FORESTS AND CLIMATE CHANGE POLICY

The research presented in this report demonstrates that the forests of the Congo Basin play a crucial role in maintaining the local, regional and global climate. This is because of their role in the carbon cycle – the region's forests are a sink of an estimated 24-39 Gt of carbon, and current deforestation rates are estimated to be releasing 0.02-0.44 Gt of carbon per annum. Furthermore, they are an important driver of atmospheric circulations, the exchange of energy and water between the forests and atmosphere influencing regional and global weather systems.

The potentially grave consequences of climate change raise the stakes in terms of forest conservation. The question now is what policy measures could be used to reduce deforestation and thus limit the impact of land-use change on the global climate. In recent years, this has been addressed within the context of the international climate regime, where the potential of using carbon financing mechanisms as an incentive to reduce deforestation is being discussed. It has been proposed that such an approach would not only provide substantial sources of funds for forest conservation but could also provide a relatively cheap means of reducing greenhouse gas emissions.

CURRENT POLICY SITUATION

The most direct means of reducing carbon emissions from the Congo Basin's forests would be through reform of the regulatory framework – in all countries of the region, current policies strongly favour industrial forest exploitation. In the case of DRC, up to 60 million hectares of forest could be opened up to mostly new industrial logging activities[9], potentially releasing an additional 3 to 6 Gt C into the atmosphere over the period in which the forest was logged[10]. A further similar amount could be released if these logged forests are eventually completely cleared – the usual pattern following forest degradation and fragmentation.

Clearly, any developments which increase the area under industrial logging are likely to run counter to global efforts to prevent climate change. However, the political reality in countries such as DRC is that expectations of increased wealth from forest exploitation have already been raised – and so there will be pressure for these short-term financial gains to be realised. Therefore, the question arises of what other policy and financial mechanisms would be needed to accompany any restrictions on industrial forest exploitation.

Under the current climate change regime, there is no incentive for developing countries to reduce their own emissions from deforestation (or any other source), since under the Kyoto Protocol no national baselines have been set for these countries. Furthermore, the mechanisms by which developed countries can support measures to reduce or avoid emissions in the forestry sector of developing countries are extremely limited.

Within the Kyoto Protocol, Annex 1 (developed) countries can obtain carbon credits by investing in energy and forestry projects. This can be done through the Joint Implementation (JI) mechanism for projects within Annex 1 countries, these including reforestation and afforestation projects and also forest management. Alternatively, under the Clean Development Mechanism (CDM), Annex 1 countries can support projects in non-Annex 1 (developing) countries. However, under this latter mechanism forestry projects are limited to reforestation or afforestation initiatives while forestry management and conservation projects are excluded (Locatelli & Karsenty, 2004).

Proposals to include forestry management and conservation within the next commitment

[9] See, for example, World Bank (2002) Democratic Republic of Congo, Mission de Suivi Sectoriel. 17-27 April 2002.
[10] Based on a loss of 25-50% of carbon (due to forest degradation - see table 2), and a conservative estimate of the average biomass density of 200 t C / ha. x 60 million hectares.

period are currently being discussed within the framework of the United Nations' Framework Convention on Climate Change (UNFCCC)[11]. Such an approach would not only make the scheme more equitable for developing countries (since forestry management projects would then also be allowable here), but could potentially provide them with a significant means of funding sustainable forest management. It would also remove the perverse incentive for deforestation which currently exists – in theory at least – as with no incentive for forest conservation, landowners could decide to clear a forest in order to obtain funding for reforestation (Niesten et al., 2002; Peskett et al., 2006b). A final benefit is that it would bring developing countries into the international climate change mitigation efforts – important not only because they are a significant source of emissions, but also politically, as nations seek an equitable means of progressing on this issue beyond the current Kyoto Protocol commitments (Peskett et al., 2006b; Skutsch et al., 2006).

ACCOUNTING FOR FORESTS AND CARBON

Thanks to the Kyoto Protocol and European Emissions Trading Scheme (ETS) there exists a market in carbon, and so it has a monetary value. Consequently, a price can be put on the costs of deforestation, or conversely, the benefits of forest conservation.

