Cheap but not easy: the reduction of greenhouse gas emissions from deforestation and forest degradation in Papua New Guinea

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Papua New Guinea has been a leader in international climate change forums in relation to deforestation, and domestic interest in carbon trading opportunities is growing. This article surveys the range of issues, international and national, that will need to be tackled if Papua New Guinea is to participate successfully in an international effort to reduce greenhouse gas emissions from deforestation and forest degradation. Getting the international and domestic building blocks in place will take time: reducing emissions from deforestation and forest degradation is often cheap, but that does not mean it will be easy. Better and more regular estimation of these emissions will be a critical first step. It is in Papua New Guinea’s interests to argue internationally against an exclusive focus on deforestation, and for a broader approach which also includes forest degradation and afforestation.

Papua New Guinea, which has the world’s tenth-largest primary forest cover (FAO 2005), has been a leader in international forums urging greater efforts towards reducing emissions from deforestation and forest degradation. A speech by the PNG Prime Minister in May 2005 gave birth to the Coalition for Rainforest Nations in Montreal in 2005, a proposal from the Governments of Papua New Guinea and Costa Rica, on behalf of the Coalition for Rainforest Nations (2005) initiated the Reducing Emissions from Deforestation and Degradation (REDD) process—a search for mechanisms for ‘compensating countries with carbon finance for reducing national rates of deforestation’ (Papua New Guinea and Costa Rica 2005).

The aim of this article is not to derive policy recommendations but to survey the range of issues that will need to be faced to turn the idea of reducing emissions into a firm opportunity in Papua New Guinea (see Kaluwin 2008 for a more general survey of climate change in relation to Papua New Guinea). Worldwide, emissions from deforestation and forest degradation are thought to be large and cheap to reduce. If there is a conclusion to this analysis it is that, at least in Papua New Guinea, reducing these emissions might be cheap but it will not be easy. Various difficult obstacles will need to be overcome along the way.

The article first summarises the global case for reducing forest-related emissions and the various proposals to achieve this goal, and then turns to PNG-specific issues. Throughout, emissions from afforestation, deforestation and forest degradation (and management) are referred to as greenhouse gas emissions from land-use change and forestry, or LUCF emissions.

Global perspectives and proposals

The global importance of reducing LUCF emissions has been stressed in recent years for three main reasons. First, the size of these emissions makes them too large to ignore. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) puts emissions from deforestation and related sources at about 17 per cent of total global emissions (Metz et al. 2007).

Second, the costs of reducing LUCF emissions are thought to be on average very low. An influential study carried out for the Stern Review (Grieg-Gran 2006) examined the cost of reducing emissions from deforestation for eight countries that together were responsible for 70 per cent of land-use emissions. The study finds that: ‘if all deforestation in these countries were to cease, the opportunity cost would amount to around US$5–10 billion annually (approximately US$1–2 [per tonne of carbon dioxide] on average)’ (Stern 2007:245). Not all studies give the very low costs of the Stern Review, and opportunity costs of preserving forests will vary greatly between sites (for a recent survey, see Boucher 2008). The general message, however, that ‘forestry can make a very significant contribution to a low-cost global mitigation portfolio’ is one endorsed by the IPCC on the basis of its survey of forestry-related cost studies (Metz et al. 2007), which found that 60 per cent of all economic potential for avoiding deforestation would carry costs below US$20 per tonne of carbon dioxide.

Third, developing countries have already shown that reduction in LUCF emissions is possible. China and India have increased their forest cover in recent years. Though there are good reasons for the world to reduce forestry-related emissions, the global climate change mitigation regime currently provides no incentive for individual countries to act in this direction. Most deforestation and forest degradation occurs in developing countries. Under the Kyoto Protocol, developing countries do not have national targets for emissions reduction. They engage in the international mitigation regime only through the Clean Development Mechanism (CDM), which provides credits for projects that reduce emissions; but the focus of the CDM is on industrial emissions. Due to a lack of agreement on how to treat LUCF emissions, the CDM explicitly excludes deforestation projects and has very strict rules relating to the inclusion of afforestation projects.

