of the four main models generated by these. Section 4 digs deeper into the question: how to set a baseline for national deforestation?

REDD is complex, and due to space limitations several key issues are not discussed, including a number of methodological ones related to the measurement of the actual GHG reduction. For the same reason the paper also focuses on the first D of REDD, paying only scant attention to forest *degradation*. This does *not*, however, suggest that reduced degradation cannot be an equally mitigation measure as reduced deforestation.

Why is REDD so hard?

The strong will and interest from almost all major parties to include REDD in one form or another into a future climate regime is a very good starting point. But, the broad consensus is also deceptive and conceals major hindrances that must be overcome. These are partly related to classical collective action problems that must be overcome, and partly to directly conflicting interests among the countries.

REDD is (not only) a collective action problem

The current REDD debate can be viewed in the light of two different games being played: a *collective action game*, and an *aid game*. Reducing emissions from deforestation has many features of a classical collective action problem of the prisoners' dilemma (PD) type: all countries would benefit if they jointly Reduce Deforestation (RD strategy) rather than Continued Deforestation (CD strategy).[3] But each country would individually always prefer CD, thus the non-cooperative solution and only Nash equilibrium is that all countries choose CD. A REDD agreement tries to change this by modifying the rules of the game such that it becomes in every country's own interest to go for RD. The problem is twofold (Barrett 2003). First, the agreement must be such that every country benefits from participating (sign and ratify the treaty). Second, after agreeing to participate the countries must have an incentive to comply. The typical international environmental agreement is *not* followed up by the signatories (Barrett 2003).

The other major aspect of REDD is the simple fact that deforestation is almost exclusively a problem in developing

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[1] In addition to the complexity of PES, the upward trend in agricultural commodity prices may also modify some of the Stern conclusions..

[2] One has to add that forest carbon credits are still viewed with high suspicion within EU, e.g., forestry CDM were excluded from their emission trading scheme (EU-ETS). One reason is that many EU firms have undertaken costly emission reduction, and would be sceptical to suddenly introducing REDD as a 'free' – or at least comparatively cheaper – 'lunch'.

[3] The terms reduced/continued deforestation are used, although some countries are beyond their forest transition turning point. Thus the more precise term, to include net reforesting countries, would be to let CD denote a business-as-usual (BAU) strategy, and RD be reduced deforestation or increased reforestation compared with BAU.

(poor) countries in the South, and it is expected that rich countries in the North pay the costs of reductions. Although global warming may hit the poor relatively more than the rich, the other conceptual model useful to understand the REDD discourse is simply one where rich countries buy REDD in poor countries. One can label this the *aid game*. The aid can be in the form of initiatives such as the Norwegian one already mentioned (bilaterally buying REDD), the World Bank's Global Carbon Fund (multilateral), or by including REDD in a climate agreement and specifying the rules such that there is a net transfer from rich to poor countries.

A major difference between the two games is the net benefits occurring to the various parties: in the collective action game the benefits to the South (and the North) will be in the form of the collective good being produced (= reduced climate change), while the implementation will be costly to all parties. In the aid game the South is expected to benefit also from the implementation of the measures, i.e., get a double benefit.

The distribution issue

Whether one frames REDD as a collective action game or as an aid game, the distributional issue is at the forefront. How much should a poor country receive for a given amount of carbon credits from REDD? In both a climate agreement and in a bilateral or multilateral (non-market) purchase of REDD the central questions are how to determine the baseline and set the carbon price (if not left to the market).

There are expectations in developing countries that REDD should imply not only major transfers of money but also significant net benefits (i.e., international transfers minus national costs of REDD). One may argue that large transfers are needed to get poor countries on board and have them make national commitments in a new climate treaty. Also, rich countries are committed to economic development and poverty reduction which might justify such large transfers.

Nevertheless, these expectations can easily translate into unrealistic demands that will put the climate negotiations in jeopardy. McKibbin and Wilcoxen (2002) therefore argue that that a new climate agreement should minimize transfers across national borders. Following this line of argument and the underlying idea of PES, a climate treaty should be about limiting climate change and not about redistributing of world income. That might be a welcome side-effect at the margin, but not a primary aim.

The argument that a new climate treaty should be solely on minimizing climate change is, however, not an argument against cross-border transfers. A treaty that includes poor countries will only be feasible (i.e., acceptable to those countries) if the deal includes net transfers of money from the rich to the poor. Thus such transfers are not based on a development and poverty argument, but rather on being a necessity to get an agreement. The question remains, however, how large such transfers should be. The expectations from the South are high. Besides the strategic element of such expectations and demand, they are to some extent also based on an old perception of developing countries being innocent victims of greenhouse gas (GHG) emissions in the North. Increasingly, however, they are part of the problem and therefore share the responsibility. Four of the six largest GHG emitters are middle-income developing countries (China, India, Indonesia, Brazil), and most of the future increase will take place in the current developing countries.

The distribution issue may also divert attention from other aspects, as noted by Barrett (2003) in his excellent treatment of international environmental treaties: "Though much energy is expended in negotiating allocations – that is, in dividing up the pie – this aspect of negotiations should not be of prime importance. It is more important that a treaty be able to promote participation, enforce compliance, and stop leakage. Unless a treaty can do these things, there will be no pie for the parties to divide."

Changing the political economy of deforestation

A national REDD approach (discussed in section 3) has two steps. First, the countries (governments) are rewarded through some international mechanism for reduced emissions (international incentives). Second, the payments received must be translated into incentives for the decision makers and land users to conserve or improve forests (domestic incentives).

There is a vast literature on the causes of deforestation; comprehensive meta-studies or reviews include Angelsen and Kaimowitz (1999), Geist and Lambin (2002), Rudel (2005), Chomitz *et al.* 2007), and Kanninen *et al.* (2007). The basic economic approach (inspired by the historical work of von Thünen) suggests that farmers and companies convert forests to agricultural use because it is the most profitable alternative to them: the agricultural rent is higher than the forest rent to the decision makers. Reducing deforestation is therefore about making standing forests more valuable (increasing forest rent) and/or non-forest uses less valuable (reduced agricultural rent). Direct payment for keeping the forest (Payment for Environmental Services - PES) has therefore emerged as a powerful measure to change the cost-benefit calculus of land users, although the preconditions needed for this to be effective should not be underestimated (e.g., Wunder 2005).[4]

This approach needs to be complemented with a political economy approach: a large portion of the deforestation is a desired policy and stimulated (or at least tolerated) by the governments. Timber and oil palm concessions are allocated to powerful individuals in exchange for political or monetary remuneration (Tacconi 2007). Export agriculture is stimulated to generate foreign exchange, at the expense of forests. Individuals and companies violating forest

[4] See also the special issue of Ecological Economics 65 (4) May 2008 on "Payments for Environmental Services in Developing and Developed Countries".

regulations can escape courts by 'using envelopes'.

An effective system for forest conservation requires changing the incentives for subsistence peasants, community forest groups, large commercial cattle ranchers, timber and oil palm companies, land use planning agencies, and politicians from the local to national level. The international payment must trickle down to those making or influencing the decisions about forest conversion. This job is as challenging as creating the incentives at the international level.

Tropical deforestation is increasingly driven by large commercial actors (Rudel 2007). The nice implication is less direct conflict between forest conservation and poverty alleviation. The uncomfortable implication is, in the words of (Pearce 2007), that: "the 'good guys' will get nothing. The money will not go to those trying to conserve forests or harvest them sustainably, but rather to bribe the 'bad guys' who are destroying them. The most prolific deforesters are already lining up". This raises key questions about who has the right to the land in the first place. Ultimately the distribution of money depends on the REDD design, but some pay to the 'rich guys' who are converting forest legally seems unavoidable.[5]

Weak data have strong implications

While it is appreciated that data on forest area and forest area change (deforestation) is weak, one has to work closely with them to appreciate how poor the data quality often is. Among the noteworthy exceptions is Brazil with its monthly announcement of satellite-based deforestation data. For particularly African countries the state of affairs is bleak, although some progress has been made. Further improvement can be expected as the incentives to develop good information systems increase with REDD and various *readiness* activities are undertaken.

In the past, poor data has been a cautionary note in most research papers on deforestation. But the consequences are a lot more profound: they have direct implications of which mechanisms are feasible for a country, and therefore their potential in a new climate treaty. The key dilemma is this: the national approach advocated in section 3 is *currently* out of reach for most developing countries due to poor national information systems on forests and land use.

Four different REDD models

A number of different models for including REDD into a global climate regime has been put forward over the past 3-4 years. This section will not provide a comprehensive review of all of them, but rather highlight three key dimensions that are important: type of commitment (emissions *vs.* causes), scale (national or regional *vs.* project level), and funding mechanism (market *vs.* funds). In addition, many of the proposals put forward differ primarily in the way baselines are determined, and that issue is discussed separately in section 4.[6]

A major distinction can be made between emission-oriented and cause-oriented approaches, cf. Schlamadinger *et al.* (2007b). These are also referred to as output *vs.* input approaches. Although inputs are needed to produce outputs, the difference is in the specification of the commitment: changing the causes (e.g., policy reforms that should reduce deforestation and emissions), or reducing emissions with no specification of how to achieve that.

The Kyoto protocol is an example of an emission-oriented approach. Its obvious merit lies in targeting as directly as possible the problem, namely "too high GHG emissions". Given the commonly poor forest cover data (and therefore also lacking data on resulting CO_2 emissions), however, that might not be an option in the short run. An alternative is therefore to address the causes in a Policy and Measures (PAM) approach, which avoids complicated and costly monitoring and verification (Benndorf *et al.* 2007).

Nevertheless, applying this approach has important flaws. The *actual* reductions achieved will be highly uncertain, thus PAM cannot be sold in a carbon market where actual and certified emission reductions is the commodity being traded. Second, for PAM to be effective, the incentive reforms must be implemented along a long chain of decision makers. Since the overall incentives are not based on performance, and full and effective implantation is costly, the reform is likely to be incomplete. Finally, one puzzling result emerging from the deforestation literature is that the underlying extra-sectoral (non-forestry) causes are the most important to address. But these are highly context specific, leaving decision makers with quite generalized policy recommendations (Angelsen and Kaimowitz 1999).

The PAM approach seems to lend itself more to bilateral and multilateral donors as a new type of development aid, rather than being part of a new climate agreement. The aid can, however, be moved in the direction of a 'performance based climate contract': the support is conditioned on implementing specific policy reforms and projects that should reduce overall deforestation.

The rest of this section focuses on the emission-based approach. The two other dimensions, scale and funding, yields four different models, as illustrated in Table 1, and discussed more closely below.[7]

"Cap and trade" (CAT)

The "cap and trade" (CAT) model is the textbook application of the tradable emission quota system, and is also referred to

[5] Additionally, due to economics of scale, large farmers may be favoured for efficiency reasons.

[6] A comprehensive review and discussion of various proposals are given in Government of New Zealand (2008).

[7] A global carbon market does not yet exist, and the distinction between market- and fund-based approaches is less clear-cut than the table suggests. For example, a conservation project by an NGO might generate certified carbon credits sold on a specific carbon market.

TABLE 1 *Different models for inclusion of REDD in a new climate agreement*

Scale \ Funding	Global carbon market	Global fund
National (regional)	"Cap and trade" (CAT) (Rainforest Coalition)	Compensated reduction (Brazil)
Project	CDM+	Conservation projects (ICDP, PES, etc.)

as Baseline and credit (BAC), or Reference level and credit (RAC), cf. Government of New Zealand (2008). The basic architecture is straightforward: First you cap: each country gets a baseline of emissions from deforestation (emission quotas). Then you trade: if the emissions are lower (higher) than the baseline, the country can sell (buy) carbon quotas. The trade part ensures that *efficiency* criterion is met: a common quota price (= global carbon price) will ensure that the marginal costs of emissions are the same across countries. As argued in the Stern report, a CAT model should be the ultimate goal for a climate agreement. Its attraction lies in the comprehensiveness and the strong and uniform incentives it gives to all participating countries.

Various versions of a CAT model has been proposed by surprisingly many countries (for a review of different country positions, see Alvarado and Wertz-Kanounnikoff 2007). The most prominent proposal is by the *Rainforest Coalition*, with Papua New Guinea and Costa Rica as frontrunners.

One of the touchy issues relates to fungibility between REDD credits and other (fossil fuel) carbon credits, i.e., sectoral fungibility. Should a parallel market for REDD credits be established, or should they be fully tradeable in a future global carbon market? Various in-between solutions with limited fungibility are also conceivable. Where one draws the line for sectoral fungibility also has implications for the financing of REDD activities: the more fungible, *ceteris paribus,* the more money can potentially be raised from the carbon market for REDD activities.

Compensated reduction

The proposal of 'compensated reductions' was launched by a group of Brazilian NGOs (Santilli *et al.* 2005), and has in a modified version eventually become the official position of the government of Brazil. It differs from the Rainforest Coalition proposal in a number of ways. First, the funding will come from a multilateral fund rather than the carbon market. Second, Brazil argued that REDD should be outside a new climate protocol, and – by implication – Annex I countries would not be able to offset own emission targets with REDD purchases. A final central element in the Brazilian proposal is to set baselines equal to the average deforestation rate of the past 10 years. Any reductions from this baseline will be rewarded from the global REDD fund, based on an agreed carbon price.

One central issue in both the CAT and 'compensated reduction' model is that of *symmetry* between achieved deforestation rates above and below the baselines, sometimes referred to as *liability*. In the textbook CAT model, any party must buy permits if emissions exceed the allocated quota. But, it is hard to imagine a poor country like Zambia or DR Congo using scarce foreign exchange to buy carbon credits. Thus, although not always explicitly made, most proposals have in mind a clear asymmetry, i.e., a failure to reduce deforestation to the given baseline will result in non-participation rather than having to buy quotas. Alternatively, as in the Brazilian proposal, a failure to meet the baseline in one period would be carried over to the next commitment period, reducing potential future benefits. The carry-over share can vary from full liability (100%) to zero.

Another contentious issue for both the national approaches is whether they should include countries with net *reforestation*. India and China, both net reforesting countries, are strong proponents for an inclusion, and have been sceptical to the Brazilian proposal on that basis. After all, zero is just a number on the number line, and all countries should be encouraged to move their figure for forest area change to the right on that line. Why stop at zero? From a climate perspective, a carbon dioxide molecule removed from the atmosphere (increased sequestering of carbon in trees) is just as good as a molecule not released (reduced deforestation). Moreover, many countries that experience a net reforestation have regions with deforestation, and there should be incentives for reducing that.

CDM+

Given the uncertainties about the short-term realism of national approaches, a tempting alternative would be to extend the existing Clean Development Mechanism (CDM) to include not only Aforestation and Reforestation (AR) projects, but also Avoided Deforestation (AD) projects at the less-than-national scale. One argument would be that one already has agreed-upon rules and regulations for CDM through the Marrakesh Accord (COP7 2001). An extension of the CDM to include AD would thus be less negotiation-intensive compared to other proposals, and can therefore come into force at an earlier stage.

There are, nevertheless, some good reasons why AD was not included in CDM. The problem of *leakage* is more pronounced compared with AR projects, and mechanisms must be in place to ensure that deforestation is not just moved outside the project area. Equally important is the problem of *additionality*; the project must come in addition to the business-as-usual (BAU) alternative. This is essentially the problem of setting a realistic baseline.

The critique of CDM generally and AR in particular is twofold. First, the contribution of CDM projects generally to

local equity and sustainable development is low, particularly when left to market forces (Olsen 2007). Second, the very limited success of establishing CDM AR project in the CDM – only one registered so far – has taught some valuable lessons.[8] The most important one is that complicated rules easily become counterproductive: trying to achieve too much and include numerous concerns make one achieve very little. AD projects are – in themselves – more complicated than AR projects, e.g., to define a credible baseline. It is therefore a real risk that a CDM+ approach might achieve very little in terms of real reductions in deforestation, by simply not approving projects for reasons of high ambition and complexity.

Conservation projects

The forth model is a continuation and intensification of various forest conservation projects at the less-than-national scale, such as 'command and control' conservation projects, integrated conservation and development projects (ICDPs), and the more recent projects with Payment for Environmental Services (PES). The latter type provides valuable experiences relevant for REDD, although most of them are limited to Latin America (see Kaimowitz, this issue, for a review of Mesoamerican experiences).[9] One of the lessons learned is that the time and transaction costs involved can be substantial, and may represent a major hurdle when dealing with thousands of small potential forest converters (e.g., Wunder 2007). Working with communities and local-level organizations is a cost-saving approach, but effective local organizations are often not present.

One possible model that has been aired in discussions is to establish a global forest conservation fund along the lines of the Global Environmental Facility (GEF), managed jointly by the UNDP, UNEP and the World Bank. But, many are sceptical to the record of GEF in dealing with conservation, and are afraid of creating (yet) another large international organization. Whatever organizational form it takes, funding would be raised by voluntary deposits in a similar way as for 'compensated reductions'. The same international body might deal with different mechanisms, i.e., with a project-based approach or PAM for countries not yet ready to participate in a system requiring credible national accounting of REDD.

Comparing the four models

The pros and cons of the different approaches are summarized in this section. Since we are dealing with possible *future* models, yet to be tried out at a large scale and/or in this context, any discussion will to some extent the author's subjective judgement.

A national approach has the following advantages *vis-à-vis* a project approach:

- Chances to have a major impact on deforestation rates are higher, since a national approach will have to address the broad forces that lead to deforestation. A project approach may create a few conservation islands, but with limited impact on overall deforestation, i.e., winning some battles, but losing the war.
- It allows for a comprehensive accounting of all emissions from the forestry sector, and therefore avoids the issue of domestic *leakage*.
- Policies and measures required to reduce deforestation are chosen and implemented by national governments, based on country contexts. No one-size-fits-all policy prescriptions are needed. Governments have financial incentives to implement the measures that really matter, rather than doing lip services. If designed well, the approach will give pecuniary incentives at all levels for reduced deforestation.
- Related to the above points, cost efficiency should be ensured both at the domestic level and also the international one (at least in the CAT model).

The arguments in favour of a project approach include:

- A national approach requires a comprehensive accounting of deforestation and resulting carbon emissions. Most developing countries are not yet ready to participate in such a regime.
- Setting baselines involves large transfers of money, and is difficult. A real risk is that baselines will be set too liberal, and therefore create "hot air" in a CAT model.
- A project-based approach like CDM+ can build on existing rules and arrangements, and therefore be implemented more quickly.

Related to the other dimension in Table 1, the funding mechanism, the main arguments in favour of a market-based approach are:

- The global carbon markets can potentially mobilize much larger amounts of money to fund REDD activities compared with voluntary funds. In particular, if the money spent on REDD by the Annex I countries is not credited in their own national carbon accounts, any voluntary fund is very unlikely to raise the amounts needed to cut deforestation rates by, say, 50 % over the next decade.
- Linking REDD to a global carbon market is needed to achieve international cost efficiency. The fundamental

[8] See http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByScopePieChart.html for the distribution of CDM projects by sector. Among the more than 1 000 projects registered more than half are in the energy industries. There are, however, a number of AR projects in the voluntary market.

[9] An increasing number of PES pilot projects and initiatives are now evolving in Asia and Africa. Even though it is too early to draw the 'lessons learned', they provide important insights into REDD design.

role of the efficiency criterion is not fully appreciated in the debate. It is not just one among a dozen of desirable features of a climate regime, nor some fancy economistic term. It is a prerequisite to minimize global warming from the limited efforts that the global community is willing to spend.

The arguments for a fund based approach can similarly be summarized as:

- Including REDD into the global carbon market at this stage runs the risk of 'hot air': large quantities of cheap carbon credits will depress the global carbon price, reducing the incentives for emission reductions in elsewhere. This scenario can, however, be avoided in two ways: (i) limiting the supply of REDD credits by setting tight baselines, or by limited fungability and 'gearing' of REDD units[10]; (ii) increasing the demand by more ambitious targets for Annex I countries.
- Integrating REDD into a global carbon market might be more complicated than a fund-based approach, and would therefore take longer time to become operational. A market based system is likely to have stricter requirements in terms of a well defined and certified product that can be traded. On the other hand, a market system will focus on that product – certified carbon credits, while a fund system is likely to include a number of other aims or co-benefits which makes it more complex.

There are quite fundamental arguments for moving Northwest in Table 1, i.e., towards a CAT model. This model has the potentially to raise the largest amounts of funds for REDD, and will also cost efficient implementation. A CAT model should therefore be the long term aim of the current climate negotiations. At the same time, the practical hindrances towards CAT have to be recognized, and thus the need for measures that can be implemented more quickly, i.e., towards the Southeast of the table. A distinction between realistic short and long term aims is therefore essential.

The basics of baselines

Baselines and distributional implications

Possibly the most critical element of a REDD regime is how to set the baseline, whether in a national or project level approach. This section focuses on the former. A national REDD baseline gives a country an emission quota for CO_2 (and possible other GHG) from deforestation and forest degradation. It is a benchmark to judge performance and reward the country if emissions are lower, and not give any reward or possibly punish if they are higher.

The question of baseline is sometimes hidden in climate speak such as 'net-net' or 'gross-net' accounting, or may be presented as a purely technical issue. Nothing can be further from the truth. Determining baselines has profound implications for both efficiency (the incentives to participate) and distribution of benefits and costs. Some might, due to the problems involved, "throw up their hands in despair at the idea of working out baselines" (Pearce 2007). But there is no escape; the unavoidable question is when to start counting CO_2 molecules. For example, behind the system of 'gross-net' accounting used for forest management activities in the first commitment period of the Kyoto protocol is the implicit assumption that the baseline is zero emissions, cf. Schlamadinger *et al.* (2007a).

To illustrate the magnitude of money flows involved, consider the scenarios run by Strassburg *et al.* (2008) with a carbon price of USD 5.63/tCO_2, and reduced deforestation cost curves along the lines presented in the Stern-report. Depending on how the baseline is set (global or national historical deforestation, or some combination of these), annual transfers to Indonesia will vary between zero (no participation) to more than USD 3 billion.

Such exercises obviously have strong elements of uncertainty. Yet, simple 'back-of-the-envelope' calculations show that various possible REDD mechanisms easily can give net transfers to developing countries in the order of tens of billions dollars per year. With such amounts on the table, the climate game will be a tough one. At the same time, these amounts illustrate the large potential in integrating REDD as a mitigation mechanism, cf. Karousakis and Corfee-Morlot (2007).

Three elements of a baseline

Given that baselines are essentially emission quotas, it is useful to think of them as being made up of three elements: (i) the business as usual (BAU) scenario, (ii) a shared responsibility for reduced overall emission reductions (downward adjustment to reflect the ambition of reduced global emissions), and (iii) special political and economic considerations.

The problems of determining the BAU scenario is discussed in the next section. The second element of shared responsibility is commonly neglected in the REDD policy debate and even academic papers. The implicit assumption is then that developing countries should be fully paid from the first CO_2 molecule not emitted. Returning to section 2, this suggests that the game being played is not 'collective action' but rather the 'aid game' where rich countries buy REDD in poor countries. This contrasts the way baselines are set in the Kyoto protocol for Annex I countries: on average a country got a GHG emission quota (baseline) equivalent to 95 % of its 1990 emission level, which is well below the BAU scenario.

There are two major reasons for not equating BAU with the baseline. First, reducing climate change is a *shared*

[10] 'Gearing' implies that an estimated REDD amount is multiplied by a factor between zero and one to take into account uncertainty related to actual measurement and permanence, cf. Government of New Zealand (2008).

responsibility among all countries, and a factor reflecting this should be included. Second, not including a shared responsibility factor would imply a lot of 'hot air': a substantial reduction in deforestation can be almost for free or very low costs (maybe to be termed 'warm air'?). In the Strassburg *et al.* (2008) study 30-40 % of the reductions can be undertaken at a cost of less than USD 1/tCO_2. Although this is at the extreme among the different analysis done, several studies point out that the first reductions are very cheap.[11]

As Chomitz *et al.* (2007) convincingly argues, the fact that something is free is not an argument against REDD but rather in favour of it: we are saving money that can be used for reductions in other sectors. But setting the baseline equal to the BAU would water out the mechanism, as significant amount would be spent on reductions that are almost costless. This is also likely to undermine the political support for the system. What matters are the incentives on the margin, and these might be diminished with high baselines.

In addition to a BAU prediction and a shared responsibility factor, the baseline can also include other elements. The proposal by the *Coalition of Rainforest Nations* includes a 'development adjustment factor' (DAF) to "allow for certain amounts of deforestation to occur for the purpose of a country's socio-economic development" (Alvarado and Wertz-Kanounnikoff 2007).

While too generous baselines might create 'warm air' and lead to politically unrealistic levels of international transfers, the main problem with setting baselines too strict is that some countries might choose to opt out of an agreement. For example, Indonesia have in recent years had a very high rate of deforestation of 2.0 % per year for 2000-05 (FAO 2005). Setting the baseline equal to or below the average of developing countries (about 0.5 %) might lead to non-participation: it has to reduce deforestation from 2.0 to 0.5 % at their own expenses before they can start getting paid, and that might not be worth the effort. Besides the distributional issues, setting the baseline can thus be seen as a balancing act between: (i) creating incentives for participation and (ii) avoiding 'hot air'.

Proposals for determining the baseline

The baseline will include many elements, some of which are ultimately political questions left to the negotiation process. Researchers' main input should be in determining the BAU scenario: what will be the predictable rate of deforestation without REDD? Researchers should provide a framework or formula or to be applied to narrow down the scope of negotiations. Which variables should enter that formula?
Several proposals have been put forward, the two most debated being the Brazilian of compensated reduction (Santilli *et al.* 2005) and the Joint Research Centre (JRC) of the European Commission approach (Achard *et al.* 2005), cf. the comparison in Skutsch *et al.* (2007). The main variables included are:

National historical deforestation: Almost all proposals put forward include historical national deforestation as a key variable in setting the baseline, cf. Alvarado and Wertz-Kanounnikoff (2007). The Brazilian proposal of 'compensated reduction' advocates that this should be the only variable: the average of the last 10 years, and updated every 3 years.

How good is past deforestation to predict the future one? There are two answers to that question. First, we don't know a lot about it, mainly due to poor time series data for most countries. Second, what we know suggests that, although it might be the best predictor, past deforestation is not a very accurate predictor of future deforestation, cf. Haugland (2008). Unlike emissions from fossil fuels, which are closely linked to one variable (GDP levels), deforestation is 'multi-causal' and can be highly variable over time within countries.

There are several reasons for this. The forest area (change) might follow a forest transition: a move over time from high forest area and low deforestation rates, to a period of accelerating deforestation, until the forest area stabilize and eventually recover, see Mather (1992), Rudel *et al.* (2005) and Angelsen (2007). Thus some countries at early stages in this transition, like Papua New Guinea and DR Congo, can be expected to have high forest area and low but accelerating deforestation rates. Others in the middle of this transition, like Indonesia, will have high rates, but these are expected to slow down as forest is getting scarcer. Finally, countries late in this transition like China and India (and rich countries) have increasing forest area.

Deforestation rates may also follow more erratic trends. Higher prices and demand for commodities that are 'deforestation agents' can have profound impacts. Much of the deforestation history is about 'commodity booms' (e.g., Angelsen and Kaimowitz (2001) and Rudel 2005). Policy and market changes often generate strong snowball effects which multiplies the initial impact.

Global historical deforestation: Given the erratic behaviour of national deforestation, one option would be to use the average deforestation rates for developing countries, or at least to give it some weight, as done in the various scenarios outline in Strassburg *et al.* (2008).

The JRC proposal suggests that countries with a rate of deforestation below *half the global average* use that as a baseline, while countries with a higher deforestation rates use a national historic baseline. This would benefit countries with low deforestation rates in the recent past, either due to good policies (which is the intention of the proposal), their location on the forest transition curve, or for other reasons, e.g., war.

Development Adjustment Factor (DAF): The proposal from the Rainforest Coalition, supported by a number of other (groups of) developing countries, gives higher baselines to the poorest countries. In addition to a fairness argument mentioned above, another justification might be that poor

[11] For two reviews and discussion of such studies, see Karousakis and Corfee-Morlot (2007) and Government of New Zealand (2008).

countries are at an early stage in the forest transition. The BAU deforestation is therefore likely to be higher than in their recent past, and this should be reflected in the baseline. Using GDP/capita as an indicator of the stage in the forest transition is at best a very rough indicator, and the empirical evidence on this is mixed.[12]

Rewarding early action: There is almost universal agreement that countries that have taken early action to reduce deforestation (and forest degradation) should *not* be penalized by getting lower baselines. While intuitively appealing, all low-deforesting countries may, of course claim to have taken important steps to reduce deforestation in the past, and should be credited for that. But, as all countries cannot be above average, there is a need for a more systematic approach to assess the impact of past policies. Theoretically, this can be done by using a predictive regression model, and let the difference between observed and predicted deforestation be attributed to differences in policies across countries.

The literature on cross-country deforestation regression models to analyse the causes of deforestation has included a number of other variables, and some of these are potential candidates for inclusion in a formula for setting baselines (see overview by Kaimowitz and Angelsen 1998). This includes population densities and growth, forest area, economic growth, commodity prices, governance variables, regional (continental) dummies, and a tropical dummy. Past work has, however, tried to detect causal links, while the task here is to predict (in particular, past deforestation can be included in the model). More research is clearly needed, and the REDD literature has to a large extent failed to draw on past work on causes of deforestation. Nevertheless, in the end, the formula must be fairly simple and have an intuitive appeal.

Considering the uncertainty of setting baselines, one practical approach suggested by Schlamadinger *et al.* (2005), is to use a *corridor approach* with an increasing percentage of the reductions being credited. For example, a reduction from 0.8 to 0.7 % (or the equivalent in hectares) gives carbon credits only worth 20 % of the estimated carbon reductions, while reductions from 0.7 % to 0.6 % give credits equivalent to 40 % of the estimated reductions, and so on.

Given the high stakes for deforesting countries, the difficulty of predicting deforestation in a BAU scenario, and the additional elements that should be factored into the final baseline, the risk for 'hot air' is very real. This has been a major concern of environmental NGOs, e.g., Leach (2008). Restricting baselines to realistic levels is therefore a major challenge in the ongoing negotiations. Proposals about countries being allowed to suggest their own baselines are like asking firms how much they would like to pollute before starting to pay a pollution tax.

The potential negative *impact* of 'hot air' can also be avoided by tightening the commitments of Annex I and possible other countries for overall GHG emission reductions. Putting REDD permits into the market is thereby accompanied by an increase in the demand, thus avoiding a significant drop in the carbon price. This is indeed a major argument for including REDD in a new climate agreement: by introducing a low-cost mitigation option, the global targets can become more ambitious.

Seeing both the forests and the trees

The perceptions created by the Stern and others reports about REDD being a quick fix, due to the low agricultural rents and therefore small compensation needed to revert the forest clearing decision, overlooks the main hurdles involved. The basic challenge is to set up a system where global willingness to pay for REDD is transferred to national governments and then to the incentives of land use decision makers. An incentive system must be created, baselines set, a reliable system for measuring change must be in place, and it all needs to be verified in a credible way. Buying carbon dioxide molecules in the forest is more difficult than buying bananas.

The long term aim should be a national approach, where funding is drawn from carbon markets (CAT). Once a mechanism is established, countries can join as soon as they satisfy a set of criteria related to reliable systems for monitoring REDD. A massive effort is needed to establish and strengthen the systems for such data collection and analysis. The latter part should be stressed: we need to analyse and better understand the domestic processes of deforestation and degradation to design and implement policies to reduce it.

Given that many countries are unlikely to be able to participate in a CAT model for several years to come, a small menu of mechanisms should be offered, including project based approaches and possibly also support to policy changes (PAM). This would be in line with the 'nested approach' put forward by Pedroni *et al.* (2007), where project activities can start immediately while national level programmes are progressively implemented as countries qualify.

The road to fully incorporating REDD in a new climate agreement is long, but must be walked in a relatively short period of time. Negotiations and the international debate easily become too focussed on the details. While the Bali meeting was an important step forward, most of the critical issues are yet to be addressed.

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[12] Haugland (2008), in her predictive model which includes historical deforestation, finds a positive correlation between deforestation rates and GDP/capita, i.e., the poorest developing countries are deforesting less.

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Will the future be REDD? Consistent carbon accounting for land use

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SUMMARY

The present article is a contribution to the international debate on the compensation mechanism for reducing emissions from deforestation and forest degradation in developing countries (REDD). Since its inception, the debate has constantly widened its scope to now cover deforestation, degradation and forest management. In order to avoid methodological complexities and inconsistencies in carbon reporting and accounting, the authors promote a unified accounting system that does not distinguish between industrialized and developing countries. Such a system has been created for Annex-I countries with the Kyoto Articles 3.3 and 3.4. It allowed for a stepwise implementation and recognized the need for capacity building and "learning-by-doing" for the first commitment period. If this system serves as a blueprint, the main difference will be that industrialized countries have overall targets, while developing countries would determine a sectoral reference level for land use emissions, against which emission reductions in the land use sector are to be measured. As developing countries take over wider climate commitments in the future, this will not affect reporting for land use uptakes and emissions. In order to develop a comprehensive system, article 3.3 and 3.4 need revision concerning the accounting modalities, i.e. Annex I countries would have to switch to net-net accounting. The way REDD has been conceived in Bali, it is restricted to developing countries' forest sector only. If this REDD mechanism were to be the future, it would create methodological hurdles and provide ammunition for opponents against enhanced responsibilities by developing countries within the climate regime.

Keywords: climate policy, post-2012, Kyoto Protocol, carbon accounting, LULUCF

Est-ce que le futur sera REDD? Comptabilité régulière du carbone dans l'utilisation de la terre

M. DUTSCHKE et T. PISTORIUS

Cet article est une contribution au débat international sur le mécanisme de compensation pour réduire les émissions provenant de la déforestation et de la dégradation de la forêt dans les pays en voie de développement (REDD). Le débat a constamment élargi son envergure depuis sa création, pour recouvrir maintenant la déforestation, la dégradation et la gestion forestière. Les auteurs recommandent un système de comptabilité unifié sans distinction entre les pays industrialisés et ceux en voie de développement, pour éviter les complexités méthodologiques et une marge d'erreur trop importante dans l'évaluation et l'analyse du carbone. Un tel système a été créé pour les pays Annex-1 par les articles 3.3 et 3.4 de Kyoto. Il permet une mise en action graduelle et reconnaît la nécessité d'autoriser un temps de croissance et d'apprentissage sur le terrain pour la première période d'action. Si ce système sert de modèle, la principale différence sera que les pays industrialisés ont des buts généraux, alors que les pays en voie de développement détermineraient plutôt un niveau de référence de secteur pour les émissions provenant de l'usage de la terre, suivant lequel les réductions d'émissions dans le secteur d'utilisation de la terre devraient être mesurées. Alors que les pays en voie de développement prennent de plus grande responsabilités quant au climat dans le futur, les rapports sur les émissions et les octrois d'usage de la terre n'ent seront pas affectés. Les articles 3.3 et 3.4 doivent être révisés du point de vue des modalités de comptabilité, plus précisément, la nécessité pour les pays Annex-1 de passer au système de comptabilité net-net, afin de développer un système complet. La façon dont la REDD a été conçue à Bali est restreinte au secteur seul de la foresterie dans les pays en voie de développemnt. Si ce mécanisme de la REDD devait être celui du futur, il créerait des obstacles méthodologiques, et fournirait des arguments aux opposants, pour justifier leur résistance à l'octroi de responsabilités accrues aux pays en voie de développement dans le sein du régime climatique.

Reducción de Emisiones por Deforestación y Degradación (REDD) a través del cálculo sistemático de carbono relacionado con el uso de la tierra

M. DUTSCHKE y T. PISTORIUS

Este artículo constituye una contribución al debate internacional sobre los mecanismos de indemnización para la reducción de emisiones por deforestación y degradación (REDD) en los países en vías de desarrollo. Desde sus comienzos el alcance del debate ha estado en constante aumento, y ahora cubre la deforestación, la degradación y la gestión forestal. En aras de evitar las complejidades metodológicas y las anomalías en los cálculos de carbono, los autores promueven un sistema unificado de cálculos que no distingue entre los países en vías de

desarrollo e industrializados. El tratado de Kioto ha creado un sistema de estas características para los países de Anexo I, en los Artículos 3.3 y 3.4, que permiten una imlementación paso a paso y reconocen durante el primer período de compromiso la necesidad de la creación de capacidad y el aprendizaje a través de la actividad. Si este sistema sirve como plan de base, la diferencia primordial se resumirá en el hecho de que los países industrializados tienen objetivos globales, mientras que los países en vías de desarrollo determinarían un nivel sectoral de referencia para las emisiones del uso de la tierra, contra el cual la reducción de emisiones en el sector del uso de la tierra debe ser medido. Cuando los países en vías de desarrollo asumen mayores compromisos climáticos en el futuro, no afectará el sistema de informes sobre el cambio del uso de la tierra y emisiones. Para desarrollar un sistema integral, los Artículos 3.3 y 3.4 necesitan ser revisados para tomar en cuenta las modalidades de cálculo; es decir, los países de Anexo I tendrían que cambiar a un sistema de contabilidad 'neto-neto'. Tal como la REDD ha sido concebido en Bali, se limita únicamente al sector forestal de los países en vías de desarrollo, y si se utilizara este mecanismo de REDD como modelo para el futuro, crearía obstáculos metodológicos y proporcionaría nuevos argumentos para los que se oponen a una mayor responsailidad de los países en vías de desarrollo dentro del régimen climático.

INTRODUCTION

Reducing Deforestation and forest Degradation in developing countries (REDD) has been high on the agenda since a country group led by Papua New Guinea and Costa Rica presented its proposal for "Compensated Reductions" at the Conference of the Parties (COP11) of the UN Framework Convention on Climate Change (UNFCCC) in Montreal 2005. The basic idea of REDD is to provide positive incentives for non-Annex-I countries to reduce the second largest single source of greenhouse gas emissions. Thus, a future REDD mechanism takes into account the UNFCCC principle of common, but differentiated responsibilities between industrial and developing countries (art 3.1 UNFCCC).
Until COP 13 in Bali the future REDD mechanism has slowly taken shape. There are several basic features we can take for granted so far:

1. REDD will entail a North-South transfer mechanism. It is estimated that financial flows need to amount to several billions of Euro per year in order to reduce a significant share of forest emissions [Karousakis and Corfee-Morlot 2007].
2. Activities will include the avoidance of deforestation, forest carbon management, and the enhancement of forest carbon stocks.
3. The accession to the REDD mechanism is voluntary, while compliance is still an open question.
4. Countries shall decide individually on how to tackle their particular domestic drivers and underlying causes of deforestation. Activities may take place on national and subnational scale, provided the central government agrees.
5. There is a need for capacity and institution building in most countries.

Unsustainable land use is the combined result of policy and market failure. Whatever its particular causes and drivers, their correction will bring about significant costs in the short run. These political and economic opportunity costs will not be incurred by developing countries, unless the proposed mechanism succeeds in providing reliable long-term income.

During the last three years, the focus of the discussion has widened enormously, from deforestation avoidance only to also cover land use conversion from forests to non-forest and forest management [UNFCCC 2007]. The negotiation Parties have realized that choosing the narrow scope of deforestation only will bring about the risk of perverse incentives for carbon storage and biodiversity. But, is the scope now adequate? Does it cover all potential sources and sinks in a way that is consistent across countries and accounting periods? Will the future be restricted to REDD?

This article proposes a reporting and accounting system that complies with the following criteria:

- become quickly operable,
- be consistent, be compatible with Annex-I country reporting,
- take into consideration the objectives of other multilateral environmental agreements,
- account for leakage and permanence risks,
- facilitate learning by doing.

SCOPE OF THE FUTURE COMPENSATION MECHANISM

When it was initially proposed, the mechanism (then denominated "RED") was to include deforestation avoidance only. This was challenged by developing country Parties, whose carbon losses actually occur within closed forests rather than from forest conversion. There was also apprehension that the logging industry would move into countries where deforestation is not an issue yet, e.g. in the Congo Basin (Greenpeace 2007). A third group of countries, represented by India, China, Viet-Nam and Costa Rica, has successfully halted deforestation and is engaged in massive reforestation (TABLE 1). The negotiation positions appear to be correlated with the respective position of the individual countries on the forest transition curve (as introduced by Rudel *et al.* 2005).

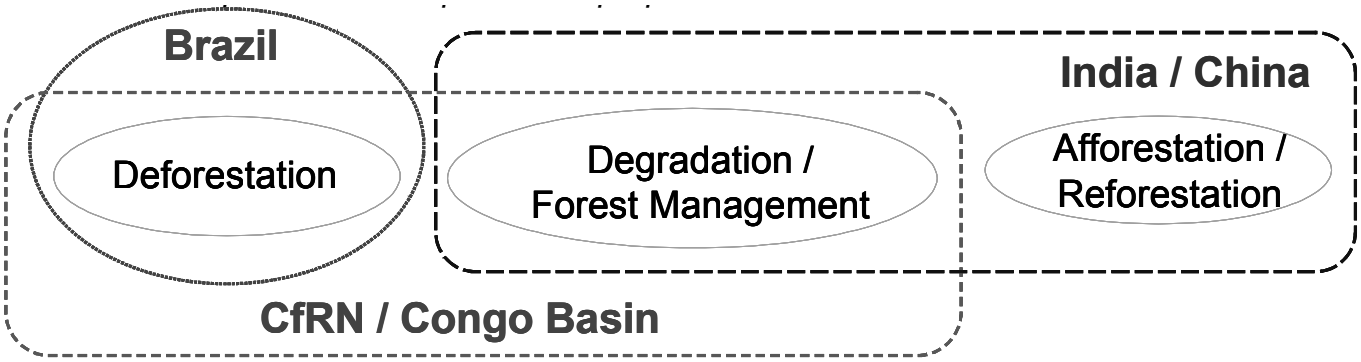
Consequently several countries proposed different scopes for the mechanism (see FIGURE 1). There were partial overlaps between the CfRN and the Congo Basin approaches and the ones of Brazil and India, but no common

TABLE 1 *Net changes of forest area in selected countries* [Karousakis 2007]

		forest area change in ha / yr. (average 1990 - 2000)	forest area change in ha / yr. (average 2000 - 2005)	LULUCF as % of total domestic GHG emissions
w/ a net loss of forest area	Brazil	- 2,681,000	- 3,103,000	62%
	Indonesia	- 1,872,000	- 1,871,000	84%
	Sudan	- 589,000	- 589,000	20%
	Myanmar	- 467,000	- 466,000	84%
	DR Congo	- 532,000	- 319,000	86%
	Zambia	- 445,000	- 445,000	40%
	Tanzania	- 412,000	- 412,000	18%
	Nigeria	- 410,000	- 410,000	50%
	Zimbabwe	- 313,000	- 313,000	58%
	Venezuela	- 288,000	- 288,000	38%
w/ a net increase of forest area	China	1,986,000	4,058,000	
	Vietnam	236,000	241,000	
	India	362,000	29,000	

Data: http://cait.wri.org/, http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php, FAO (2006)

FIGURE 1 *Scope of the most prominent proposals*



ground between the Indian and the Brazilian approach. The way these approaches were presented risked driving the negotiations to a deadlock.

As the figure shows, none of these proposals covered the full spectrum of activities concerning forest land use. They focussed on specific forest land use aspects, often with the argument to ensure the technical feasibility. This created a large potential for loosing out of sight significant carbon fluxes. A universal approach should be both, technically feasible and comprehensive in the sense that all relevant pools and fluxes are included.

Much of the debate around methodological issues takes place on the background of distributional conflicts. Bali decision 2/CP.13 found a Solomonic solution by covering all forest-related activities:

> *"reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" [UNFCCC 2007]*

Afforestation and reforestation are the only forest categories not subsumed under REDD and are thus exclusive to forestry CDM. After days of discussions, when the whole decision text was finally de-bracketed[1] and ready for approval, the US submitted a change in paragraphs 11 and 12 introducing the phrase "in the context of land use in general". The proposal was historically consistent with earlier expressions of US interest in cropland management, but in this debate it

[1] Term from UN slang referring to the practice to put in square brackets text alternatives that have not been agreed upon by all Parties.

had never been brought up and came out of time. It would have required longer deliberations on the consequences for rice-growing countries and the treatment of greenhouse gas (GHG) emissions from non-forested lands. It was consequently dropped, in order to facilitate a consensus.