For example, a recent valuation of CO^2 within the EU was US$ 20 per ton (over US$ 70 per t C)[12]. If 1 hectare of tropical forest contains the equivalent of 500 t CO^2, (or 136 t C) this gives it a value of US$ 10,000 (Chomitz, 2006). Alternatively, if prices were as high as US$ 35-50, as was assumed in the Stern report (2006), then the value would be US$17,500-25,000 per hectare. In contrast, forests are often cleared for agricultural land which may only be worth a few hundred dollars per hectare and perhaps generating up to US$ 1000 from one-off timber sales. Based on the profitability of the particular land-use system that replaces a forest, the opportunity costs of forest conservation can be calculated. One estimate placed this at between US$ 3-11 / t C (Chomitz, 2006), while a study of 8 tropical countries produced slightly higher estimates, of US$ 7 – 37 / t C, with an average value of US$ 13 (Grieg-Gran, 2006)[13].

These figures would suggest that paying countries to prevent deforestation would provide a relatively cheap means of mitigating climate change. On the basis of his estimates, Chomitz (2006) calculated that relatively modest carbon prices, of perhaps US$ 5-10 could deter forest conversion of 1-2 million km2 of forest by 2050, so preventing the release of 8-15 Gt C, while a price of US$ 100 would promote the conservation of 5 million km2 of forest, equivalent to 47 Gt C. (As a comparison, the average price of carbon under the CDM was about US$ 25 per tonne in 2005 (Grief-Gran, 2006).) At the same time, such a system could generate significant amounts of money for developing countries. For example, one estimate suggests that such initiatives could be worth between US$ 179 million and US$ 1.278 billion to DRC (Mongabay, 2006)[14].

OPTIONS FOR CARBON FINANCING MECHANISMS

There exist numerous proposals for establishing a mechanism to reduce carbon emissions from forestry, with a range of methodological and technical differences. These entail the payment of incentives for 'avoided deforestation' – an approach that has been termed 'compensated reduction' (Moutinho & Schwartzman, 2005; Santilli et al., 2005; Skutsch et al., 2006; Streck & Scholz, 2006).

In essence, compensated reduction would involve a country making a commitment to targets to reduce their greenhouse gas emissions from deforestation below a national baseline, this based on their historic emissions

[11] For example, see details of a recent workshop at: http://unfccc.int/methods_and_science/lulucf/items/3745.php
[12] 1 g C = 3.664 g CO^2
[13] The 8 countries were: Cameroon, DRC, Ghana, Brazil, Bolivia, Indonesia, Malaysia, Papua New Guinea.

from deforestation. Any reduction below this level would enable emissions reductions credits to be issued, which could be traded within international carbon markets. Payments would be made at the end of the commitment period, or if the targets were not met, a mandatory cap on emissions would be imposed in a subsequent commitment period (Peskett et al., 2006a).

Recent discussions on this issue were reinvigorated by a proposal for such a scheme presented to the UNFCCC by Papua New Guinea and Costa Rica (on behalf of a group of developing countries termed the 'Coalition for Rainforest Nations') (UNFCCC, 2005). This, and other proposals, are now being considered by the Convention's Subsidiary Body for Scientific and Technological Advice (SBSTA).

OTHER FINANCIAL MECHANISMS

Linking forest conservation with the international climate regime, and more specifically, with the carbon trading system, has the benefit that there is the potential to tap into large amounts of finance. However, the disadvantage is that it is dependent on international negotiations, which typically are incredibly slow and usually result in political compromise rather than the most practical or effective solutions. Indeed, the earliest such a mechanism could now be established within the Kyoto Protocol would be for the next commitment period of 2013-2017.

Even if such a regime is established, experience with the CDM raises doubts as to the impact it would actually have. To date, very few projects have been established under this latter mechanism in developing countries, particularly within Africa, in part because of the high transaction costs involved (Desanker, 2005; Jindal, 2006; Peskett et al., 2006a).