It is not surprising therefore that the search for a mechanism to include developing-country LUCF emissions in the global climate change mitigation process has generated substantial interest and momentum. It has not yet, however, borne
fruit. The December 2007 Bali Action Plan (UNFCCC 2007) to guide negotiations on a post-Kyoto framework stresses the need for ‘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’. How this objective will be translated into an agreed, concrete approach is far from clear.

Conceptually, the many approaches to reducing LUCF emissions can be categorised along various lines. Some focus only on deforestation, some extend to forest degradation and some extend still further to include forest conservation. Some are market-based; others assume public funding. One useful categorisation divides the various possible approaches into three types: those that take a project approach; those that take a national approach; and those that take a sectoral approach. The following sections explain and illustrate these different approaches. (The intention is not to provide a comprehensive survey of proposals; for this, see Global Canopy Program 2008.)

**The project approach**

The project approach has been the dominant mechanism by which developing countries have been engaged in the international mitigation effort. CDM projects that are deemed to reduce emissions below what they otherwise would have been receive offset credits. The CDM will not finance avoided-deforestation projects and it has to date financed only one afforestation project. The voluntary carbon market is financing various types of forest-related projects—afforestation and avoided deforestation—though on a small scale. In 2007, forestry accounted for about 20 per cent of the US$250 million voluntary market, which is growing rapidly but was then still only 2 per cent of the regulated market (Hamilton et al. 2008).

There are several advocates of a project-based approach to reducing LUCF emissions. The World Wildlife Fund (2008) has proposed that the Australian government purchase areas in Papua New Guinea earmarked as future forest concessions. Flannery and World Wildlife Fund (2007) propose linking landowners with potential industrial-country fund providers over the Internet. The project approach has three advantages: it is the most similar to the existing CDM; it avoids all the difficulties of the other two types of approaches, which are set out in the next two subsections; and it might allow individual projects to be traded on the international carbon market.

There are, however, also problems in dealing with climate change at the project level. These problems are particularly pronounced in regards to deforestation (Forner et al. 2006). It is difficult to estimate a counterfactual baseline (deforestation emissions without the project). It is also difficult to ensure that there is no leakage or even to assess the extent of leakage: one forest might be saved, but another demolished in the same country or area, and perhaps demolished instead. It is also difficult to ensure permanence (that the forest is saved forever). These problems lead to great difficulty in designing workable rules for forestry-offset projects and to significant doubts about the environmental integrity of such credits. All of these problems are reduced or avoided under the national and sectoral approaches, but all will plague a project-based approach.

Another weakness of the project approach is that it assumes that the appropriate locus for all forestry efforts is the micro level. There are, however, many drivers of deforestation (World Bank 2006) and many mechanisms for reducing it.
Local projects might be one, but changes in the legislative and enforcement framework can be another. These types of economy-wide reforms have no place in a project approach.

It is sometimes argued that because projects can be traded on carbon markets the benefits can flow directly to the beneficiaries, thus keeping governments at bay. There is, however, nothing to stop the government acting as a gatekeeper and taxing or retaining project proceeds. As we will see, this has already become an issue in Papua New Guinea.

The problems associated with a project-based approach have been widely noted. The Stern Review comments: ‘A strategy for action [in forestry] will probably have to be adopted at a country level rather than relying only on local projects (Stern 2007:618).’ The various problems with the project approach were also noted in the governments of Papua New Guinea and Costa Rica submission, which laid the foundation for the REDD process (2005). The European Commission (2008) has recently ruled out accepting credits in forestry projects in the EU Emissions Trading Scheme.

All of this is not to say that micro-level projects have no role to play in reducing emissions from deforestation. They can be used by national governments to create incentives for landowners to increase forest cover, even if they are not traded in international markets.

The national approach

Under the Kyoto Protocol, industrialised countries have signed up to greenhouse gas emission reduction targets, which they have committed to achieve through some combination of domestic emissions reductions and international trading. Under Article 3.3 of the Kyoto Protocol, these targets include emissions from deforestation and afforestation. Article 3.4, as interpreted through the subsequent Marrakesh Accords (UNFCCC 2002), gives industrialised countries the option of including other types of land-use and forestry emissions, including emissions (possibly negative) from revegetation, forest management, cropland management and grazing land management. (Note that forest management would include degradation.)

