

## PAPERS

# Reducing Emissions from Deforestation and Forest Degradation (REDD) and decentralized forest management

S. IRAWAN and L. TACCONI

*Crawford School of Economics and Government, #13 J.G. Crawford Building, The Australian National University, ACT, Australia*

Email: [silvia.irawan@anu.edu.au](mailto:silvia.irawan@anu.edu.au) and [luca.tacconi@anu.edu.au](mailto:luca.tacconi@anu.edu.au)

---

### SUMMARY

The implementation of a mechanism for Reducing Emissions from Deforestation and Forest Degradation (REDD - plus) will be affected by governance conditions within host countries. The top eight countries, which are responsible for 70 percent of the world's total annual deforestation, have implemented certain forms of decentralization in public administration and forest management. This paper analyzes implications of decentralized forest management for the implementation of REDD. Three possible options for the involvement of local governments in the implementation of REDD are: 1) the central government decides on a national reference level and devolves the implementation to local governments; 2) the central government decides on a national reference level and seeks expressions of interest from local governments to implement REDD in their administrative areas; and 3) the central and local governments decide on a national reference level jointly and local governments implement REDD activities locally. This paper also highlights fiscal instruments for REDD revenue distribution.

Keywords: reducing emissions from deforestation and degradation (REDD), decentralization, forest management, subnational level, fiscal instruments

### Réduction des émissions de la déforestation et de la dégradation des forêts (REDD) et de la gestion forestière décentralisée

S.IRAWAN et L.TACCONI

La mise en pratique d'un mécanisme pour réduire les émissions de la déforestation et de la dégradation de forêts (REDD - plus) va être affectée par les conditions gouvernementales dans les pays hôtes. Les 10 principaux pays, responsables de 70% de la déforestation annuelle dans le monde, ont mis en pratique certaines formes de décentralisation dans l'administration publique et la gestion forestière. Cet article analyse les implications de la gestion forestière décentralisée dans la mise en pratique de la REDD. Trois options possibles pour impliquer les gouvernements locaux dans la mise en pratique de la REDD sont: 1) le gouvernement central décide un niveau de référence national et décentralise sa mise en pratique vers les gouvernements locaux, 2) le gouvernement central décide d'un niveau de référence national et recherche des expressions d'intérêt de la part des gouvernements locaux pour mettre en pratique la REDD dans leur région administrative, et, 3) Les gouvernements central et locaux décident ensemble d'un niveau de référence national et le gouvernement central met en pratique les activités de la REDD localement. Cet article met également en évidence les instruments fiscaux utilisés pour distribuer les revenus de la REDD.

### La Reducción de Emisiones por Deforestación y Degradación forestal (REDD) y la gestión forestal descentralizada

S. IRAWAN y L. TACCONI

La implementación de un mecanismo para la Reducción de Emisiones producidas por la Deforestación y Degradación forestal (REDD plus) se verá afectada por las condiciones gubernamentales dentro de los países anfitriones. Los ocho países más importantes, que son responsables por un 70 por ciento de la deforestación total anual, han implementado ciertos modelos de descentralización en lo que se refiere a la administración pública y la gestión forestal. Este estudio analiza las implicaciones de una gestión forestal descentralizada para la implementación de una política de REDD. Las tres opciones posibles para la participación de los gobiernos locales en la implementación de una política de REDD son las siguientes: 1) el gobierno central se decide por un nivel de referencia nacional y pasa la implementación a las administraciones locales; 2) el gobierno central se decide por un nivel de referencia nacional y solicita a las administraciones locales propuestas posibles para la implementación de políticas de REDD en sus áreas administrativas; y 3) las administraciones central y local se deciden conjuntamente por un

nivel de referencia nacional y la administración local implementa las actividades de REDD en la zona correspondiente. Este estudio destaca también instrumentos fiscales posibles para la distribución de ingresos procedentes de la REDD.

## INTRODUCTION

A mechanism for Reducing Emissions from Deforestation and Forest Degradation (REDD - plus, hereafter simply referred to as REDD) was adopted at the climate change conference in Copenhagen to provide incentives to developing countries to reduce emissions from the forest sector (UNFCCC 2009a)<sup>1</sup>. Thus far, most analyses of REDD have focused on international to national level design issues. The issues of how to set up an appropriate reference level and to address leakage and non-permanence have attracted significant attention. However, other challenges to the implementation of REDD are related to governance within host countries. Porrúa *et al.* (2007) examine several governance indicators in eight developing countries responsible for 70 percent of emissions from deforestation and land degradation, including Brazil, Bolivia, Democratic Republic of Congo (DRC), Cameroon, Ghana, Indonesia, Malaysia and Papua New Guinea (PNG). They conclude that most of these countries are facing governance challenges particularly related to the effectiveness of public service delivery, the rule of law and the control of corruption. These governance issues do affect many countries that may become eligible for REDD. However, the intensity of the governance problems differs. For instance, a country like the DRC has more profound governance problems and lower implementation capacity than Brazil or Indonesia. Some countries may have significant governance and capacity problems limiting the implementation of decentralized REDD measures at the subnational level. However, there are countries that have the capacity to implement those measures and can benefit from the discussion presented here.

Most of the aforementioned countries have implemented certain forms of decentralization in public administration, including in forest management. Bolivia has devolved the power to manage important forest areas to municipalities (Larson 2003). In Cameroon, "the 1994 Forestry Law transfers to councils ownership rights over the forests within their jurisdiction" (Oyono *et al.* 2007: 3). In Ghana, a number of key functions have been devolved to the District Forestry Offices (Sasu 2005). The Democratic Republic of Congo in 2008 issued a decentralization law, which devolves the management of forest programmes to the provincial level (Africa Research Bulletin 2008). In Brazil, although no specific policy regulates the transfer of powers over forest resources to the local level, municipal governments, which control important infrastructure development programmes, have an important role in forest management (Larson

2003). A similar situation has also occurred in Indonesia, district governments have been playing a greater role in the management of forest resources following the introduction of decentralization laws in 1999.

This paper considers the implications of decentralized forest management for the implementation of REDD within participating countries. The discussion will specifically focus on state-owned forests, which account for 86 percent of the total world's forests (Agrawal *et al.* 2008)<sup>2</sup>. After having set the scene by summarizing key aspects of proposals concerning the design of REDD and the state of knowledge on decentralized forest management, possible modes for the involvement of local governments in the implementation of REDD are identified. Drawing on the literature on fiscal decentralization, options for fiscal instruments to distribute REDD revenues are then discussed. The paper concludes by discussing considerations to be addressed by host countries when choosing which option to adopt in order to implement REDD effectively.