For most observers, the Bali compromise went further than expected. However, is it a workable solution? We sustain that this is not the case. Our thesis is that REDD in its present scope is short-sighted. It is mainly a transfer mechanism between industrialized and developing countries. However, on the one hand neither will the willingness to pay of industrialized nations last forever, nor is the status of today's developing countries carved in stone, e.g., the OECD members Mexico and South Korea cannot be considered developing countries any longer. Malaysia's self-proclaimed target is to be an industrialized nation in 2020. On the other hand, deforestation and forest degradation is occurring in Russia and Canada as well. In order to attain the ultimate objective of the UNFCCC, the emission of GHG needs to be controlled in an integral manner. It makes no sense to build up an intricate monitoring system, if it is not compatible with data needed once the country changes its status to Annex I. It is counter-productive to insist in having REDD *outside Kyoto*, when the same sectoral emissions are controlled under the Kyoto Protocol for Annex I countries.

LESSONS LEARNED FROM A/R CDM

A large potential for perverse incentives lies in the use of definitions. Under the Kyoto Protocol, land-use definitions used for industrialized country Parties merely distinguished the different compartments of carbon accounting for land use related GHG emissions and carbon uptakes within a system heading towards full-carbon accounting.[2] Decision 11/CP.7 contains the agreed forest definition for use under the Kyoto Protocol during its first commitment period (BOX 1). For example, the forest definition is the smallest common denominator of what might be considered a forest. European Parties feared that forest activities in developing countries covered through the Clean Development Mechanism (CDM) would become so popular that domestic mitigation activities in Annex I were neglected. Thus they insisted in limiting it to afforestation and reforestation, excluding forest management and deforestation avoidance from the CDM (Jung *et al.* 2004). Resulting from this cherry-picking, forest definitions received an unmerited weight.

For the afforestation and reforestation CDM (A/R CDM), the forest definitions added a host of complexities in determining that the project areas was not even a potential forest in 1990, neither at the time of project start. To complicate things even more, under A/R CDM, with temporary crediting recurrent investor liability was introduced. Investors only "borrow" credits during the commitment period in which these were certified, having to replace them with other types of allowances in case these cannot be re-verified after five years, or at the project ending. Permanence of carbon fixation is a concern, because under the CDM, the host country does not take over liability for its

BOX 1 *Definitions of forest under the Koto Protocol (FCCC/CP/2001/13/Add.1, p.58)*

a) "Forest" is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30% with trees with the potential to reach a minimum height of 2-5 metres at maturity in situ. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30% or tree height of 2-5 metres are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest;

b) "Afforestation (A)" is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources;

c) "Reforestation (R)" is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31.12.1989.

d) "Deforestation (D)" is the direct human-induced conversion of forested land to non-forested land.

e) "Revegetation (RV)" is a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation contained here.

f) "Forest management (FM)" is a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner.

[2] For the first commitment period, certain limitations apply.

land-based carbon pools. All these problems led to the near complete failure of A/R CDM. To-date, worldwide there are 11 approved methodologies and only one project approved by the CDM Executive Board.

It has been part of the REDD mandate to seek national approaches and thereby reducing the risk of leakage immanent to project-based activities. National-level activities are also expected to better adapt to the regionally varying drivers and underlying causes for deforestation (Chomitz 2007, Geist and Lambin 2001). In contrast to the Clean Development Mechanism (CDM), many methodological problems are simply deferred to the national level. This tends to reduce conflict on the Convention level, but requires high institutional capacities on the side of the tropical countries in question.

We learn from forestry CDM that cherry-picking approaches lead to methodological and definition problems. Under REDD, an upcoming contentious issue will be the definition of "degradation" (Penman *et al.* 2003) and how to distinguish it from (sustainable) forest management. Another aspect worth consideration is the cross-cutting character of the issue and the threshold to non-forest land uses. In order to avoid perverse incentives and the methodological pitfalls exemplified above, we propose an integral approach to land-use accounting and reporting.

LULUCF IN ANNEX-I COUNTRIES – BLUEPRINT FOR CONSISTENT LAND-USE REPORTING?

The inclusion of land use under the Kyoto Protocol has been highly disputed due to methodological issues, such as permanence, leakage and accounting problems (Schlamadinger *et al.* 2007, Schlamadinger and Marland 1998). The rather imprecise character of the Kyoto regulations reflects the negotiations on this crunch issue: This debate could not be resolved in the subsequent elaboration of rules and modalities, and led to the failure of COP6I-negotiations in The Hague (2000). While the opponents argued that the inclusion and accountability of "sinks" would dilute the originally agreed reduction targets and thus impair the environmental integrity of the protocol, those in favour realized that leaving out carbon in terrestrial ecosystems would create an imperfect system and leave an important part of the global carbon cycle unaddressed (Dessai 2001). Given the political dimension of the complex land use issue, the understanding of global carbon fluxes at that time and the necessity to save the achievements of 10 years of negotiations, a compromise with iterative procedures and a certain degree of flexibility was found which is reflected in the Articles 3.3, 3.4 and 3.7 of the Kyoto Protocol. They have some deficiencies, which partly result from the complexity of both, the negotiations and the fact that the LULUCF sector is different from the other sectors, for which most of the regulations were designed. Examples are the bi-directionality of carbon fluxes (emissions and removals), the challenge of quantification, and the limited human influence on them (Schlamadinger *et al.* 2007). However, much experience on GHG quantification and reporting for the LULUCF sector has been gained in the meantime, which should be integrated into the design of the future compensation mechanism. There are several parallels to the issues debated today, leading to the conclusion that these articles and the related procedures should be examined to what extend they can serve as a blueprint its design in a post-2012 regime.

How do Article 3.3 and 3.4 work? Treatment of LULUCF in Annex-I countries

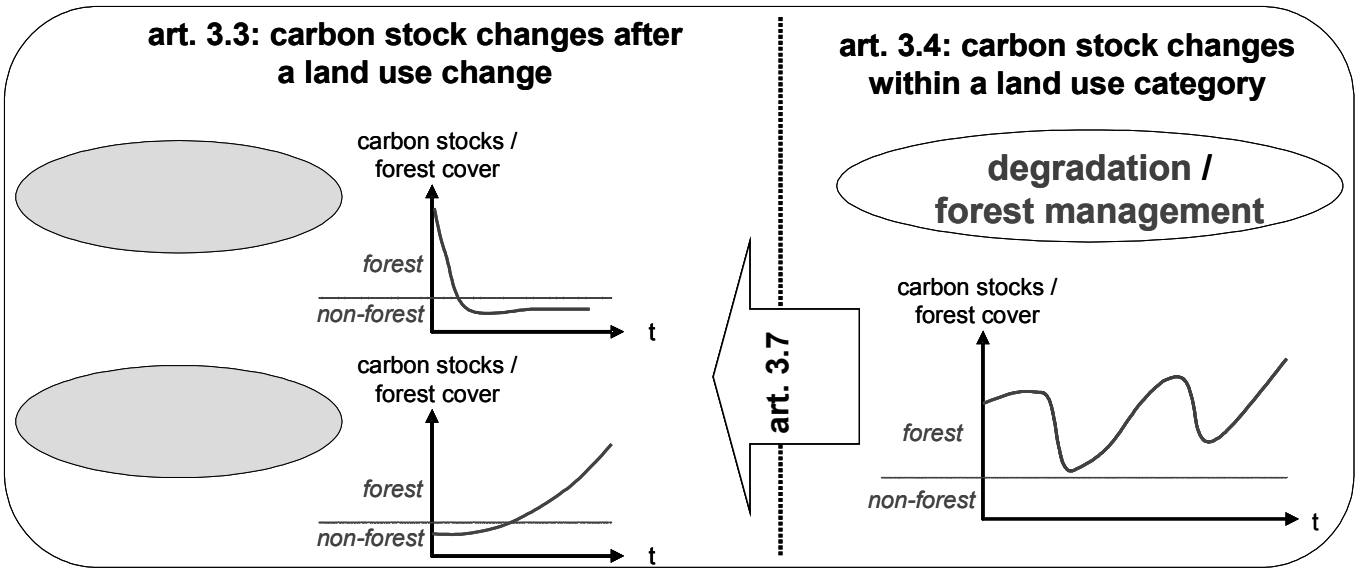
On invitation of the Marrakech COP 7, the IPCC developed in a Good Practice Guidance for LULUCF (IPCC 2003), a sophisticated reporting scheme that distinguishes between

TABLE 2 *Land use categories and land use change activities of the Kyoto Protocol [IPCC 2003]*

land use category (IPCC GPG LULUCF)		new land use							
		managed forest land	unmanaged forest land	cropland	managed grassland	unmanaged grassland	wetland	settlements	other land
previous land use	managed forest land	FM / GM / CM		D	D		D	D	D
	unmanaged forest land	FM		D	D		D	D	D
	cropland	A/R		CM / RV	GM / RV		RV	RV	
	managed grassland	A/R		CM	GM / RV		RV	RV	
	unmanaged grassland	A/R		CM	GM			RV	
	wetland	A/R		CM	GM		RV	RV	
	settlements	A/R		CM	GM / RV		RV	RV	
	other land	A/R		CM / RV	GM / RV		RV	RV	

All units of land subject to direct human-induced A/R activities are considered to be managed forests; therefore unmanaged forest land cannot result from an A/R activity. Similarly, it is assumed that all units of land subject to direct human-induced D activities are managed lands. This includes natural D followed by a change to a managed land use.

FIGURE 2 *Schematic scope of LULUCF as dealt with under the KP for Annex-I countries*



different land-use-categories without getting lost in the jungle of definitions (see Table 2, FIGURE 2). The objective was to avoid double-counting and enable all countries to perform a sound, comprehensible and verifiable reporting on all terrestrial sinks and sources.

Article 3.3, as elaborated at COP 6 bis (Bonn) and COP 7 (Marrakech), requires that all changes of GHG reservoirs, sinks as well as sources, resulting from direct human-induced **land-use changes** are to be included in the national GHG inventories. Such changes can be afforestation, reforestation, and deforestation (ARD). If in sum ARD activities result in GHG removals and thus represent a sink, the reduction target of the Party is reduced by that amount for the corresponding commitment period; respectively, if emissions exceed the removals the reduction target will increase by the same amount.

While accounting for land use change is mandatory in the first commitment period, Annex-I countries were granted the option to apply Art. 3.4 for land **use categories which remain under their current use**, in other words, to account for the stock changes where no land use occurs, but significant changes of sequestered GHG may have taken place due to human-induced activities. In case the land-use categories chosen represent a sink during the commitment period, the country in question is allowed to account a capped amount of these reductions against its respective GHG emission target. In case a country chooses to apply Article 3.4., it is automatically obliged to continue reporting in further commitment periods.

Article 3.7 allows for partially offsetting emissions resulting from LUC by improving carbon stocks in remaining land use categories (see FIGURE 2). The amounts each country can use for this purpose during the first commitment period are fixed in an appendix to Decision 11/CP.7.

Accounting and reporting

The accounting rules applied for forest activities under Article 3.3 and 3.4 are based on the principle of gross-net-accounting and refer only to the respective commitment period, i.e. they are not compared to a base year or period as this is the case in net-net-accounting. This has been criticized because the gross-net-accounting principle does not take into account altered long-term environmental conditions such as elevated CO_2 concentrations, increased length of vegetation periods or nitrogen emissions which may lead to accelerated growth (Schlamadinger *et al.* 2007). Since such effects are not "human-induced" a pragmatic approach was chosen – an individual cap for each party who decides to apply Article 3.4 is listed in the Annex Z of the Bonn agreement. Interestingly most European countries who initially opposed to the inclusion of land use accounting in the Kyoto regulations chose to apply article 3.4, while Canada as a major supporter chose not to.

REDD reference levels as discussed by the Parties automatically imply net-net accounting. Given these flaccidities and the desirability of a consistent approach on land-use accounting it would make sense for Annex I countries to switch to net-net accounting. The present country caps, which represent political compromise, would become obsolete as well[3].

[3] The authors are aware that it will be difficult to convince Annex I Parties who chose to apply Article 3.4 to switch to net-net accounting due to the uneven forest age-class distributions in most of these countries. On the other hand, gross-net accounting was mainly a compromise with the intention to facilitate an agreement. Thus, we argue that concerning LULUCF the same and scientifically sound rules for accounting should apply to all Parties.

TABLE 3 *Summary of the differences in LULUCF activities [adapted from UBA 2007]*

article	activity	application	limits	accounting
Art. 3.3	afforestation	mandatory	no limit	gross-net
	reforestation			
	deforestation		not accounted if compensated through removal between 1990 & 2008 (Art. 3.7)	
Art. 3.4	forest management	voluntary	country cap (Bonn Agreement, Annex Z)	
	revegetation		no limit	net-net

It is good practice to distinguish for each year of the commitment period between afforestation and reforestation, deforestation, forest management, cropland management, grazing land management and revegetation activities under Articles 3.3 and 3.4, as well as to remove potential overlaps and gaps between them. All areas must be attributed to only one single activity at any given point in order to avoid double counting. Reporting takes place in the form of the common reporting format tables in the annual national inventory reports which are subject for intensive review by experts. This continuous reporting and the obligation to balance all areas once accounted for address the prevailing issue of permanence. Of course, a major provision is that there will be a post-Kyoto agreement with future commitment periods.

In recognition of lacking data, experience and many reporting deficiencies, IPCC defined three methodological tiers for estimation and reporting GHG emissions and removals for each pool and its compartments – higher quality of data and methods used lead to higher reporting tiers and require more resources as well as technical and institutional capacities (IPCC 2003):

- Tier 1 uses basic methods and default emission factors provided by the IPCC Guidelines.
- Tier 2 applies emission factors and activity data which are defined by the country for the most important land uses / activities; stock-change methodologies based on country specific data may be applied as well.
- Tier 3 requires the use of higher-order methods, including models and inventory measurement systems tailored to address national circumstances, repeated over time, and driven by high-resolution activity data and disaggregated at subnational to fine grid scales.

This tiered approach takes into account that the technical and institutional capacities as well as the natural conditions vary considerably among Parties and that there are still black boxes, e.g. the complicated quantification of carbon fluxes and pools in soils; it encourages countries to initiate reporting and at the same time provides incentives for quality improvements.

Accounting under the proposed mechanism

The idea of REDD is to provide *positive incentives* for non-Annex I-countries who voluntarily reduce their emissions from the land use sector, with the intention to finally address this significant source of GHG. How is this issue dealt with in Annex-I countries? Article 3.3 and 3.4 indirectly provide positive incentives: If Annex-I countries increase carbon storage in their land use categories, they can reduce their agreed emission reduction targets, which were individually negotiated in Kyoto and refer to the GHG emissions from all sectors: industry, traffic, households. If certain land use categories in a country prove to be a sink they can be used for compliance with the respective country's Kyoto target.

Since non-Annex I countries currently do not have such targets, there is a need for agreeing **individual sectoral reduction targets** for GHG emissions from the land use sector of these countries – the reference rate. In contrast to the situation of developing countries, industrialized countries' LULUCF targets are part of their overall cross-sectoral emission reduction targets. For non-Annex I countries, there would be an incentive to set ambitious sectoral reduction targets because they represent the maximum of compensation payments a country can receive. On the other hand, there is a need for liability, continuity and incentives for compliance in future commitment periods. There should be a liability for the emission reductions achieved in previous commitment periods. Thus, countries with ambitious national targets can gain more but at the same time take on higher responsibility for the forest area they conserved in previous commitment periods.

A major problem in the expert discussions is the technical feasibility of monitoring and reporting on degradation. The inclusion of degradation as covered through Article 3.4 implies the need to monitor and report on **stock changes** in remaining land use categories. In contrast to land-use changes which can be monitored more easily and cost-efficiently through remote sensing techniques, there is a need for ground truthing, e.g. by installing permanent forest inventory plots. However, remote sensing does not give accurate information on the amount of GHG stored in forests or lost though deforestation either, and any compensation mechanism relies on such information. The experience made so far by Annex-I countries shows how difficult it is to somewhat accurately

measure carbon stocks, even with sophisticated inventory systems and sound science behind it.

The question is what level of uncertainty is tolerable and operational. Efforts and costs increase with the accuracy of reporting. It is obvious that it is impossible to install a 2*2 km grid on the forests of the Congo Basin. Even in countries with profound experience in forest monitoring, like Germany, there remains an uncertainty level of ±8 percent (Strogies *et al.* 2006). On the other hand it appears to be a question of capacity to install a statistically significant number of ground inventory plots. In both industrialized and developing countries, there is a trade-off between discounts to be applied for measurement uncertainties and the corresponding value loss of emission allowances, respectively credits.

The stepwise implementation of Article 3.3 and 3.4 is a dynamic feature of LULUCF accounting under the Kyoto Protocol: Parties were given time to get ready and install suitable inventory systems. Until 2006 they had the choice to immediately report on stock changes if they were capable to do so, or to wait with reporting until the beginning of the second commitment period. As an incentive to get ready quickly, countries applying 3.4 were allowed to choose land-use activities to report and reduce their reduction target up to the capped amount. Based on the tiered approach provided by the IPCC GPG for LULUCF [IPCC 2003], the measurement discount can be reduced with increasing quality and accurateness of national reporting.

DISCUSSION

Land-use emissions play a prominent role among developing country emissions. In countries like Brazil or Indonesia, the share of land use within total GHG emissions is in the order of 60 to over 80 percent (see TABLE 1). The proposal presented advocates for a consistent treatment of land-use related emissions and uptakes in both developing *and* industrialized countries. The system is flexible in the sense that not all compartments need to be accounted for in the first place. With a stepwise approach for land-use reporting, like under the Kyoto Protocol, capacities can be built up and learning-by-doing is facilitated. At the same time, with the stepwise introduction of land-use accounting, perverse incentives for emissions leakage to other compartments or later periods can be avoided, because all pools will eventually be accounted for in the long run.

The way by which LULUCF-related changes of carbon stocks were agreed for Annex-I countries could serve as a blueprint for the design of a comprehensive land use compensation mechanism. Once adapted to the special needs of developing countries, it would take into account all relevant aspects of GHG fluxes from forests. An iterative approach would allow to start with a reduced scope focusing on land use changes (ARD) which are relatively easy to monitor; thus giving time to install monitoring systems capable to quantify carbon stock changes in managed forests that do not fall below the threshold of the national forest definition.

The precondition for international consistency however, is to switch Annex I accounting rules from gross-net to a net-net system. For most Annex I countries, this will be a political sacrifice. Given the need to integrate a growing number of today's developing countries under the climate regime, it appears necessary to define common and consistent land use accounting rules for all countries.

In 1997, with Article 3.3 and 3.4, despite the scientific uncertainties, the Parties agreed on a learning-by-doing strategy for Annex I. Instead of aiming for a perfect accounting system of land use in developing countries right from the start, the Parties should show political courage and allow for a learning phase in developing countries too. Technical challenges must be addressed, but they should not prevent early action. The IPCC has developed a suitable approach for monitoring and reporting on 3.3 and 3.4 – a tiered approach, taking into account the availability and quality of data, which in a modified form could be applied to developing countries. Improving data quality and monitoring, i.e. by installing permanent forest inventories lead to a higher tier with a reduced measurement discount. In achieving this, there is potential for South-South and South-South-North partnerships.

The strength of the proposed system is that a transition from a developing country with a sectoral baseline-and-crediting system to a country with an overall cap-and-trade system is not linked to a switch in the reporting system. In order to make the transition smoother, the few A/R CDM activities that will emerge before 2012 need to be included under the sector baseline. Once the government takes over liability for the land use sector, these projects will become subnational JI-type activities.

The transition from A/R CDM to JI will only occur once the first credits have been compensated. Developing countries should not be held liable in their first commitment period for not meeting their forest sector targets. However, once they have received benefits, e.g. by selling carbon credits, they should be held liable, in order to ensure the permanence of the emission reductions. There are several options to securitize liability, e.g., by creating buffers or contributing to an international insurance mechanism.

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The prospects for Reduced Emissions from Deforestation and Degradation (REDD) in Mesoamerica

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SUMMARY

The general reluctance of policy makers to include forests in discussions about global warming has changed with the development of measures to Reduce Emissions from Deforestation and Degradation (REDD). Mesoamerica presents a logical starting point to promote REDD due to the extent of its forest, and the relatively advanced state of its forest management institutions and policies. This paper reviews the prospects for REDD in Mesoamerica using PES and other instruments, with emphasis on the effectiveness of REDD measures at reducing emissions, and their efficiency and fairness. It concludes that in spite of reduced deforestation in the region, the growth of payments to avoid deforestation will be the most important policy change related to REDD in the region in the coming years. However, the magnitude and impact of any payments must not be exaggerated and should be set in context of the overall trends resulting from broader social and economic dynamics.

Keywords: REDD, Mesoamerica, PES, community forests, institutions

Le futur des émissions réduites provenant de la déforestation et de la dégradation (REDD) en Méso-Amérique

D. KAIMOWITZ

Le manque d'enthousiasme général perceptible au niveau de la conception des politiques d'action dans les discussions sur l'effet serre a changé depuis le développement des mesures prises pour réduire les émissions provenant de la déforestation et de la dégradation (REDD). La Méso-Amérique représente un point de départ logique pour promouvoir la REDD du fait de l'étendue de ses forêts, et de l'état raisonnablement avancé de ses institutions et de ses politiques de gestion forestière. Cet article examine les espoirs de la REDD en Méso-Amérique en utilisant le PES et d'autres instruments, tout en soulignant l'efficacité des mesures de la REDD pour réduire les émissions, ainsi que la justice avec laquelle ses actions sont opérées, et son succès général. Il en conclut que la croissance des paiements pour éviter la déforestations va être le changement de politique le plus important relié à la REDD dans la région dans les années à venir, et ce, malgré la réduction de la déforestation dans cette même région. Il est important cependant que l'envergure et l'impact de tout paiement ne soit pas exaggérés, et qu'il s'opèrent dans le contexte des courants généraux résultant des dynamiques économiques et sociales plus larges.

Perspectivas para Reducción de Emisiones por Deforestación y Degradación (REDD) en Mesoamérica

D. KAIMOWITZ

En general los responsables de formular políticas se mostraron reacios en cuanto a la inclusión de los bosques en las discusiones sobre el calentamiento global, pero esto ha cambiado con el desarrollo de medidas para reducir las emisiones por deforestación y degradación (REDD). Mesoamérica contituye un punto de partida lógico para la promoción de REDD debido a la extensión de sus zonas forestales y el estado relativamente avanzado de sus instituciones y políticas de gestión forestal. Este artículo examina las perspectivas para la REDD en Mesoamérica mediante el uso de PES (Pago por Servicios Ambientales) y otros instrumentos, y se centra en un análisis de la eficacia de medidas de REDD respecto a la reducción de emisiones, y su eficiencia e imparcialidad. El estudio concluye que, a pesar de una reducción de la deforestación en la región, el aumento de los pagos para evitar la deforestación será el cambio político más importante de los próximos años en cuanto a REDD. Sin embargo, la magnitud y el impacto de estos pagos no deben ser exagerados, y hay que considerarlos dentro del contexto de las tendencias globales que son el resultado de una dinámica social y económica más amplia.

INTRODUCTION

Until recently, policy discussions about global warming paid scant attention to forests. Most policymakers viewed emissions resulting from forest loss as hard to measure, monitor, and control. They felt any benefit from efforts to reduce them would be short-lived and suffer considerable leakage (i.e. less carbon emissions in one place would lead to more emissions someplace else). Many worried that focusing on tropical deforestation would reduce pressure on richer countries to lower their emissions or limit governments' sovereign rights to decide how to use their forests. There were fears that including forests in trading schemes would flood the carbon markets and make other types of measures to reduce emissions unprofitable. As a result, the Kyoto Protocol provided few incentives for reforestation and none to maintain existing forests.

Nonetheless, lately interest in measures to Reduced Emissions from Deforestation and Degradation (REDD) has increased markedly. Analysts have realized that the emission reductions needed to avert catastrophic climate change are so large they will be almost impossible to achieve without reducing forest loss. Deforestation and forest degradation accounts for about 18% of global carbon emissions and REDD is potentially a cost-effective way of lowering emissions (Stern 2006). That has improved the concept's popularity, despite the inherent difficulties.

Of all the regions where one might promote REDD, Mesoamerica would seem a logical place to start.[1] It has lots of forest, greater institutional capacity, clearer forest tenure rights, and a stronger system of protected areas than many tropical regions, suffered high rates of forest loss, large areas of forests managed by indigenous peoples and other community groups, and pioneered the use of Payment for Environmental Services (PES).

However, even in Mesoamerica REDD will not be easy or straightforward. To make real progress will require more targeted and efficient PES schemes, clearer tenure rights, better monitoring and analysis of forest cover change, and a more holistic approach to reducing deforestation. There are major trade-offs between fairness and efficiency. There are also important questions about the distributional effects of REDD efforts.

This paper reviews the prospects for REDD in Mesoamerica using PES and other instruments, with emphasis on the effectiveness of REDD measures at reducing emissions, and their efficiency and fairness. It describes the region's forest resources and ownership and patterns of forest loss and recovery. Then it assesses the region's experience with institutions and policies that potentially reduce deforestation and discusses the prospects for REDD going forward. The paper does not address the important issue of the potential ancillary benefits of REDD such as biodiversity conservation and forests' provision of other environmental services.

THE CONTEXT

Forest Resources and Tenure

According to the FAO, in 2005 Mesoamerica had 86.6 million hectares of forest (2.2% of the world's total). Mexico accounted for almost three quarters of that. In addition, there were 24.9 million hectares of "other wooded lands" (FAO 2005). (See Table 1).

Roughly half of Mexico's forests are temperate and half are tropical (Bray, Merino-Perez, and Barry 2005). Over 80% of Central America's forest is tropical broadleaf forest 10% is coniferous, and the rest is mixed broadleaf and coniferous forest. Honduras has three-quarters of Central

TABLE 1 *Forest area and forest area change in Mesoamerica*

Country	Forest area (1000 hectares),2005	% of land area 2005	Annual change in forest area (1000 hectares) 1990-2000	Annual change in forest area (%) 1990-2000	Annual change in forest area (1000 hectares) 2000-2005	Annual change in forest area (%) 2000-2005
Mexico	64,238	33.7	-348	-0.5	-260	-0.4
Belize	1,653	72.5	0	0	0	0
Costa Rica	2,391	46.8	-19	-0.8	3	0.1
El Salvador	298	14.4	-5	-1.5	-5	-1.7
Guatemala	3,938	36.3	-54	-1.2	-54	-1.3
Honduras	4,648	41.5	-196	-3.0	-156	-3.1
Nicaragua	5,189	42.7	-100	-1.6	-70	-1.3
Panama	4,294	57.5	-7	-0.2	-3	-0.1
Total	86,351	35.7	-729	-0.7	-545	-0.6

Source: FAO (2005)

[3] The term Mesoamerica as used in this paper includes all of Mexico and the seven countries of Central America.

America's coniferous forest (PNUMA/CCAD 2005).

Local communities, organized in *ejidos* or *agrarian communities*, collectively own a majority of Mexico's forests (Bray, Merino-Pérez, and Barry 2005). Individual private farmers own most of the rest. Tenure rights are relatively secure, although agrarian conflicts persist in some areas.

The government owns most of Guatemala's forest, about half of which is in the Maya Biosphere Reserve in the Peten. The government has given community groups in the Reserve 25-year renewable concessions to manage some 500,000 hectares of that to produce timber and non-timber forest products on the condition that those groups are independently certified to confirm that they manage their forests sustainably.

The bulk of Nicaragua's forests are in indigenous territories in the Atlantic Coast regions. Nicaragua's constitution and regional autonomy and indigenous lands laws recognize indigenous rights to own and manage those forests. Nonetheless, most indigenous territories still lack formal titles and forest tenure conflicts are widespread. Most forest outside the Atlantic Coast regions belongs to the government or non-indigenous farmers.

The majority of Panama's forest is in indigenous territories known as *comarcas*. Costa Rica's forests belong to a mixture of private landowners, government, and indigenous communities, all of whom have secure tenure. Forest tenure in Honduras is complex, with many conflicting claims between indigenous communities, individual farmers, and national and municipal governments.

Forest Loss and Recovery

Forest cover and forest cover change estimates vary widely, as a result of differing definitions, methodologies, and reference years and the biases of the groups that produce them (Velasquez *et al*. 2002). There are also great variations in the amounts of carbon stored by different types of vegetation classified as forests. The Food and Agricultural Organization of the United Nations (FAO) produces the only regular forest cover estimates for every country in Mesoamerica, but its figures are subject to substantial error and often differ markedly from other sources.

Despite that, it is generally agreed that between 1970 and 1990 Mesoamerica had some of the highest deforestation rates in the world. All eight countries in the region lost much of their forest in that period. The 1990 FAO Forest Resources Assessment estimated the region lost 1.5% of its forest annually between 1980 and 1990 (FAO 1993). Most of that forest was converted into pasture and crops, with large and medium-sized ranchers, small farmers, and government agricultural colonization schemes playing important roles. For each hectare of forest lost in Mexico between 30 and 170 tons of carbon were emitted into the atmosphere, depending on the type of forest (Adger *et. al.* 1995).

Deforestation rates in Mesoamerica tend to be higher in areas close to roads and markets and in places with more favorable conditions for agriculture (i.e. flatter lands and better soils) (Chomitz and Gray 2003, Ludeke *et al*. 1990, Muñoz-Pina *et. al*. 2003, Rosero-Bixby and Palloni 1998). In Mexico tropical forests have much higher deforestation rates than temperate ones (Muñoz-Pina *et. al*. 2003). Indigenous territories in Central America and areas with consolidated community forest management in Mexico and Guatemala typically have lower deforestation rates (Bray *et. al*. 2007, Nelson *et al.* 2001, Stocks *et al.* 2007).

Since the late-1980s regional deforestation rates have declined and the patterns of forest cover change have become more diverse. Even though the FAO Forest Resource Assessments are notoriously inaccurate, it is noteworthy that they show the annual deforestation rate in the region fell from 1.1 million hectares in 1980-1990 to 0.7 million hectares in 1990-2000, and 0.5 million hectares in 2000-2005 (FAO 2005; FAO 1993).

The main reasons for that decline include: 1) most remaining forest is in places less suitable for agriculture with steep slopes, poor soils, and/or high rainfall; 2) governments reduced their support for agricultural colonization and cattle ranching; 3) an increasing percentage of remaining forests is in protected areas and/or indigenous territories; 4) extensive low productivity cattle ranching has become less profitable in many places; 5) rapid out-migration from rural areas to cities and to the United States and the growth of off-farm rural employment has left fewer young men interested in clearing forest; and 6) governments have increased their support for reforestation, conservation, and forest management on private and community-owned lands. Unfortunately, due to the paucity of accurate land use data and a drop-off in research about forest cover change and rural issues generally, little is known about the relative importance of these factors.

Some of these trends are unique to Mesoamerica. Others reflect the broader historical trend towards "forest transitions", in which forest loss slows down or is even reverted as countries become richer, more urban, and more environmentally conscious (Rudel *et. al*. 2005).

The forest transitions in Costa Rica, El Salvador, and the Pacific Regions of Panama and Nicaragua are already well advanced. Costa Rica reported a small net increase in forest cover between 2000 and 2005. Hecht *et. al.* (2006) report El Salvador's forest cover increased 40% between 1992 and 2001. Similar processes seem to be underway in some long-inhabited Mexican regions with high emigration and limited aptitude for agriculture (López *et. al*. 2006).

Meanwhile rapid deforestation continues in many agricultural frontier areas, particularly in the humid tropics. These include parts of eastern Tabasco and the highlands of Chiapas in Mexico, the western Peten in Guatemala, eastern Olancho in Honduras, Nicaragua's Atlantic Coast regions, and the Provinces of Panama, Colon, and Darien and the Comarca Ngobe Bugle in Panama. Forest clearing has been especially rapid in areas that were largely spared during the 1980s due to armed conflicts and opened or re-opened for settlement once those conflicts subsided. There is also reason for concern that rising agricultural prices and growing demand for biofuels could push deforestation rates back up, although it is still too early to assess that possibility.

MESOAMERICA'S EXPERIENCE WITH MEASURES FAVORING REDD

Possible measures to reduce carbon emissions from deforestation and forest degradation include: 1) strong environmental institutions 2) payments for maintaining natural forests, 3) protected areas that effectively restrict certain land uses, 4) support for community and indigenous forest management, 5) efforts to increase the profitability of sustainable production of forest products, regular and systematic monitoring and analysis of deforestation and forest degradation, 6) effective enforcement of rules and regulations restricting deforestation and degradation, 7) infrastructure policies that limit access to forested areas, and 8) macroeconomic and agricultural policies that make it less profitable to clear additional forest land for livestock and crops.

The following section examines Mesoamerica's experience in each of these eight areas. The region has made more progress in the first four areas than most other developing country regions. It has made much less progress in the last four areas.

Environmental Institutions

Compared to most of Africa and Asia and other parts of Latin America, Mesoamerica has reasonably well-consolidated national and regional environmental agencies with capacity to implement forestry and conservation policies. This is particularly true in Mexico, Costa Rica, and Panama; less so in Guatemala, Honduras, and Nicaragua. The first set of countries uses their national budgets and loans from multilateral banks to finances the majority of their forestry and conservation activities, while the second relies more on donations or highly subsidized loans from foreign funders.

The Mexican government devotes more resources to forest-related activities than all other Mesoamerican governments combined. For 2008 the Mexican Congress approved a budget of just over $700 million dollars for the National Forestry Commission (CONAFOR), National Protected Areas Commission (CONANP), and Attorney General's Office for Environmental Protection (PROFEPA). Of that perhaps 20% or 30% goes to activities that contribute to REDD directly or indirectly (Greenpeace 2007).

Over the last two decades, Mesoamerica has prepared many regional and national plans and strategies related to the environment, forests, protected areas, biodiversity, forest fires, climate change, and other related subjects (PNUMA / CCAD 2005). While these exercises have served a useful purpose in helping to collect and analyze information and to promote policy dialogue most have had notably little influence on the policies that the governments actually implemented.

Payments for Maintaining Natural Forests

Mesoamerica was among the first regions in the developing world to experiment with paying landowners to maintain forest cover. International NGOs promoted the first initiatives in the 1980s and early 1990s. Then the Costa Rican government began a formal Payment for Environmental Services (PES) program in 1997 and Mexico followed six years later. Other countries have initiated more modest programs since.

Early Experiences: The first forest carbon project was a CARE project in Guatemala, funded by Allied Energy Services in the late 1980s. It focused on planting trees in agroforestry systems and woodlots. Other projects followed in the mid-1990s, including the CARFIX project in Braulio Carrillo National Park, ECOLAND project in Piedras Blancas National Park, BIODIVERSIFIX project in the Guanacaste Conservation Area, and Klinki Forestry Project in Turrialba in Costa Rica, a carbon sequestration project in the Rio Bravo Conservation and Management Area in Belize, the Fondo Bioclimático Project in Chiapas, Mexico and the Chiriqui Reforestation Project in Panama (Moura-Costa and Stuart 1998). The United States Initiative on Joint Implementation (USIJI) established in 1994 supported these projects, most of which involved large international NGOs and electrical companies. The projects supported protected areas and reforestation, not conservation on private or collectively owned lands.

These early projects contributed to developing key concepts and tools related to using forests as carbon sinks. The areas involved were relatively small and the projects had limited impact on national deforestation rates.

Costa Rica: In the mid-1990s Costa Rica expanded an incentive program designed to encourage reforestation for timber production to also include support for sustainable forest management and conservation. Soon after it shifted from timber to a major new initiative to pay landowners for the environmental services they provided. In 1996 the Costa Rican national assembly passed a forestry law (7575) that established a formal legal and institutional framework for these payments, focused on carbon sequestration, hydrological services, biodiversity conservation, and scenic beauty.

To manage the PES program Law 7575 created the National Fund for Forest Financing, (FONAFIFO) as a semi-autonomous agency with both public and private sector representatives on its board. FONAFIFO designs the procedures for the program, collects funds from various sources, and maintains records and statistics. Since 2003 it has also directly received applications from landowners, signed contracts, and monitored their compliance. Certified foresters called *regentes* help landowners develop forestry plans and apply for funds and they assist FONAFIFO in monitoring landowners' compliance with their contracts (Pagiola 2006).

Between 1997 and 2006, the Costa Rican government signed 6,062 contracts with private landholders to conserve natural forest, reforest, manage forests, and establish agro-forestry systems. Over this period the government paid landholders to conserve 471,392 hectares and to manage another 28,066 hectares sustainably (FONAFIFO 2007). Strict conservation has accounted for over 90% of the area the program has covered since 1998. About 270,000 hectares of forest were enrolled in the program in late 2005 (Pagiola 2006).

Costa Rica pays landholders about $240 per hectare of forest to conserve that forest for five years (i.e. $48 per hectare per year) (Zbinden and Lee 2005). Landholders must prepare a forest management plan and take steps to avoid fires, hunting, logging, and grazing in the forest (Pagiola 2006). Landholders who meet their obligations receive five equal annual payments. The transactions costs for administering the system, including the costs of both FONAFIFO and the *regentes* range from 19% to 25% of the program's total costs (Wunder 2006).

Demand to participate in the program has consistently surpassed available funds. Typically there have only been enough funds to cover about one third of the area landowners offer (Pagiola 2006). Although in recent years the program has made efforts to target areas that provide more environmental services it has not made any attempt to prioritize areas where one could reduce deforestation most for the least money.

Over the last decade Costa Rica invested over $200 million in PES (CONAFOR 2007). These funds came mostly from a sales tax on gasoline, the Global Environment Facility (GEF), World Bank loans, the German and Norwegian governments, various water users, and European companies (Pagiola 2006).

Econometric studies that have assessed how much Costa Rica's PES program reduced deforestation have yielded mixed results. Some suggest the program has achieved modest reductions, others that the effect has been negligible (Pagiola 2006, Pfaff *et al.* 2006). The studies all agree that many landowners who received payments would have conserved their forest even without them and that the decline in Costa Rica's national deforestation rates cannot be attributed principally to the payments.

Most benefits from Costa Rica's PES program have gone to companies and large individual landowners. Zbinden and Lee (2005) found program participants in the northern lowlands of Costa Rica had much more land and securer land tenure than non participants. Ortiz-Malavasi, Sage-Mora, and Borge-Carvajal (2003) estimated only about 15% of PES recipients could be considered poor and found that a substantial portion of them were absentee landowners who made their living mostly from non-agricultural activities. The government made little, if any effort, to specifically target payments to poorer and smaller landowners. Nonetheless, the PES program has represented an important source of income for poor Bribri and Cabecara indigenous communities in Talamanca and low-income land-owners in the Osa Pennisula (Pagiola 2006, Rojas *et al.* 2007).

Mexico: Mexico began its PES program in 2003. Initially the program focused solely on conserving forests to provide hydrological services (PSA-H), but it later expanded to include carbon sequestration, biodiversity, and agroforestry (PSA-CABSA). The government forestry agency CONAFOR administers the program. To qualify for hydrological services payments, land must have dense forest cover and be located near towns with over-exploited aquifers and more than 5,000 inhabitants. CONAFOR gives preference to areas with cloud forest and to poorer municipalities with fewer services (Alix-García *et al*. 2005).

To receive payments landowners must commit to maintain their land in forest for five years. In return they receive $40 / hectare each year for cloud forest and $30 / hectare for other forests (Alix-García *et al*. 2005). In theory payments can only be made for one five year period. It is not clear what the government expects to happen after that. Transactions costs, including the costs of both CONAFOR and private foresters that help recipients to obtain payment, represent a portion of total costs similar to Costa Rica.

Between 2003 and 2006 the Mexican government provided payments for 680,000 hectares of conservation and agroforestry systems. Total payments have increased from $3.6 million in the program's first year to over $100 million dollars in 2007 (Alix-García *et al*. 2005). CONAFOR 2007). The federal budget, a World Bank loan, and a GEF grant provided practically all of that.

As in Costa Rica, it is not clear how much Mexico's PES program has contributed to REDD. CONAFOR has made little effort to target forests that have a high risk of being cleared. In fact, most forests involved in the program have a low or very low risk of deforestation and many belong to well-organized communities that have managed their forests sustainably for years. Even though deforestation rates are much higher in the tropics, the temperate areas have received most of the money (Alix-García *et al.* 2005).

Unlike Costa Rica, most of the money in Mexico has gone to poor communities that manage their forests collectively. In 2005, 83% of the payments went to ejidos and agrarian communities, of which 38% had indigenous inhabitants (Magaña-Torres *et al.* 2006).

Other PES projects: The World Bank has promoted PES in El Salvador and Nicaragua and the Inter-American Development Bank (IADB) in Guatemala and Honduras. A number of bilateral donors and international NGOs have supported PES projects focused on hydrological or biodiversity services. These efforts have been smaller and less institutionalized than those in Costa Rica or Mexico. Nevertheless, they have created at least an incipient capacity to implement PES activities in these other countries.

Protected Areas

Few regions in the world have given protected status to a higher percentage of their forest than Mesoamerica. Over half of Central America's forest was in protected areas in 2006, of which there were 743 covering 14.3 million hectares (CCAD / CAC 2007). About 12% of Mexico's forest is in protected areas, of which there are 161 federal protected areas, covering 22.7 million hectares.

Much of Central America's forest in protected areas is concentrated in a few large Biosphere Reserves: the Maya and Sierra de las Minas Reserves in Guatemala, the Rio Platano Reserve in Honduras, the Bosawas and South-east Reserves in Nicaragua, the Amistad and Central Volcanic Corridor Reserves in Costa Rica, and the Darien Biosphere Reserve in Panama. Mexico's main forested biosphere reserves are Calakmul, La Sepultura, Las Tuxtlas, Montes Azules, Sian Kan, and Sierra Gorda.

International agencies and national governments have invested heavily in these protected areas, with mixed results. Belize and Costa Rica have largely been able to control encroachment (Chomitz and Gray 2003). Mexico has also succeeded in many areas (Bray *et. al.* 2007), although some areas have substantial encroachment and illegal logging and many are "paper parks" with no staff or regular field activities (CONABIO 2006).

On the other hand, the parts of the Maya, Bosawas, and Rio Platano Biosphere Reserves outside community forest concessions or indigenous territories have suffered widespread deforestation, despite large investments there. For example, between 1990 and 2005, farmers and ranchers deforested nearly 50,000 hectares inside the Laguna del Tigre and Sierra del Lacandón National Parks in Guatemala's Maya Biosphere Reserve (Central America Report 2007).

Donors such as the GEF, the United States Agency for International Development (USAID), and European bilateral development agencies have provided much of the funding for protected areas in Mesoamerica. In recent years, however, they have reduced their support, raising serious questions about how these areas will be funded in the future, particularly in the poorer countries.

Community Forestry and Indigenous Territories

CONAFOR in Mexico is the government agency in the region that has invested the most in community forest management. Funding for community forestry has gradually increased since CONAFOR was established in 2002. For 2008, the Mexican Congress approved a budget of some $70 million for community forestry activities, which represented 14% of CONAFOR's budget (Enciso 2007). These efforts have re-enforced the pre-existing trend towards lower deforestation rates in areas where community forestry enterprises manage forests for timber production. In many cases these rates are as low as or lower than in protected areas (Bray *et al.* 2007).

Guatemala has also had considerable success in limiting forest clearing and forest fires in the 500,000 hectares with community forestry concessions. While the country's National Protected Areas Commission (CONAP) is ostensibly responsible for these concessions, foreign donors have provided most of the funding.

Government recognition and support for indigenous territories has curtailed deforestation in the northern portion of the Bosawas Biosphere Reserve in Nicaragua, in Talamanca in Costa Rica, and in the Darien in Panama. The demarcation and titling of the forests inhabited by Miskitu Indians in eastern Honduras and Nicaragua might yield similar results, but progress has been slow due to political opposition and the weaknesses of the relevant government agencies.

Increasing Profitability of Sustainable Forest Production

If sustainable production of timber and non-timber forest products was more profitable that might reduce the incentive to clear forests for agriculture and reduce emissions resulting from poor forest management. The main empirical evidence for this in the region is the previously mentioned low deforestation rates in many of the better managed and more profitable community forests in Mexico and Guatemala.

Besides the previously mentioned government efforts to support community forestry, the main instrument designed at least partially to increase the profitability of sustainable forest management in the region has been independent certification, mostly by groups linked to the Forest Stewardship Council (FSC). To date 1.4 million hectares of forest have been certified in Mesoamerica under FSC standards (FSC 2008). These efforts have helped to improve the management of these forests and in some cases to access new markets and maintain rights over forests, however, so far they have done little to increase the prices received by those with certified forests (Mota Villanueva 2005).

Monitoring and Analysis of Deforestation

Despite large investments in geographic information systems (GIS), environmental information systems, and indicators of sustainability, no Mesoamerican country regularly monitors forest cover rigorously and systematically (although Costa Rica comes close.) As a result, none of the region's countries with significant deforestation would be well placed to estimate how much REDD efforts reduced that deforestation. The lack of systematic monitoring is largely due to weak coordination between government agencies, frequent changes in government policies and institutions, a preference for funding short-term consultancies and the purchase of equipment and software rather than recurrent expenditures, and policymakers´ desire to avoid being held accountable if they fail to reduce deforestation.