The underlying philosophy of the international climate change architecture to date is that only industrialised countries should be subject to national commitments (the Bali Action Plan states that developing countries will undertake ‘national actions’), but in principle there is nothing to stop a developing country taking on a national target. In general, developing countries are opposed to taking on binding targets. They could, however, instead argue for one-sided targets that would reward overachievement but not penalise underachievement (Garnaut 2008).

A national approach would allow a comprehensive approach to be taken to a developing country’s emissions, and so would focus mitigation efforts on the lowest-cost opportunities, looking across all sectors. It would also require minimal institutional innovation. Since industrialised countries are already using them, accounting rules for LUCF emissions have been developed.

The national approach does away with the problem of leakage within a country by focusing on national LUCF emissions. The extent to which this approach also eliminates leakage between countries depends on the number of countries participating. It also addresses the issue of permanence, although not if countries are rewarded for going below the target but are not penalised for going above it.

Despite these attractions, the national approach is not being actively considered in the REDD process due to the general aversion of developing countries to commit
to economy-wide emissions targets. Papua New Guinea is one of the few developing countries that has talked in terms of national emissions targets: the prime minister has indicated that net national emissions should be reduced by 50 per cent by 2020, and to zero by 2050 (Garnaut 2008:180). In its leadership role in the Coalition for Rainforest Nations however, Papua New Guinea, along with other members of that alliance, is advocating the adoption of a sectoral approach.

The sectoral approach

The sectoral approach is supported by developing countries, with broad support from industrialised countries (for example, European Commission 2008). The basic idea is that participating developing countries will be allocated a baseline LUCF emissions allowance (this might include only emissions from deforestation, or emissions from deforestation and degradation, or emissions from deforestation, degradation and afforestation). Countries that reduced their LUCF emissions below the baseline would be rewarded through the carbon market and/or through an international public fund. For example, Santilli et al. (2005) ‘propose the concept of Compensated Reductions (CR), where tropical countries that reduce deforestation rates below a historical baseline receive internationally tradable carbon offsets as compensation’ (Hare and Macey 2007:49).

The sectoral approach has the same strengths and limitations as the national approach in relation to the key issues of leakage and permanence. By definition, the sectoral approach is less comprehensive than the national approach, but its segmentation of LUCF emissions has its own advantages. We are uncertain as to how easy it will be to stop deforestation and degradation. If the world were very successful in doing so, and if there was only a single carbon market, the carbon price might fall to a very low level; this could be destabilising and ultimately counterproductive. The sectoral approach would also have the advantage of reducing uncertainty for developing countries since its negotiation would require industrial-country commitment to funding LUCF emission reductions.

The many sectoral proposals under consideration differ in various ways. First, they set the baseline in different ways. As mentioned, Santilli et al. (2005) recommend a historical baseline. Other proposals try to project emissions in the absence of mitigation action (Combes Motel, Pirard & Combes 2008). Others propose that the baselines be negotiated (Platinga and Richards 2008).

Second, while most proposals advocate market funding, some argue for government funding. Brazil, which is the developing country with the largest areas of forest, argues for official financial support from industrialised countries to support avoided-deforestation efforts by developing countries.

Third, most sectoral proposals argue that countries be rewarded for reductions in emissions. Others, however, argue that this is too difficult to monitor and/or too far beyond the direct control of governments. They argue instead that governments might need to be rewarded for putting in place better forestry policies and practices (Plantiga and Richards 2008). Of course, the problem here is that it is very difficult to know whether new policies are being effectively implemented without reference to what happens to emissions.

There are perhaps two main difficulties with all the sectoral proposals on the table. The first is that forestry emissions are not only difficult to measure, they are also volatile. Data from Brazil show annual deforestation rates ranging in the past 20 years from 10,000 to 30,000 square
kilometres, without an apparent trend (Hare and Macey 2007). This volatility will make it difficult to set targets (baselines), especially annual targets. Some form of inter-temporal smoothing (for example, multi-year commitments) or insurance will be required. The second difficulty is simply that there are so many proposals with fundamentally differing characteristics. It is not at all clear how these divergent views will be resolved.