## REDD DESIGN

A number of proposals have been put forward regarding the design of REDD. The scope of REDD has expanded since the scheme was first discussed by the United Nations Framework Convention on Climate Change (UNFCCC) parties in 2005 at the Montreal Conference (Meridian Institute 2009). The proposals for a REDD scheme initially focused on deforestation and later included forest degradation. The concept of REDD adopted in Copenhagen, encompasses deforestation and forest degradation, increase anthropogenic removals from afforestation, reforestation and enhancement of forest carbon. Several key elements that are important for the implementation process within host countries include: reference levels, the implementation scale, financing options and implementation phases (Parker *et al.* 2008, Meridian Institute 2009). These elements are discussed below. This paper focuses mostly on deforestation and forest degradation.

### Reference levels

The approach to setting reference levels has become one of the most debated issues concerning the design of a REDD mechanism. The reference level is the level against which the impacts of REDD policies and measures are assessed to determine whether participating countries have reduced

<sup>1</sup> At the time of finalizing this paper, detailed text on REDD agreed in Copenhagen was not yet available to the authors.

<sup>2</sup> FAO (2006) reports a slightly different figure of the state-owned forests, which is 84 percent of the total world's forests. Forests under community or private ownership could be dealt more straightforward within REDD because property rights are better defined as compared to state forests which often have multiple overlapping claims.

emissions and should receive financial rewards (Angelsen 2008, Parker *et al.* 2008, Meridian Institute 2009). The most challenging task in setting reference levels is to accommodate the different circumstances found within developing countries. A REDD mechanism needs to be attractive enough for countries with high and low deforestation rates to participate. The greater the number of countries participating in the REDD mechanism, the greater the expected reduction of international leakage (Santilli *et al.* 2005)<sup>3</sup>.

Mollicone *et al.* (2007) recommend that the global average deforestation rate be used as a benchmark to accommodate countries with high and low deforestation rates. Under this approach, host countries with deforestation rates above the global average will be compensated for the reduction of the national rates during the commitment period as compared to the pre-commitment period. Countries with past deforestation rates lower than the global average will be rewarded for not increasing their deforestation rates higher than the pre-commitment level. This proposal also adds the element of forest degradation into the calculation of reference levels.

The on-going negotiations on a REDD mechanism have not defined what approach will be used in determining the global reference level. The only statement related to the global reference level in the ongoing negotiation text reveals that the reference level should ensure additionality as compared to the business as usual level (UNFCCC 2009b). In addition, it is suggested that national reference levels be developed based on national factors including: historic emissions and removal rates, forest cover, expected future trends and capacity for emission reductions such as GNP per capita.

### Implementation scale

Two options for the implementation scale of REDD are the national-based and project-based implementations (UNFCCC 2007). National-based implementation requires the national government to develop a national carbon accounting system and a national management system to implement REDD projects and to distribute revenue generated to relevant stakeholders within the country. Project-based implementation allows buyers to interact directly with project managers or third-party brokers with an independent entity verifying the credit generation (Myers 2007).

Most of the proposals for a REDD mechanism support the national-based approach for the implementation of REDD. National-based implementation is better suited to address the issue of leakage within host countries because it enables a complete measurement and monitoring of emission reductions within a country as a whole. Moreover, the national-based approach is more likely to address the underlying causes of deforestation that originate at different

levels within host countries including at the national and sub-national levels. The underlying causes of deforestation are usually influenced by social, political, economic, demographic, and cultural factors that occur at different levels within a country (Lambin *et al.* 2001). These causes operate indirectly but can alter the proximate causes, which are directly caused by local communities and corporations. The underlying causes often cannot be controlled by local stakeholders. Hence, the implementation of REDD only at the project level might not lead to a significant reduction of deforestation in a country because it cannot address underlying causes occurring at the district, provincial and national levels.

### Financing options

In terms of financing options, there are a number of ways to implement REDD which can be categorized as either market or non-market approaches. Market approaches enable developing countries to generate credits from REDD measures and sell them to Annex 1 (developed) countries of the Kyoto Protocol, who may purchase and use the credits to meet their emission reduction commitments. Non-market or fund-based approaches propose a fund created by Annex I countries to reward developing countries for their efforts to reduce emissions from deforestation and forest degradation (Johns *et al.* 2008).

Many parties to the ongoing negotiations propose that REDD mechanism should not be linked to the quantified emission reduction objectives of developed country parties. The exclusion is suggested because of the concern that REDD could undermine the environmental integrity of global emission reduction goals. REDD credits, which are considered very cost effective, might flood the carbon market and overwhelm the efforts aimed at reducing emissions from fossil fuels (Schlamadinger *et al.* 2005). It has been proposed that a REDD mechanism be supplementary to the emission reduction objectives of developed countries (UNFCCC 2009b). Funding for this approach could be provided through official development assistance and also market-linked revenue, such as the taxation of carbon in developed countries.

### Implementation phases

In order to ensure an effective and result-based mechanism, a REDD mechanism should be implemented in successive phases (UNFCCC 2009b). Three phases have been proposed. Phase one is proposed to focus on strategy development and core capacity building. Phase two is to provide support for the implementation of national policies and measures together with compensation for proxy-based results for emission reductions. Phase three is a fully result-based compensation mechanism for emission reductions and removals from the

<sup>3</sup> International leakage occurs when the implementation of REDD policies and measures in one country causes an increase in emissions from deforestation and forest degradation in other country.

forestry and land-use sectors. A number of criteria need to be met and specific activities are to be performed by participating countries to be eligible for the financial benefits provided for each phase (Table 1) (UNFCCC 2009b).

REDD funding would be granted based on performance. Measurable, reportable and verifiable indicators need to be developed for the implementation of REDD policies and measures. Subject to ex-post verification, upfront financing may also be granted based on spending plans and stated commitments (UNFCCC 2009b). After receiving compensation, distribution of REDD derived benefits among all stakeholders, including indigenous peoples and local communities, should be fair, efficient, transparent and equitable (UNFCCC 2009b).

### Involvement of subnational level

Negotiations have also acknowledged the importance of subnational level involvement in the implementation of REDD. National strategies for REDD should include subnational actions and strategies that are consistent with national development goals (UNFCCC 2009b). Effective forest governance at all governance levels is considered a prerequisite for managing forests sustainably. Moreover, national governments need to develop subnational reference levels, where appropriate, to calculate changes in emissions from deforestation and forest degradation. Due to the wide-variation of regional situations across a country, local reference levels would vary between one locality to another depending on, inter alia, the total forest area, opportunity costs and capacity to implement policies and measures at the local level.

In order to develop national and subnational reference levels, the analysis of land-use change patterns at the local level is necessary. Macroeconomic models, which are often considered as the appropriate approach to forecast national

reference levels, fail to take into account the causes of deforestation originating from land-use changes triggered by local factors (Bird 2005). Even when the drivers of deforestation are identified, predictions using national models are of limited use in understanding the strength of the drivers, the influence of the drivers across time and space and the inter-relationship between the drivers. The understanding of the social process influencing the decision to pursue land-use change at the local level is necessary to assess forest cover changes at the national level (Mascia *et al.* 2003, Dalle *et al.* 2006).