An alternative approach would be to establish a system outside of the Kyoto Protocol, countries agreeing to voluntary targets for reducing their emissions. Activities to achieve these goals could be financed through an international fund, established for this purpose, or alternatively, from contributions made on a bilateral or perhaps multilateral basis – through grants, loans, etc. (Lanchberry, 2006; Morgan et al., 2005). For example, Brazil has suggested that such a fund could be paid for with voluntary contributions from developed countries (Stern, 2006), an approach that has received support from the Congo Basin countries (UNFCCC, 2006c). Alternatively, an independent market for carbon credits could be established (but not ones that could be traded within the Kyoto system), or a system of 'forest' or 'biodiversity' credits could be devised – for example, based on the area of forest protected. Such a market could be paid for by the private sector, for example, companies wishing to invest in forestry projects linked to corporate social responsibility or other goals (Stern, 2006).

Indeed, there is a rapidly expanding voluntary market, which includes schemes initiated by institutions to deal with their own emissions as well as those of companies who sell carbon offsets as a service to other companies or individuals (Peskett et al., 2006a). This has already proved to be a significant source of financing for conservation initiatives, and could either be an alternative to a Kyoto based scheme, particularly for the short-term while international negotiations are ongoing, or it could operate in parallel.

The disadvantage of this is that there is less money available than if the global market for carbon credits is tapped into. In addition, there is a higher risk of leakage if a project-based approach is taken, as has developed within the voluntary market – i.e. that deforestation or unsustainable forest practices will simply be shifted from a project site to another area. However, this can be minimised if the projects are placed within the framework of a national strategy. Indeed, regardless of where funding comes from, effective national systems are

[14] This estimate was based on a carbon price of US$ 20. The calculation was made simply from FAO's estimates of annual carbon emissions from deforestation during 2000-2005 – the rate of deforestation was estimated at 320,000 ha./yr., releasing an estimated 45-64 million tons of carbon. Therefore, the total values represent the amount that could be 'earned' if all current carbon emissions from deforestation were to be stopped – an unrealistic scenario.

needed in order to translate international incentives for reduced deforestation into incentives for forest owners, and also for countries to monitor their forests and carbon emissions.

Some countries have already begun to implement national strategies, and Costa Rica is at the forefront of such efforts. Here, a national system for certified tradable offsets has been established, which includes forest conservation projects. The first offset was issued in 1997 to a consortium of the Norwegian government and private companies, representing a credit for 200,000 t of carbon offset, for a reforestation and forest conservation project (Forest Trends, n.d.; Rosenbaum, 2004).

In many countries there are an increasing number of project-based efforts. For example, in Bolivia a national park was established in 2000 through a partnership between the national government, conservation organisations and US energy companies. This is aimed at protecting 1.5 million acres of forest, which it is expected will reduce carbon emissions by 17.8 million tonnes over a period of 30 years (Winrock International, 2002). Similar initiatives have also been established in Brazil and Belize[15].

Projects such as this can be funded through grants, loans or debt for nature swaps. There are various other means by which governments can support conservation of their own forests, including tax concessions, incentive payments and subsidies (UNFCCC, 2006b). Financial incentives for sustainable forest management have been established in a number of countries. For example, in Costa Rica, tax concessions are provided for landowners who implement forest conservation – a policy aimed at promoting the full-range of environmental services provided by forests, and not just that of a carbon sink (Rosenbaum, 2004).

Initiatives such as these provide valuable experience as to how best to reduce deforestation, and means by which such efforts could be scaled up or replicated in more countries. Therefore, while discussions are ongoing within the UNFCCC, options to support forest conservation and sustainable management should continue to be explored.

THE CHALLENGES

These various options present both scientific and policy challenges if they are to be effective, feasible and equitable. These include methodological issues such as determining baselines and defining deforestation; and practical questions such as how to prevent leakage, either between projects or countries (i.e. the shifting of deforestation from a target project or country to another region) and how to ensure the permanence of forest conservation. If a system for compensated reduction is established, there are also questions such as how to compensate countries that already have low deforestation rates, and how to ensure that any carbon credits for avoided deforestation do not remove the incentive for taking action in other areas (e.g. reducing emissions from industrial sources).