Note that neither the national nor the sectoral approach would commit Papua New Guinea to introducing a domestic emissions trading scheme (ETS). Under both approaches, it would be up to Papua New Guinea to decide how to reduce emissions. Establishing an ETS is a complex task even for an industrialised country with mature institutions, and incorporating forestry into an ETS is even more complex. Australia, for example, is planning to include plantation forests (afforestation) in its ETS but not land clearing nor, at this stage, forest management.

National issues

Even if an international mechanism for financing the reduction of LUCF emissions can be agreed on, there are still several issues that Papua New Guinea will need to tackle domestically. These are discussed below under the three headings of estimation, instruments and the use of international revenue.

Estimation

According to the World Resources Institute (2008), Papua New Guinea’s emissions sources other than from land-use change and forestry, principally fossil-fuel use and agriculture, are only 9 million tonnes of carbon dioxide equivalent—a tiny amount (compare Australia’s total emissions of about 600 million tonnes of carbon dioxide equivalent). Papua New Guinea’s LUCF emissions, however, were estimated to be 146 million tonnes of carbon dioxide equivalent in 2000. This makes Papua New Guinea the ninth-largest LUCF emitter in the world (Table 1). Thus, Papua New Guinea’s per capita emissions are about 25 tonnes per person, which is about the same as Australia, and four times the global average.

Papua New Guinea’s reported high LUCF emissions are a product of its high forest cover and the continuing reduction of that forest cover. The Food and Agriculture Organisation reported that in 2005 Papua New Guinea’s forest cover was 29.4 million hectares, down from 30.1 million hectares in 2000 and 31.5 million hectares in 1990 (FAO 2005). This corresponds to a rate of reduction of 139,000 hectares or about 0.5 per cent a year.

Estimation of LUCF emissions is difficult and uncertain. The World Resources Institute figures are based on a global study (Houghton 2003) for 2000. Data for Papua New Guinea are sparse. The FAO (2005) reports exactly the same rate of deforestation for Papua New Guinea between 1990 and 2000, and 2000 and 2005. The FAO also provides no data for Papua New Guinea on forest biomass or carbon stock. This casts additional doubt on Houghton’s estimate for LUCF emissions by Papua New Guinea, since Houghton relies on FAO data on the change in forest area and average forest biomass to estimate LUCF emissions (Houghton n.d.:1).

A recent PNG-specific study (Shearman et al. 2008, 2009) from the University of Papua New Guinea Remote Sensing Centre arrived at higher annual rates of deforestation between 1972 and 2002 (1 per cent on average) and also derived separate estimates for forest degradation (an annual average of 0.3 per cent for the same period).
Shearman et al. (2008) estimate that 165–201 million tonnes of carbon dioxide were released through deforestation and forest degradation in 2001. They argue that, with the rural population increasing and with logging on the rise, annual LUCF emission levels are growing. Filer, Allen, Keenan and McAlpine (2008) have criticized the estimation of the baseline in this study.

There is no official system for estimating LUCF emissions in Papua New Guinea, although the government has stated its intention to build one (Papua New Guinea 2008). This same submission to the World Bank uses the Shearman et al. numbers on emissions.

One problem with the estimation of LUCF emissions in Papua New Guinea is the difficulty in measuring LUCF emissions from degradation, which are significant in the country. Shearman et al. (2008, 2009) find that logging has degraded more than three times the area it has deforested (with 2.9 million hectares of forest degraded between 1972 and 2002 and 0.9 million hectares deforested). Estimating emissions from degraded forest is difficult, because, unlike primary forest, degraded forest cannot be assumed to be in equilibrium: it is either growing or degrading further. Shearman et al.’s study can identify only whether forest is primary or secondary; it does not include a model to estimate the dynamics of secondary forest.