Regulatory Efforts to Limit Deforestation and Forest Degradation

Most, if not all, of the countries in the region have laws prohibiting clearing of forests to plant pasture or crops without authorization fro the government to do so. However, none of the governments devote significant funds or attention to enforcing those laws. Even though deforestation for agriculture has consistently been the main cause of forest destruction, the governments devote the vast majority of their forest law enforcement resources to regulating timber production.

Similarly, the countries have detailed laws and regulations specifying who can harvest timber and under what conditions. Nonetheless, due to limited resources for enforcement and lack of coherent enforcement strategies, poorly designed legislation, corruption, and weak commitment within the judicial system, illegal logging is widespread in the region (CCMSS 2007). Where it occurs in protected areas and other places where there would otherwise be no logging, it leads to greater carbon emissions. In other cases where logging is illegal because loggers have not paid taxes or complied with administrative procedures it is unclear whether the illegality

of the logging implies greater carbon emissions.

In recent years illegal logging has gotten much more attention from policymakers in Mesoamerica, particularly in Mexico, Honduras, and Nicaragua. Nonetheless, so far this does not seem to have significantly reduced illegal logging. Most control efforts are poorly designed and sporadic and there is little coordination between the different actors involved.

Infrastructure Policies

Improving access often creates powerful incentives to clear or exploit forests. Constructing and improving roads into forested areas played a key role in the forest destruction that took place in the region in recent decades (Chomitz and Gray 2003, Denninger and Minten 1997, Ludeke *et al.* 1990, Rosero-Bixby and Palloni 1998).

Road construction and improvement continues to pose major threats to forests in the region. One recent study of ten road projects in the region near the borders between Mexico, Guatemala, and Belize estimates these projects would cause the loss of over 300,000 additional hectares of forest over the next 30 years (Amor Conde *et al*. 2007). Road projects also pose big threats to forests in the Atlantic regions of Nicaragua and Honduras, and the Darien in Panama, among others.

All Mesoamerican governments require Environmental Impact Assessments (EIA) for large road projects. However, most EIAs are simply expensive exercises that don't significantly alter the projects' approval or design. Governments have only succeeded in implementing measures to effectively mitigate the negative impact of roads on forests in a few cases, mostly in Costa Rica and Panama. While the World Bank and the IADB have become much more sophisticated in their analysis of the impacts of road projects in forested areas and have increasingly shied away from such projects, governments have often been able to find other funding sources for such projects and go ahead without multilateral involvement.

Macro-economic and Agricultural Policies

Macro-economic and agricultural policies that influence the profitability of agriculture and forestry have large impacts on forest clearing and harvesting. Exchange rate fluctuations, changes in tariffs and other trade barriers, agricultural subsidies, and land tenure policies are especially important in this regard (Barbier and Burgess 1996, Kaimowitz and Angelsen 1998).

Many policies implemented over the last fifteen years have made agriculture and forestry less profitable, particularly in agricultural frontier regions (Hecht *et al.* 2006). The massive influx of foreign exchange from remittances, tourism, narcotics, petroleum, and the sale of public enterprises have strengthened local currencies, which negatively affects agriculture and forestry. Free trade agreements have forced Mesoamerican ranchers and farmers to compete more directly with their heavily subsidized counterparts in the United States. Government subsidies for agricultural credit and colonization have declined. The privatization of collective landholdings probably facilitated migration out of rural areas. None of these policies was designed to reduce deforestation or forest degradation but they probably had that effect.

Nonetheless, certain policies continue to favor deforestation. For example, Mexico's PROCAMPO agricultural subsidy program has apparently encouraged deforestation in South-east Mexico (Klepeis and Vance 2003). Mexico has also actively encouraged farmers to expand avocado production in Michoacán, even though this often leads to clearing pine forests to plant avocadoes. The recently negotiated Central American Free Trade Agreement may make cattle ranching in agricultural frontier areas more profitable, by opening up new markets for beef. Biofuel subsidies have encouraged forest clearing to plant oil palm.

THE OUTLOOK FOR PES AS PART OF REDD STRATEGIES GOING FORWARD

Mesoamerican deforestation will probably continue to fall. There are fewer forests left to clear. Those that remain are largely in places with steep slopes and poor soils. Government policies are largely unfavorable to agriculture and forestry. There are clear signs of forest transitions in various places.

It remains to be seen, however, to what extent new REDD measures could greatly accelerate that trend. The main such measure being discussed at present is providing significant international funding to PES programs designed to conserve natural forests.

As noted above, there is little evidence the PES programs and projects implemented to date have significantly reduced deforestation. That is largely because payments have gone mostly to maintain forests that were not really threatened.

For PES to achieve REDD they would have to be much better targeted towards forests that are really at risk of being cleared or degraded. Current remote sensing technologies and modeling techniques allow one to identify with some accuracy which forests those are.

However, targeting forests at risk is more problematic that it appears. Landowners that manage their forests well would undoubtedly object to being excluded from the program and might have considerable clout with forestry agencies. It seems – and it is – perverse and unfair to pay landowners that seem likely to clear their forests but not those that have consistently managed it well. In the medium-term only compensating landowners for forests at risk would create a substantial incentive for them to put their forests at risk by destroying or threatening to destroy part of it, particularly if those landowners had not really managed their forests until they began receiving payments. Indeed, some farmers in Mexico and Nicaragua whose PES were about to end in have threatened to destroy their forests unless they continued to receive payment.

Many forests that are most at risk of being cleared or degraded have more than one claimant, particularly in

Guatemala, Honduras, and Nicaragua. That makes it hard to determine who should receive PES and more likely that whoever does receive the PES will not be able to ensure that the forest will be preserved. There is also a risk that by making these forests more valuable PES programs might encourage greater conflicts since each claimant would stand more to gain by winning control over the forests. Governments will find it difficult to pay groups that lack formal title to their lands or that occupy government forest lands illegally and payments to the latter groups could encourage further illegal occupations.

So far the main PES programs have been in countries that have had the institutional capacity to implement them. However, a greater emphasis on forests at risks also implies the need to expand these efforts into countries such as Honduras and Nicaragua, which have relatively high deforestation rates and much less institutional capacity than Mexico or Costa Rica. That presents additional challenges.

Making PES more efficient requires not only targeting forests that are truly at risk but also ensuring that landowners do not receive more than the minimum amount necessary to convince them to conserve their forests and do not simply clear the same amount of forest in some other location. The fact that both the Costa Rican and Mexican PES programs are heavily over-subscribed suggests that these programs could pay landowners significantly less and still get them to conserve the same amount of forest. That is hardly surprising given that studies suggest landowners would have conserved most of that forest with no payment at all. Nothing in the existing PES programs limits the ability of landowners to clear forests outside the areas they receive PES payments for.

Presumably if PES programs prioritized forests landowners were more inclined to clear or harvest they would have to pay more that they would have to pay the landowners they currently work with. However, since there have been few studies of the opportunity costs of different land uses in the various regions of Mesoamerican no one knows how much that might be. The studies available for the Amazon and other regions cannot be mechanically applied to Mesoamerica.

Just as PES programs would probably have to pay more per hectare for forests at significant risk the transactions costs involved in working with these forests are also likely to be substantially higher. Costa Rica and Mexico have had relatively little problem with getting landowners to comply with their commitments, since payments went largely to landowners with little inclination to clear or exploit their forests in the forest place. In places where it is much more likely that landholders will fail to comply with their commitments programs will have to devote much more resources to monitoring compliance and impose greater penalties on those that fail to comply.

One particular problem in Mexico is that in many of the ejidos and agrarian communities that have high deforestation rates the communal authorities are relatively weak and there are high levels of internal conflict. That implies it would not be sufficient to sign contracts with the communal authorities and assume they will be in a position to deliver what they agree to, as is the case with the current program. Additional efforts would be required to build consensus and local monitoring mechanisms in such communities.

One key question in all of this is how much additional international funding might be available for new PES initiatives. Some back-of-the-envelope calculations can give some sense of that. It might be a reasonable starting point to assume that international funders would pay $10 for each ton of carbon not released into the atmosphere and that for each hectare of forest that is kept from being cleared one can keep 100 tons of carbon from being emitted. That implies avoiding one hectare of deforestation would be worth $1,000. If one were to reduce the total level of deforestation by 100,000 hectares per year (roughly 15%-20% of current levels) that would be worth $100 million per year. To achieve that reduction in deforestation might require five or ten annual payments to the owners of each hectare – so the $100 million would permit $10 - $20 million in payments each year; or $100 - $200 per hectare. Obviously the true magnitude of each of these parameters could differ significantly from these assumptions, but at least this gives a starting point.

The good news is that $100-$200 per hectare per year is substantially more than the Costa Rican or Mexican PES programs currently pay and probably higher than what most landholders could obtain from extensive cattle ranching or low yield cereal production. That could give a little room to maneuver.

The bad news is that in principle at least Mesoamerica would only receive international payments for hectares that are conserved that would otherwise have been deforested. That implies that if only 10% or 20% of the hectares covered by the PES program would otherwise have been cleared, the most landholders could receive would be $10 or $20 per hectare. Moreover they would only receive those payments for five or ten years and would have few incentives to keep the forest from being cleared after that. That gives a sense of how much more efficient the new PES initiatives would have to be than current initiatives for the new REDD approach to succeed.

The other piece of bad news is that $100 million per year is roughly what Mexico already spends on PES. Thus the amounts of additional funds the new REDD initiative might put on the table are not that high compared to what is already being spent; yet the expectations for results would be much higher, as would the imperative of demonstrating them.

How much Mesoamerica could obtain from international REDD funding also depends to a great extent on what base lines and reference scenarios the parties agree on. Negotiators are likely to find it quite hard to come up with reference scenarios that reward countries for both their past and future efforts to conserve forests. If the baselines and reference scenarios adopted are based on the assumption that recent deforestation rates will continue countries like Costa Rica and El Salvador will be unable to participate since their net deforestation is already zero or negative. Such baselines and reference scenarios would essentially punish these countries for having made progress before the REDD initiatives began. One the other hand, a country like Mexico would unduly

benefit from such a reference scenario since it has had high deforestation in the recent but the rate will probably fall in the future even if no REDD measures are taken.

Not rewarding countries for past efforts is efficient, but doesn't seem fair. Rewarding them for reductions that would have taken place anyway is neither efficient nor fair. However, it is extremely difficult to estimate what deforestation rates would have been without REDD measures and would probably be even harder to achieve a political consensus about what specific method should be used to do that.

One final issue that deserves consideration is how new REDD initiatives might affect equity and poverty. As noted previously, Mexico's PES program seems to have benefitted mostly poor communities, many of which are indigenous, while Costa Rica's program has largely benefitted the wealthy.

If one were to give greater priority going forward to heavily threatened forests that could unduly benefit wealthy cattle ranchers, as they are responsible for a large portion of deforestation. Small-holders that clear forests on the agricultural frontier would have much more difficulty participating in PES programs since many of them have no title or clear legal claim to their land, particularly in Central America. Attempts to target REDD initiatives on forests at greater risk would probably affect indigenous peoples and community forestry groups negatively, since they have conserved most of their forest reasonably well and could be expected to continue to do so.

These various considerations imply that Mesoamerica would probably need to find a delicate balance between fairness, equity, and efficiency and to find innovative ways to incorporate poor people into PES initiatives even when they lack land titles or operate illegally. If it goes too far in the direction of fairness and equity it will be difficult to significantly reduce emissions from deforestation and degradation. On the other hand, if it goes too far in the direction of efficiency it will end up rewarding wealthy groups for inappropriate and often illegal behavior, increasing inequality, and undermining the political legitimacy of the entire endeavor.

CONCLUSION

Over the last twenty years Mexico and Central America have implemented various policies designed to reduce deforestation and degradation, with mixed success. The total annual net loss of forest biomass has declined, although deforestation remains high in certain areas. There have been advances in community and indigenous forest management, protected area management, forest certification, the elimination of perverse incentives to clear forests, and payment for environmental services, among other topics, although much remains to be done in all these areas as well as topics such as road construction and maintenance, forest law enforcement, and monitoring and analysis. Forest cover change has also been affected by broader social changes, such as migration, urbanization, and more recently the rapid rise in food and energy prices and the growing demand for biofuels.

It seems likely that the growth of payments to avoid deforestation will be the most important policy change related to REDD in the region in the coming years. Such payments have potential to significantly reduce emissions from deforestation and degradation, but there are still many outstanding questions about how to make them more effectively, efficient, and fair, and there are probably significant trade-offs between those three objectives. Moreover, the magnitude of the probable increase in these payments should not be exaggerated. While the amounts of money involved may be substantial, they are unlikely to be sufficient to fundamentally change the overall trends resulting from broader social and economic dynamics.

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Paying for avoided deforestation in the Brazilian Amazon: from cost assessment to scheme design

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SUMMARY

Reducing emissions from deforestation and degradation (REDD) is considered a significant mitigation opportunity. Forest loss in the Brazilian Amazon has traditionally been highest in the world and, thus, represents a likely target for future REDD initiatives. The paper presents an ex-ante assessment of the potential REDD costs in two of the three largest states in the Brazilian Amazon using official land use and cover change statistics. The two states, Mato Grosso and Amazonas, historically feature largely different land use dynamics. The findings focus on the opportunity costs of REDD and suggest that at least 1 million ha of projected deforestation in Mato Grosso and Amazonas could be compensated for at current carbon prices until 2017. Total costs may differ between US$ 330 million and over US$ 1 billion depending on how payment mechanisms are designed. Implications of payment scheme design for the political economy of REDD are discussed.

Keywords: opportunity costs, REDD, payments for environmental services, carbon supply, land use

Coûts pour éviter la déforestation dans l'Amazonie brésilienne: de l'évaluation des coûts à la conception de projet

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La réduction des émissions provenant de la dégradation et de la déforestation (REDD) est considérée comme une opportunité d'atténuation importante. La perte de la forêt en Amazonie a été traditionnellement la plus grande au monde, et représente par conséquent un but probable pour les futures initiatives de la REDD. L'article présente un évaluation ex-ante des coûts potentiels de la REDD dans deux des trois états les plus importants dans l'Amazonie brésilienne en utilisant les statistiques officielles de l'utilisation de la terre et celles des changements du couvert forestier. Les deux états en question, le Matto Grosso et l'Amazonas, connaissent une historique bien différente de dynamique de l'utilisation de la terre. Les résultats se concentrent sur l'opportunité des coûts de la REDD et suggèrrent qu'au moins 1 million d'ha de déforestation prévue dans le Matto Grosso et l'Amazonas pourraient être compensés aux prix actuels du carbone jusqu'en 2017. Le coût total pourrait aller de 330 millions de dollars US à plus d'1 million de dollars US, selon la manière dont les mécanismes de paiement sont conçus. Les implications de la conception des mécanismes de paiement pour l'économie politique de la REDD sont examinées.

Los pagos para evitar la deforestación en la Amazonia brasileña: desde una evaluación de costos hacia el diseño de planes

J. BÖRNER y S. WUNDER

La Reducción de Emisiones por Deforestación y Degradación (REDD) se considera una oportunidad importante para aliviar los efectos de la deforestación. La tasa de pérdida de cobertura forestal en la Amazonia brasileña ha sido tradicionalmente la más alta del mundo, y por eso representa un objetivo probable para iniciativas futuras de REDD. El estudio presenta una evaluación preliminar de los costos potenciales de la REDD en dos de los tres mayores estados de la Amazonia brasileña, y se basa en las estadísticas oficiales del uso de la tierra y del cambio en cobertura forestal. Los dos estados, Mato Grosso y Amazonas, demuestran dinámicas históricas del uso de la tierra bastante diferentes. Las conclusiones se centran en los costos de oportunidad de REDD y sugieren que un mínimo de un millón de hectáreas de deforestación prevista podría ser indemnizado hasta 2017 al precio actual del carbono. Los costos globales podrían oscilar entre US$330 millones y más de mil millones, según la forma de diseñar los mecanismos de pago. Se analizan las implicaciones para la economía política del diseño del plan de pago de REDD.

DOES REDD MAKE SENSE IN THE AMAZON REGION?

Both the International Panel on Climate Change (IPCC) and the Stern Review on the Economics of Climate Change reckon that avoiding deforestation accounts for a significant share of the global potential for climate change mitigation through forest related activities (IPCC 2007, Stern 2007). For many years, Brazil has been the single country with the by far highest areas of tropical forest clearing in the world. Its dynamic agribusiness sector has led an aggressive expansion of the agricultural frontier in the Amazon region. While Chomitz and Thomas (2001) found that more than three quarters of deforested land has ended up under pasture and, in fact, pasture continues to strongly dominate the land use mix in the Amazon. Yet, recent evidence indicates that, in relative terms, cropland expands now faster than pastures (Morton *et al.* 2006). Model based simulations suggest that, until 2040, primary forest clearing in the Brazilian Amazon may release up to 32 Pg of carbon into the atmosphere -- roughly twice the amount of global annual anthropogenic greenhouse gas emissions (GHGs) (Soares-Filho *et al.* 2006).

While farmers, the local and probably also the national economy have benefited from converting forests to agricultural land (Andersen *et al.* 2002), continuous deforestation does not only accelerate climate change but also threatens the provision of other important global ecosystem services, such as biodiversity protection and hydrological regulation. Thus, it seems wise to intensify the search for flexible policy mechanisms that translate the demand for such global public good services into local economic incentives for conservation.

Traditional command-and-control policies have been ineffective in curbing deforestation in the Amazon. The *Código Florestal* has been the prime legal instrument for forest conservation on private lands since 1965. But due to lax enforcement, illegal deforestation contributes the lion's share to forest loss in the Brazilian Amazon. During 2005-06, deforestation rates had dropped sharply. At the Kyoto Protocol's International Climate Change Conference COP13 in December 2007 in Bali, many hoped this was a lasting reduction, to be attributed to better rural licensing systems, increased fines for illegal clearings, and other policy actions by the Brazilian government under its ambitious Plan to Combat Deforestation.[1]. However, in early 2008 the Brazilian Space Research Centre (INPE) reported that deforestation has accelerated again sharply during the second half of 2007, probably in response to the recovery of international soy and meat prices.

Enforcing command-and-control policies at the scale of the Amazon region is thus unlikely to work as a stand-alone strategy. Combining infrastructure expansion and other development policies with high food-commodity prices and rising demand for biofuels creates a cocktail that will add to Brazilian agricultural land demand and to forest-conversion pressures in the foreseeable future. It is against this backdrop that the debate on Reduced Emissions from Deforestation and Forest Degradation (REDD) has gained momentum, both internationally and inside Brazil. The COP13 decided to include REDD in future negotiations on mitigation mechanisms for countries that are not listed in Protocol Annex B. Several proposals to implement REDD in the Brazilian Amazon were also presented. Drawing on its experiences with *Bolsa Floresta*, a pilot compensation scheme for avoided deforestation on smallholdings, Amazonas State proposed a REDD scheme at the federal state level (Government of Amazonas 2007). Second, an NGO consortium sketched the outlines of a proposed payment for environmental services (PES) scheme for avoided Amazon deforestation[2]. Finally, another group of NGOs presented a report scientifically underpinning a national-level REDD scheme to boost Amazon conservation (Nepstad *et al.* 2007). The evidence presented in the following extends on background calculations made by the authors for the first two proposals.

The challenge of quantifying potential REDD supply has both a temporal and a spatial dimension. First, credible temporal baselines are needed to project forest-cover change relatively far into the future. Second, the total cost of implementing a payment scheme has to be estimated in a spatially disaggregated manner, for many farms with variable environmental and economic conditions. Yet, scientific assessments of the supply side of Amazon REDD have so far been scarce. In a multiple-country background study for the Stern Review, Grieg-Gran (2006) estimated avoided deforestation in Brazil to cost US$1.2-1.7 billion, depending on whether timber rents are included. Nepstad *et al.* (2007) expected avoiding 6.3 Pg of carbon emissions in the Amazon over 30 years to cost considerably more (US$ 8.2 billion)[3]. In spite of the diverging total cost estimates, both studies suggest that REDD at current carbon prices might be competitive vis-à-vis the conservation opportunity costs of private Amazon land development for crops and pastures.

Current Brazilian deforestation can be said to occur at four different levels of (il)legality. First, landowners can legally clear up to 20% of their land area (private landowners in the Amazon are required to keep 80% of their farm area as a Legal Forest Reserve.). Secondly, they could pass that legal clearing threshold and develop a so-called 'environmental deficit' on their land – a phenomenon that is

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[1] "Cutting down deforestation in the Brazilian Amazon". Report published by the Brazilian Ministry of Environment at the COP13, December 12th 2007, Bali, Indonesia.

[2] Pacto pela Valorização da Floresta e pelo o fim do Desmatamento na Amazônia (Forest Valuation Pact). http://www.icv.org.br/publique/media/PactopelaValorizacaodaFlorestaepeloFimdoDesmatamento_sumario.pdf

[3] Per ton of carbon values are less diverging. See Section 7 for explanation.

widespread (and tolerated) in many old frontier areas. Third, private individuals could invade weakly enforced state land (*terra devoluta*) and clear its forest, in the realistic hope of establishing land tenure over time. Finally, land invasion could happen in declared national parks, indigenous and extractive reserves, etc.

To counteract the third and fourth types of deforestation, international REDD payments could be used for financing improved command-and-control systems However, in the authors' view it makes less sense to calculate the opportunity costs of conserving these lands, especially for parks and reserves that have already been legally delimited by the Brazilian federal or a state government with the aim to ensure protection. On the contrary, this study will thus focuses on direct compensations to private landowners. This refers to the first and, possibly in the future, to the second legality scenario – given strong current political pressures to lower the 80% legal reserve threshold, or to allow landowners to somehow pay their way out of 'environmental deficits'. It is likely that PES-type compensations will become one important element in any Amazon REDD scheme. To make forest conservation attractive to landowners, such transfers have to exceed their land opportunity cost, i.e. the economic returns to converting forest to other uses minus the current economic benefits derived from the standing forest.

Hence, this aimed-for contribution to the REDD debate is twofold. First, it evaluates the economic feasibility of REDD using municipal-level production data for the private lands of two of the largest Brazilian federal states (combined 47% of the Legal Amazon's land area). Secondly, it uses these results to provide guidance for REDD design that combines cost effectiveness with equity concerns.

The article is structured as follows. Section 2 provides a general overview of the two case study areas and the general context for REDD in the Brazilian Amazon. Section 3 describes the methods and data used to arrive at the results presented in section 4. After interpreting the results from a political economy perspective in section 5, section 6 concludes with the main implications of this study. Finally, section 7 discusses some of the main assumptions and compares the findings with those made in other REDD opportunity cost studies. Future perspectives of REDD in the Amazon are discussed as well.

STUDY AREA: BRAZILIAN AMAZON, MATO GROSSO, AND AMAZONAS

Only roughly 25% of land in the Brazilian Amazon is private. About 35% is indigenous territory or protected by federal- or state-level protected areas, whereas the remaining land is considered public with weakly enforced tenure (*terra devoluta*) (Toni 2006). In the state of Amazonas, over 30% of total surface area are covered by either indigenous territories or protected areas, as opposed to 20% in Mato Grosso. As suggested in Table 1, land concentration is comparatively high in the Amazon, with regional Gini indices constantly being around 0.85 since 1950: it was reduced from 0.9 to 0.8 in Amazonas, and remained almost constant at 0.85 in Mato Grosso (ADA 2002). Both the small share of private lands and the high concentration of land ownership have important implications for REDD, which will be addressed in Section 5.

Figure 1 shows the location as well as the main terrestrial and fluvial access ways of Mato Grosso and Amazonas, while some comparative statistical figures are given in Table 1. Amazonas is the largest and second-least densely populated federal state in Brazil. Per-capita income is among the lowest in Brazil -- especially outside the capital Manaus with its free-trade zone, which is mainly accessible through fluvial transport. Amazonas is remotely located from the main Brazilian markets in the South. Despite some large-scale cattle operations, more that a third of private land is constituted by smallholdings – in Brazil defined as farms sized below 100 ha. Annual and permanent crops hold about equal the same share as pasture (about 40 %) in its diversified land use mix. The state has over the last years implemented many environmentally friendly policies, increasing protected areas and creating positive incentives for conservation. As a combined result of economics and policies, deforestation in Amazonas has been low, both in absolute and relative terms.

In comparison, Mato Grosso is located in the heart of the so-called 'Arc of Deforestation' at the southern end of the Amazon. It disposes of a relatively dense road network and is well connected to the main population centers in the Brazilian Center-South regions. Mato Grosso has a strong commercial agricultural sector, dominated by extensive cattle and soy production Grosso (IBGE 1995/6). Soy and cattle expansion are also responsible for Mato Grosso being the Brazilian state with highest deforestation (in the last decade more than one third of total forest loss in the Brazilian Amazon). The state has historically adopted policies that favour land-extensive economic development. In 1999, the government of Mato Grosso introduced a Licensing System for Rural Properties (SLAPR) (Fearnside 2003), which was believed by many to have mainly caused the falling deforestation rates after 2004. Enrolment in the SLAPR is, however, still below 30%, and much of the recent pick-up in deforestation has been registered in Mato Grosso[4].

Figure 2 shows the distribution of average 2000-6 deforestation rates in Amazonas and Mato Grosso, which will also serve as baselines for future deforestation in the REDD opportunity-costs calculations below. In both relative and absolute terms, deforestation is far higher in Mato Grosso than in Amazonas. Although growth in total land under agricultural crops (in Mato Grosso, especially soy) has been faster than expansion of pastures, pasture still remains

[4] Brazilian Space Research Institute (INPE): Online Communication 24.01.200 8 (http://www.inpe.br/noticias/noticia.php?Cod_Noticia=1318)

FIGURE 1 *Location and main transport ways of the states of Amazonas and Mato Grosso*

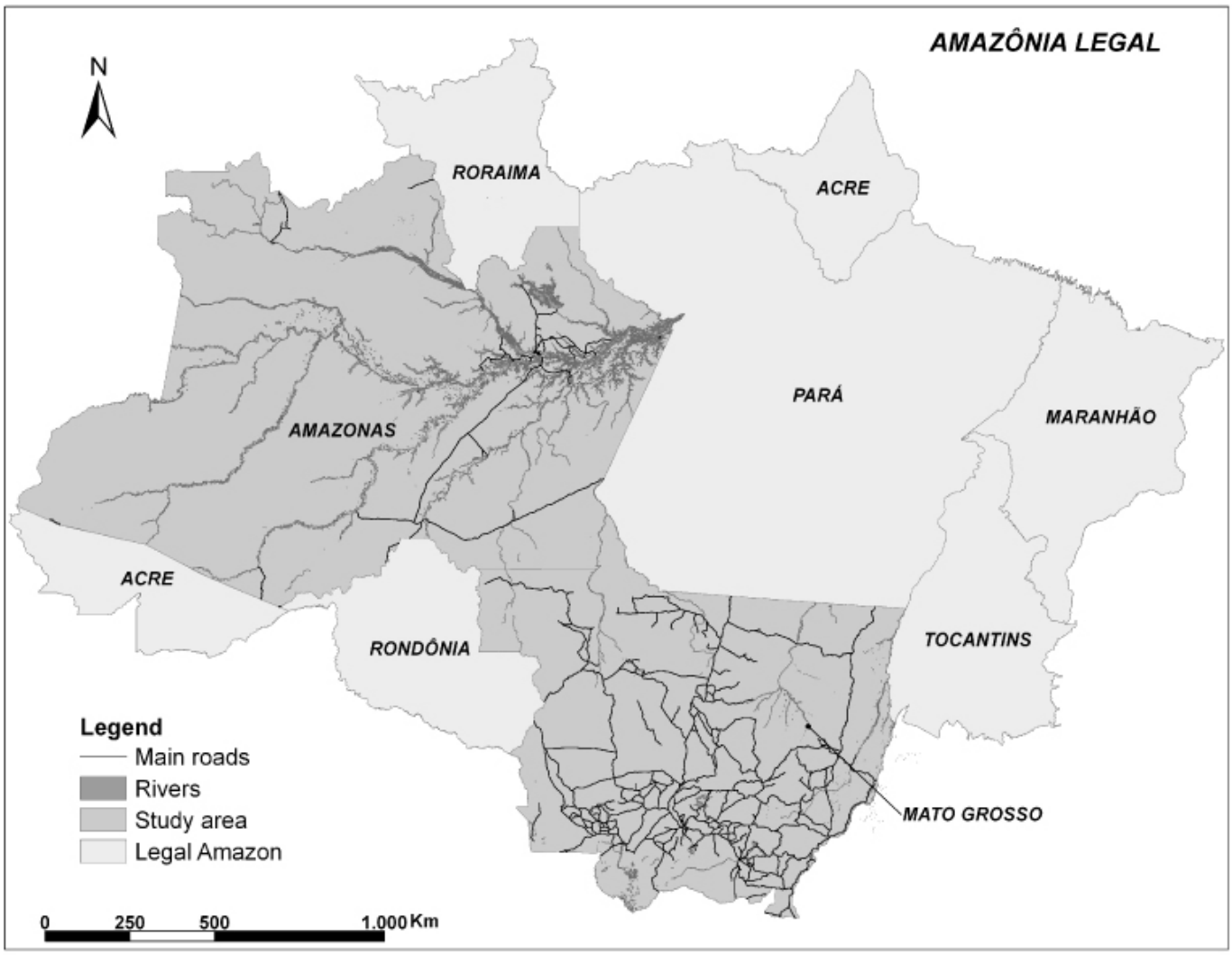
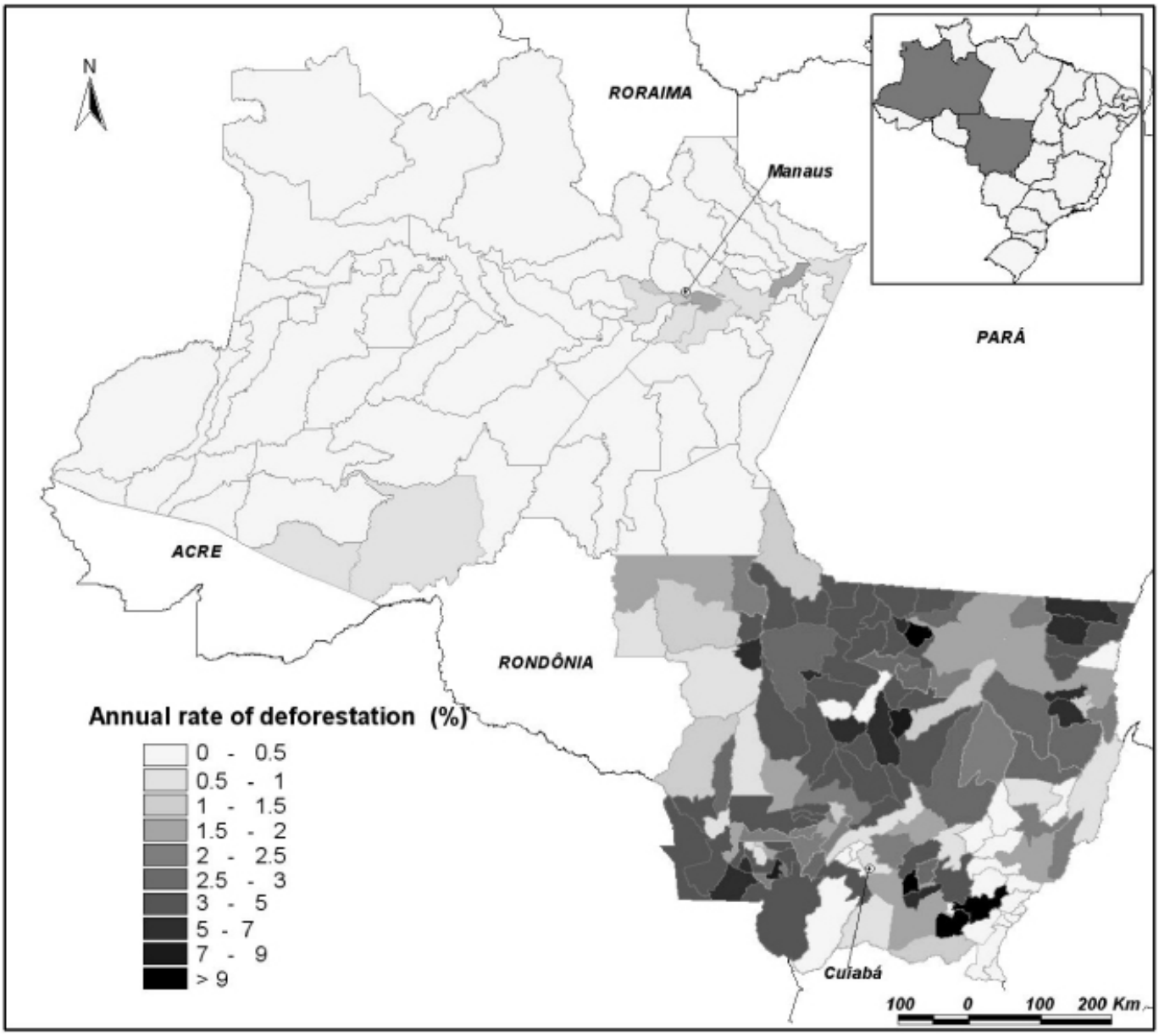


TABLE 1 *Key features of Amazonas (AM) and Mato Grosso (MT) states*

	Units	**AM**	**MT**	**Brazil**
Area	*[million km²]*	1.57	0.90	8.51
Forest cover (2006)	*[%]*	90	36	56
Forest carbon (2006)	*[Mt C]*	16 000	3 600	n.a.
Average annual forest loss (2000-6)	*[km² (%)]*	910 (0.1)	6 650 (2.5)	31 030 (0.6)*
Population density (2000)	*[people per km²]*	1.79	2.77	19.92
Income per capita (2000)	*[US$ per year]*	1 148	1 901	1 962
Share of farms smaller than 100 ha (1995/6)	*[%]*	94	60	10
Total area of farms smaller than 100 ha (1995/6)	*[%]*	35	4	80

Sources: UNDP, IBGE, FAO, Houghton *et al.* (2001)
*Calculated from FAO data (2000-5)

FIGURE 2 *Municipal deforestation rates in Amazonas and Mato Grosso during 2000-06*

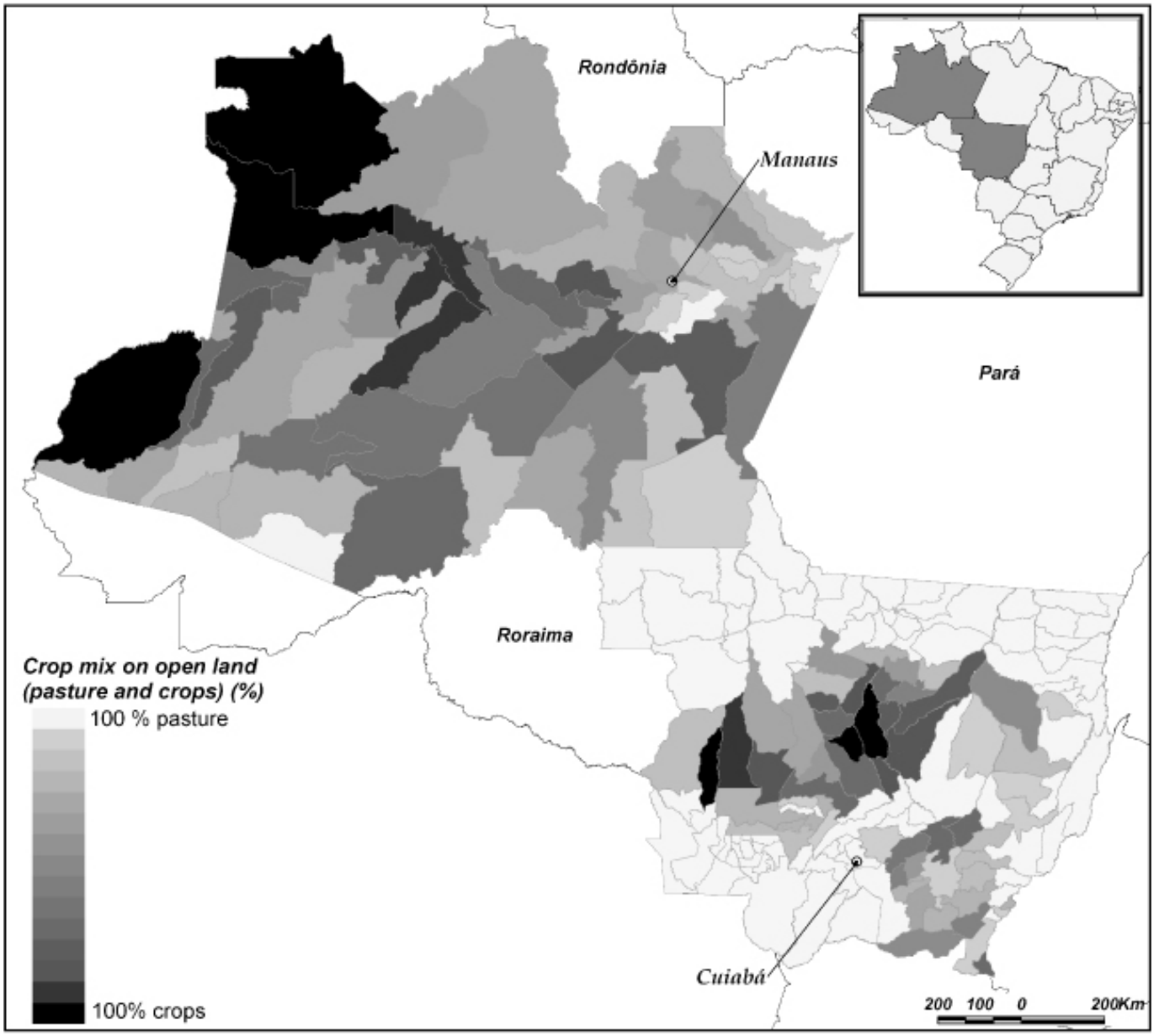


the predominant converted land cover in both Amazonas and Mato Grosso. As Figure 3 shows, soybeans have started to dominate the land-use mix in a few municipalities in the centre and southeast of Mato Grosso. In Amazonas, crops have generally a higher share in the municipal crop mix than in Mato Grosso, due to the more diverse and subsistence-oriented smallholder sector. In the westernmost remote municipalities in Amazonas, the little land that was converted during 2000-06 is exclusively covered by crops, a fact that to some extent may be explained by their large indigenous territories. In both soybean- and pasture-dominated areas, deforestation rates are high in Mato Grosso, suggesting that both activities contributed considerably to forest loss.

DATA AND METHODS

One can estimate the opportunity costs of forest conservation using various approaches, ranging from economic optimization or general equilibrium models (Cattaneo 2002, Börner *et al.* 2007) to land prices being used as surrogates for the discounted stream of future deforestation returns - see Grieg-Gran (2006) for a discussion. Nepstad *et al.* (2007) calculate REDD opportunity costs REDD based on simulated returns to soy and cattle production on land their model predicts to be cleared in the future. In their approach, land opportunity costs depend heavily on distance to roads and on suitable soil and climate conditions.

FIGURE 3 *Dominance of crops vs. pastures in deforested lands of Amazonas and Mato Grosso 2000-06*



Below opportunity costs are estimated using a complementary method, based on municipal agricultural production data from the Brazilian Institute for Geography and Statistics (IBGE). The IBGE Municipal Agricultural, Animal, and Extractive Production data base (PAM/PPM/PEV) holds annual information about total cultivated area, yields and total production value for all Brazilian municipalities. These data are not field measurements, but expert estimates collected in annual consultations of local extension agents, government officials and IBGE staff. Comparisons with the latest agricultural census (1995/96) suggest that PAM/PPM/PEV data have historically been reasonably accurate as far as municipal averages of yields and prices are concerned. Meanwhile, satellite-based annual deforestation measurements from INPE are frequently higher than the PAM/PPM/PEV estimated growth in cattle herds and cultivated area, which leads us to be less confident in the latter. In the Amazon region, technical coefficient and cost information is not available at municipality levels. The estimates thus heavily rely on national-level profitability estimates for main agricultural crops from the Brazilian Agriculture Yearbook (FNP 2007) and Amazon-specific estimates by Margulis (2004) for cattle ranching and Pokorny and Steinbrenner (2005) and Barreto *et al.* (1998) for timber harvesting.

The opportunity-cost estimation is limited to private landholdings, given that direct payments to farmers invading public lands could easily create perverse incentives for additional forest clearing. For Amazonas State, calculations rely on the rural land register published by the National Institute for Colonization and Agricultural Reform (INCRA). The INCRA data are often inconsistent

with agricultural census information, which reflects the considerable uncertainty with regard to land-tenure data in Brazil. Especially in Mato Grosso, where aggressive land grabbing has taken place for many years, INCRA data are also inconsistent with municipal boundaries. Hence, INCRA data are used only for Amazonas, whereas estimates for Mato Grosso are restricted to farms registered in the SLAPR (i.e. roughly 25% of farms in the rainforest areas of the state).

Figure 4 depicts the main analytical steps to calculate opportunity cost of REDD. Municipal-level past deforestation rates are calculated from INPE PRODES[5] data and linearly projected into the future for 2007-16. INCRA and SLAPR data serve as the basis for calculating the share of private land in each municipality. While the SLAPR database for Mato Grosso directly records remaining forests on private land, for Amazonas forestland on private properties needs to be calculated. It is assumed that the amount of forest left in Amazonas corresponds to total private land less land currently under pastures and crops. This may overestimate remaining forests in 2006, as one would expect a minor share of private land to be in fallow (3% in the agricultural census of 1995/6).

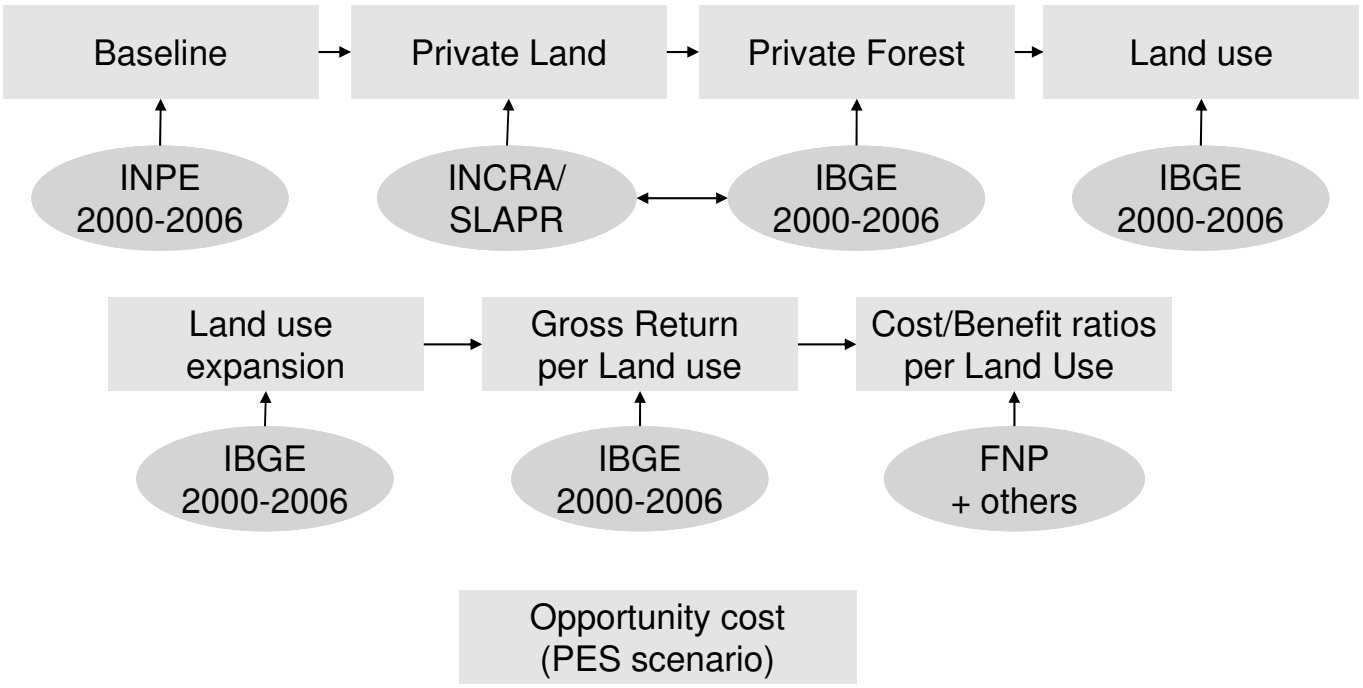
As mentioned, land-use mixes for each municipality are calculated on the basis of PAM and PPM data. PPM data on cattle-herd size per municipality is used to impute pasture cover, assuming 1995/96 stocking rates to remain constant in both states. State-level expansion rates of pastures and crops (permanent and annual) are then applied to estimate expansion of land use categories, such as annual subsistence crops produced in slash-and-burn systems, traditional cash crops, fibres, and fruits. Each land-use category is represented by the single crop with the highest share in 2000-6 total land use expansion, e.g. *soy beans* for the category *cash crops* in Mato Grosso.