### DECENTRALIZED FOREST MANAGEMENT: KEY ISSUES

Decentralization in public administration is defined as “transfer of planning, decision-making, or administrative authority from the central government to local administrative units, semi-autonomous, parastatal organizations, local governments, or non-governmental organizations” (Cheema and Rondinelli 1983: 18). As the concept of decentralization in forest management is used interchangeably between the transfer of authorities from state to local communities and from the central to local governments (Tacconi 2007), it is important to define its meaning in the present context. In this paper, decentralization refers to the latter concept.

Proponents of decentralization have both political and economic rationales. From the political and public administration point of view, decentralization is expected to (Cheema and Rondinelli 1983):

- bring the decision-making process closer to the public. Decentralization will increase sensitivity to local needs and ensure that decision makers are more flexible and innovative. Hence, the policies and decisions made should be better tailored to the local needs;

TABLE 1 Eligibility criteria and activities of REDD implementation phases

Phase	Eligibility Criteria	Activities
Phase 1	Must be a Party to the Convention and in compliance with its commitment	1) Establish policies and measures for measuring, monitoring, analysing, reporting and verifying emission reduction from the forestry sector 2) Develop an initial institution to address the reductions of emissions and identifying necessary adjustments in forest law and governance
Phase 2	Demonstrate commitment to implement REDD by ensuring: 1) transparent, rule-based forest governance; 2) multi-stakeholder consultations and cooperation including with indigenous people and local communities; 3) safeguards against the conversion of natural to plantation forests and 4) biological diversity protection	1) Develop a comprehensive legal framework including land tenure related to collective land rights, land use planning, forest governance and law enforcement; 2) Establish Monitoring Reporting and Verification (MRV) institutions and capacities; and 3) Develop action plans within the framework of a national low carbon development strategy
Phase 3	Remain in compliance with the criteria of phase 1 and 2 and demonstrate that previously received compensation has been spent according to agreed guidelines	Implement a national inventory of greenhouse gases.

Source: Adapted from UNFCCC (2009b, p. 128-129)

- promote greater participation of local people in the planning and implementation of national development;
- increase political stability by harmonizing interests between national and local levels;
- increase the capacity of local governments especially when the devolvement of powers and authorities is followed by adequate transfers of resources.

The economic rationale of decentralization is to enable local governments to provide public services according to the different preferences of individuals under their jurisdictions. Decentralization allows individuals to seek out a community that is best suited to their preferences and prevents welfare losses to society caused by the uniform provision of public services (Tiebout 1956, Oates 1972). In order to achieve the aforementioned economic objectives, decentralization in public administration is usually followed by the devolution of fiscal power from the national government to subnational governments, which is often referred to as fiscal decentralization (Davoodi and Zou 1997, Bahl 1999). Fiscal decentralization is measured based on “the spending of subnational governments as a fraction of the total government spending” (Davoodi and Zou 1997: 245).

In order to finance the provision of goods and services, local governments are provided with the authority to generate local revenue. Sources of local governments’ revenue are mostly from taxes, direct contributions such as charges, public enterprises’ profits and royalties from natural resources (Bräutigam 2002). The role of local governments is to provide local residents with public services for which they are willing to pay (Bird 2001). Local governments should, whenever possible, charge for the service they provide (Bird 2001: 11). When charging is not feasible, services should be financed from taxes collected from the residents. As local government tax bases from which to raise revenue tend to be few and limited, the higher level of governments need to share part of their revenue with local governments if they are important providers of public goods and services (De Mello 2000).

The process of decentralization in forest management has devolved certain decision-making powers to local governments. In a democratic setting, direct participation of local people in the management of forest resources, however, may not necessarily result in better forest management. Local people may choose forest conversion over protection as it generates financial benefits for their livelihoods (Tacconi 2007). In addition, local politicians will tend to invest their time and resources in forestry activities if they reap political or financial rewards from such activities (Andersson *et al.* 2004). These social, political and economic factors make decentralization in forest management much more complex than decentralization in other public services (Larson 2003).

The success of a decentralization process may be constrained by a lack of authority to raise local revenue. Ribot *et al.* (2006) reported that comprehensive decentralization reforms of forest management are constrained in raising or spending revenue and deciding upon the utilization of high valued resources. Forest conservation, in particular, requires

local governments to set aside a considerable amount of land within their administrative jurisdictions, where revenue generating activities are restricted. Conservation activities involve opportunity costs because forest exploitation and land-use change generate revenue for local governments from local taxes and revenue sharing. Some revenue generating activities that can be performed in conservation areas, such as ecotourism and non-timber forest product collection, are often less profitable than forest exploitation and other land-use change activities. While forest conservation involves local costs, it generates global benefits, such as biodiversity conservation and carbon sequestration, across jurisdictions (Ring 2008a). Forest conservation results therefore in spillover benefits. The spillover benefits create an inefficient outcome during the decision making process because local decision makers often neglect the benefits accrued to the outsiders and take into account only those benefiting local residents (Oates 1972). Financial incentives to support conservation at the local level need to be provided to induce the localities to provide an efficient level of public goods and services.