Remote sensing is regarded as essential for monitoring LUCF emissions since it is relatively cheap and its use minimises discretion. Monitoring the extent of degradation (reduction in the quality of the forest) by remote sensing is, however, much more difficult than monitoring the extent of deforestation (reduction in the quantity of the forest). While remote-sensing techniques are improving, estimates of forest degradation are more dependent on on-the-ground observation than estimates of

<table>
<thead>
<tr>
<th>Country</th>
<th>Emissions (million tonnes carbon dioxide)</th>
<th>Rank</th>
<th>Percentage of global LUCF emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>2,563</td>
<td>1</td>
<td>34.0</td>
</tr>
<tr>
<td>Brazil</td>
<td>1,372</td>
<td>2</td>
<td>18.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>699</td>
<td>3</td>
<td>9.2</td>
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<tr>
<td>Myanmar</td>
<td>425</td>
<td>4</td>
<td>5.6</td>
</tr>
<tr>
<td>Democratic Republic of Congo</td>
<td>317</td>
<td>5</td>
<td>4.2</td>
</tr>
<tr>
<td>Zambia</td>
<td>236</td>
<td>6</td>
<td>3.1</td>
</tr>
<tr>
<td>Nigeria</td>
<td>195</td>
<td>7</td>
<td>2.6</td>
</tr>
<tr>
<td>Peru</td>
<td>187</td>
<td>8</td>
<td>2.5</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>146</td>
<td>9</td>
<td>1.9</td>
</tr>
<tr>
<td>Venezuela</td>
<td>144</td>
<td>10</td>
<td>1.9</td>
</tr>
<tr>
<td>World total</td>
<td>7,619</td>
<td></td>
<td>100.0</td>
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Notes: Emissions are for carbon dioxide only; 2000 is the most recent year for which a complete set of national land-use data is available.
deforestation. Australia’s National Carbon Accounting System, which is heavily reliant on remote sensing, is used to report emissions from deforestation but not yet from forest management (which includes degradation), despite being in development for more than a decade (Australian Greenhouse Office 2006; UNFCCC 2009).

Accurate estimation of LUCF emissions is also made more difficult by uncertainty about what happens to harvested wood. Under current international rules (for the Kyoto Protocol), it is assumed that all carbon stored in forests that are logged is emitted into the atmosphere immediately. Obviously, this is misleading when some of the wood is in fact stored in long-lived products. Estimation of such storage, however, presents further challenges.

**Instruments**

How could Papua New Guinea reduce its LUCF emissions? Shearman et al. (2008) find that the two main drivers of deforestation and forest degradation in Papua New Guinea are land clearing by rural inhabitants and logging. Mining, plantation agriculture and fires are minor determinants. They found that between 1972 and 2002, rural inhabitants cleared 3.6 million hectares or 11 per cent of the 1972 forest cover for agriculture and to provide wood for construction and cooking. This represents more than 70 per cent of the land cleared in this period and is responsible for some two-thirds of LUCF emissions between 1972 and 2002. Earlier estimates showed much less land clearing by Papua New Guinea’s rural inhabitants, and instead emphasised land intensification (McAlpine and Freyne 2001; Filer et al. 2008). The provision of modern forms of energy and the availability of modern building materials would, reduce pressure on the land, as would, in the longer term, the growth of the formal sector. However, the government’s reach does not extend to subsistence farming practices.

The other main driver of deforestation and forest degradation—logging—is a highly contested subject in Papua New Guinea. There are widely varying claims about the legality and sustainability of Papua New Guinea’s logging industry. Papua New Guinea has weak governance indicators by international standards (AusAID 2008), and forestry, which by definition occurs in remote locations, is a difficult activity to monitor. While Papua New Guinea has made a number of forestry reforms, such as the use of third-party monitoring for logging exports, many still perceive a ‘lack of effective governance’ in the logging business (Shearman et al. 2008:7).