Gross per-hectare returns of crops are calculated from PAM and PEV data. No such information is available for timber extraction, so yields and per-ton extraction costs reported by Pokorny and Steinbrenner (2005) and Barreto *et al.* (1998) are used in calculations for Amazonas. Timber yields for Mato Grosso were adjusted according to estimates provided by the Forest Management Unit of the Environmental Secretariat of Mato Grosso[6]. Gross returns from each selected land-use category are converted to net profits as follows:

$$(1)\quad \Pi_i = GR_i * (1 - \frac{c}{b})$$

where Π is net per-ha profit in municipality i , GR are annual gross per-ha returns in municipality i calculated from the PAM/PPM/PEV data base, whereas b and c are per-ha gross returns and total costs, respectively, derived from other sources. Profitability of extensive cattle operations is taken from Margulis (2004), assuming his high-end estimates to apply for Mato Grosso and low-end estimates for Amazonas

FIGURE 4 *Data sources and calculation steps for REDD opportunity costs.*

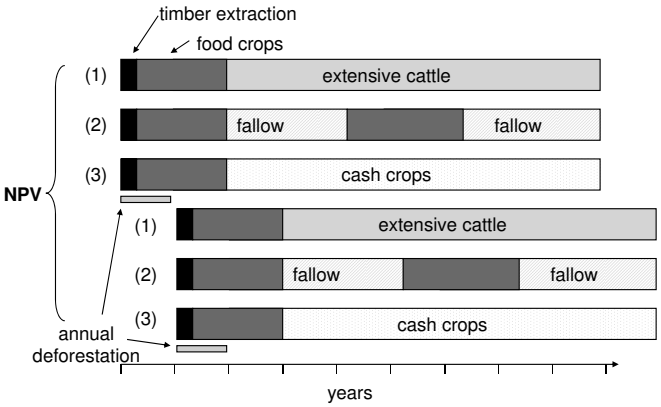


[5] INPE's Program for the Calculation of Deforestation in the Amazon (PRODES) publishes annual deforestation estimates for the Amazon.
[6] Personal Communication: Secretariat of the Environment (SEMA), Forest Management Unit 13.05.2007

(cattle ranching being less capitalized in the latter than in the former).

Vosti *et al.* (2002), among others, show that deforestation is typically followed by distinct land-use trajectories, e.g. with annual subsistence crops being the first rotation after forest clearance, followed by conversion to pastures. Hypothetical land-use sequences for the expanding land use categories are therefore identified in step five of Figure 4. Examples of such sequences are shown in a stylized form in Figure 5.

FIGURE 5 *Stylised sequences of land uses applied in the opportunity-cost estimations*



Note: Percentages represent hypothetical shares in the municipal land-use mix

Figure 5 depicts how total opportunity costs at the municipal level are calculated from individual land-use sequences at the plot level. All land use trajectories start with timber extraction followed by subsistence-crop production in the second year, but then some land goes into pasture (1), some into crop-fallow cycles (2), while other land is used for cash crops (3). Net present values (NPV) of all land use sequences are reported in Table 2 below. During years 3-10, the main land-use category follows. Since the same amount of new land is assumed to be opened each year, the ten-year period 2007-16 covers the accumulated NPV of the benefits derived from the corresponding cultivation cycles (see equation 2). The municipal land-use mix is considered constant for all subcategories, but it is annually adjusted according to the state-level growth rates of agricultural land vs. pastures during 2000-06.

$$(2)\quad NPV_{total} = \sum_{t=1}^{10} \frac{NPV_t}{(1+r)^t}$$

where NPV_{total} is the opportunity cost for a given municipality, NPV_t is the net present value of a plot-level ten-year land use trajectory in year t , and r is the discount rate.

Finally, transport costs are accounted for by creating a cost index reducing net returns proportionally to the distance of a given municipality to the state capital. Transport costs are assumed to reduce net returns by a maximum of 20%. Hence, it is ignored that bulk density and difficult access conditions in the remotest areas could lead to more considerable reductions in net profits, due to extreme transport costs.

ANALYSIS AND RESULTS

How large gains would landowners forego?

Table 2 presents average profits calculated for the main expanding land-use categories in Amazonas and Mato Grosso. It clearly shows that soybean plantations are the most profitable land-use option among those that contribute to forest loss in the two states. For the sake of simplicity, it is assumed that current returns from standing forests are nil, so that the profits from converted uses are identical to the conservation opportunity costs.

Note that the NPV values for land-use sequences are strongly influenced by the returns to timber extraction in those municipalities that report timber extraction in past years. Due to fallow periods, during which returns to land are zero, NPV for staple crops is considerably lower than to cattle production, even though average annual returns are equal. Values in the last column of Table 2 show the share of each land-use category in total 2000-6 expansion of agricultural land. In the case of crop categories, these values correspond to the crops shown in brackets in the first column that were selected as described in the previous section.

Opportunity costs per ton of carbon dioxide (the commonly traded unit) depend heavily on the amount of biomass and, hence, carbon content per hectare of primary forest, which varies widely across the Amazon region (Saatchi *et al.* 2007). Houghton *et al.* (2001) present data from seven independent studies analysing carbon content of forest biomass in the Amazon. To provide a conservative estimate of opportunity costs, this study adopts the lowest estimate presented in the Houghton *et al.* study (110 Mg C per ha) for forests in the state of Amazonas, and assume that 20% of this would be kept as an insurance reserve. For Mato Grosso, the same procedure was applied to more detailed carbon content data provided to us by the Instituto Centro de Vida (ICV)[7].

Spatial distribution and abatement cost curves

Figure 6 shows average REDD opportunity costs per ton of carbon dioxide at the municipal level. Average values are

[7] Instituto Centro de Vida (www.icv.org.br) is a subscriber to the Forest Valuation Pact, and was intensively involved in the research underlying the Pact.

highest in Mato Grosso, although many municipalities with high opportunity costs lie in savanna (*cerrado*) regions[8] with lower natural biomass density. In Amazonas, many high opportunity cost municipalities lie alongside road and fluvial transport ways (see Figure 1). Opportunity cost differences in pasture-dominated parts of Mato Grosso are mainly caused by high returns to timber extraction prior to forest conversion. In general, opportunity costs differ remarkably across space -- not only between but also within the two states.

Figures 7 and 8 present carbon-dioxide emission abatement costs (REDD supply curves) for Amazonas and Mato Grosso, respectively. As a benchmark, both figures include 2006 average prices for permanent carbon credits traded at the Chicago Climate Exchange (CCX) carbon market. However, since the authors expect that REDD payments are likely to be introduced in the form of temporary carbon credits, the figure shows a hypothetical price line with a 39% rebate on current CCX prices that is considered more cautionary (Dutschke and Schlamadinger, 2003). The grey 'bands' in Figures 7 and 8 show the result of sensitivity analyses varying key parameters such as product prices and per-ha carbon content by ±30%, to account for both expected market fluctuations and perceived uncertainties.

The supply curve for Amazonas shows that more than one third of deforestation is worth less than US$1/tCO$_2$, and thus profitable to buy out under almost any carbon-market scenario. Going towards the right the curve starts sloping, but there is in Amazonas no deforestation worth more than US$3/tCO$_2$ -- at least at the aggregated municipal-average level. The situation is slightly different in Mato Grosso. While around half of deforestation is worth less than US$3/tCO$_2$, with a relatively flat curve, the other half is more heterogeneous and rises to values around US$12/tCO$_2$.

How much REDD is economically feasible?

What does this mean for the competitiveness of REDD as a land-use option? Table 3 compares the opportunity-cost results in Mato Grosso's SLAPR areas and in Amazonas State to three carbon-price situations (rows 1-3):

(1) maximum price (i.e. the hypothetical price needed to buy out all deforestation)
(2) permanent CCX price (value in 2006)
(3) temporary CCX price (same as (2), but with a 39% discount – see above).

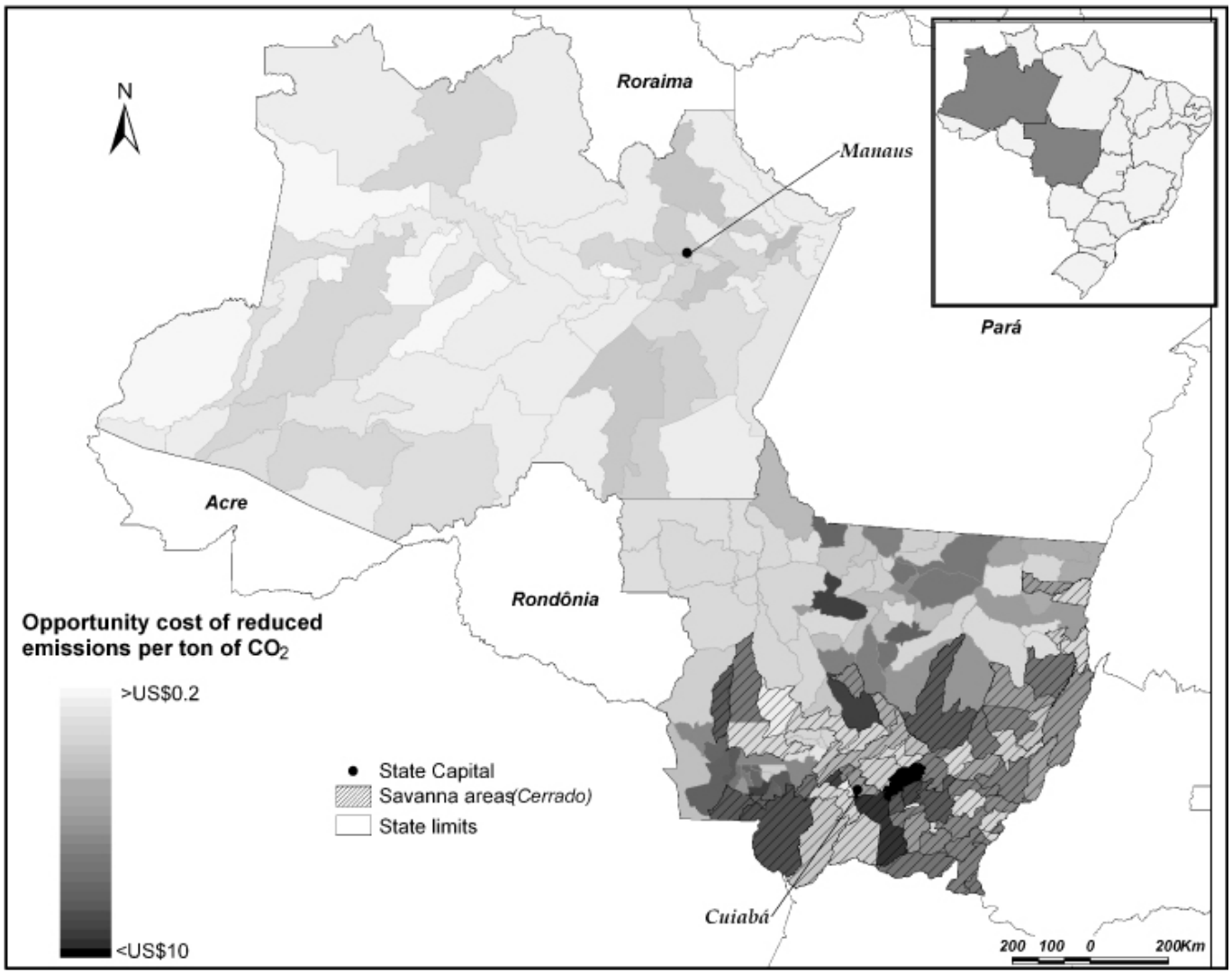
On the payment side, two generic scenarios (two last columns) are shown. First, "opportunity-cost payment" (Scenario I) implies that each farm receives differentiated compensation payments corresponding to their pure opportunity cost values. Graphically, this corresponds to the area under the emission abatement-cost curves in Figure 7 and 8. The (extreme) assumption here is that payments can be perfectly differentiated, so that provider economic rents are fully eliminated. Secondly, under "marginal pricing" (Scenario II) all providers receive the same uniform payment, determined by the farm with the highest opportunity cost. Graphically, payment value thus not only corresponds to the area under the supply curve, but to the entire price-times-quantity rectangle: cheap REDD suppliers (on the left-hand side of the curve) capture a "provider surplus", i.e. the difference between the market price and their individually lower costs

TABLE 2 *Net returns and importance of crops and land use categories in the opportunity cost estimation*

	Total net return	**Average annual net return**	**Average NPV of Land Use Trajectory**	**Share in total 2000-06 expansion***
	[US$/ha]	*[US$/ha]*	*[US$/ha]*	[%]
Amazonas				
Timber extraction	24-791	-	-	
Extensive cattle ranching	-	39	694	86
Food crops (corn)	-	39	475	6
Cash crops (coffee)	-	93	650	3
Fruits (water melons)	-	41	393	1
Fibres (malva)	-	24	307	4
Mato Grosso				
Timber extraction	109-734	-		
Extensive cattle ranching	-	59	719	84
Cash crops (soybeans)	-	171	1 080	16
* Shares in total expansion refer to land use categories.				

[8] Municipalities were defined as being "savanna-dominated" if savanna areas were larger than forest areas. However, only areas classified as forest in the INPE data base were considered in this study's calculations.

FIGURE 6 *Municipal opportunity costs per ton of carbon dioxide in Amazonas and Mato Grosso*

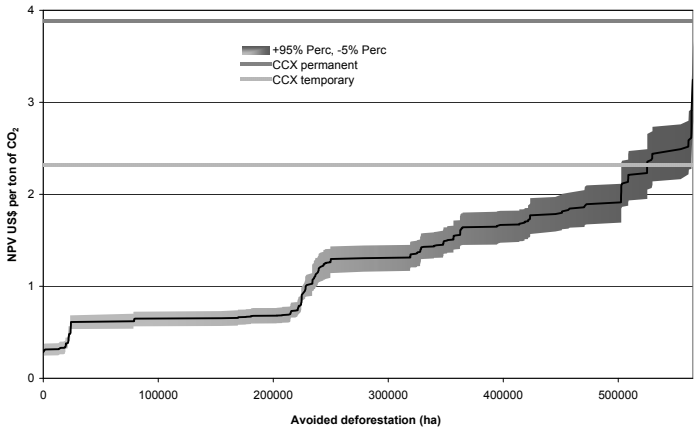


of supplying REDD. For the moment all calculations assume zero transaction costs (to be relaxed in next section).

The maximum carbon price (row 1) needed to compensate all deforestation costs would be almost US\$13/tCO_2 – most of all due to a few municipalities with very high conservation opportunity costs in Mato Grosso's SLAPR areas. Focusing first on Scenario I (pure opportunity-cost compensation), this would lead to payments of US\$680 million to achieve zero deforestation in all SLAPR areas of Mato Grosso by fully covering all producers' economic returns from deforestation. In Amazonas, the total would be only US\$143 million, both because there is less deforestation and because the average per-hectare opportunity cost there is lower. At permanent CCX prices of US\$3.88/tCO_2 in 2006 (row 2), two thirds of Mato Grosso's SLAPR deforestation would be compensable, at a total cost of US\$381 million; for Amazonas all forest loss is still being compensated for. At temporary CCX prices of US\$2.32/tCO_2 (row 3) – the scenario the authors consider the most realistic – 40% of SLAPR areas enter REDD at costs of US\$212 million, while 93% of Amazonas deforestation is compensated for at US\$123 million. Hence, at current carbon price ranges, the bulk of deforestation can potentially be compensated, especially on the lower-value lands that predominate in Amazonas.

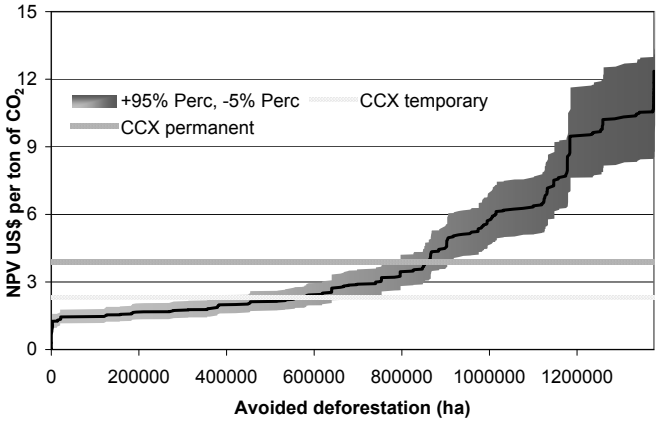
What if one has to compensate farmers at a fixed marginally determined price, rather than 'just' their pure individual opportunity costs (Scenario II, last column)? Obviously, this does not change the amount of forest area protected, but distribution-wise a 'provider's surplus' is created, thus increasing costs. Potentially, this economic rent can be sizeable, the higher is the carbon price and the more heterogeneous are producer costs. For the maximum price situation (line 1), costs in Mato Grosso's SLAPR areas would quadruple to US\$2.7 billion, three fourths of which would accrue to low-cost suppliers as windfall gains (i.e. compensations paid in excess of opportunity costs). At temporary carbon prices (3), these gains are less astronomic. For instance, for Mato Grosso's SLAPR areas the costs rise only from US\$212 to US274, since this corresponds to the low-sloping section of the supply curve. But for Amazonas, costs still more than double, from US\$123 to US\$239 million, because a large part of Amazonas' potential REDD

FIGURE 7 *Opportunity cost per avoided ton of carbon dioxide in the State of Amazonas.*



Notes:
- CCX permanent – full average price of per ton of CO_2 at Chicago Climate Exchange
- CCX temporary -- includes a 39% rebate on permanent carbon prices.
- Grey areas represent values that lie in a 5-95% sensitivity range.

FIGURE 8 *Opportunity cost per avoided ton of carbon dioxide in the State of Mato Grosso.*



Notes:
- CCX permanent – full average price of per ton of CO2 at Chicago Climate Exchange
- CCX temporary -- includes a 39% rebate on permanent carbon prices.
- Grey areas represent values that lie in a 5-95% sensitivity range.

credits are very low-cost and would fetch economic rents even under moderate prices.

These findings for Scenario II have important implications for REDD design. Rising carbon prices would multiply economic rents accruing to low-cost providers. There would thus be large efficiency gains for REDD buyers in introducing some sort of differentiated payment system (according to location, producer types, land values, etc.) that caters to highly variable provider opportunity costs. The flip side is that price differentiation would also eat into the 'provider's surplus', which represents the potential welfare gains on behalf of farmers, including for poverty alleviation. In practice, probably neither a uniform nor a fully differentiated price is very likely, but for analytical purposes they represent extreme scenarios that help us understand the competitive and distributional consequences of different payment modalities.

The results prove to be particularly sensitive to the returns from timber extraction. One-off timber rents can in some cases be sizeable, and since they accrue at the beginning of each land-use cycle, they are not being time-discounted. They can thus potentially gain high influence on the overall NPV results. However, timber rents are also often at least partially captured by actors other than the landowner proper, and their harvesting may happen well in advance (and causally divorced) from the deforestation process proper. Setting timber extraction profits to zero, for analytical purposes, would allow REDD transfers at temporary CCX prices to compensate more than 80% of forest loss in Mato Grosso and 100% of forest loss in Amazonas at current (temporary) carbon prices. This reconfirms that the timber economy, and the second "D" in REDD, merit further analysis.

Apart from timber rents, total opportunity costs are most sensitive to beef prices, e.g. a 30% price reduction decreases total opportunity costs by 9% in Mato Grosso and 10% in Amazonas, followed by soybean prices (Mato Grosso) and food crop prices (Amazonas), which is due to the dominance of the related land uses in overall crop mix. Prices per ton of carbon dioxide are particularly (and proportionally) sensitive to changes in the amount of tradable emission reductions assumed per hectare of avoided deforestation. Finally, discount rate changes also affect total opportunity costs to a considerable extent. For example, reducing the assumed 10% discount rate to 5% would increase total costs in Mato Grosso by roughly one third.

How large could transaction costs be?

Of course, opportunity costs are only one part of the story: transaction costs also need to be paid for through the REDD resources. Relatively little is known about the transaction costs of payments for environmental services (PES) schemes in general, less so for still to-be-developed direct REDD compensations to landowners. Transaction costs are defined all costs of the payment schemes that are not transfers proper. Transaction costs occur both on behalf of the carbon buyer (e.g. having to monitor compliance) and the buyer (e.g. having to document landholdings and cash in payments).

Ex-ante transaction-cost estimates have to be interpreted with caution. May *et al.* (2003) note that many incipient carbon-based PES schemes have incurred extremely high transaction costs, mainly because of the difficulties involved in developing forest carbon projects in an uncertain market environment. As a consequence, pioneering carbon investors have required projects to repeatedly revise strategies throughout project implementation. In general, PES schemes seem to require relatively large start-up costs, while running costs tend to be more manageable, as shown for a series of carbon projects in Indonesia (Cacho *et al.* 2005).

TABLE 3 *Opportunity costs and area coverage in Mato Grosso (SLAPR) and Amazonas under different payment scenarios and carbon prices*

		Scenario I		**Scenario II**	
		Opportunity cost payment		**Marginal pricing payment**	
	Units	***Mato Grosso***	***Amazonas***	***Mato Grosso***	***Amazonas***
(1) Maximum price (MT US$/ tCO_2 12.36) and (AM US$/$tCO_2$ 3.24)*					
Total opportunity cost	*mill US$*	680	143	2 745	363
Reduced forest loss	*%*	100	100	100	100
Reduced forest loss	*ha*	1 375 385	564 849	1 375 385	564 849
(2) CCX permanent price (US$/ tCO_2 3.88)					
Opportunity cost	*mill US$*	381	143	677	363
Reduced forest loss	*%*	62	100	62	100
Reduced forest loss	*ha*	850 122	564 849	850 122	564 849
(3) CCX temporary price (US$/ tCO_2 2.32)					
Opportunity cost	*mill US$*	212	123	274	239
Reduced forest loss	*%*	40	93	40	93
Reduced forest loss	*ha*	554 842	525 094	554 842	525 094

TABLE 4 *REDD transaction costs and implications for REDD in the Amazon*

Transaction cost category	**Comments**
1. Information and procurement	Currently, carbon markets are not prepared for large-scale REDD in the Amazon and carbon buyers have traditionally been reluctant to invest in carbon projects in the forestry sector. Procurement costs can therefore be expected to be significant.
2. Scheme design and negotiation	Large-scale REDD schemes may incur significant negotiation costs, especially if they contemplate payments from national government budgets that need to be negotiated with the civil society.
3. Implementation	Existing organisations and institutions needed to be strengthened and systems like SLAPR implemented in all areas covered by REDD. Establishing and running payment mechanisms (especially in the case of direct payments to landowners) are likely to contribute the lion's share to this cost item.
4. Monitoring	In some states, rural licensing systems are in place that would allow annual deforestation monitoring at farm-level scales. The technology for satellite-based deforestation monitoring is relatively well developed and much more cost-effective than ground-based monitoring.
5. Enforcement and protection	Enforcement costs might be considerably reduced by delivering payments only after verification of effectively avoided deforestation. Given weakly enforced property rights in large parts of the Amazon, enforcing theses rights (e.g. in and around protected areas) might prove crucial to assuring additionally of REDD and, hence, represent a relevant source of transaction costs.
7. Verification and certification (Approval)	These cost items have shown to be an important barrier for small-scale carbon forestry projects (Cacho *et al.*, 2005), but are expected to decrease with project size.

Source: Adapted from Milne (1999)

Turning to South America, in two Ecuadorian PES cases of Pimampiro (watershed protection) and PROFAFOR (carbon sequestration), start-up costs were US$76/ha and US$184/ha, respectively, while recurrent annual per-hectare transaction costs in the operational phase were only US$7 and US$3 (Wunder and Albán 2007). In the Amazon, the authors expect transaction costs to arise mainly in the categories presented in Table 4.

Based on information from Environmental Secretariat of Mato Grosso, a hypothetical state-level REDD scenario

was set up. The scenario involves the creation of a carbon payment fund that cooperates with existing government and civil society organizations in implementing direct REDD payments to land owners in Mato Grosso. Then, likely transaction costs in the categories 3., 4., and 7. of Table 4 are preliminary assessed. Start up costs are estimated at US$7.5/ha and annual implementation costs at US$4.5/ha of avoided forest loss. Recurrent costs are thus slightly higher than what Grieg-Gran (2006) calculated for the Costa Rican national PES scheme (US$3/ha/yr). Depending on biomass density, transaction costs in Mato Grosso would with these absolute values range within US$0.07-0.24 per ton of carbon dioxide during a 10 year period, or a total of US$49 million. Given temporary CCX prices, thus would marginally shift up the emission abatement cost curve in Figure 8, so that cost-effectiveness in terms of deforestation avoided would be reduced by roughly 3%.

This addresses the transaction costs of buyers or intermediaries, but what about service providers? Poor transport infrastructure (e.g. in Amazonas' remote areas) can potentially drive up their transaction costs in negotiating contracts and cash in payments. REDD initiatives might learn important lessons from other experiences with decentralized conditional cash transfers, such as the Brazilian Family Assistance Program (*Bolsa Familia*) (Hall 2006).

THE POLITICAL ECONOMY OF REDD

The Amazon framework conditions for REDD described in Section 1 also have implications in terms of:

1. Who may be the winners and the losers?
2. Which areas become eligible for REDD?
3. What share of the REDD potential can be considered truly additional

First, REDD will only attract large-scale investments, if additional emission reductions can be credibly demonstrated. For a region with highly unequal land and power distribution like the Brazilian Amazon, smallholders and forest-dwelling communities may not be the prime beneficiaries when additionality is put at the forefront. Chomitz (2006) shows that less than 20% of forest clearings in the Amazon are small-scale, i.e. smaller than 20 ha, though with some differences between Amazon regions (populist vs corporative frontiers). To the extent that it is necessary to compensate those who would benefit from (legal) deforestation, and thus would suffer the opportunity costs, a rather high share would need to go to commercial farmers at medium and large scales. On the other hand, for a REDD programme to be politically acceptable in Brazil, and to avoid significant leakage to the smallholder sector, it may turn out to be beneficial to invest a more than threat-proportional share of REDD money into rewarding good forest stewards and local communities for assistance in monitoring protected areas. A general sense of fairness will be crucial for the political acceptance of REDD, both in ES buyer and seller countries.

An example may underscore this point. The Forest Valuation Pact, a recently proposed scheme to compensate farmers for not deforesting with primarily Treasury resources, received mixed political reactions. It was criticised that services to the benefit of the global society should be paid for by Brazilian taxpayers, especially when the beneficiaries would be large commercial landowners with a history of aggressive land clearing (such as in Mato Grosso) – i.e. rewarding the bad rather than the good guys. However, it is possible that political acceptance of such compensations would be higher if funding came directly from international carbon markets, rather than from the Brazilian state that cannot focus solely on additionality while closing its eyes to social objectives.

Second, only some of the highly threatened forests in the Brazilian Amazon can potentially be protected through direct REDD payments, because much of the land cleared is public or has insecure tenure. Direct payments to farmers on land with deficient access control will be inefficient – and paying land grabbers to desist from invasions would likely create outright perverse incentives for others to simulate similar clearing threats in order to claim compensations. As for the large protected areas and indigenous territories, many lie in remote and relatively undisturbed areas where de facto threats are low, and payments here could easily become "hot air". Deforestation within protected areas has been relatively low, compared to outside (see Ferreira *et al.* 2005 for a comparison of deforested areas in and outside protected areas), though part of this may be explained by remoteness rather than protection status. Studies of less remote protected areas in the state of Pará show that illegal deforestation there can get close to regional averages (Velásquez *et al.* 2006). Yet, from a legal point of view, paying REDD in these areas based on opportunity costs is highly questionable. At best, one could imagine the use of REDD to co-finance the creation of new protected areas, or subsidize recurrent costs in ways that clearly diminish threats to standing forests as carbon stocks.

Third, in the opportunity cost estimation it was assumed that all privately owned forests are potentially available for REDD. Yet as mentioned, Brazilian forest retention standards require 50-80% of private property in the Amazon region to remain under forest. Although few farmers de facto comply with this requirement, REDD in these areas would legally not be additional. Conversely, restricting payments exclusively to legally convertible forests on private properties would dramatically reduce the scope for REDD. Some combination of improved command-and-control tools and incentives is probably necessary.

Finally, a similar efficiency vs. fairness trade-off can obviously apply at the level of distinctive federal states within Brazil. Above it was found that the currently competitive REDD options for the environmentally pro-active Amazonas state were summing up to US$123 million, buying out 92% of deforestation, while for the Mato Grosso state with a history of aggressive agricultural expansion the figure was nine times that high (~US$1.1 billion), buying out less than half (47%) of forest clearing. In other words, if funds were allocated exclusively according to additionality criteria,

Mato Grosso could skim the bulk of REDD payments and still continue with high-value forest clearing for its economic development, while Amazonas would have to do with much less transfers and simultaneously be almost barred from further land clearing. This disparity results from agricultural market dynamics and the basic economics of deforestation, but also in part because Amazonas state had in advance declared many more protected areas than Mato Grosso. If the REDD system is operated at the level of the federal government in Brasilia, the distribution of resources on federal states should surely be guided largely by additionality concerns, but must also make rewards for 'good past stewardship' (e.g. through co-financing for national parks, reserves, etc.). Otherwise, a backlash against these environmentally progressive policies could occur, which would also negatively impact on the protection of carbon stocks.

CONCLUSIONS

The empirical assessment of likely REDD opportunity costs in the Brazilian states of Amazonas and Mato Grosso, based on Brazil's official agricultural statistics, clearly supports previous claims that REDD can be a cost-effective way of reducing deforestation in the Brazilian Amazon. This conclusion is valid in the market-remote Amazonas state with its conservationist policies and low deforestation rates, but equally so in the agribusiness-oriented Mato Grosso state with its vibrant soy and beef industries and a history of aggressive forest clearing. A partial assessment of approximate transaction costs does not seem to alter this fundamental conclusion: at current carbon prices, paying for protecting forests is a good deal with wide options.

Nonetheless, the comparison of the two very different federal states in the Amazon also shows that (at current carbon prices and demand) zero deforestation is an unrealistic goal to be achieved through REDD: some high-value uses of converted land cannot be "bought out" through REDD. In addition, only a minor share of deforestation happens on lands with private secure tenure, or at the least with effective control over third-party access rights. Direct REDD payments can therefore not be a substitute for improved command-and-control policies in the Amazon region – in fact, REDD could also co-finance this improvement. Yet, direct REDD payments can be a meaningful complementary strategy, providing positive economic incentives, i.e. "carrots" that will help increasing the political acceptability of "stick" policies to effectively reduce deforestation.

At current carbon prices, how much deforestation would REDD really reduce, and at what costs? The answer from above was "almost all deforestation in Amazonas (525 094 ha), and half to two thirds in Mato Grosso's SLAPR areas (554 842 ha), at somewhere between US$330 million and US$1 billion of total costs" – depending on the payment modality (uniform rates vs. differentiated cost-aligned compensations) and whether permanent or transitory CCX carbon prices (the latter implying a 39% price discount) apply. Taking the two states together this corresponds to roughly 360 million tons of reduced carbon emissions in a ten year period.

Nevertheless, it has to be kept in mind that only about a quarter of private land in Mato Grosso is licensed under SLAPR. If one makes the heroic assumption that SLAPR-registered farms are fully cost-representative of all farms in Mato Grosso, one would have to multiply SLAPR cost estimates by four. This would raise to somewhere between US$1.2 and US$4 billion – again depending on the assumptions about payment modes and carbon prices. This large variance of estimates points to the importance of designing the payment mechanism in a way that combines cost effectiveness with equity considerations.

DISCUSSION AND POLICY PERSPECTIVES

How do the presented results compare to other REDD opportunity cost studies? Nepstad *et al.* (2007) estimated potential productivity of beef and soybean production based on suitability of climate and soil conditions and at spatially more disaggregated scales than ours. Their emission abatement cost curve does therefore include very high-cost abatement options at its upper end. Including all, not only private, land plus the use of a 5%, instead of 10%, discount rate and a 30, instead of 10, year time period for cost accounting boosts their estimate of total opportunity costs to over US$200 billion for the whole Brazilian Amazon. Because they include not directly threatened, but potentially suitable, forests, the carbon unit-cost estimates in the Nepstad *et al.* study are not directly comparable with the values presented here. Nevertheless, the authors share the conclusion that REDD in the Amazon is a highly competitive mitigation option at current carbon prices.

Swallow *et al.* (2007) estimated emission abatement cost for sites in the Peruvian Amazon. Their approach is based on cost-benefit analyses of existing land-use systems and observed land-use changes. The study presents values that correspond to this study's findings for the state of Amazonas, where more than 90% of emission reductions are competitive at current carbon prices. At a 10% discount rate Swallow *et al.* estimate that the majority of carbon emitting land use changes between 1998 and 2007 could be compensated for at less than US$5/t$CO_2$.

This study's approach to estimating opportunity costs of REDD in Mato Grosso and Amazonas required the following key assumptions:

1. Deforestation on private land is equal to the municipal level deforestation rate. This potentially underestimates true total opportunity costs, because private deforestation rates are expected to be higher than those in protected areas or public land. Preliminary results from the Brazilian Agricultural Census 2006, for instance, suggest that forest on private lands in Mato Grosso between 1995 and 2006 has been reduced at an average annual rate of 5%, i.e. about twice the 2000-2006 rate at the state level.

2. REDD-compatible benefits from the standing forest, e.g. extraction of non-timber forest products, are zero. This assumption leads to a potential overestimation of per ha opportunity costs. For the type of farmers that most contribute to deforestation in the Amazon (i.e. commercial cattle and agricultural producers), it is expected that non-timber forest products play a minor role in resource use decisions.
3. Current municipal land-use distribution and profits are fully replicated on deforested land. The direction of bias introduced by this rigid assumption is ambiguous, and depends on the relative weight of new opportunities (e.g. technological progress, price changes, new crops such as biofuels) versus incremental limitations (e.g. running into soil fertility or producer capital constraints).

Deforestation rates on private land, the actual net returns to individual land uses, and the carbon content of forests can all be expected to vary much across the Amazon. The upcoming Brazilian agricultural census will provide more solid data for illuminating the first two factors. Other changes in assumptions could also influence the results. Differentiation of returns for cattle-based activities, i.e. ranching vs dairy farming and land-intensive/ modernized versus land-extensive/ rudimentary operations could reveal more land units at the high-cost end. A more detailed assessment of transport costs would likely reduce the opportunity costs for remote land units (of which there are many in the state of Amazonas) and bulky commodities.

Given favourable opportunity costs for REDD, it might be beneficial to separate the carbon-supply for the "deforestation" and "forest degradation" elements. One pathway is to offer payments for reduced-impact logging that minimizes carbon losses. A second would be a "log-and-protect" strategy of extracting only the most valuable timbers and then setting aside the resulting secondary forests for strict conservation. A full assessment of the cost-effectiveness of REDD, however, needed to account for losses incurred throughout the entire value chain of agricultural production in the Amazon. As a result, governments might decide to tax income from private REDD agreements to make up for losses in productive activity, which would further increase total costs.

Second, the above observed difficulty of precisely estimating highly variable opportunity costs in space might be alleviated through the use of more sophisticated economic techniques. This study's results suggest price differentiation between REDD suppliers can make REDD considerably cheaper (see Senario I and II in table 3). Experiments with inverse auction systems where producers 'self-reveal' their costs and preferences have progressed sufficiently to also pilot these techniques in the Amazon, thus validating *ex-ante* cost estimates and avoiding over- or underpaying individual farmers due to aggregation errors.

Third, who would pay for REDD on a massive scale, and at what price? Only some markets currently accept REDD carbon. With roughly 47 Mt CO_2/yr (available at current CCX prices) from private lands in Amazonas and Mato Grosso being thrown into the world market, the above assumed constant prices on existing voluntary markets might in fact drop significantly, unless there is a simultaneous hike in demand.

Finally, the REDD scenario on which the presented calculations are based would only pay for those private land areas that will be deforested. However, it is illusionary to predict exactly where deforestation is bound to happen. Furthermore, even if this was possible, paying only for threatened areas will relocate part of conversion pressures to areas not covered (leakage). To counteract the inevitable imprecision of spatial predictions and leakage, payment schemes may need to have a broader spatial coverage of all private areas potentially at risk, and/or raise the carbon stocks set aside as 'insurance reserve'. This will make REDD schemes more expensive than suggested above.

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Estimating opportunity costs of Avoided Deforestation (REDD): application of a flexible stepwise approach to the Indonesian pulp sector

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SUMMARY

Developing countries are expected to contribute to climate change mitigation efforts by reducing deforestation, with financial compensations for associated economic losses. These losses are due to foregone revenues and limited economic development, all of these labeled "opportunity costs". Their accurate estimation is strategic for at least two reasons: to determine fair compensations, and to prioritize low cost strategies to reduce emissions. However, numerous interpretations of the opportunity cost concept coexist in the literature and in influential reports (e.g. Stern review), with differing estimated values for similar cases. This paper presents a framework to better identify relevant values to the calculations: profits / total national economic value, conservation site / downstream industries. When applied to the pulp sector in Indonesia, the framework yields contrasted opportunity costs. This contrast is due to several factors, including the heterogeneity of the pulp industry, or the availability of non-forested lands to displace activities. These values range from zero to one thousand dollars per hectare per year. To use such a framework would help gain credibility and achieve fairness in negotiations between host countries and other stakeholders, in particular those who fund activities to reduce deforestation.

Keywords: opportunity cost, avoided deforestation, REDD, pulp industry, Indonesia,

Estimation des coûts opportuns de la déforestation évitée (REDD): application d'une approche pas à pas flexible dans le secteur de la pulpe en Indonésie

R. PIRARD

Il est prévu que les pays en voie de développement contribuent aux efforts d'atténuation du changement climatique en réduisant la déforestation, avec un octroi de compensations financières pour les pertes économiques résultantes. Ces pertes sont dues aux revenus perdus et au développement économique limité, tous labellisés: coûts opportuns. La précision de leur estimation est stratégique pour au moins deux raisons: déterminer des compensations justes, et donner priorité aux stratégies à coût bas pour réduire les émissions. Cependant, de nombreuses interprétations du concept de coût opportun coexistent dans la littérature associée et dans les rapports influenciels comme l'étude Stern, ayant chacune des valeurs estimées différentes pour des cas similaires. Cet article offre un cadre pour mieux identifier les valeurs importantes pour les calculs: profits/ valeur économique nationale totale, site de conservation/ industries en aval. Appliqué au secteur de la pulpe en Indonésie, ce cadre révèle des coûts opportuns contrastés. Ce contraste est dû à plusieurs facteurs, lesquels incluent la nature hétérogène de l'industrie de la pulpe, ou la disponibilité de terres non boisées pour déplacer des activités. Ces valeurs vont de zéro à mille dollars par hectare par an. L'utilisation d'un tel cadre aiderait à gagner une crédibilité et à obtenir davantage de justice dans les négotiations entre les pays hôtes et les autres parties prenantes, en particulier celles finançant des activités visant à réduire la déforestation.

Cálculo de los costos de oportunidad de la Deforestación Evitada (REDD): aplicación de un modelo flexible paso a paso en el sector indonesio de pulpa de madera

R. PIRARD

Se espera que los países en vías de desarrollo contribuyan a los esfuerzos para paliar los efectos del cambio climático por medio de la reducción de la deforestación, y se proporcionan indemnizaciones financieras para compensar las pérdidas económicas asociadas. Estas pérdidas se deben a la pérdida de ingresos y la limitación del desarrollo económico, llamadas 'costos de oportunidad'. El cálculo exacto de estas pérdidas tiene una importancia estratégica por al menos dos razones: la determinación de una indemnización justa, y la prioritización de estrategias de bajo costo para reducir las emisiones. Sin embargo, existen numerosas interpretaciones del concepto del costo de oportunidad en el material publicado y en los informes importantes (p.ej. el informe Stern), y cada una postula valores estimados diferentes en casos similares. Este estudio presenta un modelo para mejorar la identificación de valores relevantes para el cálculo, como por ejemplo las relaciones entre beneficios y valor económico nacional global, y entre la zona de conservación y las industrias de río abajo. Al aplicarse al sector de

pulpa de Indonesia, el modelo demuestra un contraste en los costos de oportunidad. Este contraste se debe a varios factores, incluyendo la heterogeneidad de la industria de pulpa y la disponibilidad de tierras no forestales para reemplazar las forestales en las actividades. Estos valores oscilan entre cero y mil dólares anuales por hectárea. El uso de un modelo parecido ayudaría a establecer una mayor credibilidad y a lograr negociaciones más justas entre los países en vías de desarrollo y otros interesados, sobre todo los que financian las actividades para reducir la deforestación.

INTRODUCTION

The COP13 in Bali was an important step towards enhanced efforts for climate change mitigation. The Climate Convention (UNFCCC) resulted in the Kyoto Protocol a decade ago with legally-binding targets for Greenhouse Gas (GHG) emissions in industrialized countries. While focusing on fossil fuel emissions, this agreement did include carbon stocks in industrialized countries forests in national carbon accounts. Besides, the Clean Development Mechanism (CDM) allows industrialized countries to make part of their emissions reductions in developing countries. Regarding forestry projects under the CDM, agreements in 2001 limited eligible activities to afforestation/reforestation activities (Neeff and Henders 2007).

Tropical deforestation (broadly speaking) was responsible for emissions amounting to 15-35% of those generated by fossil fuels in the 1990s (Houghton 2005). Since ignoring such a source of emissions would affect climate change mitigation, the formal inclusion of "avoided deforestation" (REDD: Reduced Emissions from Deforestation and forest Degradation[1]) in the Kyoto Protocol recently became a source of discussion in international fora (Skutsch *et al.* 2007).

Influential proponents of avoided deforestation, e.g. Stern review (2006) or Chomitz *et al.* (2006), believe that the average cost of reducing tropical deforestation (usually equalled to the opportunity cost) is low compared to emissions reductions in industrialized countries. Simultaneously, developing countries argue that reducing deforestation generates high opportunity costs, mostly in terms of economic development. It is common that countries provide global figures, more or less based on previous studies, as did for instance Indonesia's environment minister: "*We will ask for a compensation of $5-10/ha*" (Reuters 8 October 2007[2]), or the Democratic Republic of Congo's president who claimed three billon dollars for protecting forests.

This issue is highly sensitive. If REDD takes the form of a Multilateral Fund that finances initiatives and measures to reduce deforestation, then tropical countries would *negotiate* compensations based on estimated opportunity costs. It is less relevant if REDD generates carbon credits fungible with the international carbon markets, because prices then will be *fixed* by the market. But in all cases opportunity costs remain strategic for determining the role that tropical forests will play in climate change mitigation efforts.

So far studies have focused on the costs of sequestration, i.e. mostly afforestation activities or forest management. Richards and Stokes (2004) provide an extensive review of carbon sequestration cost studies since the early 1990s, and conclude that results are hard to compare because of "*inconsistent use of terms, geographic scope, assumptions, and methods*". Their review in principle comprises three main types of activities: afforestation, forest management, and avoidance of conversion; yet most of the studies they quote relate to the first category and to North America area. These studies are hardly replicable to the conservation of natural forests in tropical developing countries for methodological reasons: illegal logging is a widespread phenomenon, unknown land prices with poorly recognized land ownership, informal markets are commonly favoured, etc.

This being said, the clarification of the concept of opportunity costs for tropical forest conservation is very much required for current negotiations on REDD. Calculations of these opportunity costs thus require methods that suit various contexts in order to avoid inequitable outcomes: inappropriate calculations potentially lead to inappropriate compensations. Referring to the proceedings of the international workshop on which is based this IFR special issue (Karsenty *et al.* 2008), it was noted that "*the reliability of* [opportunity costs'] *calculation has given rise to a debate on the relevance and use of such exercises*". By definition these methods tend to estimate low costs for subsistence agriculture and high costs for industrial activities, with the possible risk to "*stick poorest farmers into their current poverty levels*" (*ibid*) if compensations are based on simplistic calculations of farmers' revenues.

Next section analyses the concept of opportunity costs in relation to forest conservation. The third section presents a stepwise approach for making opportunity costs calculations more relevant. The fourth section applies the stepwise approach to the pulp sector in Indonesia. The last section draws conclusions.