There also remains the fundamental problem of how to reduce deforestation, which is the result of a complex of social, economic and political factors. Such efforts would have to address a variety of issues, including logging, agricultural expansion, infrastructure development, land tenure and other factors (Peskett et al., 2006b). As is noted above, in most countries of the region, industrial exploitation is a central element of forest policy, and indeed can play an important role in political patronage and corruption. Therefore, there are serious doubts as to whether the long-term substitution of these timber 'rents' with carbon financing would be sufficient to discourage logging activities. Any such mechanism would have to be very

[15] http://www.nature.org/initiatives/climatechange/work/art4253.html

carefully targeted, to ensure that the right decision-makers were reached.

This relates to the question of how any funding mechanism should be established – should international funds be paid to a national government or to individual projects or landowners, and what activities should be supported? If a project-based approach is taken, funders would perhaps be able to chose the types of project they support, and it could help to ensure that the funds are not diverted to other areas. However, the disadvantage of this is that there is a higher risk of leakage, since it does not facilitate a whole landscape or national approach being taken, and would not necessarily support the establishment of a national forestry strategy (Chomitz, 2006; Peskett et al., 2006b).

Many of these issues are discussed in detail in the literature, and so will not be considered here (Chomitz, 2006; Lanchberry, 2006; Moutinho & Schwartzman, 2005; Peskett et al., 2006b; Santilli et al., 2005; Skutsch et al., 2006; Streck & Scholz, 2006). Rather, discussion will be limited to those issues of particular concern in the context of the Congo Basin and of relevance to efforts to maintain the region's forests and their wider environmental and social values.

One fundamental issue is that the implementation of an effective, workable mechanism depends on being able to measure and monitor changes in forest area, and thus, to evaluate carbon emissions. Lack of data and understanding of these issues is a global problem, as has been highlighted in this report. However, the situation is particularly severe in the Congo Basin, where there are limited resources and capabilities for the necessary research and monitoring activities (Defries et al., 2005; Washington et al., 2004; 2006).

Therefore, significant investment is needed to build capacity. The proposed systems for carbon finance would result in payments for credits being paid at a later date – i.e. after there has been a reduction in deforestation. Therefore, raising the initial funding required is problematic and could present a financial barrier for many of these countries. This could be raised from financial institutions (such as the World Bank) or private sector finance could be sought, and these are valid options for the immediate term. Alternatively, a solution for the longer term could be to establish a mechanism by which developed countries could fund the required capacity-building programmes, claiming a percentage of the resulting emissions (thus, along similar lines to the current CDM) (Chomitz, 2006; Santilli et al., 2005; Skutsch et al., 2006).

The lack of data on land-use change and carbon flux is exacerbated by the fact that there remain no internationally accepted criteria or methodologies for assessing forest area and biomass, and thus, of carbon flux (Skutsch et al., 2006). One particular issue of concern is that many existing estimates of deforestation have taken insufficient account of forest degradation – this accounting for a significant proportion of the land-use change taking place within the Congo Basin, and consequently, representing an important source of carbon emissions in the region. One proposal for a system of carbon credits has been developed in which degradation is also accounted for. Achard et al. (2005) suggest that carbon credits could be calculated through monitoring not only the change from intact forest to non-forest (i.e. deforestation), but also that from intact to non-intact forest (i.e. degradation), as well as from non-intact forest to non-forest (deforestation). Non-intact forest is defined as forest which shows signs of human intervention, and under the proposed scheme would be assumed to contain 50% of the amount of carbon of the equivalent intact forest. While such an approach does present considerable practical problems – forest

degradation being difficult to assess – it would enable more realistic calculations of carbon emissions.