In Papua New Guinea, timber licences are generally provided for selective logging, not for clear felling. Some land, however, is cleared as a direct result of selective logging—for example, for roads. As well, some forest is lost as a result of severe degradation and an absence of regeneration. A recent Overseas Development Institute study notes that harvesting practices in Papua New Guinea have been characterised as extremely careless (ODI 2007). The draft National Reforestation Policy recognises this problem, when it states that ‘the current practice in harvesting natural forest is that of selective logging, cutting stems greater than 50 cm at breast height. In many concession areas it presents an almost clear felling of the scene after the operation’ (Papua New Guinea, 2005: 5). Post harvesting studies have found that selective logging in Papua New Guinea can lead to the death of more than 70 per cent of the remaining trees in the following 10 years (Cameron and Vigus 1993).

Finally, even if logging is selective, if logging rates are unsustainable the loss of
carbon associated with the logging will not be made good. Filer et al. (2008) argue that current regulations permit unsustainable logging.

Various options would, in principle, be open to the PNG government to reduce logging-induced deforestation and degradation. Of Papua New Guinea’s forest area, about 11 million hectares are suitable for possible commercial exploitation; seven million hectares have already been allocated for large-scale commercial logging. Ten new concessions covering a total area of some 2.5 million hectares have recently been identified and are apparently in the process of being granted. Options facing the PNG government include a ban on logging, a moratorium on new logging concessions, a shift to sustainable logging through greater enforcement of existing selective-logging regulations and greater attempts to repair damaged forests (Bingeding 2008).5 In choosing between these options, the PNG government would need to take into account both employment and revenue implications.

Another instrument open to Papua New Guinea for reducing LUCF emissions is through afforestation. The extent to which Papua New Guinea has the potential to create new forests might be large but it is uncertain, not least due to issues around tenure, Niles, Brown, Petty, Ball and Fay (2002) estimate from a multi-country study that forest restoration in Papua New Guinea could occur at a rate of 100,000 hectares per annum, with annual average capture of 5 million tonnes of carbon dioxide.

The use of international revenue

For Papua New Guinea, the prospect of a financial value being placed on the carbon content of its forests is akin to a new mineral discovery. The employment implications of such a development are, however, mixed. Employment opportunities can be created through forest regeneration and afforestation projects, but can be lost by any reduction in logging (depending on the degree of sustainability of logging to begin with). The international revenues that could flow to Papua New Guinea from attaching a monetary value to standing forests could be of huge benefit, but could also bring the ‘resource curse’—namely, the risk of increased corruption, rent-seeking and exchange-rate appreciation. The greatest challenge facing Papua New Guinea in this area could eventually be one of dealing with success—that is, ensuring that the large revenues that could flow its way if LUCF emissions are reduced are used wisely.

Placing an effective development framework around any international financial flows associated with Papua New Guinea’s emission reductions is not only in the country’s interests. It is quite possible that the international community will not agree to treat payments for avoided deforestation in a purely commercial manner and will instead push for a development framework that places limits on the use of funds (see, for example, Australia 2008a).

How any international funding should be shared between the government and landowners is already proving to be a problematic issue, with some landowners wanting the PNG government and its Climate Change Office to stay out of deals they might make with international groups to protect their forest (Marshall 2008). No general guidance can be given on the right approach here. In general, however, this article argues for a sectoral or national approach to the reduction of LUCF emissions. The less the extent that a project-based approach is taken, the less the extent to which payments of international funds to particular groups of landowners will be appropriate. For example, if the government decides not to issue further
logging concessions, there might be no need for compensation to landowners whose forests might have been, but will not now be, logged.

Conclusion

Although there is widespread support for the development of a mechanism that will give developing countries an incentive to reduce LUCF emissions, there is a long way to go in reaching international agreement on such a mechanism. The limitations of a project-based approach are widely acknowledged. Adoption of a national approach covering all developing-country emissions, including but not restricted to LUCF emissions, would require minimal institutional innovation, since it is already used by industrialised countries under the Kyoto Protocol. However, this avenue is not being pursued because developing countries are generally averse to signing up to economy-wide emissions targets. The adoption of a sectoral approach to the reduction of LUCF emissions is under active consideration. There is, however, a large number of candidate approaches and no sign of consensus. Whether a national or sectoral approach is taken, complex issues relating to the establishment of the baseline, the volatility of annual emissions and the funding of emissions reductions will need to be resolved.