OPPORTUNITY COSTS: WHAT DOES IT MEAN FOR CARBON SEQUESTRATION?

Basic notions and definitions

The opportunity cost is a concept which definition involves two core notions: (i) the notion of a foregone opportunity, meaning that an investment, activity, or use of a resource,

[1] At the COP13 it was decided to include « Degradation » during the preliminary phase at least until COP15 in Copenhagen.
[2] Available on www.reuters.com/article/environmentNews/idUSJAK10785920071008.

all prevent an alternative investment, activity or use of the resource; and (ii) the notion of a cost, meaning that the foregone opportunity would have provided benefits.

Alternatively named economic cost, it is "*the cost of something in terms of an opportunity forgone*" (Wikipedia, consulted 4 October 2007), as opposed to the accounting cost (operational, investment…) expressed in monetary terms. Some argue that the word "opportunity" is redundant, but useful in reminding that in economics "*the cost of using a resource arises from the value of what it could be used for instead*" (Concise Encyclopedia of Economics). Therefore, the sum of both costs assesses the true cost of any course of action. In the case of forest conservation, the accounting cost is limited to operational costs (salaries to security guards mainly), but the conservation might prevent people from generating value with agriculture.

The concept of opportunity cost is based on scarcity and exclusiveness, because a course of action prevents another one. Forest conservation could take place along with other land uses in a world without land scarcity, thus suppressing opportunity costs. But scarcity usually then translates into exclusiveness when two activities or land uses cannot take place simultaneously. They are *mutually exclusive*.

To estimate the cost of preventing an activity, we need to define two values that explain its contribution to the national economy:

(i) The "total national economic value" is the sum of all expenses that an activity generates in the country: employment, machinery, taxes, etc. It does not include payments abroad, such as equipment imports. Its rationale is to estimate the total contribution of an activity to the national economy.
(ii) The "profit" is the "*redistributive share different from the returns to the productive services of land, labour, and capital*" to take the seminal definition by Knight (1921). It is the benefit to the entrepreneur after all expenses have been paid, included the cost of capital. Its rationale is to estimate the specific contribution of an activity compared to other investment opportunities in a country.

Identification of foregone opportunities: several issues to consider

To take the most valuable alternative as the opportunity forgone, assumes that no limited rationality for the decision-taker neither the presence of barriers would prevent its realization. But the real opportunity cost might better rely on the alternative option with the highest probability. This distinction finds an important application with "avoided deforestation", where the opportunity foregone is identified with the business-as-usual scenario (what would happen with deforestation). While host countries that participate to the mechanism have an interest to point to the most profitable land uses, these would not necessarily take place. It is difficult, to say the least, to determine the shares of each land use based on its profitability, notwithstanding the variability of output prices and resulting profits.

Second, scarcity of production factors relatively to investment opportunities determines opportunity costs. For instance, a capital-intensive pulp mill in a country with insufficient capital availability (like Indonesia) has high opportunity costs because it limits investments in other sectors. Reversely, labour-intensive industries (e.g. garment manufacturing) are appropriate in densely populated countries because they do not limit other activities from a labour perspective.

Related to the previous issue, any barrier to a project (e.g. not allowing forest conversion) is especially costly in a country with few investment opportunities, because it means that capital cannot be invested in any other project *instead*. Reversely, the cost would be low in a country with limited availability of capital because the investment might be simply *diverted* to another sector or geographical area with a contribution to the national income. Opportunity costs might be respectively the total national economic value of the project or just the profits it generates[3]. As an application to avoided deforestation: it is likely that logging companies in Central Africa would move to other countries if not allowed to log forests; on the contrary it is plausible that Indonesian conglomerates, if not allocated licenses to build pulp mills, would invest in other domestic sectors through their own active subsidiaries.

Land uses are frequently connected to various industries: oil palm plantations supply factories that process CPO into biodiesel, Acacia plantations supply pulp mills, etc. This justifies in some cases to include downstream investments in the opportunity cost of not deforesting. But it is not straightforward because, once again, scarce capital might be invested in other productive sectors instead of downstream industries.

Social *versus* Private opportunity cost

The opportunity cost can be viewed from a social or private perspective. The latter view is limited to the agents directly affected by forgone opportunities. It could be a worker who loses employment when a local project is cancelled.

But the social opportunity cost embraces the national economy and its estimation should theoretically include all collateral effects of a course of action. In particular, the alternative use of capital when specific investment options are suppressed is important (e.g. domestic use or investment abroad). In the case of forest conservation, the local impacts on labor and taxes are simple to measure. However, positive impacts in other geographical areas and sectors where capital and labour are used might be uneasy to measure, and impacts on the national economy might be hardly identifiable. If investments are displaced, impacts on the national economy

[3] The terms 'total national economic value' and 'profit' are defined in the Box 1.

could be equivalent overall, but some people will benefit from new opportunities to the detriment of others living in the area with conservation. This is less true in case rural migrations accompany the move of capital.

Lessons from carbon sequestration cost studies

Great efforts were done by Richards and Stokes (2004) to review carbon sequestration cost studies since the early 1990s. Reviewed studies make diverse assumptions for various parameters: carbon yield is an emblematic example of these discrepancies. Not only do the studies inconsistently use various terms as important as "ton of carbon" and refer to distinct geographical areas and scales, but they also base their calculations on different time horizons or discount rates. In addition, the methods belong to three distinct categories, which "*complicates direct comparison of study results*". These three categories are briefly presented below:

(i) Bottom-up engineering studies in their most simple form consider observable prices from agricultural land rental or purchase markets (e.g. de Jong *et al.* 2000). More sophisticated studies account for increasing marginal costs of land with some kind of elasticity (e.g. Richards *et al.* 1993), in order to include the effects of afforestation programs on the availability of agricultural lands. Estimations are labelled "rents" or "net returns", which is pretty close to the "profits" as defined in the present paper. The method has a limited scope because land prices are the only proxy for net returns.

(ii) Sectoral models add an important component to the first category with endogenous prices that orient the method towards spatial equilibrium models (e.g. Alig *et al.* 1997). Thus the studies can incorporate the leakage effects when afforestation in one place causes price increases in the agricultural markets and forest conversion in other places. While enabling on the one hand up-scaled cost estimations, on the other hand costs for specific projects and sites cannot be estimated.

(iii) Last, econometric studies basically model historic land uses as a function of market prices, but consider actual decisions rather than they model decision-making as a function of expected profits. This category is by nature more oriented towards predictions of the respective shares of land uses, rather than to an estimation of opportunity costs to divert land away from agricultural production. Yet one study attempted to indirectly estimate forest conservation costs in Costa Rica by comparing economic yields of forest clearance *versus* conservation scenarios with revenues from the sale of carbon credits (Kerr *et al.* 2001).

Apart from telling us how fragmented and heterogeneous are the available cost estimations for carbon sequestration, this large review also provides key lessons regarding the opportunity costs of avoided deforestation. We understand that land prices are usually considered a prerequisite of any cost estimation, and that studies are mostly based on the conversion of agricultural lands (either pastures or cultivated fields) into forested lands. When studies address actively managed forests for timber production, the future economic benefits are pretty straightforward to model and predict. But these conditions are rarely satisfied for avoided deforestation. Not only might the natural forests not be exploited for commercial purposes, but land prices do not exist and future land uses are quite uncertain.

This very different context makes it unrealistic to base opportunity costs estimations on similar methods. Avoided deforestation in tropical developing countries will likely be a result of domestic policies such as stricter criteria for the allocation of forest conversion permits, the protection of forests from encroachment by surrounding populations, improved law enforcement, etc. (Pirard and Karsenty In press). Land uses after forest conversion are potentially diverse and investments are yet to be realized. Some are legal, some are not. Some take place on state forests, others on private or community lands. Some are small-scale and rely on local investors, but others are large-scale and based on foreign capital.

Contrasted assumptions in forest conservation cost studies

Although opportunity costs are the entry point to all studies on forest conservation costs, a succinct literature review shows how diverse are the definitions and methods of calculation. The Table 1 supports this point with a classification of five articles published in academic peer-reviewed journal with impact factor (except for the influential Stern review). This limited number of cases provides interesting insights regarding methods and assumptions:

- Some studies follow a total national economic value approach that equals opportunity costs of conservation to the various economic benefits provided by an alternative land use (employment, taxes mainly); while other studies follow a profit-oriented approach that equals opportunity costs to investment returns
- Scale is local, regional or national
- All studies take costs and prices at current values, thereby assuming no evolution in time (although up to 30 years time horizon). One study only points to the implication in terms of poverty alleviation in the long run
- Investor's alternative strategies are investigated in two cases (domestic / foreign)
- Only activities on site are addressed, except for one study that includes downstream effects (transportation and mill processing)
- Various time horizons and discount rates
- One study only used the classical (yet modified) approach with land prices as a proxy for land value

TABLE 1 *Characteristics of various published methods of calculation for opportunity costs for forest conservation*

Reference	Business-as-usual land use*	Scale of analysis	Basic value for cost calculation	Analysis of downstream effects	Analysis of investor's alternative strategies	Inclusion of timber harvesting benefits before conversion	Inclusion of conservation benefits	Specifics
Naidoo and Adamowicz (2006)	Past conversion rates for each land use	Regional	Profit/ha estimated as weighted-mean of net benefits (regional estimates) based on past conversion rates	No	No	No	No	Discount rate 20%
Stern (2006), based on Grieg-Gran (2006)	Past conversion patterns or "subjective assessment drawing from qualitative statements"	National	Profit/ha taking average national land productivity	No	No	Yes / No	No	Time horizon 30 years, discount rate 10% (for most of cases)
Kremen *et al* (2000)	(i) Land use with highest alternative return at national level (industrial logging) plus subsequent rice field after forest damage due to poor law enforcement (ii) Same with assumption that only one-third due taxes are paid (iii) only industrial logging with full law enforcement	Local (employment), and national (employment, taxes, infrastructure development)	Taxes and employment (logging), "value" for rice fields (not further specified)	No	Alternative investment abroad	-	Estimated separately	Use market values and shadow prices; 10 and 30 years time horizon; 3-10-20% discount rate.
Karsenty (2007)	Concession allocation plans	Site of conservation plus sectoral impacts	Taxes (government and population) and revenues from employment	Transportation and processing activities related to timber logging	Alternative investment abroad	-	No	Stresses need to assume increasing revenues with logging operations

Chomitz *et al* (2005)	Related to land characteristics (soil quality, soil quality, slope, climate, road proximity, land cover)	Regional	Land price estimated with regressions on land characteristics	No	No	Yes (indirectly as forest cover is one explanatory variable for land value)	No	No business-as-usual land use

* What would happen without conservation.

PROPOSAL FOR A FLEXIBLE STEPWISE APPROACH

Building on the diversity of views, methods and contexts as showed in previous sections, a general framework is provided for the calculation of opportunity costs of avoided deforestation. This stepwise approach is flexible in the sense that it derives formulae that suit key characteristics of each case. The following operational definition is proposed:

"*The social opportunity cost of avoided deforestation is the financial loss for a country when one hectare of forest prevents another land use as determined by the business-as-usual scenario. This financial loss also considers the most obvious alternatives for investors, and impacts on downstream industries*".

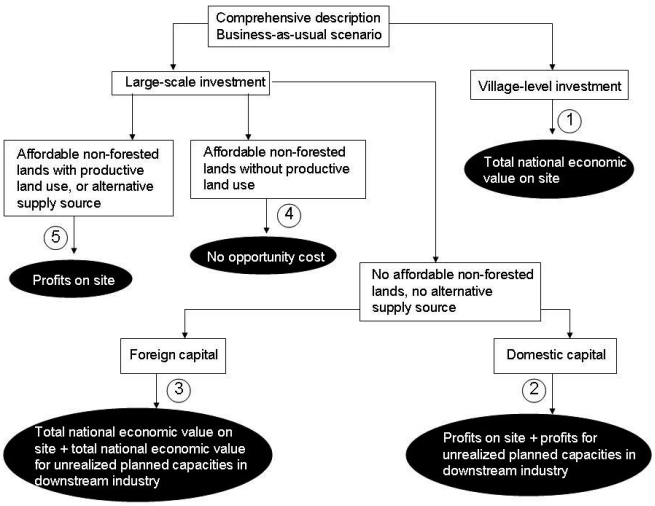
A flexible stepwise approach requires simplicity for being operational while guaranteeing fair and credible cost estimations. This trade-off translates in the necessity to be context-specific and inclusive of the most significant side effects (e.g. downstream industries) of avoided deforestation, while not using costly and time-consuming methods (e.g. exhaustive cost-benefit analyses). Moreover, cost estimations are likely to be more useful in classifying high / low costs rather than refining estimations. Precise estimations are indeed most justified for determining individual compensations to land users (e.g. *private* opportunity costs).

Therefore this approach merely intends to orient the calculation in the right direction in order that decision-makers do not miss the real low cost strategies for reducing deforestation. Once a direction is chosen, the choice of assumptions like discount rates and time horizons is as debatable as for any other opportunity cost calculation.

Several pathways appear in the Figure 1 and each of them is detailed below as a matter of clarification. An important assumption is that no leakage occurs, i.e. avoided deforestation does not generate forest conversion elsewhere. Note that pathways are mutually exclusive.

Pathway 1: Avoided deforestation prevents village-level investments, i.e. on a small-scale basis and without external financing. The opportunity cost is equal to the total national economic value on site generated by the business-as-usual land use. The rationale is that villagers do not have alternative opportunities for investments because of limited access to lands and productive sectors of the economy. It follows the logic of the Payments for Environmental Services

FIGURE 1 *Flexible stepwise approach*



whereby villagers earn revenues from forest conservation without alternative opportunities. Ex.: Shifting cultivators or smallholders of coffee plantations do not engage in alternative activities and might lose all economic value generated by land uses following deforestation.

Pathways 2 and 3: Avoided deforestation prevents large-scale investments that cannot be displaced to non-forested lands (physical or economic reasons), and which production for domestic industries (if any) cannot be substituted by alternative supply sources at affordable prices. Consequently downstream industries (if any) will not be realized. The question is whether investments in business-as-usual land uses and downstream industries will be diverted to other activities within the country or abroad. We assume that this relates to the capital origin: domestic investors find other opportunities within the country, but foreign investors look for opportunities abroad. Ex. pathway 2: A domestic group invests in palm oil plantations and mills that process fresh fruit bunches into crude palm oil. If not allowed to establish the plantation, the investor finds with alternative investments in the country. Ex. pathway 3: a foreign group invests in forest concessions to supply plywood mills located nearby. If not allowed to manage the forest concession, the investor looks for alternative investments abroad.

Pathway 4: In specific contexts forest conversion takes place although non-forested lands are available with similar

land characteristics except for forest cover. Among the reasons for such a situation, the forested lands might be close to the markets, or forest conversion generates substantial benefits with timber sales. In this context, avoided deforestation does not generate opportunity costs to the country because land uses are simply displaced to non-forested lands. Yet the necessary condition for opportunity costs to be low or nil is that no competition takes place among productive land uses on non-forested lands. Ex.: A pulp and paper (P&P) group lobbies the government for controlling tree plantation concessions close to the pulp mills with rights to clear-cut remaining natural forests for pulpwood production. As barren lands are located further, the government might decide to relocate tree plantation concessions.

Pathway 5: The difference with pathway 4 lies in the competition among productive land uses on non-forested lands with the consequence that land uses are mutually exclusive to some extent. In this context, we assume the opportunity cost to be equal to the profits generated after forest conversion on site. Also relevant to pathway 5, the case where alternative supply sources exist within the country or abroad to supply downstream industries. Ex.: Example is similar with pathway 4, but the P&P group needs to compensate right-holders to the land (villagers, smallholders, or the State) in proportion to foregone opportunities.

The stepwise approach has limitations for application that are due to somehow indeterminate thresholds. To take an example, it is debatable and certainly not straightforward to classify lands as "affordable". But the approach is merely intended to provide guidance in the choice of data and calculation formulae, in order to match local contexts, and thus flexibility in its application is a logical outcome.

APPLICATION OF THE STEPWISE APPROACH TO THE PULP SECTOR IN INDONESIA

In this section the stepwise approach is applied to the pulp sector in Indonesia. This sector has several important characteristics:

1. By 2005 the country's installed pulp production capacity reached 6.3 million tonnes per year (tpa), making the country the ninth world producer. The expansion was extremely rapid, with only 706 000 tpa in 1989.
2. Very specific to Indonesia, the major pulp producers have used Mixed Tropical Hardwood (MTH, natural forests) for production and plantations have remained a minor supply source until recently.
3. Pulpwood plantations were established after forest conversion, and new concession permits are still distributed on forested areas mostly. No regulation so far has been drafted to prevent producers from converting natural forests.

Baseline scenario for deforestation related to the pulp sector

Among the most influential factors for future deforestation related to the pulp sector: (i) rules and their enforcement, and (ii) available domestic plantations with low cost supplies to the pulp mills. Each of these is discussed below. Pulpwood plantation establishment has traditionally been motivated by domestic fibre needs, with the exception of several plantations in Kalimantan that might possibly export chips (Pirard and Cossalter 2006). Therefore the baseline scenario used in this paper is based on the domestic demand for pulpwood.

Note that figures are intended to be illustrative. While these figures are based on previous analysis and research by the author, they should not be given too much importance. The focus is on qualitative analysis and conclusions.

Regulations and their enforcement

The conversion of natural forests has been subject to changing regulations in Indonesia. The word "conversion" is not used by Indonesian authorities in the case of subsequent tree plantation establishment, because it officially refers only to the excision of lands from the forest domain to the non-forest domain (e.g. oil palm). Instead, the Ministry of Forestry (MoF) introduced the concept of "productive / unproductive forest" that justifies conversions of degraded forests (unproductive) into tree plantations (productive).

Since1986 HTI concessions (large-scale tree plantations) must be allocated on unproductive forests, but the definition of "productive forests" has varied with a criterion ranging from 5 to 20 m^3 commercial timber per hectare (among other criteria). Yet, a key regulation was issued in 2004 that allows pulp mills to convert natural forests up to 2009 and whatever the standing volume. The criteria for the period after 2009 are in the process of elaboration, but will likely be flexible to allow the distribution of conversion permits on primary forests in the Papua province that enjoys a large autonomy.

The Table 2 recapitulates some key regulations with their impact on forest conversion depending on enforcement.

Next, what about the size and localization of the plantation estate? Official targets for plantation development have been repeatedly well above effective implementation since the early 1980s (Iskandar *et al.* 2003), so we question the relevance of latest MoF targets. The report drafted by senior advisors to the MoF (Departemen Kehutanan 2007) announces 5 million hectares plantations in HTI concessions by 2009, and 5.4 million hectares of community tree plantations in the decade 2007-2016. The MoF "Strategic plan" for 2005-2009 (Departemen Kehutanan 2006) provides slightly different figures.

Availability of low cost pulpwood plantations

Official figures on standing pulpwood plantations are poorly reliable, not only because of deficient data management at the MoF, but also because the pulp sector in Indonesia is opaque with large financial amounts at stake and controversial

TABLE 2 *Regulations for pulpwood plantations: likelihood, implementation and impact*

Regulation	Likelihood of issuance	Assumed degree of enforcement if issuance	Resulting deforestation if issuance, based on degree of enforcement
Lax criteria for forest conversion in Papua	High	High	High
No conversion on peat soils	Medium	Medium	Medium
Strict criteria on remaining timber stocks for conversion	Low	Low	Medium
Ban on wood chip exports	Low	High	Uncertain
Match allocation of concessions to domestic pulp capacities	Low	Low	Uncertain
Ban on MTH use for pulpwood	Low	High	Low
Increasing requirements for set-asides within concessions	Medium	Medium	Medium

management. The two main groups APP and APRIL are those on which we concentrate our efforts, because they represent a majority of the domestic wood pulp capacities (> 80%) and the two other significant pulp mills are not engaged into forest conversion. The mill Toba Pulp Lestari fully relies on plantations and is thus not addressed.

The latest complete assessment available shows that planted areas will not be sufficient to fully supply pulp mills up to 2010 (Pirard and Cossalter 2006). The authors estimate that about 300 000 hectares of natural forests are going to be converted in 2006 and afterwards to supply the gap. With the expansion at APP and APRIL planned for 2008, the forest conversion would cover about 600 000 hectares (*ibid*). They express their doubts on the possibility that ambitious plans for plantation establishment will achieve targets due to the majority of plots on peat soils.

Among the planned pulp mills for the coming years, one will fully rely on affiliated plantations in Central Kalimantan (Korindo), and another one (UFS) is hard to assess due to contradictory assessments so far on the standing stocks in the affiliated plantation (Pirard and Cossalter 2006). In a conservative stance, it is assumed that none of their supply will originate from forest conversion.

So what baseline scenario?

Predictions based on previous points are recapitulated in the Table 3. Most important among these, the expected lax criteria for Papua would make further forest conversion related to pulp capacities' increase very likely, with the exception of Korindo and UFS pulp mills (i.e. 2012 increase in pulp capacities). Figures are largely based on most recent study of the sector (*ibid*).

Avoided deforestation and the strategies of pulp and paper groups

To stop pulpwood plantations' establishment on forested lands is the most obvious direct policy for reducing deforestation with the pulp sector. Large P&P groups have traditionally targeted forested areas to benefit cheap pulpwood supplies, and this practice continues owing to lax regulations and the intense lobbying of Indonesian authorities (Pirard and Irland 2006). Moreover, these authorities argue that forest conversions are desirable from an environmental perspective owing to reforestation. If such conversions are stopped, P&P groups will have four different alternatives that are discussed

TABLE 3 *Evolution of pulp capacities and related forest conversion*

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Pulp Capacity (10^6 ADt/yr)	6.3	7.5	7.5	7.5	7.5	8.6	8.6	8.6	10.1
Fiber needs (10^6 m^3)	27.1	32.25	32.25	32.25	32.25	36.98	36.98	36.98	43.43
Plantation area needed (10^6 ha)	1.41	1.68	1.68	1.68	1.68	1.93	1.93	1.93	2.26
Expected forest conversion for plantation establishment (ha)	600 000 (expansion up to 7.5 million ADt/yr) + 0 (expansion from 7.5 to 8.6 million ADt/yr) + 330 000 (expansion from 8.6 to 10.1 million ADt/yr) = 930 000 hectares								

Source: For 2008-2011 based on company information. For 2012 we assume that Korindo and UFS pulp mills will start production but rely on affiliated plantations. For 2015 onwards we assume the construction of an additional 1.5 million ADt pulp mill based on plans by APP and APRIL, with associated forest conversion.

Assumptions: One ADt pulp requires 4.3 m3 wood. Mean Annual Increment 24 m3 in pulpwood plantations. 25% losses from site to processing: fires, harvest, transport, chipping.

briefly before application of the stepwise approach.

First, they rely on non-forested areas in two ways: large-scale HTI concessions or smallholder plantations. In the first case, local claims are likely to arise with only 10% of the total Forest Estate being delineated (Contreras-Hermosilla and Fay 2005). But appropriate compensations could help solve these conflicts as P&P groups have done very little financial effort in this direction so far. In the second case, limited access to cheap pulpwood from forest conversions is an incentive to develop smallholder plantations in order to fill the fibre gap. In all cases the access to non-forested lands for pulpwood plantations will face competition with other productive land uses.

Second, the P&P groups look for standing plantations. Pirard and Cossalter (2006) showed that in early 2005 Indonesia had an aggregate area of close to 250 000 hectares of standing industrial tree plantations in the Kalimantan province that could supply more than 20 million m^3.

Third, the groups buy chips in the Asia Pacific market. This significantly increases the production costs so that it is an alternative to fill the supply gap for installed pulp capacities, but certainly not for new capacities in Greenfield projects.

Fourth, the groups take the decision to reduce pulp production. This is unlikely because of extremely high fixed costs and the possibility still to import chips.

Opportunity costs according to the stepwise approach: great differences in value

Pulpwood plantations and pulp mills generate large-scale investments in the business-as-usual scenario. There are non-forested lands all over the country, with limited use at the moment, but with expected development of more productive land uses such as oil palm or rubber plantations. In Indonesia even *alang-alang* fields are potentially useful for pasture, hunting, houses, etc. The extent of non-forested lands is debated: according to MoF data approximately one fifth (1.5 million ha) of the area allocated to HTI concessions was without forest cover in 2003. These figures need cautious interpretation because plantations have been established at a rapid pace since 2003, and information does not exist on the availability of these lands four years later. However it is assumed that forest conversion for pulpwood plantations' establishment could be partially compensated with these non-forested lands within the HTI concessions. This is the pathway 4, for which the opportunity costs are nil.

At the country level, MoF data for 2003 disclose 22.5 million ha of lands without tree cover in the Forest Estate (World Bank 2007). With exclusion of lands located further than maximum commercial distance to pulp mills (about 150 km) and lands under more competitive land uses (especially oil palm with the "Bio Diesel New Deal"), then these non-forested lands could only partially compensate reduced forest conversion for pulpwood plantations' establishment. The program for smallholder plantations goes in this direction. This is the pathway 5, for which the opportunity costs are the profits on site because plantation establishment prevents other land uses.

As surprising as it might be in a context of overcapacities for the timber industry, the plantation estate in Indonesia is under-utilized with the presence of standing plantations without production. These plantations have been progressively purchased by the main P&P groups in Kalimantan in recent years (for chip exports mainly) and appropriate regulations could help to increase supplies to domestic pulp mills. It was estimated that such a policy could avoid deforestation on 100-200 000 ha in the short term (Pirard and Cossalter 2006). Other plantations may exist although with poor maintenance and scattered all over the archipelago (especially those of public ownership). Presumably these would be identified and fully used by the pulp mills if forest conversion is halted. This is also the pathway 5, for which the opportunity costs are the profits on site.

Investments in new pulp capacities might decrease if cheap fibre supplies from forest conversion are not available, as this has been a key argument for attracting large investments in the past (Barr 2002). Both Indonesian conglomerates and foreign groups are planning investments: Sinar Mas (APP) and Raja Garuda Mas (APRIL) for the domestic side, UFS and Korindo for the foreign side. In the former case, this is pathway 2, for which the opportunity cost are the profits on site and for unrealized pulp expansion. In the latter case this is pathway 3 with the highest opportunity costs: Indonesia loses the total economic value generated on site and in pulp mills.

CONCLUSIONS

The cost of avoided deforestation (REDD) in developing countries is usually approximated with the opportunity cost of the associated (business-as-usual) activity. Setting the cost of avoided deforestation is strategic for at least two reasons: it will influence decisions to dramatically increase the role of tropical forests for climate change mitigation, and serve as a basis for setting the level of financial compensations to countries that reduce deforestation.

Numerous studies were written on the matter. These studies fall broadly into two categories: national studies based on land prices to model the opportunity costs of sequestering carbon or conserving forests, and more detailed studies on specific sites and conservation activities. This paper argues that these methods might fail to identify real costs, and commonly lack sound justifications regarding the methods used. Although opportunity cost is merely a concept and might not be measurable with a high degree of accuracy, it is important to enable stakeholders (host countries, donors, buyers of credits, etc.) to identify activities or projects with extremely high / low costs. Relevance should be prioritized over precision in opportunity cost calculations.

To identify high / low cost avoided deforestation, this paper proposes a flexible stepwise approach that is aimed to enable analysts identify most relevant values for the calculation of opportunity costs. Depending on cases, these relevant values could be the total economic value of a given activity, or its profits only; they could be limited to the site,

TABLE 4 *Opportunity costs for each pathway related to the pulp sector**

	Pathway 2	Pathway 3	Pathway 4	Pathway 5
Description	Main Indonesian conglomerates that control P&P groups (e.g. APP and APRIL) cancel expansion of pulp capacities because of reduced profitability if low cost fibre is not available from forest conversion. Conglomerates invest in other sectors of the economy through their national industrial groups.	Foreign pulp and paper groups cancel their investments in Greenfield pulp mills in Indonesia (e.g. UFS and Korindo) because of reduced profitability if low cost fibre is not available from forest conversion. Groups invest in other countries instead.	The suppression of conversion permits forces P&P groups to plant on non-forested lands available in plantations concessions (HTI).	The suppression of conversion permits forces the pulp and paper groups to look for alternative supply sources (standing plantations or chip imports), or concessions / local partnerships in non-forested lands where they compete with other productive land uses.
Values to consider	Profits generated by pulpwood plantations after forest conversion + profits for unrealized pulp capacities	Total economic value generated by pulpwood plantations after forest conversion + total economic value generated by unrealized pulp capacities (only operational costs nationally)	-	Profits generated by pulpwood plantations after forest conversion
Estimation of opportunity costs (per ha)	\$120/ha/yr (plantation profit) + \$200/ha/yr (pulp mill profit)	\$720/ha/yr (total economic value plantation) + \$400/ha/yr (total economic value pulp mill)	0	\$120/ha/yr (plantation profit)

Assumptions: One ADt pulp requires 4.3 m^3 wood. Mean Annual Increment 24 m^3 in pulpwood plantations. 25% losses from site to processing: fires, harvest, transport, chipping. Plantations generate profits \$5/m^3 on site, with production costs \$30/m^3. Pulp mills generate profits \$50/ADt pulp, with operational production costs \$100/ADt pulp (chemicals, energy, labour, maintenance, other mill costs).
* Pathway 1 is not represented because the sector is specifically large-scale and does not rely on village-level investments.

or expanded to downstream industries. The identification of relevant values is crucial because resulting estimations differ significantly, with consequences in terms of policy design and fair distribution of compensations. The flexibility of the stepwise approach is intended to match local contexts, and to provide guidance rather than to impose calculation methods.

The stepwise approach was applied to the pulp sector in Indonesia with interesting results. Indeed it showed that opportunity costs could be calculated in different ways with contrasted values ranging from zero to more than one thousand dollars per hectare per year. This supports the view that negotiations between host countries and other stakeholders, in particular those who fund activities to reduce deforestation, would gain in credibility with the use of a similar framework. To do so could help to allocate financial resources to developing countries in a fairer way. It could allow contributors to wisely use their resources and to prevent ultimate beneficiaries from being inappropriately compensated. Yet, as for any other method, transparency is a requirement in order to ensure that the right assumptions are applied.

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Putting the National back into Forest-Related Policies: the International Forests Regime and National Policies in Brazil and Indonesia

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SUMMARY

The impact of the international forests regime (IFR) in shaping national forest-related policies (FRPs) is often considered as one of the key indicators of its effectiveness. This study is based on a comparison of the evolution over the past three decades of FRPs and the IFR's impact in Brazil and Indonesia – the two top-ranking countries in deforestation figures – and draws two conclusions. First, far from acting as a mere source of resistance to the IFR, the domestic policy context determines both the extent and type of impact of the IFR on FRPs. Secondly, FRPs also influence the IFR, which contradicts the top-down vision put forward by attempts to evaluate the IFR's effectiveness. This suggests that instead of a hierarchical relationship, the link between the national and international spheres is a dynamic one where the IFR and FRPs mutually adjust to each other according to the specificities of policy networks at both levels.

Keywords: forest-related policies, international forests regime, Brazil, Indonesia

Remettre la dimension nationale dans les politiques liées à la forêt: le Régime intenational des forêts et les politiques nationales au Brésil et en Indonésie

B. SINGER

L'impact du régime international des forêts (IFR) dans la formation des politiques nationales liées à la forêt est souvent considéré comme l'un des indicateurs clés de son efficacité. Cette étude se base sur une comparaison de l'évolution de l'impact de l'IFR et des FRP au Brésil et en Indonésie - les deux pays au plus fort taux de déforestation- au cours des trois décénnies passées, et en tire deux conclusions. Tout d'abord, le contexte de politique domestique, loin d'agir comme une source de résistance à l'IFR, détermine plutôt l'étendue et le type de l'impact sur l'IFR et les FRP. Deuxièmement, les FRP influencent aussi l'IFR, contradisant la vision allant du haut vers le bas mis de l'avant par des efforts d'évaluer l'efficacité de l'IFR. Tout cela suggère que le lien entre les sphères nationales et internationales est une relation dynamique, plutôt que hiérarchique, où l'IFR et les FRP s'accordent l'un avec l'autre selon les aspects spécifiques des réseaux de politiques aux deux niveaux.

Devolver lo 'nacional' a la política forestal: el régimen forestal internacional y la política nacional en Brasil e Indonesia

B. SINGER

El impacto del régimen forestal internacional (RFI) sobre las políticas forestales nacionales (PFN) se suele considerar como uno de los indicadores más importantes de su eficacia. Este estudio se basa en una comparación de la evolución durante las últimas tres décadas de PFN y el impacto del RFI en Brasil e Indonesia, los dos países con mayor índice de deforestación, y presenta dos conclusiones. Primero, lejos de actuar como mera fuente de resistencia al RFI, el contexto político nacional determina el alcance y carácter del impacto del RFI sobre la política forestal nacional. En segundo lugar, las políticas forestales nacionales también influyen al RFI, lo cual se contradice con la perspectiva verticalista que han mostrado muchos de los intentos de evaluar la eficacia del RFI. Esto sugiere que, en vez de una relación jerárquica, la relación entre lo nacional y lo internacional es dinámica, y que el régimen forestal internacional y la política forestal nacional se adaptan mutuamente según el carácter específico de las redes políticas a ambos niveles.

INTRODUCTION

The importance of the International Forests Regime (IFR) in shaping national policies and gearing them towards ways in which to curb deforestation and forest degradation is often viewed as a key criterion of the IFR's effectiveness.

This paper provides a study of change in national forest-related policies (FRPs) in order to understand its origins and the relative importance of the IFR in shaping such policies. It focuses on Brazil and Indonesia as two contrasting case-studies that rank top in deforestation figures (see Table 1) and which have greatly contributed to the international debate on forest management. Particular attention is paid to the nature of the relationship between the IFR, domestic FRPs and the broader domestic political contexts.

The data presented below were collected in the field between January and August 2006 for Brazil, and between November 2006 and July 2007 for Indonesia. They originate both from a number of semi-structured interviews carried out in Portuguese, Indonesian, English and French with key actors involved in national FRPs as well as a wide range of grey and academic literature including letters, reports and university publications.

The existing literature tends to remain silent on the definition of forest policies, although from the way the issue is generally treated, it appears that the expression is usually understood as governmental policies that explicitly affect forests. However, two problems appear when trying to operationalise such a definition. First, governments are increasingly both challenged and assisted by an ever growing number of actors involved in forest policies, especially in developing countries where state actors have limited human and financial resources. Secondly, choosing to focus on policies explicitly affecting forests limits the perspective to a small number of policies and closes the door on those from other sectors which might affect forests. This is especially the case in Brazil where forest policies *stricto sensu* were almost non-existent until the 1990s.

In order to include agricultural or industrial policies that have affected forested landscapes in Brazil or Indonesia – sometimes to a greater extent than have forest policies themselves – it is necessary to include all policies that affect forests, whether explicitly or not. Hence the choice of the term "forest-related policies" or FRPs, which can be defined as policies established by governmental and non-governmental actors that affect forest landscapes whether intentionally or not. Policies from sectors other than forests are only included so long as they have an impact on forest landscapes.

This study takes a historical approach to analysing change in FRPs in Brazil and Indonesia and covers the period since the late 1970s, prior to the time when the different components of the IFR first appeared. In general, studies on the IFR have tended to look at international rather than national policies (*e.g.*, Humphreys 1996a, 1996b, 2001, 2007; Smouts 2001); in this paper, however, the author has specifically chosen to tackle the issue from a national perspective – by studying national policies – so as to identify other potential sources of change that might compete or act in synergy with the IFR. In particular, the author focuses on three aspects of FRPs that act as variables for comparing both case-studies:

- Policy discourse, defined here as the rationale for political action or the logical construction of a set of arguments justifying the actions of stakeholders involved in FRPs. Discourse can be identified both in written and oral forms, in interviews as well as in the literature.
- Policy instruments, which Lascoumes and Le Galès (2004) define as "a technical and social device that organises specific social relationships between public authorities and its recipients as a function of the representations and meanings that it bears".[1]
- Policy networks, defined by Le Galès and Thatcher (1995) as "the result of more or less stable non-hierarchical cooperation between organisations that know and recognise each other, negotiate, exchange resources and may share norms and interests (…). The study of policy networks is embedded in a conception of public policies which emphasises their incremental nature and which developed in reaction to the vision of a monolithic state and of a single centre of domination".[2]

Partly as a result of the choice, in the existing literature, to focus on the relationship between the IFR and FRPs from the international level, the role of FRPs in this relationship has often been reduced to one of a passive, static receptacle, either permeable or impervious to change. One the one hand, domestic actors and aid recipients frequently overemphasise the progress towards "sustainability" of national policies in a bid to justify donor expenditure, thus portraying FRPs as little more than a receptacle for stimuli induced from the IFR. Paradoxically, actors who denounce what they perceive as unjustified foreign interference in domestic affairs also paint a similar picture of FRPs (although the very fact that they denounce it suggests otherwise). On the other hand, international actors and observers who often express their frustration at the failure of the IFR in modifying FRPs tend to reduce FRPs to a

[1] "Un instrument d'action publique constitue un dispositif à la fois technique et social qui organise des rapports sociaux spécifiques entre la puissance publique et ses destinataires en fonction des représentations et des significations dont il est porteur" (Lascoumes and Le Galès 2004:13).

[2] "(L)es réseaux sont le résultat de la coopération plus ou moins stable, non hiérarchique, entre des organisations qui se connaissent et se reconnaissent, négocient, échangent des ressources et peuvent partager des normes et des intérêts (…). L'étude des réseaux d'action publique s'enracine dans cune conception des politiques publiques qui souligne leur nature incrémentale et qui s'est développée contre la vision d'un Etat monolithique, d'une centre unique de domination" (Le Galès and Thatcher 1995:14).

mere source of resistance to externally induced change.

In this paper, it will be argued that far from being passive or static, FRPs and their broader domestic political context not only play key roles in which IFR-induced changes take place and how, but in some cases they can even influence the IFR in return, hence two hypotheses: first, the IFR can only influence FRPs through the national level that acts as a prism in shaping the IFR's influence; and secondly, the relationship between the IFR and FRPs is two-way as both levels can influence each other.

BRAZIL, INDONESIA AND THE INTERNATIONAL FORESTS REGIME

The IFR in a Nutshell

Given that the focus of this paper is on domestic FRPs, this section only provides a brief overview of the IFR which is analysed in much greater detail in Smouts (2001) and Humphreys (2007).

An international regime is most commonly defined as a framework of "norms, rules, principles and decision-making procedures around which actors' expectations converge in a given area of international relations" (Krasner 1983). Many observers continue to question whether the international forests debate may be called a regime, notably because of the absence of a convention and the fact that debates appear so scattered – often reaching well beyond the forest sector – that they lack a common core. However, insofar as (i) forest-related policies are a "given area of international relations" and (ii) the actors involved in these policies at the international level do converge on various sets of "norms, rules, principles and decision-making procedures",[3] the international debate on forests does fall within Krasner's definition.

With the creation of the International Union of Forest Research Organisations (IUFRO) back in 1896 (Humphreys 2007), international debates on forest management remained on a technical level for many decades, focusing primarily on improving silviculture and timber production. It was not until the 1980s that a handful of NGOs (notably WWF and WRI) began expressing concern at an environmental problem that appeared to be common to all three tropical regions (Latin America, Africa and Asia-Pacific), namely that of deforestation.

1985 marked the beginning of two major initiatives with the launching of the International Tropical Timber Organisation (ITTO) and the Tropical Forestry Action Plan (TFAP). The following years witnessed a sharp rise in media coverage of a number of events – notably in the Brazilian Amazon – such as the first estimates of deforestation rates and forest fires in 1987 and the assassination of the leader of the Rubber Tapper Movement Chico Mendes in December the following year. By 1992 when the United Nations Conference on Environment and Development (UNCED) was held in Rio, the three following components of the International Forests Regime had come together:

1. An ever-growing number of actors involved in shaping the IFR and linking it with other regimes as well as national policies, including (i) non-governmental organisations, (ii) governmental organisations (UN organisations, International Financial Institutions, bilateral aid donors and governments themselves), (iii) the private sector (notably timber companies and representatives such as federations), and (iv) research organisations and university departments;
2. A flurry of international forums on forests and related issues, especially during the period following the Rio summit which saw a range of forums on forests including the Intergovernmental Panel on Forests (IPF, 1995-7), Intergovernmental Forum on Forests (IFF, 1997-2000) and the United Nations Forum on Forests (UNFF, established 2000). In parallel, deforestation has been linked to adjacent issues – notably biodiversity, poverty reduction and climate change – and has been brought up at a number of events notably in the Johannesburg and Bali Summits (WSSD, 2002 and UNCCC, 2007 respectively); and
3. A wide range of principles or norms that have each dominated international debates on forests at specific and still compete with each other today: (i) conservation *stricto sensu*, promoted mainly in the 1980s by NGOs which advocated timber boycotts and the expansion of protected areas; (ii) participation (early and mid-1990s), whereby local populations are perceived as a solution rather than a threat to forests; (iii) good governance (late 1990s), that emphasises law enforcement and the fight against illegal logging and corruption; (iv) sustainable forest management (early 2000s), which developed from timber certification schemes that portray timber production as a potential means of maintaining forest cover, and (v) avoided deforestation (mid to late 2000s) that focuses on compensating actors for reducing deforestation rates.

To this day, however, the IFR continues to be marred by its lack of coherence, whether in terms of agreements, principles or even the multiplicity of actors who together only contribute further to the impression of cacophony that epitomises international conferences on forestry issues. The absence of a common core in this regime is undoubtedly both the cause and the consequence of the absence of a convention this has characterised other environmental regimes such as biodiversity, the fight against desertification, and climate change. But as suggested below, the absence of coherence

[3] Despite the absence of legally binding agreements, actors of the IFR have officially converged several times on a number of issues. The series of action proposals set up by the IPF and IFF in the second half of the 1990s, and more recently the Non-Legally Binding Instrument on all Types of Forests in December 2007 are only a few examples of such convergence.

TABLE 1 *Brazil and Indonesia at a glance*

		Brazil	Indonesia
Population		190 million[1]	235 million[1]
Surface area (ha)		851.2 million ha[1]	191.9 million ha[1]
Forests	Percentage cover in 2005	56 %	46%
	Forest cover lost between 1990 and 2005 (ha)	42.4 million ha	28.1 million ha
	Forest cover lost between 1990 and 2005 (%)	8.2 %	24.1%

Source: FAO (2005)
[1] CIA Factbook: Brazil (https://www.cia.gov/library/publications/the-world-factbook/geos/br.html#Geo) and CIA Factbook: Indonesia (https://www.cia.gov/library/publications/the-world-factbook/geos/id.html), retrieved 23 January 2008.

within the IFR paradoxically facilitates appropriation by actors at the domestic level.

Brazilian FRPs since the 1970s

Brazilian FRPs, especially Amazonian policies, have long been characterised by a notable absence of forestry issues *per se*. The military regime that had come to power in a coup in 1964 decided to focus on "unlocking" the wealth of Brazil's vast interior as a means of national development. The "conquest" of the country's hinterland had long defined Brazil's construction as a state as teams of *bandeirantes* (prospectors and explorers) successfully pushed the border westwards between Portuguese and Spanish America in the sixteenth to eighteenth centuries, thus enabling Brazil to cover over half of the Amazon Basin.

In a bid to "occupy" this huge territory, President Juscelino Kubitschek oversaw the long-dreamed construction of Brasília and the first highway to cross the Brazilian Amazon (BR 010 between Belém and Brasília), both "completed" in 1961. The ensuing military regime (1964-1985) thus only pursued an already existing policy, but by taking it several steps further, it ensured that Brazil's "Manifest Destiny" (Barbosa 2000) had never been more palpable.

Throughout the 1970s and into the early 1980s, a large number of "pharaonic works" (*obras faraônicas*) were carried out by the Federal Government with the help of the military (as a form of labour among other roles). In 1966 the Superintendence for the Development of the Amazon (SUDAM) was created to oversee a number of infrastructure programmes (Droulers 2004) such as *Operação Amazônia* (1966-70), *Projeto de Integração da Amazônia* or PIN (1970-4), *Poloamazônia* (1975-9) *Projeto Grande Carajás* (1974-84) and *Polonoroeste* (1981-5).

Each programme set out specific long-term objectives such as promoting national integration or solving the problem of landless peasants, yet two overarching and related goals may be identified in the military regime's Amazonian policies – or at least in the government's discourse. The first goal was to tap into the Amazon Basin's supposed immense riches to fuel the country's development and bring it within the circle of the world's superpowers. The second was to reaffirm Brazil's sovereignty over this vast territory against foreign interests. These were both local (guerrilla movements were raging in neighbouring countries including Bolivia, Peru, Colombia and Surinam) and global, such as the United States and Europe's supposed plans to internationalise the Amazon to prevent Brazil from becoming a viable competitor on the international stage. *Integrar para não entregar* ("Integrate the Amazon or surrender it") had almost become a motto for the Brazilian Amazon.