In addition, a more nuanced approach to the role of forests on climate is also needed. To date, most of the discussions on an international climate change regime have focused purely on the role of greenhouse gases, with little attention being given to the impact of land-cover change. For example, the Kyoto Protocol is only concerned with limiting greenhouse gas emissions and not with other anthropogenic effects on climate change. The research findings highlighted above demonstrate that a more holistic approach is needed, in which both the flux of CO^2 and changes in albedo and energy flow are incorporated. This would clearly be much more complex if a system for carbon credits were to be established that was fully exchangeable with those from fossil fuels, requiring an evaluation of the relative contribution of albedo, evapo-transpiration and surface roughness in relation to carbon emissions.

The feasibility of such an approach is uncertain, particularly given that some of these factors may operate synergistically while others may be counteractive. However, it would perhaps be possible within a system that was outside of the Kyoto protocol, for example, under a scheme for biodiversity or forest conservation credits. This needs further exploration, since focusing purely on carbon flux could result in land management decisions that do not in fact produce the intended climatic results (Marland et al., 2003; Pielke et al., 2002).

As well as greater consideration of the role of land-use effects, climate research also needs to focus more on local effects and on climate variability, rather than on global averages, which are cited in many studies. Thus, more data is needed on the way in which climate change could manifest itself at the local level, on seasonal and inter-annual time-scales, and also how climate variability would be affected (for example, changes in daily temperature ranges). It is such information that is of most significance for agriculture and non-timber forest products (for example, influencing fruiting patterns and species distribution). Furthermore, this shift in approach could also help prioritise climate research in Africa, which has been neglected here, perhaps in part because of the seeming distance between much climate research and immediate development priorities (Washington et al., 2006).

In addition to these methodological issues, there are a number of more general concerns related to equity, both between the various stakeholders in the forestry sector within a particular country (indigenous and rural peoples, timber and other forest-based industries, et al.), and also between developing and developed countries.

One issue is that in discussions of carbon financing, most attention is given to forest protection rather than looking more broadly at sustainable forest management. This is reflected in the use of terminology – for example, the term 'avoided deforestation' is widely used but this tends to imply strict conservation measures. Consequently, Peskett et al. (2006b) have suggested that the term 'reduced deforestation' is more appropriate. Whatever the terminology, the aim of such measures is to reduce carbon emissions, something that could be achieved not only through forest protection but also through facilitating traditional forest management systems – where these are found to be sustainable (Skutsch et al., 2006). In fact, there is evidence that recognition of traditional land rights promotes forest conservation – research in Brazil found that many indigenous reserves have prevented deforestation, even when they are located in frontier areas of agricultural expansion (Nepstad et al., 2006).

Forest-dependent peoples are at risk of losing

out under such mechanisms. For example, logging companies could end up being paid incentives not to log, while local people, who may have been using the forest sustainably, would receive nothing. Therefore, mechanisms need to be explored by which forest-dependent communities could be compensated for sustainable forest use, while also discouraging unsustainable practices (Skutsch et al., 2006).

With this in mind, caution is needed that governments do not adopt heavy policing policies of forest areas (as has been done in the past, either for timber production or conservation goals), and cut off the livelihood options of forest-dependent peoples (Peskett et al., 2006b). Indeed, there is a danger that any such scheme will result in primacy being given to the reduction of carbon emissions at the expense of all other forest values. In much of the Congo Basin, shifting cultivation has been practiced by Bantu farmers for several thousand years (Vansina, 1990). These agricultural systems have been broadly sustainable in ecological terms (Wilkie et al, 1998), and indeed, may have contributed to the present high forest structure (Willis et al, 2004). It would be ironic, if not environmentally and socially catastrophic, if such sustainable farming practices were to be proscribed on the basis that they result in carbon emissions.

A balanced approach is needed in which the full range of forest values is recognised, these including biodiversity and other environmental values, harvesting of forest products (both timber and non-timber), and the rights of forest-dependent peoples. To facilitate this, any system to mitigate the impact of deforestation on climate change must be part of a wider national forest strategy. This will enable the development of measures to reduce deforestation that are appropriate to the particular country, taking into account national priorities and circumstances.