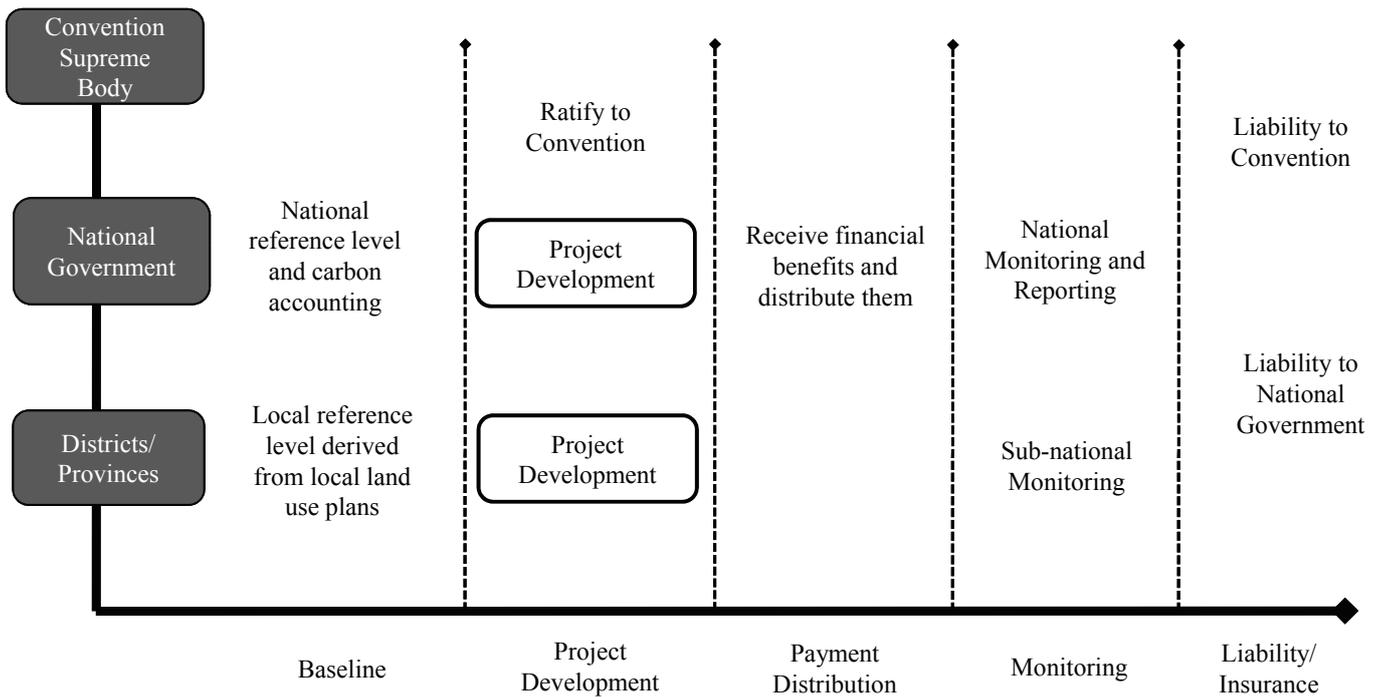
#### POSSIBLE DISTRIBUTION OF ROLES BETWEEN GOVERNMENTAL LEVELS IN REDD IMPLEMENTATION

In order to ensure the successful implementation of REDD in decentralized countries, it is important to consider which tasks could be devolved at what level in these countries. The basic principle of subsidiarity in decentralized public administration is that “tasks and powers should rest at the lower level subunit unless allocating them to a higher central unit would ensure higher comparative efficiency or effectiveness in achieving them” (Follesdal 1998: 190). Based on this principle, this paper discusses REDD activities that could be performed by countries and their possible allocation to the various levels of government as summarized in Figure 1.

In the implementation of REDD, several activities are best handled by the national government, while others would be best devolved to the local level. Based on the ongoing negotiations, national governments need to develop national carbon accounting, monitor the implementation of REDD policies and measures, receive and distribute REDD credits and assume liability after payment has been received. This paper suggests that local governments are in a better position to develop local policies and measures at the local level. Local authorities are considered to have better specific information related to local resources, which results in better-targeted policies and lower transaction costs (World Bank 1997, Ribot *et al.* 2006). Several benefits of having local governments involved in the implementation of REDD can therefore be summarized as follows:

- to ensure greater participation of subnational groups in the decision-making process where the decision making process of land-use has been devolved;
- to increase the efficiency of REDD implementation

FIGURE 1 REDD implementation measures within decentralized countries



through internalizing costs and reducing transaction costs;

- to tackle the specific causes of deforestation at the local level as the drivers vary from one location to another within a country depending on the economy and the population’s needs.

The sub-national level also plays a crucial role in ensuring the implementation of sustainable forest management to reduce forest degradation. Local governments need to support the enforcement of environmental laws, which is one of the requirements of sustainable forest management (Ros-Tonen *et al.* 2008). The close geographical proximity with forest areas enables local governments to monitor and detect violation of forest practices within their localities.

The involvement of the sub-national level in the implementation of REDD can vary depending on the extent of authority devolved in forest management. The implementation process can involve a top-down or a bottom up model. In a top-down model, local governments implement REDD based on certain prescriptions provided by the national government. In contrast, local governments have the authority to develop local implementation plans and to implement them under a bottom-up model. Irrespective of the model adopted, the local governments’ involvement in the implementation of REDD is under the national-based approach, which should be situated within a framework of intergovernmental relationship between the central and sub-national levels. There are three possible options for the involvement of local governments in the implementation of REDD:

- the central government decides on a national reference level and devolves the implementation to local

governments;

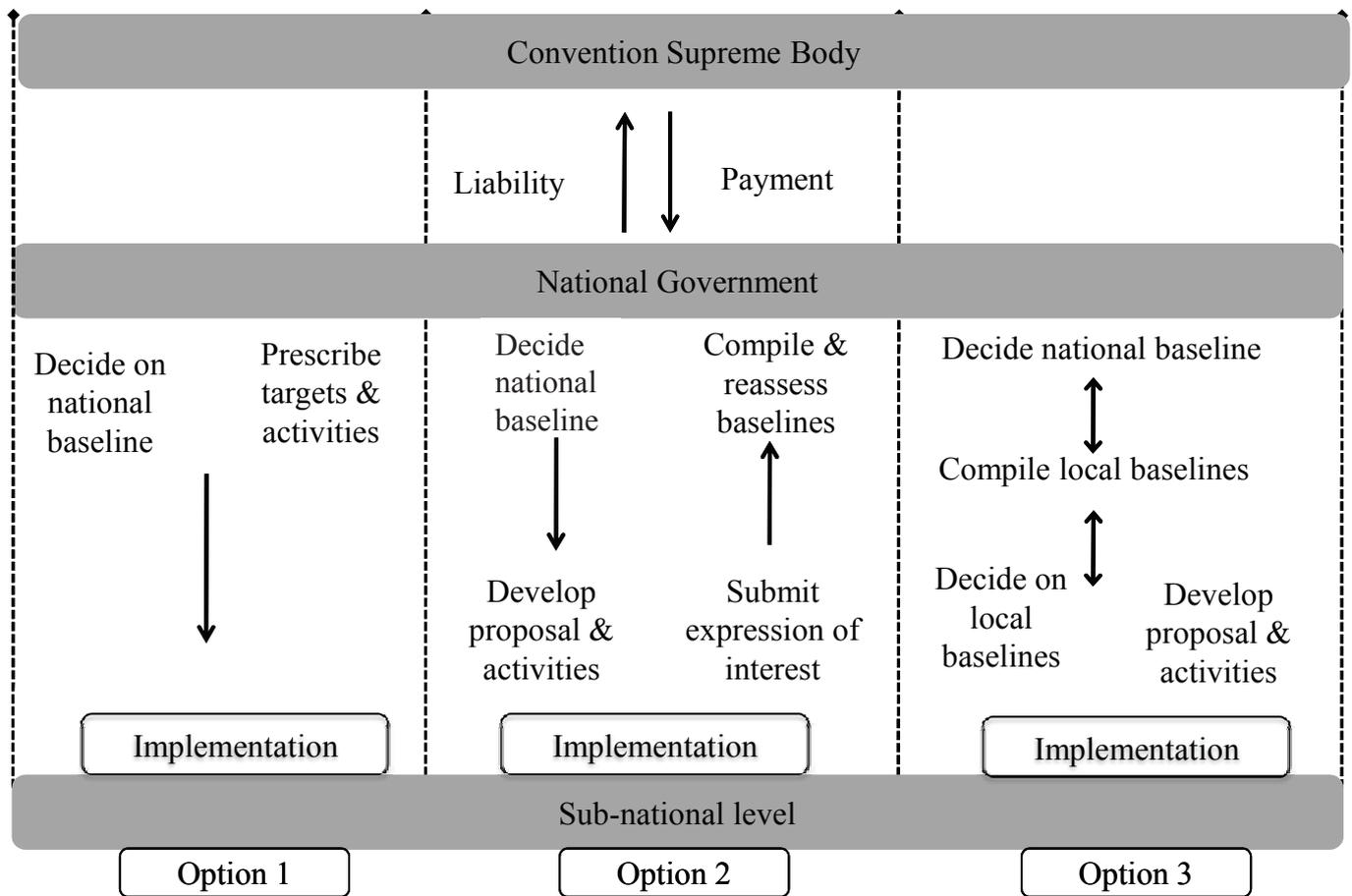
- the central government decides on a national reference level and seeks expressions of interest from local governments to implement REDD in their administrative areas; and
- the central and local governments decide on a national reference level jointly and the local governments implement REDD measures at the local level.