By the mid-1980s, however, a turning point had been reached. Following several years of political crisis and President Figueiredo's promises for *abertura* (opening), the military government handed over power to a civilian government and the first free elections for over 20 years were held. This regime change, however, was only the result of an ongoing process of democratisation that lasted throughout the 1980s and which saw major changes in the country's FRPs among others.

The rise of several social movements starting in the late 1970s is key to understanding the changes that the Amazon underwent during the following decade. With the help of a politically mobilised wing of the Catholic Church known as Liberation Theology, two Amazon-wide social movements appeared. First, the rubber tapper movement headed by Chico Mendes arrived on the political scene in the late 1970s by carrying out *empates* ("peaceful resistance meetings") to prevent the allocation of the land they lived on to cattle ranches, notably in the state of Acre.

Secondly, Church representatives working with indigenous groups mobilised indigenous leaders and facilitated communication between groups across the region so as to establish a single indigenous political voice. Both movements shared many points in common, including demands for a recognition of access to the land they lived on and opposition to the government's policies that were threatening their livelihoods. Building on these common points, Chico Mendes established the Alliance of Peoples of the Forest (*Aliança dos Povos da Floresta*) shortly before his assassination in 1988.

These movements pictured themselves as representatives of the rural poor oppressed by the dictatorship and businesses and thus found a sympathetic ear both abroad and among the country's urbanised middle classes. This attracted two additional allies: (i) a rapidly developing

environmental movement (which had strong connections with foreign conservation NGOs), which led to a sometimes uneasy marriage (Singer 2007a) with social movements to preserve both the Amazon rainforest and its traditional and indigenous cultures; and (ii) the media both abroad and at home which from 1985 onwards enjoyed increased freedom of information and communication. Suddenly, pictures of Indian chiefs in full traditional gear demonstrating in front of the Brazilian Congress were beamed around the world, along with images of rampant deforestation and forest fires, thus mobilising world opinion on the fate of the Amazon Forest.

Foreign public opinion played an non-negligible role in tipping the balance in favour of major change in Brazil's FRPs. Until the mid-1980s, the World Bank had approved and in some cases contributed to financing the military government's works in the Amazon, including the construction of the Tucuruí Dam as part of the *Projeto Grande Carajás*. Yet in the face of the forced eviction of Parakanã Indians from the vicinity of Tucuruí, the World Bank decided to stop financing the project – a first in relations between the Bank and Brazil.

The Bank's new policy to take into account social and environmental consequences of such works was reaffirmed in 1987 when it demanded that the Waimiri-Atroari Indians be compensated for the loss of their territory due to the construction of the Balbina Dam in northern Amazonas (Singer 2007a). Kolk (1996) argues that this radical shift in World Bank policy was due to threats from the US Congress to cut funding to the Bank following domestic public concern about the fate of the Amazon and its indigenous peoples.

From the late 1980s onwards, federal FRPs were to focus on issues other than industry, agriculture and defence, and for the first time the issue of forests made their appearance in Amazonian policies. It must be pointed out that forests had been mentioned in Amazonian policies before 1985, such as when Jaú National Park was created in the 1970s, yet they remained marginal in politics and policies alike. With the turn in FRPs, however, forests and in particular forest conservation were to figure much higher in the political agenda.

President Fernando Collor set the tone by requesting that the 1992 UN Conference on Environment and Development be held on Brazilian soil in a bid to show his government's good will towards protecting the Amazon forest. That year, the Ministry of the Environment (*Ministério do Meio Ambiente* or MMA) was established, only three years after its executive branch, IBAMA, had been set up. The Rio Summit had major consequences on Brazil's FRPs, embodied in the creation of the G7 Pilot Project (PPG7) which channelled funding from international donors under the auspices of the MMA for conservation and sustainable development projects in Brazil's forests.

The 1990s thus witnessed major changes in the three main components of Brazilian FRPs. First, a whole range of actors made their appearance during the period surrounding the Rio Summit, including many international conservation NGOs such as WWF and Friends of the Earth (*Amigos da Terra*) but also several Brazilian NGOs that have played key roles ever since, such as *Instituto Socio-Ambiental*, IPAM and IMAZON. Likewise, PPG7 officially enabled the entire international donor community to play a much larger role in FRPs than they had ever before, especially the World Bank, GTZ and the European Commission. Secondly, public government discourse changed radically and shifted from a focus on the Amazon as a source of development and a territory to be defended against outside interests, to a discourse that had already been adopted by NGOs and social movements that emphasised the rights of traditional peoples and the need to protect the Amazon forest.

Thirdly, policy instruments also shifted from large-scale constructions and colonisation schemes to one of "zoning" (*zonagem*) and in particular the creation and demarcation of protected areas – both conservation units and indigenous territories. The 1990s saw the greatest increase in the total surface of conservation units and indigenous territories the country had ever witnessed. This process culminated with the establishment of the National Conservation Unit System (SNUC) passed in 2000 in the law of the same name which recognised a wide range of different conservation units with specific purposes. It was also during this period – in 1996 to be precise – that the legal reserve[4] for the Amazon was bumped up to 80% in what appears to be a knee-jerk reaction due to an international outcry following a peak in deforestation the previous year.

However, the transition to these new FRPs was not as smooth or as clear-cut as it might appear at first sight. As Kolk (1996) correctly points out, the three emerging movements (rubber tapper, indigenist and environmentalist) and the international public outcry at the fate of the Amazon was met with fierce nationalistic rhetoric throughout the second half of the 1980s. "*A Amazônia é nossa!*" (The Amazon is ours!): President José Sarney's words sum up the discourse which focused on denouncing the three social movements as agents of an international lobby bent on internationalising the Amazon. These arguments saw a recent revival in the 2000s as witnessed by the publication of a series of books attempting to label environmentalist and indigenist movements as American spies:

> The environmental movement is not a spontaneous sociological phenomenon that arises out of growing awareness about the real needs to reconcile human activities with respect for the environment in which they are inserted. Instead, the movement is an ideological and political construction, specifically and carefully planned, created and maintained by powerful internationalist hegemonic groups with the aim of preventing the expansion of the profits made by the industrial-technological societies from reaching certain peoples and

[4] The legal reserve is the percentage of surface area on private property that must retain forest cover.

> parts of the world so as to keep the development process under their own control.[5]
> Lino *et al.* (2005)

Likewise, the year the military regime came to an end, a secret programme known as *Calha Norte* was set up aimed at building infrastructure along the northern border with Colombia and Venezuela. Military territories seriously overlapped with protected areas and indigenous territories (Yanomami ones among others) in particular, which eventually led to the suspension of the programme in 1990 at a time when the demarcation of indigenous territories was in the international spotlight. Yet the programme was revived in 2000, although this time a much more civilian tone was given to the project which was aimed at "increasing border vigilance and protection of populations. As well as providing assistance to populations, the programme's actions hope to fix humans in the Amazon region. The programme aims to set up development projects with are socially fair and ecologically sustainable" (Ministério da Defesa 2006).

Along with other initiatives such as President Fernando Henrique Cardoso's *Brasil em Ação* in the mid-1990s and despite the fact that conservation policies were the new order of the day, Brazil's FRPs from the late 1980s to the early 2000s might appear somewhat schizophrenic. This could explain why observers have referred to Amazonian policies during those years in terms of vectors (Becker 2004) or forces (Aparecida de Mello 2002) opposing each other – hence President Inácio Lula da Silva's attempts to conciliate apparently diverging goals by packaging a number of measures into "sustainable" programmes.

The most famous of these was the "Sustainable BR163" programme (*BR163 sustentável*) which responded to demands both from agricultural and environmental lobbies. At a time when soy exports were buoying the Brazilian economy, the Lula government accepted the agricultural lobby's request to have the BR163 paved from Cuiabá to Santarém, which would facilitate access for Mato Grosso's agricultural products to the Amazon River and thus the Pacific via the Panama Canal. However, aware of the potential negative impacts that the increased use of the BR163 would have on the environment, the government notably promised to create protected areas on both sides of the highway so as to minimise environmental degradation.

The 2000s have also seen an additional dimension appear in Brazilian FRPs, namely that of timber production. During the military regime, as before, the timber industry had never been the focus of Amazonian policies despite being one of the region's most important sectors. In the late 1980s and 1990s, the image of the timber industry as a major factor of deforestation emphasised by environmental movements had also prevented the government from implementing anything more than measures restricting logging activities. Such policies were pursued well into the 2000s as illustrated by *Operação Curupira* which dismantled a network of IBAMA staff involved in permit forgery as late as 2005, leaving the timber industry reeling as very few companies were given permits that year.

Yet at the same time, a debate was raging throughout the country on whether to introduce a concession system which would allow logging on public lands. Paradoxically, it was NGOs such as *Amigos da Terra* and IMAZON which had originally encouraged the idea, suggesting that concessions actually provide forests with economic value and ensure human presence whilst maintaining forest cover and preventing illegal appropriation of lands (*grilagem*). With the help of ex-NGO staff at the Ministry of the Environment, NGOs succeeded in mobilising virtually all actors in favour of this idea that became reality in 2006 with the law on Public Forests – which also saw the creation of the Brazilian Forestry Service (SFB), the first public organisation to deal specifically with the timber industry.

Indonesian FRPs since the 1970s

In stark contrast to Brazil, Indonesian FRPs have very much focused on timber production ever since Suharto came to power in 1965. Until then, FRPs in the Dutch East Indies and during the Soekarno era were mostly restricted to timber production in Java's teak plantations whose management goes back to pre-colonial times (Peluso 1992, Durand 1994), the rest of the archipelago's forests remaining mostly untouched.

The Soekarno era (1949-1965) saw little change in this status quo. However, at the risk of sounding simplistic, if Soekarno's policies can be summed up in one word – nationalism – then his successor Suharto's definitely focused on development instead. Following his sudden rise to power in 1965 in the midst of massacres and general confusion, Suharto depoliticised and imposed major restrictions on Indonesian society. He channelled his policies to embark the country on a long period of sustained economic growth fuelled by a small number of industries. By far the most profitable of these was the oil industry (De Koninck 2004), but timber production also played a major role.

It has been argued that the Indonesian state and the ruling elite during the New Order was primarily geared towards developing the country economically. Whilst figures certainly show that this was the case – at least in the 1970s and 1980s – this elite also focused on concentrating both economic and political power in the hands of a few individuals who were all members of Suharto's close entourage (both family and

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[5] "O movimento ambientalista não é um fenômeno sociológico espontâneo, decorrente de uma conscientização sobre as necessidades reais de compatibilização das atividades humanas com certos requisitos de respeito ao meio ambiente no qual elas se inserem. Na verdade, trata-se de um engendro ideológico e político, específica e habilmente planejado, criado e mantido por poderosos grupos hegemônicos internacionalistas, com o propósito de conter a expansão dos benefícios das sociedade industrial-tecnológica a todos os povos e países do planeta e manter o processo de desenvolvimento sob o seu controle."

friends), as suggested by Barr (1999). Close collaboration with the army in all sectors – which Suharto was successful in establishing through an early series of purges – was crucial in maintaining power (Ross 2001).

The forest sector was no exception. Starting in 1967 Suharto thus brought about fundamental changes to Indonesia's FRPs, each step bringing the timber industry under increasingly tighter control by the government and a small economic elite. With the Basic Forestry Law (*Undang-undang Pokok-pokok Kehutanan*) 5/1967 the concept of a state-owned forest estate that existed on Java was applied to the entire archipelago and a staggering 143 million hectares (three quarters of the country's surface area according to Ross (2001) became labelled as state Forest Estate (*kawasan hutan*), a large portion of which was earmarked for timber production (Barr 1998). As delineated in Government Regulation (*Peraturan Pemerintah*) 21/1970, production forests within the forest estate were divided into concessions (*Hak pengusahaan hutan* or HPH) to be allocated to public or private timber companies by the Directorate General of Forestry in Jakarta.

Suharto immediately set about banning small-scale logging ventures, known as *banjir kap*, by revoking the authority of provincial governments to distribute small-scale concessions. In doing so, Suharto succeeded in concentrating the industry in the hands of fewer, larger businesses whilst allowing the sector to boom, as witnessed by the sharp increase in log exports during that decade:

> [T]he recorded volume of log exports [between 1966 and 1973] rose from 334,000 m^3 to 18.5 million m^3. By 1973, Indonesia's logging industry generated US$562 million, or 18% of the nation's total exchange earnings (…). Indonesia's log export levels and the revenues they produced reached new heights in the late 1970s. The reported volume of unprocessed timber shipped overseas exceeded 20 million m^3 per year during 1976-1978, when Indonesia supplied 44% of world hardwood exports.
> Barr (2006)

As Barr (1999) points out, "the distribution of timber concessions to rent-seeking state elites played an especially significant role in solidifying Soeharto's own power base within the state apparatus by buying the allegiance of key functionaries". By the late 1970s, however, Suharto declared his intention to end this system by banning log exports that were to be phased out between 1981 and 1985. As might be expected, log production fell dramatically in the late 1970s and early 1980s which saw a corresponding growth in exported plywood from 1.25 million m^3 in 1982 (just under 30% of world tropical plywood exports) to 6.9 million m^3 six years later (71%), peaking at 9 million m^3 throughout the early 1990s (78%) (Barr 1999).

Durand (1994) explains this apparently paradoxical decision by suggesting that Suharto was bowing to external pressure to promote domestic industrial development. Yet Barr (1999) claims that "the New Order state's decision in the late 1970s / early 1980s to ban the export of raw logs was anything but an apolitical move" and interprets this policy simply as a means of regaining control of the timber sector: "while the log export ban pushed scores of concession-holders out of business, it also proved to be tremendously profitable for a much smaller number of timber operators" (Barr 1999).

Throughout the rest of the New Order the timber industry was submitted to further control measures, including the creation of the Indonesian Wood Panel Producers Association (*Asosiasi Panel Kayu Indonesia* or Apkindo) in 1976. By the early 1980s, Apkindo had been vested with far-reaching powers over the sector, including controlling the overall volume and prices of Indonesian plywood as well as assigning firm-level export quotas to its members. It even went so far as to serve as an intermediary between sellers and buyers. The concentration of power was especially beneficial to one man, "Bob" Hasan, who enjoyed very close ties with Suharto and served as Chair of Apkindo's Board of Directors throughout the 1980s and 1990s – a position that turned out to be enormously profitable for him. Additional means of keeping control over the timber sector included (i) maintaining the state as the dominant source of capital investment (thanks to huge benefits generated from oil exports); (ii) forcing ethnic Chinese entrepreneurs – the backbone of the economy – to seek political protection by declaring populist anti-Chinese measures (*e.g.*, banning the use of the Chinese language); and (iii) revoking timber licenses whenever deemed necessary (Dauvergne 2001).

The fall of Suharto in May 1998 following the 1997 Asian financial crisis brought about major changes in the timber sector. The state's tight control over the industry was dismantled, starting with the IMF's request for the cancellation of Apkindo's marketing restrictions by 1 February 1998 as part of structural reforms tagged to emergency bailout loans. A struggle ensued for the survival of Apkindo which was dissolved by Suharto's successor B.J. Habibie. Bob Hasan was later imprisoned and has since been released.

The post-Suharto era has also been characterised by the arrival of a range of new actors, including within the timber sector (Barr 1999). This was partly enabled by a number of laws on decentralisation which have marked the period following 1998 known as *Reformasi*. The New Order had left a legacy of bitterness towards Jakarta and the Javanese-dominated bureaucracy among provincial elites who were eager to increase their power again. Law 22/1999 set the tone by transferring considerable authority to autonomous regions and although a wide range of sectors were affected, analysts believe this law primarily targeted forest management.

The transfer of authority stipulated in the law was much more in favour of districts (*kabupaten*) and municipalities (*kecamatan*) than to provinces (*propinsi*), possibly in a bid to limit desire for independence observed at provincial level. Law 41/1999 on forestry was issued five months later but in many ways was contradictory to Law 22/1999 as it assigned very little authority to the country's regional governments (McCarthy *et al.* 2006). Likewise, Government Regulation 34/2002 aimed at implementing Law 41/1999 was widely seen as an effort to recentralise administrative authority in

the forest sector as it confirmed the Minister of Forestry's sole authority in issuing concessions, renamed "commercial timber utilisation permits" (*Izin usaha pemanfaatan hasil hutan kayu* or IUPHHK).

Yet a flurry of other decrees in 1999 and 2000 vested *bupatis* (heads of districts) with the authority to issue small-scale logging and forest conversion permits whose names and specificities differed according to the region (HPHH and IPPK in Kalimantan, IPKR in Jambi, etc.) and the decree (Ministerial Decree 05.1/Kpts-II/2000 referring to them as IPHHK) (Barr *et al.* 2006). However, they were eventually limited in scope by Government Regulation 34/2002 and have since been revoked. Such accumulation of legislatory dissonance created considerable confusion throughout the 2000s that only contributed to mismanagement, deforestation and the exhaustion of the country's timber resources.

Back in the 1990s, the depletion of timber in concessions despite the compulsory application of scientific management rules (known as TPTI) started becoming glaringly obvious from the late 1990s and partially accounts for the sharp fall of HPHs/IUPHHKs in the past decade. This fall from 61.70 million hectares in the sector's heyday in 1993-4 to 27.72 million hectares in 2005 (Departemen Kehutanan 2006) epitomises the agony of the large-scale timber industry which has now all but disappeared except in East Kalimantan. Additional reasons have been put forward for this virtual freefall: (i) the phasing out of the army's *dwifungsi* (dual function) meant that disgruntled local populations have often successfully driven out timber companies from concessions; (ii) forest fires which have taken place every year since the late 1990s have further contributed to depletion as well as constituting a health and transport hazard known as the "haze"; and (iii) extensive media coverage and NGO campaigns (such as that of NGO Telapak's investigation in Papua in 2003) on illegal logging led to a clampdown on the logging industry nationwide which – according to industry representatives – have had a major negative impact on the entire sector including its legal part.

Probably the only form of logging currently on the increase is of community-based timber production. The movement towards involving local populations in forest management already has a long history on Java (Peluso 1992) and received a boost following the 1978 World Forestry congress held in Jakarta (San Afri Awang, personal communication). It was further strengthened on Java during the *Reformasi* era with the creation of a programme known as "Forest Management with the People" (*Pengelolaan Hutan Bersama Masyarakat* or PHBM) (Affianto *et al.* 2005), whilst recent debates to generalise and systematise community involvement to the whole country has been encouraged by Government Regulation 6/2007 which promotes the creation of community-managed forests across the entire archipelago.

However, in contrast to Brazil, the indigenous dimension of this trend remains very discreet. In the wake of *Reformasi* a number of NGOs were created (*e.g.*, AMAN) to promote the rights of "indigenous peoples" of Indonesia for which the term *masyarakat adat* was used. Following the fall of Suharto and the demise of the army's role in social affairs, the issue of ethnicity reappeared as ethnic conflicts flared across the nation. The Transmigration (*Transmigrasi*) policy[6] had been greatly developed under the New Order and put local populations on the Outer Islands in direct contact with Javanese, Balinese and Madurese immigrants mainly. Yet demands for official recognition of *adat* peoples have so far fallen on deaf ears among government circles (*e.g.*, World Agroforestry Centre *et al.* 2003). Transmigration has not only had a social impact but is also widely believed to have contributed to deforestation, notably on Sumatra and Kalimantan. In more recent years, "transmigrant" communities have been instrumental in the expansion of one of Indonesia's fastest-growing industries, the palm oil sector.

In the face of dwindling revenues from the timber sector and the depletion of timber in the country's concessions, the Ministry of Forestry has taken steps to promote the expansion of fast-growing plantations within the Forest Estate (such as acacia and eucalyptus), notably for the production of pulp and paper. In December 2006, the Ministry announced a target of establishing a total of 9 million hectares of plantations for industrial wood by 2016 as part of a "forestry revitalisation programme". This trend has been spearheaded by the province of Riau on the eastern coast of Sumatra, which is home to Indonesia's two greatest pulp and paper companies, RAPP (also known as APRIL) and APP. Both companies have greatly benefited from conversion of natural forest timber concessions (HPH) with depleted standing stocks of commercially valuable timber to plantation concessions (HTI) (Singer 2007b).

The palm oil sector – which recently received a boost after having been recognised as a biofuel – has also greatly benefited from the land freed up by the demise of the timber sector. Despite the fact that – unlike "fastwood" plantations – oil palm plantations are not allowed inside the Forest Estate, the industry has found several ways to overcome this particular hurdle to its expansion. First, it took advantage of the short period of time in the early 2000s when *bupatis* were allowed to grant conversion areas (*Areal penggunaan lain* or APL) within the Forest Estate, thus reducing the latter's surface area. Secondly, in Riau for example, it is believed that local officials have encouraged "transmigrant" populations to settle inside the Forest Estate and cultivate oil palm.

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[6] Transmigration was actually initiated by the Dutch at the turn of the 20th century under the name Kolonisatie but its scope was greatly expanded by the New Order during which an estimated 5.5 million people from Java, Madura and Bali settled in the "Outer Islands", especially Sumatra and Kalimantan. To this figure certain analysts (e.g., De Koninck 2004:153) have added another 5.5 million of spontaneous immigrants (pendatang spontan), most of whom were following family members who had moved with the official transmigration programme. The Transmigration programme officially came to an end in 2000.

As a result, although Indonesia comes second after Brazil in the total area lost to deforestation (see Table 1), it outranks it in percentage terms, having lost a staggering 24.1% between 1990 and 2005 alone according to FAO figures. Yet the plight of Indonesian forests does not appear to have captured as much attention as the Brazilian Amazon in international debates, possibly as a consequence of a more limited civil society. After a number of international NGOs such as WWF had gradually increased their presence in the archipelago, the period of *Reformasi* witnessed an explosion in the number of local environmental NGOs, much like that of Brazil in the late 1980s. However, access to information often remains difficult and the capacity of NGOs to push for reform sometimes limited.

This might also explain why forest conservation policies have undergone little change in recent decades, especially when compared to the Brazilian Amazon. Following the 1978 World Forestry Congress held in Jakarta, the government admittedly expanded the country's protected area network from 3.3 to 18.7 million hectares, yet this growth mainly took place at the expense of "protected forests" (*hutan lindung*) where logging is not allowed. More recently, Wiryono (2003) notes the lack of clarity between different types of protected areas and the failure to have a clear classification system such as in Brazil. As this author points out, despite a recent expansion in numbers, protected areas continue to face the same threats as several decades ago, notably agricultural encroachment and illegal logging.

TABLE 2 *The evolution of Brazilian FRPs since the 1970s according to policy discourses, instruments and networks. Only the main discourses, instruments and networks are described and dates provided cover their presence high on the political agenda. This table does not illustrate the diversity within each of the elements mentioned.*

Discourse	Instruments	Networks
• **"Classic" Nationalism (1960s to 1980s)** The Amazon has to be developed and "occupied" to (i) help Brazil developed country status and (ii) protect the Amazon against foreign intruders (*Integrar para não entregar*, *A Amazônia é nossa*) • **"Green Mafia" Nationalism (since 1990s)** The Amazon needs to be occupied to protect it against foreigners (especially developed countries) and their allies, notably indigenist and environmentalist movements (*e.g.*, *Máfia Verde*) • **Pro-poor conservation (since 1980s)** Traditional and indigenous populations need to be made stewards of the forest to protect it against oppressive forces such as the government and the agricultural lobby. Further construction of infrastructure and colonisation must be halted and protected areas expanded. • **Sustainable development (since 2000s)** An attempt to conciliate infrastructure development and economic activities with social and environmental priorities. Economic activities need not be harmful to the environment if packaged with social and environmental mitigation programmes (*e.g.* "Sustainable BR163 programme", introduction of timber concessions). Some of these activities (*e.g.* logging) may actually contribute to maintaining forest cover.	• **Large-scale public/private works (1970s & 1980s)** Public construction of large-scale infrastructure, *e.g.*, road-building (BR010, BR163, BR319, BR364, etc.) and dam-building (Tucuruí, Balbina) and private investments in other projects (*e.g.*, Projeto Jari, Projeto Carajás) as a means of "developing" the Amazon and promoting economic activities • **Colonisation (1970s to 1990s)** Encouraging immigration to solve the landless peasant issue (Agrarian reform) and "occupy" the Amazon. Both public (through INCRA) and private colonisation schemes • **Protected areas and zoning (since late 1980s)** Geographical restriction of economic activities and use of natural resources (as well as recognising access to land of certain social categories) through the creation of protected areas (conservation units and indigenous territories) and more widely through zoning plans (*e.g.*, SNUC, *zonagem*) • **"Sustainable" projects (since 2000s)** Building infrastructure and/ or encouraging economic activities packaged with social and environmental mitigations measures (*e.g.*, "Sustainable BR163 programme", introduction of timber concessions through the 2006 law on Public Forests, state governments promoting FSC certification)	• **Military network (1964-1985)** The military federal government and its network of nominated state governments and governors, along with SUDAM as the executive organisation and the army as labour. This network survives to this day through the *Comando da Amazônia* battalion but has been largely depoliticised • **Agricultural lobby (since 1980s)** Political representatives elected along the "deforestation front" (states of Pará, Mato Grosso, Rondônia and Acre) at municipal, state and federal levels; some state governments such as Mato Grosso (Blairo Maggi's government); private sector federations (*e.g*, FAMATO in Mato Grosso); an agricultural lobby of over 100 Congressmen in Brasília; and the Ministry of Agriculture (MAPA) • **"Forest Peoples' Alliance" (since late 1980s)** Loose network of indigenist, community-based and environmental NGOs, indigenous and rubber tapper leaders and organisations, the Catholic Church (until 1990s), some state governments (*e.g.*, Acre), the Ministry of the Environment (MMA), and the international donor community (notably international NGOs and bilateral governmental donors such as GTZ) as the main providers of the network's financial resources

TABLE 3 *The evolution of Indonesian FRPs since the 1970s according to policy discourses, instruments and networks. Only the main discourses, instruments and networks are described and dates provided cover their presence high on the political agenda. This table does not illustrate the diversity within each of the elements mentioned.*

Discourse	Instruments	Networks
• **Forests for development (1960s to 1998)** The state and timber companies as the legitimate stewards of Indonesia's forests. By logging forests according to scientific methods (TPTI), the state and the timber sector – through the concession system (HPH) – manage forests in the interests of the nation whilst providing one of the backbones of the country's economy (timber exports). • ***Korupsi, Kolusi, Nepotisme* (since 1998)** A reaction to the "Forests for Development" discourse: the state and Suharto's cronies colluded to control the country's timber industry. What remains of corruption in forest management must be fought and transparency, accountability and good governance encouraged • **Forests for local communities (since 1998)** A second reaction to the "Forests for Development" discourse: local and *adat* communities must be empowered and their rights to their land recognised. By legitimising rural populations forests will be managed sustainably and deforestation reduced • **Forest Conservation (since 1978)** A "minority" discourse that was promoted following the 1978 World Forestry Congress in Jakarta and which has been maintained ever since (*e.g.*, Suharto's proclamation of 1993 as the "year of the Environment"): Indonesia's protected area network must be expanded and guarded as one of the nation's natural assets.	• **Controlling the Timber Sector (1970s to 1998)** Introduction of different legal instruments to increase state control over the timber sector: Basic Forestry Law (1967), HPHs (1970), banning of *banjir kap* companies (1970), log export ban (1985), timber license revocations (1990s) • **Decentralisation and Recentralisation (1999-2004)** Laws transferring powers and revenues to district level in particular (22/1999, 25/1999) and eventually back to the Ministry of Forestry (41/1999, 34/2002, 32/2004). The introduction and subsequent revocation of "mini-concessions" distributed by heads of districts (*bupati*) epitomises these policies • **Community Forestry (since 1998)** Wide range of initiatives to involve local populations in forest management; has taken place on a piecemeal basis with mitigated results, arguably the most successful being on Java (PHBM). The introduction into law of community-based forest management in Government Regulation 6/2007 might ensure success in the years to come • **Protected areas and zoning (since 1978)** The geographical restriction of economic activities through the expansion of protected areas has neither been successful (encroachment continues unabated) nor is it placed high on agendas. Periods of protected area expansion include 1978 (World Forestry Congress) and the *Reformasi* era with the appearance of new NGOs.	• **"Bob Hasan" Network (1970s to 1998)** A network of individuals close to Suharto who tightened their control on Indonesia's timber sector through a series of legal instruments. At the heart of this network was Suharto, the Ministry of Forestry and Apkindo, headed by Mohammed "Bob" Hasan. Apkindo was dismantled in 1998. • **Environmentalist-Indigenist Network (since 1998)** Loose network of local, national and international environmental NGOs as well as *adat* leaders and national and international indigenist NGOs. The number of NGOs increased exponentially during the *Reformasi* era and retains a strong student component, hence proximity with some universities. Much funding is also provided by the international donor community. Other than for donors this network remains almost exclusively non-governmental, especially on the *adat* issue as the state does not recognise the existence of "indigenous" communities. • **"Fastwood Plantation" Network (since late 1990s)** Once under tight control during the New Order as a means of pressuring the press, the pulp and paper sector has boomed in recent years and is almost exclusively in the hands of two companies based in Riau (APP & RAPP/APRIL). The Ministry of Forestry has sought a *rapprochement*, has focused on this sector and encouraged its expansion politically as part of a country-wide "forestry revitalisation" policy.

APPROPRIATING THE IFR

This brief description of Brazilian and Indonesian FRPs shows the extent to which the national political context outweighs the international forests regime in shaping national forest-related policies. FRPs appear to be dominated by one or two national policy networks which are instrumental both in maintaining dominant discourses and introducing policy instruments that legitimise their role in forest management issues.

This is not to say that the influence of the international forests regime (IFR) on Brazilian and Indonesian FRPs has remained negligible – on the contrary. Tables 2 and 3 show that the actors, forums and principles that make up the IFR are found peppered across the three components (networks, discourses, instruments) of FRPs: (i) the presence of international NGOs and the donor community; (ii) certain instruments such as protected areas; and (iii) specific discourses such as the conservation, pro-poor and community-

oriented ones are only a few examples. Yet inputs from the IFR also visibly differ both in time (according to the period covered) and in space (according to the country affected). In fact, two main patterns are discernable in the way the IFR has influenced FRPs.

Quantitative Variations in the IFR's Influence

First, the IFR's influence varies visibly in *quantity*, especially when comparing different moments in time. In Brazil, the military regime saw very little input from the outside, with the notable exception of foreign investments (*e.g.* from the World Bank) – although only to fund projects set up by the Brazilian government itself. In contrast, the period since 1985 has seen much greater international influence than during the military regime. This input – doubtlessly facilitated by sudden freedom of expression – enabled many international organisations to get involved in Brazil and ultimately contributed to the organisation of the Summit on Environment and Development in Rio.

One could argue that the IFR is unlikely to have influenced Brazilian FRPs prior to 1985 because it only came into being in the second half of the decade. To a large extent, this holds true, despite the fact that the origins of the IFR can be traced back to the 1970s. Yet although it was well underway by the late 1990s, the IFR only began significantly affecting Indonesian FRPs after Suharto's fall in 1998. During Indonesia's New Order, the IFR's influence remained marginal: several international donors funded forest sector projects which nevertheless had a minimal political dimension and were mainly restricted to the technical sphere.

In 1998, however, the "Bob Hasan" network was dismantled and the following period was marked by a strengthening of the presence of international NGOs and donors alike. Several donors even opened offices inside the Ministry of Forestry, such as DFID and the European Commission. Principles in discussion at the time within the IFR were also introduced in Indonesian FRPs, notably (i) "good governance" which took the form of the FLEGT (Forest Law Enforcement, Governance and Trade) process, and (ii) to a lesser extent participation, implemented mainly on Java with the introduction of PHBM.

A comparison of the countries thus shows that it was during periods immediately following regime change (1985-1992 for Brazil, 1998-2004 for Indonesia) that the IFR was able to influence national FRPs in a more significant way. The power vacuum caused by the downfall of long-standing political regimes and the economic crises that triggered them (at least partly) thus acted as windows of opportunity for networks of actors belonging to the IFR to introduce their own actors and principles.

However, one cannot extrapolate from this comparison that democratic regimes are more amenable to the IFR than dictatorial ones. The difference between both types of regimes and their effects on the IFR's influence might appear to be clear-cut in Brazil and Indonesia. Yet this conclusion does not necessarily stand once the comparison is extended to some Central African countries where the divide between democracy and dictatorship is more blurred and the growing influence of the IFR in the sub-region cannot be accounted for by any sudden regime change. Instead, the balance of power between policy networks might be a more solid indicator of the IFR's influence. In Brazil and Indonesia, it was only once the military and Apkindo networks were dismantled that other policy networks were able to bring about change inspired by the IFR. This also holds true for Central African countries such as Cameroon where the Biya regime was severely weakened in the early 1990s by deep economic recession and public unrest. This acted as a window of opportunity for the international donor community – spearheaded by the World Bank – to bring about sweeping reforms in the forest sector, epitomised by the 1994 forestry law, even in the absence of any regime change.

Qualitative Variations in the IFR's Influence

Secondly, a comparison between the IFR's input in Brazilian and Indonesian FRPs shows that the IFR's influence also varies in *quality*. As described above, the IFR's influence has been felt in a much stronger way in Brazil since 1985 and in Indonesia since 1998, but when comparing both countries, the type of influence has been very different. Admittedly, the IFR's input in terms of international actors present in national networks varies little – the same set of international organisations or "donor community" (UN organisations, International Financial Institutions, bilateral donors, large NGOs) are found in both countries. However, the weight of different principles developed within the IFR differs strongly according to (i) prominent ideas, and (ii) specific interests within dominant domestic policy networks.

First, existing ideas and interests upheld by domestic opponents to the regime prior to its downfall appear to have determined which of the main principles vehicled by the IFR was to figure highest within FRPs following regime change. In Brazil the issue of conservation *sensu lato* (*i.e.*, with the recognition of local people's rights) has been developed to a much greater extent than in Indonesia; as Pádua (1996) points out, Brazil never focused on protected areas that excluded human presence ("integral reserves") but instead gave priority to areas in which the use of natural resources is restricted but which recognises the rights of particular groups of individuals, in particular indigenous groups (in indigenous territories) and rubber tapper communities (in extractive reserves or RESEX). The second half of the 1980s and the 1990s are indeed marked by the considerable expansion of both the total surface area protected in the Amazon and the number of categories of protected areas. The "SNUC" law in 2000 marked a milestone, but the protected area networks has never ceased expanding since.

In Indonesia, debates linked to the IFR have focused instead on the issue of good governance and by extension the fight against both corruption and "illegal logging". The decentralisation laws of 1999 were primarily called for by all the regional actors whose power had been reduced by an ever increasingly centralised political system. In such a

context, measures to devolve power to regional authorities was a way of serving the interests of local actors, many of whom were to be known as *raja-raja kecil* (little kings). Yet it was also strongly supported by international organisations as a means of taking power out of the hands of what was perceived as a corrupt elite. International organisations funded several investigations into the corruption of the New Order (*e.g.* Brown 1999 sponsored by DFID), further fuelling the outcry and more widely the anti-New Order *Korupsi, Kolusi, Nepotisme* or KKN discourse that marked the *Reformasi* generation.

By the early 2000s, the focus on good governance turned towards "illegal logging" and at the request of the donor community the FLEGT process was established. The issue was placed high on the political agenda in the first half of the decade – at least in discourse – both by the media which denounced illicit timber production all over the archipelago, and by investigations by CIFOR researchers (*e.g.* Casson and Obidzinski 2002, McCarthy 2000, Obidzinski 2005, Obidzinski and Suramenggala 2000, Smith *et al.* 2003) and NGOs. The investigation that probably had the greatest impact on policies was that of local NGO Telapak in collaboration with British NGO EIA which produced a documentary uncovering a vast network of illegal logging in Papua. The months that followed this denunciation saw a major clampdown on Papuan forest services. As shown by recent events in Riau, even pulp and paper companies have not managed to avoid similar waves of police investigations.

It must be pointed out that good governance has also been promoted in Brazil (as witnessed by *Operação Curupira*, for instance) and conservation and indigenous issues in Indonesia (as illustrated by the revival of *adat* and the rise of an "indigenous" movement). These concepts and many others have featured on both countries' political agenda; it is the *priority* given to these principles that has differed and which is emphasised here.

The recent debate in Brazil leading up to the adoption of the 2006 law on Public Forests is also a good example of how FRPs integrate potential influences from the IFR according to the dominant policy network. Throughout the first half of the 2000s, the idea of introducing a concession system to public forests in the Brazilian Amazon gained momentum within political circles related to NGO networks and the Ministry of the Environment (MMA). The rationale behind the introduction of concessions was in line with the "sustainable forest management" principle from the IFR which suggests that selective, sustainable logging can actually contribute to reducing deforestation as it provides economic value to existing forests. "Successful" examples of concessions such as Costa Rica were often brought up, whilst other more mitigated experiences such as Indonesia were hardly ever mentioned.

Yet a minority group of NGOs voiced their discontent at such a measure throughout the debate, evoking the "participation" principle – which also originated from the IFR. According to the NGO IPAM, for example, concessions were not a viable form of forest management as they did not take the concerns of local populations into account. Ultimately, however, the dominant policy network succeeded in rallying sufficient momentum to pass the law, thus determining which element of the IFR was to have the last say in shaping Brazilian FRPs.

In both countries studied, it thus appears that certain elements of the IFR were given particular political attention in accordance with existing ideas and interests. These elements actually correspond to the demands of the dominant policy networks at the time: (i) the "Forest Peoples' Alliance" in 1980s Brazil and the request for protection of the Amazon with the recognition of local peoples' rights; (ii) the loose network of NGOs and regional actors in Indonesia who demanded an end to the corruption and excessive centralisation that plagued the New Order regime; and (iii) the dominant NGO network and the Ministry of the Environment in Brazil which successfully introduced the 2006 law on Public Forests. The evidence provided here strongly suggests, therefore, that dominant policy networks have played a crucial role in *appropriating* specific elements of the IFR and deciding which ones would be introduced into the national sphere.

In fact, the lack of cohesion within the IFR is likely to have only further contributed to this phenomenon of appropriation. The array of different actors and principles and the lack of a single voice within the IFR have only made it easier for domestic policy networks to use elements of the IFR in a "pick-and-mix" fashion. In some instances such as in the debate leading to the introduction of the concession system in Brazil, actors even used contradictions inherent to the IFR (*e.g.*, participation versus sustainable forest management) to play different elements of the IFR against each other.

WHEN FRPS INFLUENCE THE IFR

Some might claim, however, that it was the timing of the fall of the long-standing Brazilian and Indonesian regimes that determined which principles from the IFR would shape national FRPs. It is true that in the late 1980s and early 1990s, conservation and participation were particularly in vogue in international debates linked to the IFR, just like "good governance" issues were in the late 1990s. Yet this argument leads us to questioning a chicken-and-egg situation: should the timing of the conservation/participation and good governance principles be imputed to the IFR or to the demise of the Brazilian military regime and the end of the Indonesian New Order respectively? In other words, it is possible that national FRPs influenced the IFR rather than vice-versa. The fall of long-standing political regimes may have opened windows of opportunity for the IFR to influence domestic FRPs, but in return, it is likely that the Brazilian and Indonesian cases – particularly in such critical moments – contributed to shaping international debates and placing certain principles on the agenda.

The Brazilian input into the emerging IFR up to 1992 is fairly clear. Regime change in Brazil (along with the associated rise of social movements) happened to coincide

with the increase in attention that NGOs, the media and governments of developed countries paid towards environmental issues. As a result, the plight of the Brazilian Amazon which was suddenly revealed to the world thanks to the loosening of governmental control over domestic media doubtlessly fed the debate on deforestation and contributed to shaping it in specific ways. In 1987, the first figures on deforestation in the Amazon (now known to have been a gross overestimation) were released whilst Chico Mendes received both a "Global 500" award from the United Nations and another one from the Better World Society. Both awards as well as the Amazon's deforestation figures received ample international media coverage. The same year, *Our Common Future*, also known as the Brundtland Report, was released, suggesting that environmental conservation could go hand in hand with economic development, thus popularising the term "sustainable development". It was also in this key year that the World Bank decided to stop funding the construction of the Tucurui Dam (Kolk 1996) because of environmental concerns.

Until then, the principle of conservation had dominated the international debate on forests and focused primarily on protecting the natural environment, often regardless of the welfare of local populations or economic operators. This principle, however, remained relatively unpopular in Brazil where actors had envisaged instead an alliance between environmental and social movements, embodied in Chico Mendes' "Alliance of the Peoples of the Forest". Although this "marriage" was to prove shaky in the years to come, the focus of the emerging IFR most probably steered debates away from a "fortress conservation" to a "community-based conservation" perspective. The door was open to conciliating environmental protection with human needs, and it is probably no coincidence that the World Summit on Environment *and* Development was ultimately held in Rio.

The idea that development could be conciliated with the environment was not a new one; in fact, the World Commission on Environment and Development which was to write up the Brundtland Report was created in 1983. However, this idea was only one among many in the emerging debate on forests. It was the coming together of events in a timely fashion in the Brazilian Amazon, as well as the publication of a major international report drawing similar conclusions, that is likely to have enabled the principles of community-based conservation, participation and ultimately sustainable development to dominate the IFR for the years to come. During this particular window of opportunity opened by the change of regime in Brazil, therefore, domestic FRPs were able to provide significant input into the IFR through a series of key actors which acted as "go-betweens" (notably Chico Mendes, the World Bank, a handful of NGOs and the media).

Although the link between the fall of the New Order in Indonesia and the arrival of the principle of good governance in the IFR is somewhat more tenuous, a case can still be made suggesting that once again domestic FRPs contributed to shaping the IFR. The last few years of Suharto's presidency had been marked by a slowing down of the Indonesian economy that had witnessed a boom throughout the New Order. Although the regime had been plagued by corruption allegations since the 1960s, the blame of the looming economic crisis was increasingly placed on corruption within Suharto's inner circle of cronies by the growing opposition. However, it was only with the Asian crisis in 1997 that Suharto's regime was seriously threatened by a coalition of opponents who pointed the finger at the regime's inefficiency, and the three words Kolusi, Korupsi, Nepotisme (or "KKN discourse") became the order of the day.

Corruption was believed to be rife in all sectors of the economy, but the forest sector took the brunt of the accusations – not only because it had been a pillar of the Indonesian economy, but also because Suharto's circle had been closely involved. Finally, the sector was beginning to show signs of exhaustion well before the 1997 crisis and signs of collusion at all levels of the sector – from the field to key positions in Apkindo and the Ministry – were visible for all to see. In the couple of years following Suharto's resignation accusations only gained pace, rapidly reaching the international level, as witnessed by the IMF's conditions in the forest sector as part of the structural reforms attached to its 1998 loans. Several researchers and donor organisations also rapidly focused on the issue of corruption and illegality, such as Christopher Barr (CIFOR) and David Brown (DFID) (see Barr [1998, 1999] and Brown [1999]). In the following years, illegal logging emerged as one of the most discussed issues in forestry circles in Indonesia, ranking among top priorities for donors, NGOs and researchers alike.

It was also in the late 1990s that "illegal logging", "forest crime" and governance became major debating issues within the IFR. According to key witnesses, the issue of "good governance" had existed among donor circles throughout the 1990s following the end of the Cold War, but it was only towards the end of the decade that some actors within the IFR reached out to this concept to apply it to the forest sector in a bid to place the sector within a wider political agenda. As McAlpine (2003) points out, the term "illegal logging" first appeared in international negotiations in 1996 (UN IPF E/CN.117/1996/24 Para 16 and Para 31), and again in the G8's Action Programme on Forests in 1998. At the local level, Global Witness had been working in Southeast Asia since 1995, but it was only in December 1999 that it signed a contract with the World Bank and DFID to act as an "independent observer" in Cambodia. At the same time, DFID focused on revenue loss in the Indonesian forest sector following publications such as Brown (1999) and the realisation by the Ministry of Finance of the income foregone due to alleged corruption within the sector.

By 2001, donors spearheaded by the US Department of State, DFID and the World Bank (Auer *et al.* 2006) had come together to convene on a process known as Forest Law Enforcement and Governance (FLEG) in East Asia which came together in Bali on the (ill-fated) date of 11 September. This meeting had the effect of hoisting illegal logging to the top handful of priorities discussed in the IFR, following which an AFLEG process was set up for Central Africa and good governance, fighting corruption and transparency all

became key buzzwords within the donor community. Whilst it remains difficult to pinpoint precise events during which the case of Indonesia could have steered debates within the IFR towards good governance, it is obvious that the linkage between this long-standing issue and the forest sector emerged from an East Asian context in which the fall of Suharto and the KKN discourse are very likely to have played a key role. Again, whilst the principle of good governance already existed prior to regime change in Indonesia, the two came together in a timely fashion to change the course of the IFR.