Even if an international mechanism is agreed on, Papua New Guinea will have to overcome considerable domestic challenges to utilise it successfully. It will need to be able to estimate emissions from deforestation and degradation. It will need to work out which instruments it will use to reduce emissions. And it will need to decide what to do with any resulting revenue. The prominence of degradation in Papua New Guinea’s LUCF emissions makes the task more difficult. Emissions from forest degradation are harder to measure than those from deforestation and can be more volatile due to the risks posed by fire and drought.

Of course, Papua New Guinea is not alone in dealing with these issues. Australia has decided not to utilise the option provided to industrialised countries by the Kyoto Protocol of including emissions from forest management (which would allow it to benefit from a reduction in degradation) because of concerns about measurement and volatility (Australia 2008b). Worldwide, Grainger (2008:818) notes that ‘while the planet has been monitored by remote-sensing satellites since 1972, estimates of the annual deforestation rate are still inaccurate, and the appearance of each new estimate generates debate’.

The point of raising all these issues is not to suggest that REDD belongs in the ‘too-hard’ basket. Climate change is an issue that is likely to grow in importance, as will developing-country participation in international climate change mitigation efforts. In addition to financial benefits, the REDD process holds the potential for Papua New Guinea to improve the governance and functioning of its forestry sector. Already, the debate about REDD has apparently led the forestry industry in the direction of greater emphasis on forest regeneration and afforestation.6

Three lessons emerge from this survey. First, better and more regular estimation of LUCF emissions, including from forest degradation, is critical. Better and more regular estimation will also enable better monitoring of the forest industry and will provide the foundation for the ‘credible governance standards for addressing climate change and carbon trading’, the importance of which Barker (2008) rightly highlights.
Second, it is in Papua New Guinea’s interests in international forums to argue for a broad definition of LUCF emissions. The focus should be not only on deforestation but on degradation (and its inverse, forest regeneration), as well as on afforestation. Ultimately, all sources of terrestrial carbon should be considered (Terrestrial Carbon Group 2008).

Third, getting the international and domestic building blocks in place will take time. Participation in the REDD process will not generate quick returns for Papua New Guinea. Small projects, sponsored by the voluntary carbon market or through official aid, could get off the ground relatively quickly. The real game, however, is at the policy and institutional levels, addressing the difficult issues covered in this article.

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Notes

1 The author of these estimates himself puts margins of uncertainty around the estimates of +/- 150 per cent (Houghton n.d.:4).

2 For example, the recent UK Eliasch Review (Eliasch with the UK Office of Climate Change 2008:145) notes that: ‘Deforestation, afforestation and reforestation can be monitored effectively using satellite technology to assess changes in forest cover and land use. Monitoring forest degradation is more challenging, although recent developments in remote sensing, coupled with ground work and additional data such as proximity to roads, can be effective.’ Lanly (2003) writes: ‘Whereas the different forms of remote sensing are very useful tools for estimating deforestation, they are far less so for assessing degradation which most often calls for observations on the ground.’

3 Although plantation agriculture has not been a major driver of LUCF emissions in Papua New Guinea, and its consideration is beyond the scope of this paper, it could become so in the future, as it is in other countries, such as Indonesia.

4 See the three Overseas Development Institute papers (ODI 2007a, 2007b and 2007c) for a recent survey of issues in the forestry sector of Papua New Guinea. For other views, see www.forestryanddevelopment.com and www.timcurtin.com

5 In Papua New Guinea, logging companies are not responsible for the regeneration of the forests they selectively log. They pay a reforestation levy to the PNG Forest Authority, which has this responsibility. Investments in regeneration are, however, inadequate, according to the PNG Forest Industry Association (PNGFIA 2007).

6 For example, in a recent submission, the PNG Forest Industries Association emphasises ‘measures to promote re-growth after harvesting’ (ITS Global 2007). Rimbunan Hijau, Papua New Guinea’s largest logging company, has recently announced plans to invest more in reforestation and forest regeneration. The PNG Sustainable Development Program is also moving into the area of sustainable forestry.

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