Figure 2 depicts the flow of the implementation process entailed by these options, which are discussed below.

*Option One* is where the central government decides on a national reference level and delegates the implementation to local governments. The central government prescribes certain targets and measures for local governments to pursue REDD at the local level. The authority transferred from the central to local level is a delegated authority, which does not create discretionary power for local governments (Ribot, 2003). The local governments have no authority to refuse participation in the scheme even when they do not consider REDD beneficial for their localities.

The implementation of REDD under *Option One* does not require extensive resources and time for project development. As reference levels and measures are formulated and prescribed by the central government, intensive consultation and political negotiation processes between the national and local governments may not be necessary. Local governments only execute instructions provided by the central government. This approach would reduce the risk of leakage due to the participation of all local governments in the scheme. However, the implementation could be hampered by lack of meaningful participation or resistance from the local governments. Local preferences,

FIGURE 2 Roles of different governmental levels in the implementation of REDD



as well as socio-economic needs and conditions, may also be neglected during the development of REDD policies and measures at the central level. The implementation of REDD under this approach carries, therefore, a risk that it might look good on paper without addressing the actual causes of land use change at the local level.

In *Option Two*, the central government decides on a national reference level and seeks expressions of interest from local governments. This option resembles a bidding process. The expressions of interest are to be submitted together with project proposals consisting of measures that will be performed by local governments to reduce land use change within their jurisdictions. On the basis of the concept proposed by Boucher (2008) for REDD payment distribution at the global level, two possible options for the ‘bidding mechanism’ under this arrangement include:

- the national government establishes a price for every unit of emission reduction achieved at the local level so local governments are only requested to submit their expected targets of emission reductions within their localities; or
- local governments are requested to state the amount of compensation that they are willing to accept for every unit of emission reduction.

Under the latter mechanism, the amount of compensation per unit of reduced emission will vary between localities. At the end of the ‘bidding’ process, the national government

compiles the proposed reference levels and modifies, if needed, the original national reference level.

The implementation of *Option Two* would allow only interested local governments to participate in the REDD mechanism. Local governments would need to assess the social costs and benefits of REDD implementation. They could then decline to participate if the REDD mechanism was not considered beneficial for their localities. This may eventually lead to a higher level of participation and acceptance from local stakeholders. This approach could be expected to increase competition between the localities in the implementation of REDD. One of the important rationales of decentralization is to increase competition and foster innovation at the local level through breaking down the government into subnational entities (Oates 1991).

However, the issue of leakage is more problematic under this approach. This issue is evident when a local government refuses to partake in REDD and allows land use change to take place in the locality while other localities tighten up their policies to reduce deforestation (Myer 2007). Leakage could lead to an insignificant reduction in emissions in the country as a whole. As a result, the local governments who decide to implement measures to reduce land use change may not receive payments. It is unlikely that the national government will take on the burden of providing the payments to the performing local governments in the

absence of international REDD funding. In order to address this issue, a robust enforcement and monitoring system needs to be implemented to avoid national leakage. This system would involve setting reference levels for participating and non-participating local government areas. Under this scenario, the non-participating local governments would not be allowed to exceed their reference levels and could be punished with fines if the established reference levels are exceeded. In order to avoid leakage, the local government that would not commit to reductions would still have to be accounted for in the scheme.

In *Option Three*, the central and local governments jointly decide on a national reference level and the local governments implement REDD measures based on their own proposals. The implementation process under the proposed option would apply a bottom-up model. This model views policy implementation from the perspective of the targeted population and local governments as service providers at the local level (Matland and Richard 1995). The national government would devise a national program at the macro-implementation level such as establishing strict rules and regulations on illegal logging prevention and sustainable forest management. Local governments, at the micro-implementation level, would then develop their own programs to ensure the implementation of the national rules and regulations in their localities. The implementation of REDD under this approach would ensure the widest participation and acceptance from local stakeholders. Participation of local stakeholders in the development of REDD strategies or policies is possible when the planning process is conducted at the lowest governmental level. Local stakeholders, who will be directly impacted by REDD policies and measures, are often geographically distant from national authorities. When the planning process is devolved to the local level, local voices and socio-economic conditions are more likely to be taken into consideration in the development and implementation of REDD.

Under *Option Three*, the issue of leakage is also persistent given that some local governments might choose not to participate following the consultation process. The solution to the leakage problem would be the same as in *Option Two*. Moreover, REDD implementation under this option may require significant resources and time to be allocated to the consultation and planning process. There is, however, lack of precise information related to time and

resources required to complete bottom-up land use planning processes. Studies examining the process of local land-use planning in developed countries show that it is a complex process (e.g. Tang and Brody 2008). A high quality plan requires professional technical planners with specified skills and experience. The development of local governments' capacity to prepare high quality land-use plans would be necessary, although in some decentralized countries, such as Indonesia, local governments already carry out land use planning functions.

Each of the options presented above has its advantages and disadvantages, which are summarized in Table 2. Under all the options discussed, the implementation of REDD is conducted together between the national and local governments. Local governments are not operating independently from the national government. According to ongoing negotiations, a country that "authorizes private and public entities to participate in REDD measures shall remain responsible for the fulfilment of its obligations under the Convention" (UNFCCC 2009b: 128). In return, the national government will receive REDD revenue, a share of which would need to be allocated to local governments and possibly other stakeholders.