CONCLUSION

In this light, the question of the effectiveness of the IFR in shaping FRPs appears to be much more complex than anticipated. First, the IFR has to contend with other factors that appear to have a greater influence on FRPs, especially the national political context which probably constitutes the single strongest factor of change in FRPs. It is obvious that the IFR's impact ultimately depends on a number of elements of national political contexts, notably (i) the political regime in place, and (ii) the dominant policy networks that are key in deciding how the IFR is appropriated. Secondly, actors in the IFR should expect to find that the relationship between FRPs and the IFR is not necessarily one-way; in fact, Brazilian and Indonesian FRPs are both likely to have provided their input into the IFR at critical moments of their history, helping to steer debates within the IFR on a new course. The evidence goes against the vision of a top-down relationship between the IFR and FRPs, thus suggesting that this relationship cannot be used as a convincing indicator of the IFR's effectiveness.

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The climate regime as global forest governance: can reduced emissions from Deforestation and Forest Degradation (REDD) initiatives pass a 'dual effectiveness' test?

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SUMMARY

For two generations, policy makers, environmental groups, industry associations and other stakeholders have given global forest deterioration concerted and sustained attention. Widespread disappointment over the failure to achieve a binding global forest convention at the 1992 Rio Earth Summit has been followed by frustration over the relatively limited impact to date of post-Rio forest-related global policy initiatives, including intergovernmental and non-state efforts. This paper argues that "reduced emissions from deforestation and forest degradation" (REDD) initiatives will yield significant impacts only if decision makers are committed to a results-based "dual effectiveness" test, addressing both forest degradation and global emissions reductions, and involving significant and measurable global-scale targets. While the importance of such a commitment may appear obvious, lessons from past forest and climate efforts suggest that greater results-based accountability is needed to overcome short-term and narrowly defined organizational and national self-interest.

Keywords: REDD, climate change, intergovernmental forest agreements, forest degradation, forest policy.

Le régime climatique comme gérance globale des forêts: les initiatives de réduction d'émissions provenant de la deforestation et de la dégradation (REDD) peuvent-elles passer un test de «double efficacité»?

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Depuis deux générations, les concepteurs de politique, les groupes environnementaux, les associations industrielles et une pléthore d'autres parties prenantes ont porté sur la détérioration globale des forêts une attention concertée et soutenue. Une déception générale devant l'incapacité de parvenir à une convention affirmée de la forêt globale au Sommet de la Terre de Rio en 1992 a été suivie par la frustration de voir l'impact relatvement limité, jusqu'à présent, d'un ensemble d'initiatives de gestion globale associées à la forêt, post- Rio, comprenant des efforts intergouvernementaux et privés basés sur le marché. Cet article démontre que pour qu'un intérêt général pour les initiatives de réduction des émissions provenant de la déforestation et de la dégradation (REDD) puisse avoir un impact important, il faut que les propositions fassent passer un test de "double efficacité" qui améliorerait la dégradation de la forêt tout en réduisant les émissions résultantes. Une telle approche requiert que les organisations ayant partie prenante prennent des décisions stratégiques allant au delà de leur conceptions immédiates d'intérêt organisationnel et national.

El régimen climático como modelo de gestión forestal global: ¿Las emisiones reducidas productos de iniciativas REDD pueden aprobar una prueba de 'eficacia doble'?

K. LEVIN, C. McDERMOTT, y B. CASHORE

Durante dos generaciones los responsables de formular políticas, las asociaciones industriales y muchos otros grupos interesados han otorgado al deterioro forestal mundial una atención coordinada y sostenida. A la decepción muy extendida sobre la incapacidad de lograr un convenio forestal global en la cumbre de la Tierra de Rio (1992) se agrega una frustración sobre el impacto relativamente limitado, hasta ahora, de una serie de iniciativas de política forestal a nivel mundial, incluyendo esfuerzos privados, basados en el mercado, e intergubernamentales. Este estudio sostiene que el interés generalizado en iniciativas de REDD sólo rendirá resultados significativos si las propuestas aprueban una prueba de 'eficacia doble', es decir, si al mismo tiempo limitan la degradación forestal y reducen las emisiones. Este modelo requiere que las organizaciones interesadas tomen decisiones estratégicas que traspasen sus conceptos inmediatos de interés organizacional o nacional.

INTRODUCTION

There is now widespread acceptance among forest industry officials, professional foresters, governmental agencies, and environmental groups that the ecological, social, and economic functions of the world's forests are under stress. Despite an array of governmental, intergovernmental, and non-governmental efforts to address global forest deterioration, the gravity, and hastening, of most problems is increasing. Deforestation, desertification, forest degradation and climate-related impacts on forest ecosystems are combining to contribute to unprecedented species losses, amounting to what some refer to as the sixth major mass extinction in the Earth's history (Leakey and Lewin 1995, Pimm and Brooks 2000), with significant implications for ecosystem services. Furthermore, drivers of forest loss and degradation are now accelerating due to high consumption levels in industrialized countries and rapidly increasing demand within developing countries, creating significant uncertainty and risk for all actors engaged in the global economy. Their most dramatic effects, however, are felt by those who depend on forests for their livelihoods, comprising many of the most impoverished regions and indigenous communities throughout the world.

Recognition of the gravity of these problems has led to significant and sustained attention on the part of intergovernmental institutions, public-private partnerships, and private market-based efforts to reverse such trends. Initiatives include the International Tropical Timber Agreement, failed efforts to develop a binding global forest convention, national forest programs spurred by Rio's Agenda 21, criteria and indicator processes, forest certification, forest law enforcement and governance processes, and measures to address illegal logging. Though resulting in some noteworthy successes, these efforts have, at this point, not yet been able to reverse broad global trends in forest deterioration.

Partly as a result, environmental groups, proactive firms, industry associations and interested governments have now placed concerted and sustained attention on addressing whether deforestation and forest degradation within a global *climate* regime might succeed in improving global forest management. Given that current enthusiasm so closely resembles enthusiasm over past processes, what can we make of this widespread interest in the climate regime, namely to include "reduced emissions from deforestation and forest degradation" (REDD)? Will the results be similar to previous heralded efforts? Or will these efforts lead to meaningful measures to address critical environmental challenges?

This paper argues that the answers to these questions are not preordained, but will instead result from the ability of strategic actors to champion proposals that pass a "dual effectiveness" test. That is, policy innovations that emerge under REDD must be assessed by whether, and how, they will simultaneously address the dual *problems* of global forest loss and degradation – especially as related to equity and co-benefits, such as impacts on inter-generational distribution, biodiversity, economic development, local and indigenous communities, and forest governance – and global greenhouse gas emissions reductions. Such a problem-focused exercise requires clear articulation of what, if fully implemented, a REDD proposal could, and could not, achieve. Commitment to the achievement of significant and measurable global-scale targets is essential to counteract short-term strategies based on organizational or national self-interest.

The paper proceeds in the following analytical steps. First, the components of a "dual effectiveness" test are outlined. This is followed by a brief description of the state of global forest deterioration and the science on the relationship between forests and the global carbon cycle, a critical step in understanding the potential and pitfalls of REDD efforts. A third section puts the current interest in REDD in context by providing a historical review of intergovernmental and non-state efforts designed to address forest decline. Fourth, the paper reviews intergovernmental efforts to address climate and means of incorporating forests within this regime. Fifth, the paper outlines the results required for REDD to pass the "dual effectiveness" test. The article then concludes by arguing that while much effort in the near future will be focused on the details of how to develop a post-2012 climate regime that incorporates REDD, it is also necessary to stand back from the policy fray, and apply the lessons from past efforts to assess the prospect of future success. We argue that the incorporation of a "dual effectiveness test" in REDD efforts could help to prevail over strategic thinking based primarily on short-term self-interest.

THE "DUAL EFFECTIVENESS TEST"

Defining effectiveness

Of all of the important questions facing those proposing new policy initiatives designed to address some type of deteriorating environmental problem, the most important is to understand, whether, and how, the policy might actually ameliorate the problem for which it was proposed (Young 1999). While this is an obvious acknowledgement, it challenges much of the literature on effectiveness that defines success by assessing whether the initiative was "better than otherwise would have been" (Hovi *et al.* 2003, Young 2003) or against some "collective optimal" solution that is distinct from whether, and to what degree, the problem itself was ameliorated (Kutting 2000). Part of the explanation for varying definitions of effectiveness is owing to methodological challenges that make assessing causality extremely difficult (ibid). Problem-focused scholarship must address these challenges head on. To facilitate such an approach, we discern three types of outcomes that any policy initiative might have:

a. *No* or *minimal* discernible impact
b. *Worse* impact
c. *Better* impact

Yet the last outcome, while seemingly a sign of goal achievement, conflates two very different phenomena:

i. *Reductions* in the rate of decline (moving more slowly but in the same direction),
ii. *Reversal* in the decline (amelioration)

We argue that given the state of environmental deterioration related to both forests and climate, it is incumbent upon those proposing policy initiatives to distinguish between mere relativistic reductions, and significant reversal of environmental decline.

Dual problems

Given the growing interest in linking a climate regime to forest deterioration, we argue that policy proponents have a dual task – to identify the impacts of an innovation on global emissions reduction *and* on global forest degradation. Many worry that the current rush to turn to forestry to champion emission reductions may take political pressure off of efforts to reduce emissions from industrialization, or that well intentioned forestry advocates, long frustrated by previous efforts, may overemphasize the potential of REDD efforts in stabilizing and reversing anthropogenic climate change as a way to finally get traction for their particular cause. Likewise, the rush to link forest-related problems to carbon markets may preclude the development of other effective forest strategies, and/or cause policy makers to neglect key forested regions with lesser carbon market potential. We, therefore, argue that proposals ought to be rejected if they do not have a clear rationale as to how they will directly or indirectly ameliorate both forestry and climate problems at a global scale.

Table 1 provides a classification framework for such an assessment.

TABLE 1 *The "dual effectiveness test"*

Type of Impact	Forest degradation / deforestation	Greenhouse gas emissions reduction
Minimal	No discernible global impact	No discernible global impact
Worse	Did the global problem accelerate?	Did the global problem accelerate?
Better: Reduces decline	Did the policy reduce the global rate of forest deterioration? What are the implications?	Did the policy reduce growth in global emissions? What are the implications?
Better: Reverses decline	Did the policy halt, or reverse, further forest deterioration? Was there an improvement in forest status?	Did the policy reduce net global emissions? Was there a reduction in atmospheric concentrations of greenhouse gases?

MEASURING OUTCOMES - LESSONS FROM HISTORY

The following sections provide a review of both forest- and climate-related efforts from Rio to the present day. This discussion begins with a definition of the problems these efforts were designed to address. While by no means comprehensive, the section then provides an overview of how negotiations have unfolded and identifies key barriers to their success in reversing deteriorating global conditions. Such an understanding of why past efforts have failed is essential to predicting whether, and how, present efforts may succeed.

General trends in global deforestation and degradation

Total global forest area is estimated to have shrunk by three percent between 1990 and 2005, with those countries experiencing a net decrease in forest cover losing an average of 13 million ha per year per country. This forest loss, compounded by population growth, has resulted in dramatic decreases in per capita forest area. If REDD is to be the primary tool for significantly slowing or reversing millions of hectares of forest loss per year, then highly ambitious targets are required, both in terms of the net global area of avoided deforestation, and in terms of the timetable set to achieve it. From the dual perspectives of climate change and avoided deforestation, annual forest loss figures need to be disentangled in an effort to understand where efforts might best be targeted. For example, rates of deforestation, and impacts of forest loss on biodiversity and ecosystem services, are unequally distributed. Between 1990 and 2005, the largest net loss in forest area occurred in South America (mostly in secondary and degraded forests), followed by Africa (mostly outside of the megadiverse tropical Congo forests). The largest percentages of total forest area lost were in Central America and Southeast Asia (Geist and Lambin 2002, FAO 2007). From a climate-mitigation standpoint, regional priorities would be based on stemming the loss of biomass. From the perspective of champions of preserving forest cover (irrespective of forest density) and ecosystem services, regional priorities could be quite different.

While considerable research has been devoted to estimating the global loss of forest area, data on forest degradation are much less readily available. However, using loss of primary forests as one proxy for degradation, UN Food and Agriculture Organization (FAO) estimates a 6% loss over a fifteen-year period, at a rate of 6 million ha of forest degradation per year. Meanwhile, many secondary forests are increasingly degraded through poor forest practices, increased fire disturbance, shifting cultivation and numerous other anthropogenic impacts, contributing to the loss of biodiversity and forest productivity that may, in some

cases, result in ecosystem transformation (FAO 2005, UNEP 2007). Given the substantial role that forest degradation plays in global carbon emissions, from a dual effectiveness perspective, it, nor its potential net market impacts, cannot be ignored in future REDD initiatives.

The direct and indirect causes of forest deterioration are highly complex, including such diverse drivers as global consumer demand, poor logging practices, agricultural and pastoral expansion, rural poverty and displacement, war and civil unrest, and conflicting and/or ineffective government institutions and policies (Geist and Lambin 2002, FAO 2005). Furthermore, forest vulnerability to climate effects is often higher in degraded and/or intensively management forests, creating a negative feedback loop. This complexity serves to complicate amelioration efforts.

From a carbon-mitigation standpoint, deforestation and forest degradation are critical to reducing levels of carbon dioxide concentrations in the atmosphere. For example, emissions from deforestation in the 1990s were estimated to equal 5.8 $GtCO_2$ annually (Nabuurs *et al.* 2007), constituting roughly 20% of global annual emissions (United Nations Framework Convention on Climate Change (a)). Indeed, the Intergovernmental Panel on Climate Change (IPCC) asserts that reduced deforestation and degradation will be the mitigation option in the forestry sector with the largest and most immediate impact (Nabuurs *et al.* 2007). The IPCC considers forestry as an important contributor in the global mitigation portfolio. Activities in the sector include increasing and maintaining forest area, increasing and maintaining site-level carbon density and off-site carbon in products, as well as increasing bioenergy and substitution (Nabuurs *et al.* 2007).

Because of the potential in reducing emissions by avoiding deforestation/forest degradation – for example, it has been estimated that four-fifths of the Kyoto Protocol's first commitment period target could be met through the elimination of deforestation activities in Brazil and Indonesia alone (Santilli *et al.* 2005) – compounded by the challenges in meeting existing Kyoto targets and imminent future targets, nation states have begun to examine the prospects of inclusion of such emissions reduction in a future climate regime. Other actors, such as environmental organizations and some industry groups, see this renewed interest in forest protection as a potential win-win – abating greenhouse gas emissions while at the same time addressing non-carbon goals, such as protecting biodiversity and achieving sustainable development goals. The following section examines the history of attempts to develop a global forest convention in an effort to illustrate the gap in forest governance that has been created in the absence of a global forest regime, and why, for some, efforts to fold forestry under the climate regime have become so attractive.

Global policy responses 1985- 2005

Motivated by concerns over global deforestation and forest degradation, many coalitions of environmentalists, governments, and industry members have been engaged in consensus-based negotiation for a legally binding global agreement specifically and exclusively focused on forest use and conservation. However, while these negotiations have opened new international channels of communication and learning, they have yet to deliver concrete targets and timetables for reversing forest degradation and destruction. Additionally, rapid growth in the number of multi-lateral environmental agreements has scattered intergovernmental forest policy making across a plethora of global, regional and bi-lateral environmental and trade negotiations.

The following brief review of these forest-related initiatives highlights the role of national and organizational short-term self-interest in stalling on-the-ground impacts. It also illustrates the tendency for such initiatives to proliferate, given various single-issue agendas and/or frustration with the slow pace of existing efforts. A commitment to "dual effectiveness" would require that REDD, as yet another new instrument, can somehow overcome these familiar hurdles.

The International Tropical Timber Organization (ITTO)

Intergovernmental negotiations focused expressly on forestry have followed a complex and diffuse path. In 1985, the International Tropical Timber Organization (ITTO) was launched with a mandate to promote global trade in tropical timber products. While primarily focused on trade, the ITTO also incorporated the conservation of tropical forests into its organizational mandate. Whether a forest agreement centered on trade is suited to address environmental threats to tropical forests has been subject to considerable debate (Dauvergne 1997, Dauvergne 2001). In the 1990s, it was estimated that only 6% of tropical non-coniferous roundwood production is sold for export, thus limiting any impact that trade-based rules might have (Barbier *et al.* 1994).

The Rio Earth Summit

In many ways, the 1992 Earth Summit in Rio can be viewed as a pivotal point in the history of global forest policy, when world attention was drawn beyond tropical forests to include forests in the Northern Hemisphere. Developed countries came to Rio with a proposal to establish a global forest convention. Proponents of a legally binding forest convention argued that the world's forests should be considered as a "global commons" (Porter *et al.* 2000, Humphreys 2007), in which all world citizens share an interest and no party could claim exclusive rights. Many developing countries, while interested in inter-governmental dialogue, were highly resistant to the proposed legally binding commitments.

Despite increased acknowledgment of forestry challenges in the North, many countries in the South saw this call for collective action as driven by Northern self-interest, since the majority of the world's most species-rich and/or severely threatened forests are located in the tropics. Tropical developing countries, therefore, could expect to bear the brunt of the effort, and possibly the costs, of implementing any global forest agreement. Perhaps even more important was the South's historically rooted suspicion that multilateral

environmental agreements were simply another ploy for asserting Northern control over Southern resources.

Despite these fundamental challenges, the Rio Summit did manage to produce the first pieces of international soft law on forests. This law is contained in Chapter 11 "Combating Deforestation" of Agenda 21 and in the Statement of Principles for the Sustainable Management of Forests. Agreement was reached by avoiding all reference to global forest management guidelines and sustainable forest trade, and by recognizing the sovereign right of nations to deforest their own territories (Porter *et al.* 2000).

The Intergovernmental Panel on Forests (IPF), the International Forum on Forests (IFF), and the United Nations Forum on Forests (UNFF)

Since 1992, there have been sustained efforts to keep the dialogue on a global forestry policy alive and operationalize the goals put forward in Rio. This dialogue has taken place within a succession of different institutional settings, beginning with the Intergovernmental Panel on Forests (IPF) (Canadell *et al.*, 2007). After five years, the IPF dialogue was elevated to a place within the United Nations, through the creation of the Intergovernmental Forum on Forests (IFF) under the United Nations Commission on Sustainable Development. The major output of the IPF and IFF (Canadell *et al.*, 2007) was a set of over 270 Proposals for Action to address global forest problems. These Proposals include a broad diversity of laudable intentions, but their complex and sometimes contradictory nature reflects the processes from which they originated.

Regarding the execution of the IPF/IFF Proposals for Action, only a few voluntary initiatives have been implemented on a widespread basis over the past decade. These include ten different regional intergovernmental Criteria and Indicator processes, involving consensus-based agreements on the essential components of sustainable forest management. They also include the development of National Forest Programmes, whereby individual countries establish their own goals and objectives within their sovereign territories.

Despite, or perhaps because of, a growing consensus among all parties that inadequate progress was being made, the dialogue was re-defined again in 2000 as the United Nations Forum of Forests (UNFF), located under the United Nations Economic and Social Council. A year later, a new Collaborative Partnership on Forests (CPF) was created, consisting of fourteen major forest-related international organizations, institutions and convention secretariats. The development of the UNFF and the CPF, which together are referred to as the International Arrangement, constituted a more permanent, higher priority platform for global forestry negotiations. Unfortunately, however, this promotion was not enough to catalyze measurable progress.

Another central sticking point in the development of a global forest regime has been the issue of North/South finance and technical support. Since the inception of the global forest dialogue, overseas development aid has continued to decline (UNFF 2002, Molnar 2005). Northern countries have resisted the trade of financial commitments in exchange for forestry reform. Instead, they have deferred the issue of North/South finance to other international institutions and the private sector.

In addition, a fundamental ideological tension within forest governance processes – between those promoting neoliberal strategies for economic growth and trade, and those more focused on non-industrial forest uses and public and community participation – has impeded the development of a regime. The latter promotion of non-industrial interests can be attributed in large part to NGO and developing country alliances (Humphreys 2007). This tension, in fact, parallels the debate within the climate community over the inclusion of non-climate environmental and/or social benefits within global carbon markets.

Other intergovernmental processes

Meanwhile, outside of the IPF/IFF/UNFF dialogue, the number of forest-related global, regional and bilateral environmental and trade agreements has grown dramatically (Chambers 2008). Each of these agreements varies in its primary focus, as well as in the make-up of governmental and non-governmental stakeholders. Some emphasize the promotion of free trade, some, poverty reduction, and yet others, various aspects of environmental conservation and public participation. While the agreements span a wide-range of forest sustainability issues, there are considerable gaps, overlaps and conflicts. Moreover, collaboration across institutional boundaries is very limited. While the UNFF has made considerable efforts to play a coordinating role, it has thus far been constrained by limited resources, capacity and authority (McDermott *et al*. in prep).

The result is a highly fragmented global and regional forest governance arena. All agreements are fraught to some degree with tensions among economic, environmental and social goals, and the North/South agreements face conflict over global equity and the appropriate distribution of funds.

These tensions help to explain both the impetus behind and challenges facing the introduction of REDD into the climate regime. Perhaps most importantly, REDD appears to offer a feasible option for North-South benefit transfer. However, it will be difficult to reach consensus on how to distribute those benefits among countries and among stakeholders. It also comes fraught with the familiar conflicts over prioritizing free trade and market growth versus the incorporation of non-commodity environmental and social benefits. It remains to be seen whether REDD will be more successful than its predecessors in resolving these tensions, and in making measurable progress to mitigate global carbon emissions, deforestation and forest degradation.

The onset of certification

In addition to the development of numerous intergovernmental initiatives, the failure of the Rio Earth Summit to reach a legally binding global forest agreement caused NGO

attention to turn to the private sector, and specifically to eco-labeling, or certification. These organizations had become frustrated with a perceived dominance of economic interests in intergovernmental processes, but, recognizing the power of economic arguments, they turned directly to the marketplace to achieve more rapid and effective change (Cashore *et al.* 2004).

The idea of certification was first raised at the international level by NGOs in the context of the International Tropical Timber Organization (ITTO) in 1989 (Gale 1998). These NGOs, including the Worldwide Fund for Nature (WWF) and Friends of the Earth, had requested that the ITTO carry out a feasibility study on a labeling system for tropical wood products that meet standards for sustainable forest management (Elliott 2000). The idea of product labeling was met with resistance from tropical producer countries, and never evolved within the ITTO beyond the level of investigation and debate. Meanwhile, at the grassroots level, a number of NGOs predominately based in North America began to pilot the implementation of certification and on-product labeling, thereby gaining legitimacy through their own policy networks and local-level consultation.

The combination of these efforts resulted in a wide coalition spearheaded by the WWF and its allies to from a new organization, known as the Forest Stewardship Council (FSC), to oversee forest certification and forest product labeling worldwide. When the FSC first emerged, the majority of forest companies around the world declined to participate. Instead, some chose to form alternative forest certification programs that would be more receptive to their interests (*ibid*). Thus, a plethora of forest certification programs in North America, Europe and other developed countries emerged, including the Sustainable Forestry Initiative (SFI), the Canadian Standards Association (CSA) and a host of European national systems under the umbrella of the Pan-European Forest Certification scheme (later to become the global Programme for the Endorsement of Forest Certification schemes (PEFC)).

Once again, widespread consensus on a global forest instrument proved elusive. While certification had accelerated in developed countries, its growth in developing countries had been severely stunted. Reasons for failure are again familiar, including: the relatively small role of industrial wood production in tropical wood removals, lack of industry capacity, weak forest governance, insufficient domestic markets for certified products, and lack of well-developed export markets (Cashore *et al.* 2006). Such drivers have fueled concerns regarding the long-term effectiveness of the instrument for reversing global deforestation and forest degradation.

Looking outside the forestry sector: eyes turn towards the climate regime

In sum, two distinct tracks have been developed to address forest protection: one characterized by a weak intergovernmental process, and the other characterized by an array of private governance certification schemes, which may ultimately serve as a legitimate governance form but has yet to converge into a single standard that has gained legitimacy and authority to govern. As mentioned above, neither route has been successful in reviving intergovernmental efforts to develop a binding global forest regime. However, recently, stakeholders have begun to look beyond the forest sector to evaluate whether other regimes may be able to address the concerns of forest deterioration and loss. Interest in climate change abatement has strengthened recently, and actors in both the climate and forest regimes have noted the potential synergies between forest protection and climate protection.

The following section provides a brief history of the climate change regime, examines the manner in which forests have been included thus far, and outlines several proposals for including forest degradation and deforestation in future policy arrangements. It is not intended as a comprehensive review, which is beyond this scope of this paper, of all private sector, domestic, bilateral and multilateral strategies aimed at addressing the problems of forestry and climate change. We do, however, turn our attention to examining the prospects for future policies in meeting forestry objectives, as well as climate objectives.

Intergovernmental responses: emergence of the climate regime

Recognizing the impact of human activities on the atmosphere, and resultant impacts to communities and ecosystems, the United Nations General Assembly launched the first global climate change negotiations on the United Nations Framework Convention on Climate Change (UNFCCC) in December of 1990. The UNFCCC was adopted a year and a half later, establishing the mechanics and commitment of the regime: a Conference of the Parties (COP), a secretariat, and two subsidiary bodies providing implementation, technical and scientific advice (Copeland and Patterson) (Depledge 2005). The first COP was held in 1995 in Berlin. As a result of the perceived weaknesses of the UNFCCC, a new round of negotiations known as the Berlin Mandate was initiated, leading to the establishment of the Kyoto Protocol (United Nations Framework Convention on Climate Change (b)). Significantly strengthening the language of the UNFCCC with the adoption of targets and timetables, the Kyoto Protocol was outlined and adopted at COP 3 in Kyoto, Japan in December of 1997. A few years later, at COP 7 in Marrakech, the Parties drafted the "rule book" for implementation, known as the Marrakech Accords, and outlined compliance commitments, funding, rules for emission trading, and other Protocol technicalities. In February of 2005, the Protocol entered into force, as the requirement of inclusion of at least 55 countries accounting for at least 55% of developed country emissions in 1990 had been met with Russia's ratification (United Nations Framework Convention on Climate Change (b)). In December of 2005, the first Meeting of the Parties of the Kyoto Protocol was held, demonstrating significant maturation of the climate change regime (Olivas 2005).

Three flexibility mechanisms were created in COP 3 to provide cost-effective strategies for meeting reduction

targets: (1) Emissions Trading, (2) Joint Implementation (JI), and (3) the Clean Development Mechanism (CDM). Under Emissions Trading, Parties with binding targets, known as Annex I countries, can trade with other Annex I countries. Within this mechanism, a Party with higher costs of abatement (e.g. a highly efficient country) can buy reduction credits from a country with low abatement costs (e.g. a country that has yet to convert outdated, inefficient technologies and infrastructure and can do so with little relative cost). JI is similar to Emissions Trading in that it occurs between Annex I countries, but emission reduction projects (e.g. energy efficiency projects) and sinks are traded instead of emissions reductions from capped sources. Lastly, the CDM, on the other hand, does not involve trading between Annex I countries; instead, Annex I countries receive credits for emission reductions generated from projects in non-Annex I (developing) countries (United Nations Framework Convention on Climate Change (b)).

The Kyoto Protocol's first commitment period ends in 2012, and recent negotiations in Bali, Indonesia in December 2007 launched a two-year *ad hoc* working group dialogue on developing a framework for a post-2012 policy, likely to be agreed upon in Copenhagen in 2009. Creation of a policy will not only give security to investors and project planners, but it will also address the long-term nature of the climate change problem, specifically with regard to defining new emissions targets. Given the role that deforestation and forest degradation play in the global carbon cycle, many contend that REDD will be incorporated in some fashion into the post-2012 policy.

Initial inclusion of forests under the Kyoto Protocol

Thus far, inclusion of forest-related activities in the Kyoto Protocol has been limited. However, related abatement activities can be used towards emission reduction commitments in the land use, land-use change, and forestry (LULUCF) sector, and as projects under the JI and CDM instruments.

Credits for emissions and removals from LULUCF activities

Under the Kyoto Protocol, Annex I Parties are required to report emissions by sources and removals by sinks resulting from LULUCF activities carried out within their our country (Articles 3.3 and 3.4, Kyoto Protocol). Net changes in such emissions and removals resulting from afforestation (creation of forests on lands that have been out of forest use for at least fifty years), reforestation (establishment of forests on land that lacked forests in 1989), and deforestation (non-temporary removal of forests) activities can be included in Parties' emission reduction commitments. However, forest management – either through the regeneration following harvest or removal during harvest – does not fall under any of the above categories. Industrialized nations have the option of including forest management into inventory accounting, as pursuant with Article 3.4 of the Protocol. This exercise is challenging, as natural disturbances, such as fire and pests, are difficult to predict, and, therefore, forest management could vary from constituting a source to a sink of carbon dioxide emissions over time (Nelson 2003). The sector's emissions are highly variable and depend on natural disturbances. Once a party decides to include forest management in its emission reduction commitments, the decision is set for the first commitment period.

Credits from JI and CDM activities

Under JI, projects that enhance removals by sinks can be developed in Annex I countries. However, eligible projects must be developed in accordance to the rules, modalities and guidelines under LULUCF reporting guidelines, thus limiting the scope of project eligibility to afforestation, reforestation and deforestation activities. It is important to note that JI by definition is constrained to project development in Annex I Parties, and, thus, it cannot be used as a tool to limit deforestation in non-Annex I Parties.

Projects under the CDM, which are carried out in non-Annex I Parties, fall into one of two categories: (1) greenhouse gas emission reduction projects or (2) sinks that sequester greenhouse gases. LULUCF is a viable project category under CDM, however, LULUCF activities are limited to afforestation and reforestation in non-Annex I Parties. Thus, reduction of deforestation and forest degradation does not qualify as viable emission reduction projects under the CDM during the first commitment period. While Parties did raise the idea of reduced deforestation as a viable CDM project category, the idea was rejected in Marrakech, and only afforestation and reforestation credits were allowed for inclusion under the CDM (Sanz 2007). The primary reason that reduced deforestation projects were not considered was due to methodological concerns, such as those related to leakage, additionality, permanence and baselines (Nabuurs *et al.* 2007).

Bringing in REDD?

Because of the limited recognition of deforestation and forest degradation under the Kyoto Protocol, and especially of the limited recognition of its potential role in reducing such emissions in non-Annex I Parties, several attempts have been made to include such emission sources. At COP 11 in Montreal in 2005, Papua New Guinea, Costa Rica and several other nations, collectively known as the "Coalition for Rainforest Nations" (Myers 2007), raised the agenda item called, "Reduced Emissions from Deforestation in Developing Countries: Approaches to Stimulate Action," which led to two workshops and ongoing Subsidiary Body of Scientific and Technological Advice (SBSTA) review to further evaluate the prospect of inclusion.

In the Bali negotiations in December 2007, the item was revisited. In a sea of topics discussed and decided upon, including an Adaptation Fund, technology transfer, and planning for a post-2012 period, REDD was among the top agenda items (Earth Negotiations Bulletin 2007). Discussion

on the topic included issues concerning conservation and enhancement of carbon in forests; consideration of deforestation/degradation in a post-2012 arrangement; recognition for early action on deforestation; among others (Earth Negotiations Bulletin 2007). The COP decisions on REDD in Bali (United Nations Framework Convention on Climate Change (c), Decision 2.CP.13) included voluntary exploration of REDD; encouragement for parties to support capacity building, technology development and transfer, monitoring, reporting, and institutional development; and a request to SBSTA to adopt work on the methodological issues.

Perhaps most significantly, REDD was included in the Bali Action Plan (United Nations Framework Convention on Climate Change (c), Decision 1.CP.13), a document that was created and distributed in Bali and outlined a two-year strategy to be embraced before the Copenhagen negotiations in 2009, when a decision for a post-2012 policy framework is projected to be agreed upon. The roadmap calls upon a newly created *Ad Hoc* Working Group on Long-term Cooperative Action under the Convention to consider "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" (United Nations Framework Convention on Climate Change (c), Decision 1.CP.13 para. 1b (3)).

Specific proposals

Because emissions from deforestation and forest degradation have not been addressed under the Kyoto Protocol thus far, most actors vying for policy development have begun to look elsewhere: either within a post-2012 agreement, after the first commitment period of the Kyoto Protocol, or outside of the established climate regime altogether in regional, national, and sub-national markets, as well as the voluntary market. In an effort to influence such processes, states and environmental NGOs have put forward numerous proposals for moving forward with REDD inclusion. While by no means comprehensive, the following section explores several key categories of REDD proposals that could ensue. Proposals vary in whether they target national- or project-level emission reductions; whether they are financed by the carbon market – and, if so, whether a voluntary or regulated market - or a fund; and whether they are designed to address the cause of emissions or the emissions themselves.

National-level crediting

Emission reductions from deforestation and forest degradation could be incorporated into the carbon market and used to meet agreed upon emissions targets. In a national-level crediting scheme, countries would calculate a baseline of historical deforestation rates and would assess the change in deforestation levels over time. The country could then sell the generated emission reductions achieved when emissions fall below a predetermined reference level to Annex I Parties (Daviet *et al.* 2007). While there are many proposals that fall under this category, one of the first proposals was introduced by Papua New Guinea on behalf of the Coalition for Rainforests Nations. Under this proposal, entitled, "Compensated Reduction," nations would elect to participate and then create a baseline for their rate of deforestation, much like they do for other emission reductions sectors, and reduce levels of deforestation in exchange for credits that would be fungible on the global carbon market (Myers 2007). Compensated Reduction's baseline rates are benchmarked against national rates in an effort to reduce the risk of leakage (i.e. deforestation/degradation resulting outside of the project's boundaries to compensate for the loss of the project's supply of forest products). Once a country agrees to participate in Compensated Reduction, it is locked into reducing emissions from deforestation in future years (Myers 2007), mandating long-term participation. It should be noted that Compensated Reduction focuses on deforestation rather than degradation.

The European Commission Joint Research Centre's proposal is quite similar to Compensated Reduction although it includes temporary credits for REDD in an effort to address issues concerned with permanence, and measures reductions over a global baseline set at half the global average conversion rate, which aims to encourage countries with lower rates of deforestation to participate and preserve their baseline (Myers 2007).

Under the Center for Clean Air Policy's (CCAP) Dual Markets Approach, a predetermined percentage of national emissions targets would be met through REDD projects, programs and policies, while the other percentage would be generated from efforts to reduce emissions in other sectors. The design to limit the percentage of REDD credits aims to address methodological concerns, as well as concerns that REDD efforts could detract from energy system and behavioral transformation. Unlike Compensated Reduction, the REDD market would be kept separate, in an effort to avoid potential disruption and volatility (Ognowski *et al.* 2007).

Another noteworthy proposal is the Centro Agronómico Tropical de Investigación y Enseñanza "Nested Approach" (Pedroni 2007) in which a national baseline is established, and credits can be generated if emission levels are reduced below a given reference year. At the same time, sub-national project-level developers can hold credits, regardless of national performance on REDD, a design feature aimed to attract private investment. Projects can be developed irrespective of the country's participation in the scheme; however, above a threshold of project development, the country would be committed to a national target.

Project-level crediting

While REDD inclusion under the CDM was rejected in Marrakech, as described above, REDD could be included in a project-based architecture of a future climate regime. Whether under the CDM or another policy instrument, projects could be carried out against a baseline in a defined sub-national area.

Creation of Fund to Encourage REDD

Instead of incorporating REDD activities directly into a cap-and-trade scheme, a fund can be created to finance emission reduction efforts in the sector. There are several funds that have recently been created for the purpose of funding REDD efforts. Some focus their attention on project-level reduction, while others focus on national policies and programs. The fund proposals also vary in their approaches, with some aiming to finance the creation of enabling environments, and others devoting efforts to maintaining forest cover, and still others on avoiding deforestation. One significant development on REDD funds is the World Bank's Forest Carbon Partnership Facility (FCPF), launched in Bali in December of 2007 (Gordon 2007). The Partnership Facility, which strives to amount to US $300 million, is comprised of two mechanisms: a readiness mechanism and a carbon finance mechanism. The readiness mechanism includes support for REDD strategy development, monitoring, building baselines, modeling and other activities that enhance national capacity to implement REDD policies. Other funds include Australia's Global Initiative on Forests and Climate (Myers 2007).

APPLYING THE "DUAL EFFECTIVENESS TEST" TO REDD

It is beyond the scope of this paper to thoroughly apply the "dual effectiveness test" to all existing REDD proposals. Instead, the following section uses the "dual effectiveness test" to assess what results might be expected under the scenarios of: minimal change, change that is worse than before, and change that is better than otherwise would have been. The last scenario can be further broken down into two categories - reduction of deterioration, and reversal of deterioration – as explained below.

Dual Effectiveness scenarios

Minimal change

Under a scenario of minimal change, REDD policies for climate concerns would not hasten or slow the rate at which we are curbing greenhouse gas emissions on a global scale. For forestry-related concerns, REDD policies would not hasten or slow the global rate at which we are converting forests through deforestation/degradation activities. There would be no net benefit or loss in equity and other co-benefit objectives.

Worse than before

Under a worse than before scenario, REDD policies would lead to a higher level of global greenhouse gas emissions. This might occur, for instance, if REDD efforts detract from the reductions that industrialized and rapidly industrializing nations have to make in carbon-intensive sectors on site, including adopting policies that would spark behavioral change, which many assert is necessary to avert dangerous anthropogenic climate change.

This scenario might also occur if scientific understanding about REDD changes, leading to the championing of policies with perverse outcomes. This could transpire, for example, if REDD projects take place in forests where significant uncertainties exist with respect to carbon accounting in soils and forests types, as well as the non-carbon climate-altering attributes of forests (e.g. with regard to albedo, or cloud formation). In addition to scientific complexity, accounting and methodological challenges, such as leakage and permanence, could be passed over in an attempt to develop efforts on REDD. Thus, meaningful reductions could be sacrificed and global targets could be overshot. Also, if only countries with significant rates of deforestation/degradation are given credits/funding in a future arrangement, those countries with lower levels of emissions from deforestation/degradation may not have an incentive to maintain such levels (Myers 2007).

Similar challenges exist over forest governance. For instance, REDD policies may compete for attention with other global forest-related policy instruments. A lack of coordination among initiatives may lead to further fragmentation of the global forest regime. A failure to adequately address non-carbon benefits could further divide policy community support. And if programs fail to address equity among countries and generations, intergovernmental and civil society cooperation on forestry issues could be further reduced. This, in turn, could lead to a loss of legitimacy for other forest-related intergovernmental processes.

Another fear is that REDD credits may focus more on carbon accounting than forest decline, creating a blunt instrument to address complex forest ecosystems. That is, REDD will likely be implemented with a principle climate change mitigation goal. If non-carbon benefits are ignored, this could adversely impact biodiversity and ecosystem function. For example, with regard to its Forest Carbon Partnership Fund, the World Banks states that "emission reductions from REDD will not be created equal. Some may offer, in addition to climate change mitigation benefits, a range of 'co-benefits', in particular for local people and the local environment. How the FCPF may help create, monitor and value co-benefits is a matter for participants in the FCPF to determine. It is recognized that the FCPF is, first and foremost, a climate change mitigation instrument" (Gordon 2007). While sustainable development and biodiversity conservation are objectives of the FCPF, they are currently not the priority emphasis.

Lastly, some are concerned with the notion of putting an economic value on an ecosystem, which provides multiple services and values, some of which cannot be quantified easily. Such benefits may be overlooked if land-use change decisions rely solely upon the economics of conversion.

Better than otherwise would have been:

i. Reduces deterioration
ii. Reverses deterioration

Given multiple scenarios and uncertainty of outcomes, we review both conceptions of effectiveness in the same section. With respect to climate objectives, a better than otherwise would have been scenario would see REDD creating incentives for forest-rich developing nations, such as Brazil, Indonesia, and Central African nations, to reduce their emissions, while not detracting from realizing emissions reductions from carbon-intensive activities in industrialized/industrializing countries. (Whether this would fit *reduces deterioration* or *reverses deterioration* would be entirely dependent on the targets that future negotiations would determine). Under this scenario, the science of forest carbon accounting will be prioritized in the policy-making process, reducing critical uncertainties, and accounting for methodological challenges, such as concerns related to leakage, baseline data, and permanence.

What would the implications of such scenarios be for global forest governance? Clearly deforestation and degradation would have to be reduced, and in a manner that ameliorates the current decline in deforestation in the tropics and degradation globally. If REDD strategies were to also take into account non-carbon benefits, there would be gains across a breadth of sustainable forestry and conservation issues, including biodiversity protection, provision of environmental services, poverty reduction, among others. Likewise, any overall reduction of emissions will reduce the climate change impacts on forests and the communities that rely upon forest-derived ecosystem services. Finally, successful stakeholder collaboration within the context of REDD could facilitate enhanced cooperation among a wide range of existing international institutions and processes, potentially reinvigorating the global forest regime.

CONCLUSION

Can the widespread interest in addressing forest degradation through a global climate regime achieve a different fate, and yield greater results, than two generations of concerted attention to developing a global forest policy consensus? Legitimate concerns about the ability of such efforts have been raised by those focusing on both climate and forest objectives. On the forest front, some are pessimistic about the inclusion of REDD, contending that recognition of forests under the climate regime could detract from more encompassing policies that aim to protect all ecosystem services of forests, and could potentially lead to policy fragmentation and further preclude a global regime on forests. Some also argue that non-carbon attributes of forests, such as preservation of biodiversity and livelihoods, will not only be overlooked in REDD project development but, moreover, may be sacrificed in an effort to maximize carbon budgets (e.g. fast-growing monocrop plantations become economical, and replace older growth, diverse forests). And in addition to concerns for ecosystem services and livelihoods, others question whether REDD policies can address methodological uncertainties, especially with regard to permanence and leakage, and governance challenges, with regard to implementation, verification, and enforcement.

On the carbon front, concerned actors may point to the notion that the industrialized nations, which historically have contributed more emissions than developing nations and are the main culprit of human-induced climate change, should be required to make on-site emissions reductions that will lead to behavioral changes, which may not result from buying REDD credits from a tropical neighbour. These critics argue that policies should focus on altering consumption patterns, renewable energy quotas, efficiency standards, and urban and suburban planning codes before nations are allowed to look elsewhere for more easily generated credits.

This paper has argued that whether such fears will be realized, and whether REDD might succeed in ways that other global forestry efforts have failed, depends on whether a range of forestry stakeholders champion policy initiatives under REDD that, if fully implemented, would pass a "dual effectiveness test" – i.e. lead to a net worldwide amelioration of forest loss and degradation, and meaningful reduction of global concentrations of greenhouse gas emissions.

While this argument may appear to be stating the obvious, lessons from past efforts, as discussed above, reveal that such a focus on global-scale, results-based accountability has yet to be integrated into any major multilateral agreement on forestry. The failures of previous efforts, and resultant stakeholder frustration, certainly provide an explanation for the latest and current interest in turning to a more institutionalized climate regime to address forestry concerns. Any effort to create a different fate, with greater on-the-ground results, requires that those supporting REDD inclusion reflect deeply on the rationale for how their proposed initiatives might succeed. Our proposal for a "dual effectiveness test" highlights the need for a range of stakeholders, including governments, environmental groups, industry associations, international organizations, environmental and resource "think tanks" and other relevant actors, to commit to results-based global targets.

We argue that the incorporation of a "dual effectiveness test" could help to "force," or impose, a longer-term perspective and override strategic thinking based primarily on short-term self-interest. To be clear, self-interest motivation is an important factor in decision making. The current strong interest of tropical countries and firms operating in regions with high REDD potential can be explained, at least in part, because of economic self-interest. However, these concerns must only be addressed *after* policies deemed to fail the "dual effectiveness" test are ruled out. If there is one thing those studying global forest governance have learned, it is that self-interest accounts often explain truncated historical global policy development, and their inadequacies in addressing global problems. We will need new, less predictable types of behavior – and policies that encourage the development of such behavior, such as mandating the use of a "dual effectiveness" test – if the latest wave of interest in REDD is to be different from, and more effective than, the previous two generations of efforts.

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Towards the privatization of global forest governance?