#### Fiscal instruments for REDD revenue distribution

The distribution of revenue generated from REDD can utilize intergovernmental fiscal instruments that are commonly applied within decentralized countries. Two intergovernmental fiscal instruments that can be utilized are a revenue sharing mechanism and an intergovernmental transfer. Both options entail different characteristics related to the distribution formula used and the conditionality on how the funds could be spent by local governments.

A revenue-sharing mechanism is usually implemented to distribute between the national and producing local governments revenue generated from the extraction of natural resources. Revenue generated from REDD are similar to revenue generated from any other forest commodity traded on the market such as timber. The central government would keep a portion of revenue to perform REDD related measures at the national level. These measures might include:

- assuming liability;
- monitoring and reporting;
- performing law enforcement related to the implementation

TABLE 2 Summary of advantages and disadvantages of options for the subnational implementation of REDD

	Advantages	Disadvantages
Option 1	<ul style="list-style-type: none"> <li>• Less resources and time required for project development</li> <li>• Easy to monitor due to complete participation of all localities in host countries</li> </ul>	<ul style="list-style-type: none"> <li>• More resistance from the local governments to participate</li> <li>• Higher risks of mis-targeting the causes of deforestation</li> </ul>
Option 2	<ul style="list-style-type: none"> <li>• A compromised approach between Option 1 and 3</li> <li>• Increase competition amongst local governments</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to monitor and require robust enforcement systems to prevent leakage</li> <li>• Difficult to monitor and require robust enforcement systems to prevent leakage</li> </ul>
Option 3	<ul style="list-style-type: none"> <li>• More acceptance from local governments</li> <li>• Promote capacity building of local actors</li> </ul>	<ul style="list-style-type: none"> <li>• More resources and time required for project development</li> </ul>

- of REDD; and
- financing national policies required to address the drivers of deforestation.

Other than to finance these measures, the revenue generated would need to be returned to producing areas, and local governments would have the liberty to decide how they spend the revenue generated. The amount of revenue distributed across governmental levels is usually determined on the basis of political negotiations between the national and local governments. This process would benefit, however, by an assessment of the opportunity and transaction costs faced by local stakeholders and various governmental levels.

REDD revenues can also be distributed using an intergovernmental fiscal transfer. One of the many purposes of an intergovernmental fiscal transfer is to internalize spatial externalities associated with the provision of public services and goods at the local level. The prescription proposed by Pigou to rectify the spatial externalities is that: "in the case of external benefits, the economic unit generating the spillover should receive a unit subsidy equal to the value at the margin of the spillover benefits it creates" (Oates 1972: 66). The implementation of intergovernmental transfers from national to local governments to create incentives for biodiversity conservation has been implemented in Brazil and Portugal and proposed in several countries such as Switzerland, Germany and India (Köllner *et al.* 2002, May *et al.* 2002, Ring 2008b, Ring 2008c, Kumar and Managi 2009).

Another important element in the design of intergovernmental transfers is the conditionality factor that regulates how the transfer should be spent at the local level. The conditionality factor of intergovernmental fiscal transfers can be classified as expenditure and performance conditionality (Bird 2001). Expenditure conditionality ensures that funds are spent on specified services. In contrast, performance conditionality focuses on outputs or the achievement of policy objectives and not merely on the increase of local expenditures. A conditional transfer requires the recipients to provide a particular good or service at a specified level corresponding to the fiscal transfer (Bird 1999). The transfer does not provide any freedom for the local governments to spend the transferred funds. In contrast, an unconditional transfer allows the recipients to manage the fund according to the recipient's set of priorities without any restriction. The main purpose of an unconditional transfer is to create an income effect for the local governments and to ensure regions have adequate resources to provide goods and services (Bird 2001).

The expenditure conditionality of REDD transfers from the national to local governments depends on various components of REDD payment. If local governments are not constrained by the centrally pre-determined obligation to sustain forest conservation, the forgone earnings from other land-use alternatives will be considered as local revenue generated by the localities. Based on this argument, REDD payments to compensate the opportunity costs would merely have the objective of increasing the income of local governments, hence, they should be treated as

an unconditional transfer. On the other hand, a portion of REDD revenues needs to be transferred with a set of prescribed measures particularly related to management costs at the local level, including purchasing equipment, building necessary infrastructure, performing monitoring activities and pursuing community development activities. This will ensure that the funds are further channelled to finance conservation policies and measures as part of the efforts to reduce emissions at the local level. Furthermore, in terms of performance conditionality, fiscal transfers to distribute REDD revenues need to be made conditional on the achievement of emission reductions. Most of the REDD funding would be distributed only after local governments achieved the promised targets of avoided deforestation and forest degradation within their localities. The funding required to set up the necessary infrastructure to achieve emission reductions could be paid in advance.

REDD revenues aimed at compensating for opportunity costs could be distributed using a revenue-sharing mechanism or an unconditional transfer. The conditional component of REDD payment, such as management costs, could be transferred using a conditional fiscal transfer. Using a conditional transfer scheme to transfer the management costs allows the national government to provide upfront financing for local governments. The upfront financing needs to carry precise prescriptions as to how local governments should spend the funding to avoid misuse of funds.

#### CHOOSING BETWEEN OPTIONS OF LOCAL GOVERNMENTS' INVOLVEMENT IN REDD IMPLEMENTATION

In order to select the preferred option for the implementation of REDD at the subnational level, the existing political and administrative conditions within participating countries should be taken into consideration. The choice between top-down and bottom-up models can be weighed on the basis of policy conflict and policy ambiguity (Matland and Richard 1995). Policy conflicts exist when a particular group within a country perceives a policy as relevant to its interest while others oppose it. Forest conservation has always been hampered by conflict with other land-use changes driven by the demand for food, fuel and profit (Agrawal *et al.* 2008). Furthermore, policy ambiguity is caused by the uncertainties of policy goals and the uncertainties of the roles of various organizations during the implementation process. The implementation of REDD within host countries will most likely be influenced by high policy ambiguity, particularly during the initial stages. A REDD mechanism involves many new technical concepts such as how to address leakage, non-permanence and reference levels. Initial, and possibly persistent, policy ambiguity can be expected at the implementation level.

In countries where both policy conflict and policy ambiguity are low, a top-down model will be a feasible option. Under a top-down model of REDD implementation, such as Option One, the national government needs to have

sufficient information, resources and enforcement power to implement a policy. The local governments will have a clear idea of their tasks and responsibilities if the policy goals and means are clearly formulated. However, when conflicts amongst stakeholders cannot be resolved, compliance will not occur automatically and coercive mechanisms would be necessary to ensure the compliance of local governments. As policy ambiguity negatively correlates with policy conflict, high policy ambiguity usually minimizes policy conflict (Matland and Richard 1995). Implementation of Option Three would be suitable under high policy ambiguity. In the bottom-up model, the implementation process should be seen as an opportunity to learn new means and new goals. However, the implementation under this approach will only be possible if host countries have the flexibility, both in terms of time and resources, to implement REDD during the initial phase.

Capacity development is also a crucial factor for the successful implementation of REDD under all options. Implementation under Option Three would require more resources for capacity development because the authority devolved to the local level ranges from the planning to the implementation process. The concern of low capacity is considered less complicated for REDD implementation under Option One and Option Two. Under Option One, local governments will only implement measures that are prescribed by the central government, therefore, the planning process is conducted by the national government. Moreover, REDD implementation under Option Two would encourage local governments with sufficient capacity to respond first to the bidding process. A national coordinating body is required to address all aspects of implementation including strengthening institutional capacity of all stakeholders including subnational governments (UNFCCC 2009b).

Furthermore, selection of the preferred option also needs to consider the outcome of the ongoing negotiations, particularly related to the time-frame of REDD implementation. Based on the ongoing negotiations, the implementation of REDD could be divided into three phases as already discussed (UNFCCC 2009b). The negotiations may result, however, in a mechanism that does not provide participating countries with any upfront payment nor allow flexibilities during the initial preparation phase. If the agreed REDD mechanism disburses the REDD payment only after emission reductions are achieved, the national government might need to allocate internal resources to prepare and kick off the REDD scheme in their countries. This action would require a more simplified process that does not involve high transaction and management costs, particularly during the process of developing national reference levels. For this reason, Option One or Option Two would then be feasible. However, if funds were available upfront along with a flexible time-frame that allowed a more thorough preparation, host countries could then opt for Option Three allowing meaningful participation of stakeholders at all levels.

## CONCLUSION

Participation of the sub-national level is important to ensure the successful implementation of REDD. Modes of local governments' involvement can vary depending on the degree of authority devolved to the local level. Adopting a top-down model to REDD implementation, such as Option One, would enable the national government to address the issue of leakage within a country using a more straightforward approach because all local governments are expected to participate in the REDD scheme. However, local socio-economic conditions may be neglected in the development of REDD policies and measures; and the actual causes of deforestation would not be addressed properly at the local level. The bottom-up approach to REDD implementation, such as Option Two and Three, would increase the perceived legitimacy of a REDD scheme among local governments and would also enable decision-makers to identify and address specific causes of deforestation at the local level. Nevertheless, the risks of leakage are more significant under these options, which require a robust monitoring and enforcement system to be put in place to limit emissions generated by the non-participating local governments to their reference levels. This system would involve setting up reference levels for non-participating local governments and the impositions of fines on local governments who exceed the established reference level.

There is no one-fits-all solution, therefore, the preferred option for REDD implementation in decentralized countries needs to be assessed on the basis of the political and administrative structures as well as the existing capacity of a country.

## ACKNOWLEDGEMENTS

An earlier draft of this paper was presented at the conference 'Climate Change: Global Risks, Challenges & Decisions', University of Copenhagen, 10-12 March; we appreciate the comments provided by the participants at the panel. We also thank four anonymous reviewers for their constructive comments. This paper benefited from funding from the Australian Centre for International Agricultural Research project FST/2007/052 'Improving governance, policy and institutional arrangements to reduce emissions from deforestation and degradation (REDD)'. The views expressed in this paper do not necessarily represent those of the organizations associated with that project.

## REFERENCES

- AFRICA RESEARCH BULLETIN. 2008. Democratic of Congo: decentralisation law. *Africa Research Bulletin: Political, Social and Cultural Series* 45 (1): 17381C-17382A.
- AGRAWAL, A., CHHATRE, A. and HARDIN, R. 2008. Changing governance of the world's forests. *Science*