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SUMMARY

Faced with the fragmentation and the weakness of international forest regimes, new forms of global governance have emerged over the last 15 years through the creation of private transnational certification institutions. By analyzing the political processes linked to the establishment of these institutions, this paper aims to question the scope and performance of a form of regulation based on private governance, but also to ask whether forest governance is truly being increasingly privatized, as is often claimed. Through a review of literature, a look at statistics and surveys conducted in Brazil, we identify the limitations of governing through the market. We go on to analyze the linkages between public policy and private governance, highlighting the correlation between the performative nature of certification institutions and the prior filling of a certain number of gaps in public policies, especially in countries possessing tropical forest resources.

Keywords: forest certification, global governance, public policy, standard

Allons-nous vers la privatisation de la gestion globale des forêts?

S. GUÉNEAU et P. TOZZI

Face à la fragmentation et à la faiblesse des régimes internationaux des forêts, de nouvelles formes de gestion globales ont émergé ces quinze dernières années, à travers la création d'insitutions privées de certification trans-nationale. En analysant les processus politiques liés à l'établissement de ces institutions, cet article vise à mettre en question l'envergure et la performance d'une forme de régulation basée sur une gestion privée, mais aussi à examiner si la gestion forestière est vraiment en train d'être de plus en plus privatisée, comme on l'assure généralement. A travers un examen de la littérature disponible, des statistiques et des enquêtes menées au Brésil, nous identifions les limitations de la gestion à travers le marché. Nous continuons avec une analyse des liens entre la politique publique et la gestion privée. en soulignant la corrélation entre la nature performante des insitutions de certification, et l'effort passé de pallier à un certain nombre de hiatus dans les politiques publiques, particulièrement dans les pays possédant des ressources forestières tropicales.

¿Hacia la privatización del manejo forestal mundial?

S. GUÉNEAU y P. TOZZI

Ante la fragmentación y debilidad de los regimenes forestales internacionales, los últimos 15 años han presenciado la aparición de nuevos modelos de gestión forestal mundial con el establecimiento de instituciones privadas de certificación a nivel internacional. Este artículo tiene como objetivo cuestionar, a través de un análisis de los procesos políticos relacionados con el establecimiento de estas instituciones, el alcance y los resultados de un modelo reglamentario basado en la gestión privada, pero cuestiona también el hecho de que el manejo forestal se está privatizando cada vez más, como se suele afirmar. Mediante un resumen del material publicado y de las estadísticas y encuestas realizadas en Brasil, se identifican las limitaciones del manejo por medio del mercado. El estudio analiza luego las conexiones entre la política pública y la gestión privada y se centra en la correlación entre el carácter performativo de las instituciones certificadoras y la resolución anterior de ciertos vacios en políticas públicas, sobre todo en países con recursos forestales tropicales.

INTRODUCTION

The international negotiations launched by states with a view to establishing a regime focusing specifically on forests resulted in the construction of a global mechanism for forest management and protection standards, which is often criticized today for its stumbling blocks, its weakness and its fragmented nature, a source of complexity and of harmful overlaps (Humphreys 2006, Wilson and Guéneau 2003). At the same time, new forms of forest regulation have progressively emerged through market instruments such as forest certification. By increasingly involving private stakeholders – including NGOs and corporations – these governance systems convey the idea that private forest certification initiatives are a means of fostering the voluntary adoption of forest management standards through market-based instruments.

The emergence of private mechanisms on the

international scene also raises the question of a move towards the increasing privatization of governance and of its development to the detriment of public regulation. Through its analysis of the political processes involved in establishing forest certification systems, this paper aims to examine the scope and performance of a form of regulation based on private governance, but also to ask whether forest governance is truly being increasingly privatized, as is often claimed. We suggest that beyond the technical obstacles frequently presented (Durst *et al.* 2006), the development of these mechanisms – especially for certification – is hampered by political limitations linked to the failure to apply public policies in tropical countries.

Our paper will first concentrate on changes in global forest governance, basing our analysis on the theoretical framework of global governance and giving special attention to research on the privatization of global governance. We will then go on to examine the implementation of private forest governance instruments, focusing our analysis on the characteristics of these kinds of private governance: their reliance on the market and the way in which they transcend the state framework.

CHANGES IN GLOBAL FOREST GOVERNANCE

Over recent decades, pressure on the environment, especially on tropical forests, has raised a set of questions on the ways in which natural resources are used. Largely due to the ecosystem services they provide, forests have gradually emerged as a global concern. Representing issues that go beyond the individual competence of states, forests have therefore gradually moved to center stage in debates on global governance.

The dimensions of the concept of global governance

Governance is traditionally defined as a set of regulations and rules of conduct that, without necessarily emanating from an official authority, define practices, assign roles and guide interaction in order to address collective problems in an increasingly interdependent world marked by the proliferation of networks of stakeholders (Rosenau and Czempiel 1992, Young 1997, Smouts 1998). This concept emerged – not without controversy – at a time when the influence of non-state actors was growing in the development of global political processes. Heavily criticized by the realist movement (Gilpin 1981, Buzan *et al.* 1993), the concept of global governance was nevertheless favorably received within other paradigmatic schools of international relations, which linked the concept to "regime theory", whereby interdependent stakeholders attempt to solve transnational or global problems by cooperating at a given level, with all of them adhering to a set of principles, standards, rules and procedures (Krasner 1983).

Subject to its acceptance as a theoretical operator, global governance is therefore more generally speaking "the sum of the many ways individuals and institutions, public and private, manage their common affairs" (CGG 1995). As such, it has a variety of meanings depending on the nature of the stakeholders – public and/or private – that influence its structure and its systems. Ba and Hoffmann (2007) state that the "global governance" label, as used in international relations analysis, marks "a new state of affairs in world politics (a new set of phenomena to be studied) and/or a new way to approach world politics (a new analytic framework)".

A good deal of research has been devoted to the concept of global governance, which seems to have become a buzzword in the field of international relations (Pattberg 2006); this overuse of the term – even more than theoretical criticism leveled at it – has robbed it of any meaning. Ba and Hoffmann (2007) nevertheless attempt to clarify the concept by providing a typology of its use in literature. They describe three categories of research on global governance. First, global governance is seen as a phenomenon used to manage a series of new issues resulting from the generalization of the global capitalist system (environmental problems, poverty, etc.) According to this understanding, global governance is made up of all instruments and activities existing – or to be created – in order to manage these problems collectively at the supranational level. In this category we find research on international organizations' activities, debates on a potential global government, or even on the institutional design for managing globalization. A second series of research studies sees global governance as the plan for a global political and economic order, based on liberal rules and standards. In this sense, global governance is considered in an essentially normative dimension. Finally, a third approach views global governance as an analytical concept, which can be used to describe and analyze the form taken by the regulation of collective action, no longer considered as a static inter-state activity, but as a dynamic interactive process between different stakeholders, making it possible to provide new solutions to a given global problem. It is mainly in this third category that we find a self-labeled global governance literature.

If we look at this last category, the concept of global governance is used to indicate a break away from more traditional international relations approaches, stressing several ways in which means of public action have changed. The global governance field of analysis has in fact been extended to a wide range of different stakeholders involved in governance: NGOs, social movements, businesses, etc. The boundaries between public and private are redefined with the transfer of responsibilities taking place between the state, civil society and market forces. Analysis tends to focus on systems of regulations and their influence on stakeholders' behavior, rather than on inter-state power relations. Governance is therefore based on a process of interaction and negotiation between diverse stakeholders, making it possible to look beyond conflicting interests in order to reach a consensus. A forerunner in this field, James Rosenau thus approaches global governance as the possibility of "governing without government", in other words regulating human activities using mechanisms that are not provided by the official authorities (Rosenau and Czempiel 1992).

This decade, the idea of a break or a change in the way issues of global collective interest are approached is associated with an abundant literature on the phenomenon known as "the privatization of governance". Some research has focused on the way in which transnational advocacy networks influence international political processes, in other words on the role played by non-governmental actors in establishing international political agendas and in lobbying governments during international negotiations and the implementation of multilateral agreements (Arts 1998, Keck and Sikkink 1998).

Other research has centered more specifically on the role of non-state actors in setting rules and standards for the resolution of global environmental problems. Some authors have analyzed the regulatory processes that companies develop as a means of improving their corporate responsibility, processes that are made possible by governments' implicit or explicit delegation of some of their decision-making powers (Clapp 1998, Cutler *et al.* 1999). These examples of the institutionalization of private governance (Pattberg 2004, Bartley 2007) are different from the previous *ad hoc* partnerships or strategic alliances: they imply shared standards and principles in addition to a clear definition of roles and responsibilities. Other researchers have developed the concept of the non-state market-driven (NSMD) governance system, in which governments simply have no decision-making powers, since political decision-making processes are based on the manipulation of world markets by non-state bodies (Cashore 2002).

The contemporary privatization of governance can also be linked to the emergence of private certification institutions which are defined by Garcia Johnson (2001) as follows: they are first a set of rules, practices or guidelines, and second, a control mechanism that may take the form of an annual report, an audit or a certification and labeling process. The aim of these institutions is to foster the voluntary adoption of production standards through market dynamics. Such institutions of certification have existed for a long time. ISO is probably the best example of these institutions. However, recently some new institutions have emerged which differ from other standardization devices such as ISO standards. They do not standardize products but processes of production (although ISO has started to standardize processes through ISO 14000 series. They are sector-oriented: forest, fisheries, mining, tourism, biofuel, various agriculture products like oil-palm, soybean, etc. They are based on an agreement produced by bringing together heterogeneous points of view.

As we will see, where forests are concerned, these certification institutions fall within the theoretical framework for global governance due to two main characteristics: they are a product of power relations within civil society between economic actors or between economic actors and NGOs; their legitimacy is based on a scientific or technical rationality and also on a democratic rationality reflected by their negotiated dimension (Borraz 2004).

The emergence of private global forest governance

The development of private forest governance can be seen as a major change in a world in which forests are traditionally governed in a highly centralized manner by states. This phenomenon emerged in the 1990s, particularly during the Rio Earth Summit in 1992, when an attempt to set up a legally binding instrument on forests failed. Although a formal intergovernmental negotiation process has been underway since then, the results remain inconclusive (Humphreys 2006). In 2007, during its seventh session, the United Nations Forum on Forests (UNFF) ended with an agreement on the implementation of a non-binding instrument on forests, which looks unlikely to achieve any real consolidation of global forest governance (Nasi and Guéneau 2007).

Consequently, states are still wary of a global agreement, seen as a potential threat to the sovereign management of their forest resources. Two options were found to attempt to avoid this kind of stalemate (Cashore *et al.* 2007, Humphreys 2006). The first involved decentralizing negotiations, especially by launching a series of regional processes[1] with the aim of establishing the content of good forest management criteria and indicators and promoting national forest programs. In a way, the idea was to solve global disagreements by adopting a bottom-up approach whereby, instead of a supranational umbrella organization, states or regions would take responsibility for forest concerns at their own level. A second strategy was adopted by some stakeholders to overcome the obstacle of national sovereignty in negotiations: the complete rejection of intergovernmental negotiations and the creation of a transnational political process aimed at drawing up good forest management standards between non-state actors, excluding governments.

These two processes gave rise to several certification institutions. The first, the Forest Stewardship Council (FSC), was created in 1993 as a gathering point for stakeholders from different exclusively non-state backgrounds (NGOs, social movements, corporations) concerned with the issue of sustainable forest management. Its aim is to set global rules within a participative framework – 10 principles and 56 good forest management criteria that apply to all types of forests throughout the world. These general standards are the result of the confrontation of diverse – and sometimes conflicting – points of view between the different stakeholders that make up FSC. In order to provide market recognition for those who put these forest standards into practice, FSC uses a third party certification mechanism. To acknowledge the specificity of forests according to their country or region, standards are drawn up within national FSC initiatives, which are themselves made up of a wide range of stakeholders. Where no national initiatives exist, FSC International authorizes

[1] The Helsinki Process in 1993 for Europe, the Montreal Process in 1993 for North America, and the Tarapoto Process in 1995 for the Amazon, etc.

third party certifying organizations to set provisional standards for companies wishing to obtain certification.

Other forest certification institutions emerged in the wake of FSC. Unlike FSC, which was instigated by environmental NGOs, these institutions were initiated by industrial groups or private landowners in response to the threat of economic actors losing power over forest governance. Most of these certification institutions are now part of PEFC. Originally the Pan-European Forest Certification scheme, it was renamed the Programme for the Endorsement of Forest Certification in 2003. Its objectives were extended to the global level, making it a truly international mechanism for mutual recognition between the voluntary certification initiatives created at the national level, based on the forest management criteria and indicators set during regional intergovernmental negotiation processes. The PEFC standards define procedures for improving practices to which forest users must subscribe. They are more flexible than the FSC standards, which set performance levels that apply to all forest operators.

Engaged in fierce competition, and coexisting with other certification systems, the two main institutions — FSC and PEFC - have different approaches. FSC is built around universal principles that are applied locally, whereas PEFC is based on the international harmonization of criteria and indicators drawn up at the regional level.

Although they currently concern only a small percentage of global forest area, the number of forests certified by these two institutions, and many others, is constantly growing. This progress raises questions about the ability of forest certification initiatives to transcend international disagreements and to govern forest issues at the global level.

Private certification institutions at the heart of global forest governance

A considerable amount of social science research on new forms of private governance focuses specifically on these forest certification institutions – especially FSC – from the perspective of global governance. Meidinger (2003) argues that in their effort to create and impose global standards, certification programs are testing the possibility of creating a kind of global citizenship characterized by a shared understanding of public responsibility. In the same vein, Gale (2006) believes that the strength of FSC's institutional structure makes it an authority for global democratic corporatism that would be more capable of governing the global market system than national or international institutions.

The voting and interest balancing system within FSC International decision-making authorities can be seen as an attempt to find a democratic solution to collective problems at the global level. For its supporters, FSC's internal governance rules aim to guarantee all participants identical participation conditions and to ensure decisions made are transparent. The members of FSC International are divided among three chambers (economic, social and environmental) whose voting weight is the same whatever the number of participants in each chamber. Votes are weighted in order to ensure parity of representation between Southern and Northern members in each chamber, whatever the number of voters from the North or the South. The forum for dialogue set up by FSC is open to all – organizations and individuals – but the voting weight of individual members must not exceed 10%.

Other authors attempt to show how forest certification institutions can compensate for the shortcomings of the international forest regime (Gulbrandsen 2004) or provide an alternative to intergovernmental cooperation on forests, particularly by trying to understand why this kind of private regulation seems to be emerging, rather than a more traditional kind, such as a binding intergovernmental agreement (Bernstein and Cashore 2004, Bartley, 2007).

According to Gulbrandsen (2004), forest certification institutions are complementary to the current forest regime in that by including a wide number of stakeholders, they make it possible to balance powers in the determination of forest management rules, to raise environmental and social standards, to assure the effective implementation of performance standards, to have a real impact on forest management practices and to guarantee trade in timber from well-managed forests.

According to Bernstein and Cashore (2004), the certification process is in opposition to intergovernmental cooperation on forests, rather than complementary to it. These authors believe that a certification institution like FSC – which they describe as a Non-State Market-Driven (NSMD) governance scheme – functions outside state barriers. In their opinion, the "performance" of these NSMD governance systems depends on the legitimacy the different groups of stakeholders grant these systems, which is superior to other forms of legitimacy, democratic, for example. According to Bartley (2007), forest certification institutions are a form of "private transnational regulation" and emerged partly due to their ability to solve market coordination problems by reducing transaction costs[2], but also because of their capacity for resolving conflicts between stakeholders with asymmetric powers. Beyond these optimistic observations, what can we say about the role of the market and the state in private global forest governance?

GOVERNING THROUGH THE MARKET?

Whatever the differences between the FSC and PEFC, certification is always seen as a means of creating a more

[2] Referring to an institutional approach, Bartley (2007) points out that certification institutions provide opportunities for economic actors: protecting their reputation (separating the wheat from the chaff); providing consumers with credible information; limiting competition and creating competitive advantages.

dynamic link between environmental concerns and market transactions. Viewed from this perspective, the disparities between certification institutions are reduced and it becomes interesting to question their shared belief: can forest issues be governed through the market (Cashore *et al.* 2004) and what are the potential limitations of this kind of approach?

A significant part of the deforestation problem occurs outside the forest sector and outside the conventional market economy

When looking at the aims and objectives of certification institutions, we see that they do not attempt to deal with all forest issues. They concentrate on the limited number of forests that are managed and exploited for their goods and services. If we consider the aim of economic profitability put forward, we can further reduce the target area of these institutions to only forests that are managed for essentially commercial purposes.

However, a large part of the deforestation problem in fact occurs outside the market economy or within informal economic systems. This is the case for fuelwood: according to FAO estimations, around half of all wood harvested in the world is intended for energy consumption, and around 90% of this wood is produced and consumed in developing countries (FAO 2007). This wood is largely for home consumption by poor populations. Moreover, as regards non-energy uses, the small proportion of wood used in developing countries is not often subject to market transactions, or is traded on informal markets.

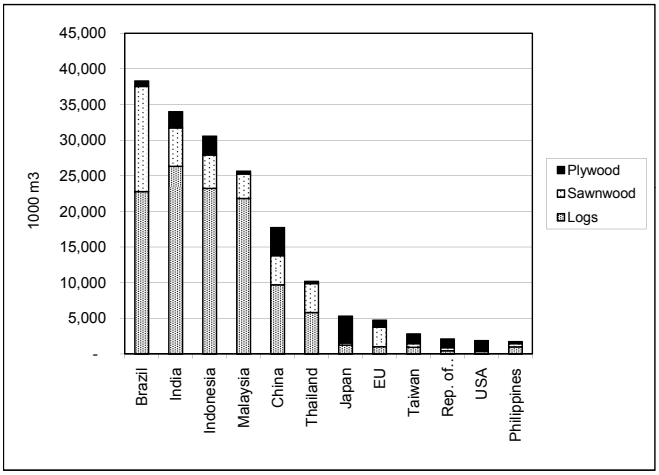
Furthermore, in several tropical countries, the causes of the deforestation are the conversion of forests in agricultural cultures or in pastures. In Brazil for instance, according to recent research works (Bonaudo *et al.,* 2007), extensive cattle ranching is the main cause of forest deforestation in Amazonia. In South-east Asia, some reports (Stibig *et al.,* 2007) have highlighted the role of other factors than commercial logging in the deforestation increase, specifically the growth of palm-oil plantations.

Demand limited to sensitive markets.

Analysis of the trade flows for forest products provides a final perspective on the scope of a market mechanism like certification. Around 80% of industrial roundwood production comes from developed countries where most of the forests already have management plans that can be deemed – with just a few exceptions – to guarantee good management. According to FAO (2007), only 7% of world industrial roundwood production enters international trade. As regards tropical forest products, which are the worst hit by deforestation and poor management practices, it appears that the major markets are essentially domestic. However, in top tropical timber consuming countries, such as Brazil, Indonesia, India, Malaysia and China, there is very little – if any – demand for products from "well-managed" forests. Efforts have been made by those promoting certification to create, for example, groups of certified timber buyers[3], or to organize commercial operations such as the trade fair for certified forest products organized every year in Brazil. But these attempts at mobilizing people have not yet produced any conclusive results.

Finally, demand for forest products from sustainably managed forests is mostly concentrated on European and American markets, which represent only a very small proportion of global tropical timber consumption (see Figure 1).

FIGURE 1 *Tropical timber consumption in top consuming countries 2005-2007*



Source: adapted from ITTO Annual review and assessment of the world timber situation (www.itto.org)

On these sensitive markets, certification is set up to guarantee consumers a minimum quality level in terms of sustainable forest management, through ecolabels. These stamps indicate that the buyer is contributing to global sustainable development by choosing more expensive wood products that are in line with a certain environmental ethic. In return, this type of preferential purchase helps to put normative pressure on producers by inciting them to improve their forest management practices. Turning this argument of "environmental awareness" on its head, the limited market research conducted to date shows that the proportion of consumers willing to pay a premium for certified products is small (Ozanne and Vlosky 1997, 2003). Except for a few countries such as the Netherlands, consumers demand very little in the way of certified forest products (FAO 2006) and continue to favor esthetic and technical characteristics over environmental arguments. However, the active campaigns carried out by the NGOs behind FSC among retailers and

[3] For example a group of buyers was created in Brazil, including around 60 companies, two provincial governments – Acre and Amapa – town councils and furniture making trade unions.

importers have had effects on another level: some large distributors – group purchasing organizations, DIY stores, retail joinery and furniture stores, etc. – have adopted a strategy of buying products from forests with certified good management practices. This social construction of the FSC certification market nevertheless remains limited: it is efficient only in sectors where the distributors are in a position of oligopsony. For example, in the civil construction sector, trade in timber and by-products is sufficiently concentrated among certain specialized companies that they can insist that their suppliers obtain FSC certification. In terms of demand, the scope of forest products is consequently limited to sectors involving major private multinational groups, established in countries where environmental awareness is particularly high.

Supply limited by a number of obstacles

In addition to competition between forest labels and a lack of legibility – in terms of environmental criteria – which make it difficult to distinguish between products when purchasing and reduce supply efficiency, the main limitations are financial ones. Low consumer demand leads distributors to attempt to avoid passing on the cost of certification to the sales price of certified products. It is therefore mainly producers who must bear these costs if they wish to gain access to sensitive European markets. These high costs are a considerable obstacle to the development of the certified product market (Baharuddin and Simula 1994, Eba'a Atyi and Simula, 2002, Durst *et al.* 2006). They include the preliminary certification assessment costs, the costs of the management changes needed to obtain certification and, finally, the cost of the yearly audit. Some of these costs are fixed-costs and therefore result in scale effects: the smaller the forest operation, the higher the proportion of these costs in the total price of the certified product, and the greater the competitive disadvantages generated by forest certification. Conversely, large-scale operations will find it easiest to bear these costs. Given the heterogeneous structure of tropical forests, the lack of qualified personnel to carry out audits in developing countries and the difficulty in accessing the areas to be audited, there are also considerable cost differentials for certification between developed and developing countries. According to Gullison (2003), certification costs for large forestry companies in the United States or Poland stand at 0.02 to 0.03 US$ per cubic meter, compared to 0.26 to 1.10 US$ in tropical countries and over 4.00 US$ for small-scale producers in Latin America.

In view of the high costs, certification remains a relatively unprofitable mechanism. According to the director of Eldorado[4], a company in the Brazilian state of Pará, the price paid to suppliers for certified timber is on average 12% higher than the price of non-certified timber. Eldorado's sales price for the certified processed product on the European market is 18% higher, which is far from generating the considerable profits – of between 10 and 15% – that are often suggested in literature (Carneiro 2005). But the promise of extra income from certification is even less evident for small-scale landowners and forest communities. They are faced with financial and technical deficiencies in addition to a lack of organization and experience in managing forests. To reduce *per capita* auditing and certification costs, certification schemes have promoted 'group certification', for instance through forest cooperatives. In 2004, the FSC has approved new standards for small and low-intensity managed forests (SLIMFs). Nevetheless, projects for the certification of community tropical forests are still strongly dependent on financial and technical assistance from NGOs and foreign assistance. The communities are not made sufficiently aware of the financial risks involved and market low-quality products that find no takers in the marketplace (Garcia Drigo *et al.* 2006).

In addition to the extra costs generated by certification, there are obstacles linked to uncertainty over the economic viability of a logging model based on forest management and certification. Planning sustainable forest management implies setting yearly limits on the areas and volumes that can be logged as well as organizing harvest cycles on average every 30 years. In tropical areas, the economic advantages generated by the first cycle – which targets mature, large diameter trees – are gradually diminishing. During the second harvest cycle, the forest is inevitably impoverished: this forces economic operators to extend the range of species logged to second choice species, with no real guarantee of trading opportunities or satisfactory profits.

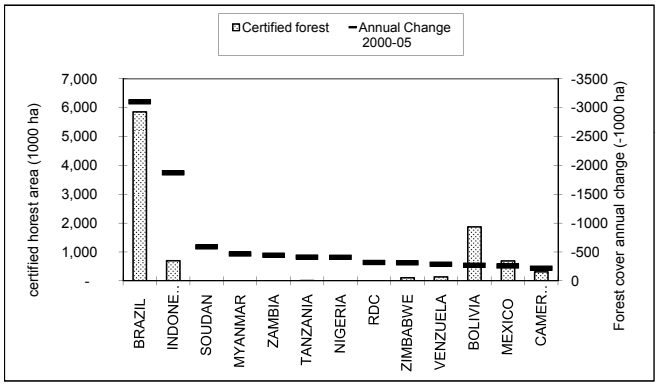
Furthermore, sustainable forest management and investment in certification are a long-term matter, yet several tropical countries are still restricted by ongoing political instability. This precarious situation does not encourage responsible investment. Because of these high risks, the conditions for raising awareness among companies are very poor. For example, in Central Africa, the bank loan system for investment in forest management is practically non-existent.

Ultimately, although the small size of the certification market limits the scope of certification institutions, it seems that the main obstacle to private forest governance through markets is the short supply of certified products from tropical forests. Most European timber retailers point out that it is in fact very difficult to source certified tropical timber (LCB 2005). Certified timber comes mostly from European or North American forests: over half of all certified forest areas are found in two countries, the United States and Canada. The implementation of certification in tropical regions, on the other hand, remains marginal, despite the fact that this is where the richest biodiversity and most endangered forests are found (see Figure 2).

Moreover, national figures often mask the wide range of situations that should be taken into consideration. First,

[4] Interviews conducted in the Brazilian state of Pará in November 2007 among companies with a certified control chain, in the margins of the ATIBT Forum.

FIGURE 2 *Certified forest area in the main countries affected by deforestation*



Sources: www.fsc.org, www.pefc.org, www.mtcc.com.my, UNECE/FAO

the nature of resources and land structure are elements that limit the scope of an indicator such as certified forest area. In tropical areas, the development of certification has in fact focused largely on industrial plantations. For example, in Brazil between 2000 and 2005, the area of FSC-certified industrial plantations represented around two thirds of all certified forest areas[5]. In 2007, of the 5.9 million hectares of certified forest in Brazil, only 2.8 million were in the Amazon, and were part of areas dedicated to timber production or to the production of non-wood forest products (see Table 1). It should be noted that the increase in 2006 of 1.5 million hectares of certified Amazon forest was due to the certification of the management of some indigenous lands where the forest is used for Brazil nut production. Finally, the area of Amazon forest certified for timber production is relatively small in Brazil, standing at 1.2 million hectares, of which 2% are managed by forest communities.

TABLE 1 *Certified natural forests, for timber production in the Brazilian Amazon in December 2007*

Name of operator	**Year of certification**	**FSC certified areas (ha)**
APRUMA - Associação dos Produtores Rurais em Manejo Florestal e Agricultura	2003	800
Assoc. Moradores e Produtores do Projeto Agroextrativista Chico Mendes – AMPPAEM	2002/2007	9 400
Associação Comunitária Agrícola de Extratores de Produtos da Floresta - ACAF / Comunidade do Menino Deus do Curuça	2005	2 400
Associação dos Produtores do Projeto de Assentamento Agroextrativista do Seringal Equador – ASSPAE-SE	2005	2 200
Associação dos Seringueiros da Reserva Extrativista São Luiz do Remanso – ASSER	2004	7 205
Associação dos Seringueiros de PORTO DIAS	2002	4 209
Total community certifications		**26 214**
Acre Brasil Verde Industrial Madeireira Ltda.	2005	7 840
Agroflorestal Vale do Guaporé Ltda. MADEVALE	2003	4 924
Cikel Brasil Verde S.A. – Faz. Jutaituba	2004	108 241
Cikel Brasil Verde S/A	2001	140 658
Ecolog Indústria e Comércio Ltda.	2004	22 132
Floresta Estadual do Antimary – FUNTAC	2005	61 426
IBL - Izabel Madeiras do Brasil	2004	20 000
Indústria de Madeiras Manoa Ltda.	2005	73 079
Juruá Florestal Ltda	2002	25 000
Mil Madeireira Itacoatiara Ltda. (Precious Wood Amazon)	1997	122 729
Orsa Florestral Ltda.	2004	545 335
Ouro Verde Importação e Exportação Ltda.	2006	7 500
Precious Woods Belem Ltda. (LISBOA Madeireira Ltda)	2002	43 776
Rohden Indústria Lígnea Ltda.	2003	25 100
Total industrial certifications		**1 207 740**
Total certified areas		**1 233 954**

Source : FSC Brasil

[5] Figures available on the FSC-Brazil Web site (http://www.fsc.org.br/).

GOVERNING BEYOND THE STATE?

According to some authors, through the construction of private multistakeholder networks, we are seeing the progressive intrusion of a certain number of standards that are initiated and set outside traditional public structures – including states –, which thereby lose all possibility of direct control (Cashore 2002, Csikos, 2005). Regulatory functions are moved from the public to the private, in other words from states – and the organizations mandated by them – to companies and NGOs, which are playing an increasing role in the definition of the international standards that are becoming a specific category of soft law (Sassen 1996, Lipschutz and Fogel 2002, Borraz, 2004). At this stage, we may ask whether privatization, which dominates the field of forest certification, might not be interpreted as the tangible manifestation of a deregulation taking place outside traditional legal categories. Can private forest certification institutions henceforth aspire to govern forest issues beyond the state?

The state's role in relation to forest certification

The issue of the linkage between the public and the private in the emergence of certification institutions has recently been addressed in literature. Several scholars have focused on the way in which the development of private certification can be influenced by public policy in countries possessing forest resources (Segura 2004, Ebeling 2005). Some have developed normative argumentation on what the role of governments should be vis-à-vis certification, from a neo-institutional approach (Rametsteiner 2002). Others have looked at the way in which certification institutions influence public policy through their integrative functions (Pattberg 2005).

In 2005, an FAO forum focused specifically on the role of governments in relation to certification. This meeting ended by declaring that as forest owners and buyers of forest products, states were inevitably involved in the development of certification. Moreover, governments lead capacity building programs for certification and participate in and/or finance standard setting and the creation of certification institutions. They sometimes act as moderators between the different competing certification institutions and also guarantee that fair competition conditions are respected on national and international markets for certified products (FAO 2006).

If we refer to Rametsteiner (2002), governments have a particularly active role in the development of certification by pulling three levers. The first is the setting and implementation of sustainable management standards: the standards used by several certification institutions, such as PEFC, are based on the principles, criteria and indicators drawn up within regional intergovernmental processes. Furthermore, certain governments provide financial assistance to certification institutions that develop their own standards, without state participation, as is the case for FSC. The second lever pulled at the governmental level is that of the development and effective implementation of certification systems. Some countries, such as Austria, the Netherlands and Mexico, have for example played a pivotal role in supporting the creation of FSC. In other countries, the institutional architecture of private certification institutions, acting at the national level, has been largely shaped by the state, as in Malaysia and Indonesia. Finally, governments pull a third lever: the creation of market incentives, essentially through public procurement.

This analysis can be supplemented by empirical observations on the influence of the public policies implemented in several developing countries to encourage private companies to adhere to a certification process. Segura (2004) points out that in Bolivia, for example, the explosion of certification took place after the approval of the forest law of 1996, especially due to the proximity of the text to certification standards. In 2003, tax exemptions were introduced for certified forestry units in Bolivia: annual surface area tax was reduced from 1 US$ to 0.64 US$ per hectare for forest managers that had obtained certification. In Guatemala and South Africa, forest concessions are only granted if applicants commit to certifying their forest management. In these countries, private certification is used in order to ensure that logging operations in state forests respect national laws.

Bilateral and multilateral cooperation has also played a decisive role in promoting forest certification. Several European development agencies have actively backed the creation of certification institutions in developing countries. The French Development Agency has supported the drafting and implementation of management plans in Central Africa, which have allowed forest managers to progressively commit to certifying their practices. According to the Interafrican Forest Industries Association (IFIA), 10 million hectares of forest – of a total production forest area of 53 million hectares – should be certified by 2012 (Bourguignon 2007). The rise of FSC at the international level was also prompted by the agreement signed between WWF and the World Bank in 1998, with the aim of reaching 200 million hectares of certified forests by 2005.

Finally, several European governments (United Kingdom, France, Denmark, the Netherlands, Germany) have implemented public procurement policies that enjoin national administrations to use only timber of known origin from well-managed and certified forests in the construction of public buildings and for other public uses. France, for example, adopted a regulation in April 2005 which provides that all public procurement of tropical timber will be sourced from sustainably managed forests by 2010.

These different studies and inventories highlight the central role played by the state in the development of certification. Consequently, they tend to question the hypothesis of global forest governance beyond the state. However, analyses tell us little about the shortcomings of public policy and the ways in which certification institutions could help to compensate for them.

The regulatory role of private certification institutions

The proliferation of private standardization processes in increasingly diverse economic sectors raises questions about the political implications of transferring public action to private bodies, which some interpret as a growing attempt by public authorities to delegate their regulatory powers to the private sector (Borraz 2004). Forest certification institutions could thus fill a gap in the exercise of certain sovereign functions in countries where state services are being dismantled. Some authors see this as a good thing, indicating that these instruments are lower cost solutions in a context in which 'increasing the efficiency of the public forest administration often requires many more resources than are available in most countries' (Contreras-Hermillosa and Peter 2006).

The certification process and the related threat of certification withdrawal if specifications are not met are elements that contribute to forest law enforcement. This is especially true in countries where the administrations responsible for monitoring compliance with laws have insufficient means or numbers and where forest resources are very extensive. For FSC, for example, the certificate is issued for a limited period, at the end of which it can be withdrawn if the forest company no longer complies with FSC standards. A sanctions system also exists, whereby the certificate may be withdrawn at any time during this period. Certification organizations can also be sanctioned by means of the temporary or permanent withdrawal of their accreditation. For example, FSC accreditation was temporarily withdrawn from the Dutch certifier SKAL in 2001 (Kern 2004).Some authors add that, in a certain sense, certification has indirectly contributed to defining sustainable forest management standards by helping to reach an agreement on the definition of the good practices that are introduced into national legislation (Segura 2004).

Nevertheless, these analyses, which tend to conclude that the influence of private forms of governance on public action is positive, suffer from a considerable distortion: conversely, it is in fact in countries possessing tropical forest resources where state presence is limited that certification often struggles to develop. Faced with this observation, we suggest that certain shortcomings of public policies, which go far beyond simple policies to support certification, hamper the development of forest certification. We have sought to identify these shortcomings using surveys conducted in the Brazilian Amazon between 2005 and 2007.

Policy failures remain high: case study in the Brazilian Amazon

Some of the obstacles to sustainable tropical forest management that are most often highlighted are the lack of appropriate forest policies, their poor implementation and the disparities between public policies. In Brazil, for example, policies promoting forest management may be inconsistent with other public mechanisms, such as agricultural development policies or land policies. Historically, the successive governments have fostered colonization and agricultural extension in the Amazon, symbolized by the slogan '*integrar para não entregar*'[6]. Logging operations were not covered by strong regulations, as timber was harvested mainly by cattle ranchers in order to build up capital for establishing pastures (Bonaudo 2005). Agrarian reform, a highly sensitive issue in Brazil, has led the Brazilian state to limit the regularization of land titles to desired lands not exceeding 500 hectares: this does not encourage the development of long-term investment, which is necessary in a sector like logging, where the harvest cycles imposed by management plans require large areas. On the other hand, the numerous small colonies – less than 100 hectares – that clear the forest to establish family subsistence farming can obtain property titles after a period of several years of farming.

Furthermore, it is very common for farmers to make incursions into private forest properties or concessions. Thus, in June 2005 some 2 000 people settled on an Amazon property where the forests are managed in line with FSC standards by the certified company CIKEL. These new occupants cleared trees and jeopardized the company's wildlife reintroduction plans (Pinto 2005). Several cases of land disputes between certified logging companies and local communities have been recorded (Lachefski and Freris 2002, Carneiro 2004, Fanzeres and Murrieta 2000) and the Brazilian authorities regularly suspend logging permits in certified areas in order to clarify the land tenure situation.

In 2003 in the Brazilian Amazon, 42 million hectares were concerned by "informal possession", according to the National Institute for Colonization and Agrarian Reform (Barreto 2007). Due to this land tenure insecurity, forest owners are not encouraged to implement costly management plans, and even less to meet the demanding certification standards that they are not certain of being able to respect in the long term (Becker 2004). In this region, "legal" timber may come from either forests covered by a sustainable forest management plan (*Plano de Manejo Florestal Sustentavel*) – which implies that the operators have proved that they own the forests –, or from clearing authorized under agricultural colonization projects. But it is increasingly difficult for forest entrepreneurs to acquire lands and, since 2001, the law permits clearing on only 20% of the area of Amazon properties, which considerably limits the legal supply of timber (Sablayrolles *et al*. 2006). The legal obligation to present management plans in order to harvest timber in forest properties, which has existed since the Forest Code of 1965 was adopted, remained a dead letter until the 1990s. This is

[6] "integrate or forfeit": this slogan was first popularized by the army to counter the historical claims to Brazilian Amazon lands, and recently resurfaced in debates on the role of the Amazon forest as a provider of global environmental goods and services, which, according to some Brazilian politicians, was indicative of the internationalization of the Amazon.

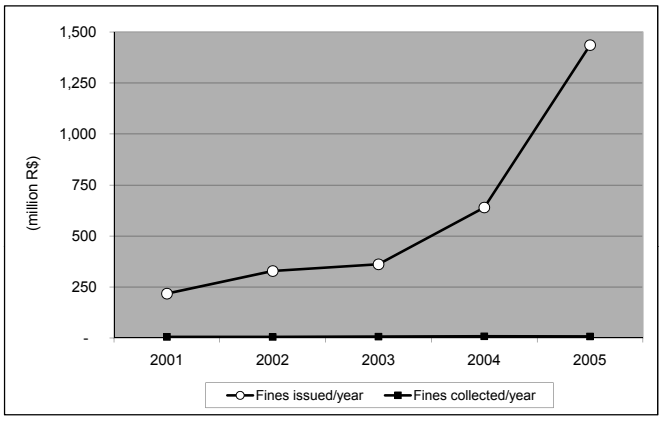
mainly because obtaining legal land titles is unpredictable, due to land tenure problems, but also because clear directives from the administration are lacking. Another reason is bureaucratic inertia in forestry services, which delays the approval of management plans, often by several years. Furthermore, for stakeholders in the productive sector with a low level of capital investment – in other words the majority of forest operators in the Amazon – the implementation of management plans seems very costly (Garrido Filha 2002).

Much of the timber harvested therefore comes from the public domain that is invaded and illegally logged by foresters: protected areas, Indian reserves, state-owned forest, and properties belonging to the army. Lentini *et al.* (2005) have thus estimated that the proportion of timber harvested illegally stood at 47% in 2001 and 43% in 2004. According to recent satellite images, 88% of logging conducted in September 2006 in the state of Mato Grosso in the southern Brazilian Amazon, was illegal (Brito 2006). In 2000, timber from forests with sustainable management plans represented 4.13 million cubic meters, or around only 15% of total production (Barreto *et al* 2002).

New satellite observation technologies nevertheless make it possible to pinpoint the places where deforestation is continuing due to a failure to implement management plans. For example, the deforestation alert system (SAD) launched in September 2006 by two Brazilian NGOs, ICV and Imazon, monitors the progress of deforestation in the state of Mato Grosso. The system makes it possible to detect places where illegal deforestation is progressing, and to rapidly deliver this information to the public authorities so that they can apply the appropriate sanctions and oblige the landowners to comply with their legal reserve obligations[7]. The monitoring of forest activities has therefore considerably improved over recent years, leading to an unprecedented increase in fines imposed on operators. However, while field monitoring has made considerable progress, weaknesses remain in the legal system. Due to the lack of public prosecutors and the different means of redress available to the defense, the actual application of sanctions is very poor: according to Paulo Barreto, a researcher at Imazon, less than 4% of the value of fines is actually settled by offenders (see Figure 3).

In these conditions, the forest industry is undergoing a severe crisis: it is facing a shortage of legal, certified timber at a time when national and international pressure urging it to move towards responsible management and procurement practices has never been as intense. Faced with this contradictory situation, some certified companies have decided to abandon their forest activities in order to move over to lower risk industry[8]. Only a few companies, whose forest management is certified, benefit from this state of affairs. These companies, which are vertically integrated, use

FIGURE 3 *Fines issued and collected by the Brazilian authorities for illegal logging offences between 2001 and 2005*



Source: P. Barreto, Imazon, 2007

their own forest resources to manufacture certified processed products that they export to Europe and the United States, but they remain few in number. For example, in the state of Pará, the main timber-producing state in the Brazilian Amazon, only five companies have forest areas with certified management, along with a community that harvests non-wood forest products and a company that harvests plantation timber for paper pulp manufacturing. On the other hand, manufacturers that export finished or semi-finished products but own no forests are running very low on wood raw materials: they are faced with severe difficulties in obtaining tropical timber from natural certified forests. For example, between only 2 and 15% of the timber volume entering the production chain of the companies DLH Nordisk, Tramontina and Eldorado[9] in the state of Pará is from certified forests.

During the Forum of the International Technical Tropical Timber Association (ATIBT), held in late 2007 in Belém, a number of stakeholders from different backgrounds[10] identified several obstacles to sustainable forest management and to the development of certification in the Brazilian Amazon: the failure to resolve land tenure problems, the repeated incursions into managed areas by loggers, red tape resulting in excessive delays in the delivery of management plans and the severe lack of effective sanctions against offenders. Given these weaknesses in public policies, the basic standards of private certification institutions have a very limited field of application. FSC Principle 1 demands compliance with all applicable laws of the country, respect of administrative requirements, payment of all legally prescribed fines and other charges and protection from illegal harvesting, settlement and other unauthorized activities. Principle 2 demands a clear definition of long-term tenure

[7] In the Brazilian Amazon, the law obliges landowners to reserve 80% of their land, but this provision is generally ignored.
[8] Personal interview with the director of the EMAPA Company, Belém, Brazil.
[9] Interviews conducted with the board and purchasing managers in these companies in the margins of the ATIBT Forum in Belém, November 2007
[10] FSC-Brazil, IDEFLOR, Cikel (FSC-certified company), AIMEX, Imazon, etc.

and use rights to the land and forest resources. These principles are far from being applicable in the Brazilian Amazon, given that land titles are often inexistent or granted informally. Moreover, land disputes are ongoing, including over certified forest areas.

The new Brazilian forest laws define the methods for granting logging concessions in state forests with a view to sustainable timber production involving the private sector, communities and other stakeholders. The law defines three ways of using forests: creating conservation units that authorize sustainable forest production; community management (extractive reserves, etc.); and forest concessions of a maximum of 40 years delivered to Brazilian companies after a specific allocation process. In fact, this system is fundamentally similar to that of forest concessions in the other tropical regions. The law requires the submission of a financial and technical tender before concessions can be acquired. Moreover, companies that commit to certifying their management methods could benefit from extra points when submitting their technical tender. The government hopes that this concessions system will prove capable of cleaning up a forest sector whose legality is currently disputed; it provides that in 10 years time, a maximum area of 13 million hectares of forest, or 3% of the Brazilian Amazon, will be covered by concessions contracts (Azevedo and Tocantins 2006). Brazilian logging companies are convinced that concessions should allow long-term access to forest resources, which would encourage an increase in the supply of legal, certified timber[11].

CONCLUSION

At the end of this analysis, it is clear that private certification institutions are not in a position to effectively compensate – through markets – for all the shortcomings of public action. On the contrary, only a certain level of government regulation enables the development of private forms of governance like certification. Thus, although states seem poised to grant substantial amounts of regulatory power to transnational and private regimes, the recent lessons taught by forest certification moderate the idea of a shift towards privatization that it is supposed to generate. Research carried out in Brazil in fact contradicts the vision of the emerging strength of the private sector in forest and certification regulation processes. On the contrary, as in other emerging countries, we are witnessing the rehabilitation of public policies, which is the expression of the limits of market-based regulation systems.

Thus, through forest certification we see the persistence of the public state sector in forest governance, with private governance and public national governance appearing as inextricably linked. We are no longer experiencing "governance without government" (Rosenau and Czempiel 1992), but rather a situation of hybridization showing that market regulation cannot permanently substitute the state. Therefore, forest certification is taking on the paradoxical characteristics of the global standardization process to which it is attached. The standardization process establishes voluntary technical specifications within a multstakeholder context, but it is governments that define the dividing line between voluntary standards and compulsory legislation, and which frame the conditions required for the creation of standards and their recognition in their countries (Graz 2002). The effectiveness of private forest governance therefore depends on a political legitimization at the national level, while most states seem to be losing some of their prerogatives by delegating standard setting to private supranational bodies, over which they seem to have almost no influence.

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[11] Interviews conducted in 2007 with the presidents of the UNIFLOR (*União das Entidades Florestais do Pará*) timber producers union and the timber exporters union, AIMEX (*Associação das Indústrias Exportadoras de Madeiras do Estado do Pará*) in the state of Pará.

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