- 320:1460-1462.
- ANDERSSON, K.P., GIBSON, C.C. and LEOUCQ, F. 2004. The politics of decentralized natural resources governance. *Political Science & Politics* 37: 421-426.
- ANGELSEN, A. 2008. REDD models and baselines. *International Forestry Review* 10 (3): 465-475.
- BAHL, R. 1999. Implementation rules for fiscal decentralization. International Studies Program Working Paper 99-1. Andrew Young School of Policy Studies, Georgia State University. Atlanta.
- BIRD, R.M. 1999. Transfer and incentives in intergovernmental fiscal relations. The World Bank. <http://info.worldbank.org/etools/docs/library/128836/Bird%201999%20transfer.PDF>
- BIRD, R.M. 2001. Intergovernmental fiscal relations in Latin America: policy design and policy outcomes. Inter-American Development Bank. Washington D.C. <http://www.iadb.org/sds/doc/Intergovernmentaltotal.pdf>
- BIRD, N. 2005. Considerations for choosing an emission target for compensated reductions. in MOUTINHO, P. and SCHWARTZMAN, S. (eds.) Tropical deforestation and climate change. Instituto de Pesquisa Ambiental da Amazônia, Washington DC.
- BOUCHER, D. 2008. Out of the woods: a realistic role for tropical forests in curbing global warming. Union Concerned Scientists, Cambridge.
- BRÄUTIGAM, D. 2002. Building Leviathan: revenue, state capacity and governance. *IDS Bulletin* 33 (3): 10-20.
- CHEEMA, G.S. and RONDINELLI, D.A. 1983. Decentralization and development policy implementation in developing countries. Sage. Beverly Hills.
- DALLE, S.P., DE BLOIS, S., CABALLERO, J. and JOHNS, T. 2006. Integrating analyses of local land-use regulations, cultural perceptions and land-use/land cover data for assessing the success of community-based conservation. *Forest Ecology and Management* 222: 370-383.
- DAVOODI, H. and ZOU, H. 1998. Fiscal decentralization and economic growth: A cross-country study. *Journal of Urban Economics* 43: 244-257.
- DE MELLO, L.R. 2000. Fiscal decentralization and intergovernmental fiscal relations: a cross-country analysis. *World Development* 28 (2): 365-380.
- FAO (FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS). 2006. Global forest resource assessment 2005: progress toward sustainable forest management. FAO Forestry Paper 147. Rome.
- FOLLESDAL, A. 1998. Survey Article: Subsidiarity. *Journal of Political Philosophy* 6 (2): 190-218.
- JOHNS, T., MERRY, F., STICKLER, C., NEPSTAD, D., LAPORTE, D. and GOETZ, D. 2008. A three-fund approach to incorporating government, public and private forest stewards into a REDD funding mechanism. *International Forestry Review* 10 (3): 458-464.
- KÖLLNER, T., SCHELSKE, O. and SEIDL, I. 2002. Integrating biodiversity into intergovernmental fiscal transfer based on cantonal benchmarking: a Swiss case study. *Basic and Applied Ecology* 3: 381-391.
- KUMAR, S. and MANAGI, S. 2009. Compensation for environmental services and intergovernmental fiscal transfer: the case of India. *Ecological Economics* 68: 3052-3059.
- LARSON, A.M. 2003. Decentralization and forest management in Latin America: towards a working model. *Public Administration and Development* 23: 211-226.
- LAMBIN, E.F., TURNER, B.L., GEIST, H.J., AGBOLA, S.B., ANGELSEN, A., BRUCE, J.W., COOMES, O., DIRZO, R., FISCHER, G., FOLKE, C., GEORGE, P.S., HOMEWOOD, K., IMBERNON, J., LEEMANS, R., LI, X., MORAN, E.F., MORTIMORE, M., RAMAKRISHNAN, P.S., RICHARDS, M.B., SKÅNES, H., STEFFEN, W.L., STONE, G.D., SVEDIN, U., VELDKAMP, T.A., VOGEL, C. and XU, J. 2001. The causes of land-use and land-cover change: moving beyond the myths. *Global Environmental Change* 11: 261-269.
- MASCIA, M.B., BROSIUS, J.P., DOBSON, T.A., FORBES, B.C., HOROWITZ, L., MCKEAN, M.A. and TURNER, N.J. 2003. Conservation and the social sciences. *Conservation Biology* 17: 649-650.
- MATLAND, A and RICHARD, E. 1995. Synthesizing the implementation literature: the ambiguity-conflict model of policy implementation. *Journal of Public Administration Research and Theory* 5 (2): 145-174.
- MAY, P.H., VEIGA NETO, F., DENARDIN, V. and LOUREIRO, W. 2002. Using fiscal instruments to encourage conservation: municipal responses to the 'ecological' value-added tax in Parana and Minas Gerais, Brazil. In PAGIOLA, S. BISHOP, J. LANDELL-MILLS, N. (Eds.) Selling forest environmental services: market-based mechanisms for conservation and development. Earthscan, London, pp. 173-199.
- MERIDIAN INSTITUTE. 2009. Reducing emissions from deforestation and forest degradation (REDD): an options assessment report. Meridian Institute. Norway.
- MOLLICONE, D., ACHARD, F., FEDERIC, S., EVA, H., GRASSI, G., BELWARD, A., RAES, F., SEUFERT, G., STIBIG, H.J., MATTEUCCI, G. and SCHULZE, E.D. 2007. An incentive mechanism for reducing emissions from conversion of intact and non-intact forests. *Climatic Change* 83 (4): 477-493.
- MYERS, E.C. 2007. Policies to reduce emissions from deforestation and degradation (REDD) in tropical forests: an examination of the issues facing the incorporation of REDD into market-based climate policies. Resource for Future Discussion Paper 07-50. Washington D.C.
- OATES, W.E. 1972. Fiscal federalism. Harcourt Brace Jovanovich. New York.
- OATES, W.E. 1991. Studies in fiscal federalism. Elgar Pub. England.
- OYONO, P.R., RIBOT, J.C., ASSEMBE, S. and LOGO, P.B. 2007. Improving decentralized forest management in Cameroon: options and opportunities from ten years of experience. Center for International Forestry Research (CIFOR). Bogor, Indonesia.
- PARKER, C., MITCHELL, A., TRIVEDI, M. and MARDAS,

- N. 2008. The little REDD book: a guide to governmental and non-governmental proposals to reducing emissions from deforestation and degradation. Global Canopy Programme. Oxford.
- PORRÙRA, M.E., CORBERA, E. and BROWN, K. 2007. Reducing greenhouse gas emissions from deforestation in developing countries: revisiting the assumptions. Working Paper 115, Tyndall Centre for Climate Change Research, UK.
- RIBOT, J.C. 2003. Democratic decentralisation of natural resources: institutional choice and discretionary power transfers in Sub-Saharan Africa. *Public Administration and Development* 23 (1): 53-65.
- RIBOT, J.C., AGRAWAL, A. and LARSON, A.M. 2006. Recentralizing while decentralizing: how national governments reappropriate forest resources. *World Development* 34 (11): 1864-1886.
- RING, I. 2008a. Biodiversity governance: adjusting local costs and global benefits. In SIKOR, T (ed.) Public and private in natural resource governance: a false dichotomy? Earthscan. London.
- RING, I. 2008b. Compensating municipalities for protection areas: fiscal transfer for biodiversity conservation in Saxony, Germany. *GAIA* 17: 143-151.
- RING, I. 2008c. Integrating local ecological services into intergovernmental fiscal transfers: the case of the ecological ICMS in Brazil. *Land Use Policy* 25: 485-497.
- ROS-TONEN, M.A.F., VAN ANDEL, T., MORSELLO, C., OTSUKI, K., ROSENDO, S. and SCHOLZ, I. 2008. Forest-related partnerships in Brazilian Amazonia: There is more to sustainable forest management than reduced impact logging. *Forest Ecology and Management*, 256: 1482-1497.
- SASU, P. 2005. Decentralization of federal forestry systems in Ghana. In: PIERCE COLFER, C.J. CAPISTRANO, D. (eds.) The politics of decentralization: forests, power and people. EarthScan. London.
- SANTILLI, M., MOUTINHO, P., SCHWARTZMAN, S., NEPSTAD, D., CURRAN, L. and NOBRE, C. 2005. Tropical deforestation and the Kyoto Protocol: an editorial essay. *Climate Change* 71: 267-276.
- SCHLAMADINGER, B., CICCARESE, L., DUTSCHKE, M., FEARNSIDE, P.M., BROWN, S. and MUDIYARSO, D. 2005. Should we include avoidance of deforestation in the international response to climate change? In: MOUTINHO and P. SCHWARTZMAN, S. (eds.) Tropical deforestation and climate change. Instituto de Pesquisa Ambiental da Amazônia. Washington DC.
- TACCONI, L. 2007. Decentralization, forests and livelihoods: theory and narrative. *Global Environmental Change* 17 (3-4): 338-348.
- TANG, Z. and BRODY, S.D. 2009. Linking planning theories with factors influencing local environmental-plan quality. *Environment and Planning B: Planning and Design* 36: 522 - 537.
- THE WORLD BANK. 1997. World Development Report 1997: the state in a changing world. Oxford University Press. Oxford.
- TIEBOUT, C.M. 1956. A pure theory of local expenditure. *The Journal of Political Economy* 64 (5): 416-424.
- UNFCCC. 2007. Report on the second workshop on Reducing Emissions from Deforestation in Developing Countries. SBSTA. FCCC/SBSTA/2007/3: 18.
- UNFCCC. 2009a. Copenhagen Accord. Draft Decision CP15. FCCC/CP/2009/L.7.
- UNFCCC. 2009b. Revised negotiating text, ad hoc working group on long-term cooperative action under the convention, sixth session held in Bonn from 1 to 12 June 2009. FCCC/AWGLCA/2009/INF.1.