

## Protected areas as tools for REDD: an issues paper for WWF

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### Executive summary

Forests contained within protected areas offer important potential for “*reducing emissions from deforestation and forest degradation*” (REDD) although there are still uncertainties about how protected areas might meet REDD requirements. Methods to measure and verify reductions resulting from changes in land-use and management are currently being developed under the UN Framework Convention on Climate Change. It is also possible that maintenance of carbon stored in other ecosystems, such as grass, peat and wetlands, could be eligible for funding under REDD-type mechanisms.

### The role of protected areas as vehicles for carbon storage and capture and for REDD

The objectives of protected areas (long-term protection) are fully compatible with carbon management

- ✓ Governance structures, legal tools, capacity and understanding of social conditions already exist
  - ✓ Key management tools exist including for baseline data collection and effectiveness assessments
  - ✓ Studies show that protected areas are the most effective vehicles to prevent ecosystem decline
- Yet protected areas remain imperfect and often require additional support, which could come from REDD

**Potential role for existing protected areas:** 4 options exist to meet additionality requirements

- ✓ Implementation of paper parks that have been agreed but not or only partially implemented
- ✓ Improving management effectiveness of protected areas that are failing to meet their objectives
- ✓ Avoiding de-gazettement (and thus carbon loss) by providing incentives to keep protected areas
- ✓ *In the future* perhaps also restoration projects in degraded protected areas

**Potential role of new protected areas:** new protected areas will also need to meet certain conditions, e.g.

- ✓ Ecosystems under immediate threat of degradation
- ✓ Ecosystems where management changes could secure or capture extra carbon
- ✓ Cultural ecosystems that have degraded and would benefit from restoration

Efforts to develop new protected areas need to be linked closely with the Convention on Biological Diversity Programme of Work on Protected Areas, up for renegotiation in 2010; proposals for changes are given along with implications and new tools needed to implement REDD in new protected areas.

**Finance mechanisms within a country:** A variety of finance mechanisms are possible. The clearest option would be to go through an existing protected area agency, which is likely to be used to handling external funding. In the case of private or community protected areas other options may be needed. Care must be taken not to overwhelm an agency with poor capacity through provision of a sudden influx of funds.

**Stock-flow approach:** There are potential problems of providing a perverse incentive for deforestation through REDD, by focusing funds on areas where management is poor. The stock flow approach separates incentives for lower deforestation from maintenance of existing carbon stocks and negotiates a common price paid to avoid emissions from deforestation. Some REDD funds would be distributed as a dividend per tonne of standing forest carbon stock. Whilst not perfect, this offers one possible way forward.

### Comparing protected areas to other REDD mechanisms

Protected area REDD projects will have to compete with many alternative reduction strategies; clear figures on comparative costs are still needed. Protected areas REDD investments supply three benefits:

- ✓ Climate change mitigation in terms of carbon sequestration
- ✓ Climate change adaptation through provision of ecosystem-based adaptation benefits
- ✓ Biodiversity conservation and other protected area values (ecotourism etc)

## The advantages of protected areas as vehicles for carbon storage and capture

Well managed protected areas offer advantages for carbon storage and sequestration and for REDD. Individual attributes occur in other management systems, but the combination in protected areas is unique and includes: **management objectives; governance, legal constitution; management processes; and evidence of effectiveness.** Each is examined below, along with some limitations of protected areas.

**Management objectives:** protected areas have objectives compatible with carbon storage, in that they:

- ✓ **Aim to protect and restore natural ecosystems.** Natural ecosystems – particularly forests and peat – provide good conditions for carbon sequestration. Research in Africa<sup>1</sup>, the Amazon<sup>2</sup>, Australia<sup>3</sup> and boreal forests<sup>4</sup> shows that old-growth forests sequester carbon. Conversely, while plantations quickly accumulate biomass, establishment often causes huge carbon loss: one calculation suggests that it would take 420 years of biofuel production on peat to replace carbon lost in establishment<sup>5</sup>.
- ✓ **Are by definition set aside in perpetuity.** They are based around a commitment to permanence<sup>6</sup>.
- ✓ **Are supported by government policy.** This includes commitments under the Convention on Biological Diversity (CBD) that focus attention on protected areas, adding to their protection

**Governance, legal constitution and safeguards:** as pre-existing management tools, protected areas:

- ✓ **Have defined borders.** These are often legally defined and physically marked out, delineating precise areas that can be used to measure carbon potential.
- ✓ **Operate under legal or other effective frameworks.** Legislation and policies provide stable mechanisms for protecting ecosystems. Protected areas usually have systems for establishing and codifying land tenure agreements; which have already been identified as key requirements of REDD.
- ✓ **Have agreed governance structures.** Most protected areas remain in government control but a growing number are managed by private individuals, trusts, indigenous peoples and communities or are under some form of co-management; all follow the same basic definition and objectives.
- ✓ **Are backed by a range of supportive conventions and agreements.** These include the CBD's *Programme of Work on Protected Areas*, UNESCO Man and the Biosphere and World Heritage, the Ramsar Convention on Wetlands, plus regional agreements like the European Union's Natura 2000.
- ✓ **Recognise cultural and social values of protected areas.** Many protected area managers have experience in implementing accessible, local approaches involving people in management<sup>7</sup>.

**Management processes:** contain elements particularly useful in applying REDD, including that they:

- ✓ **Have organised and populated data sources to set baselines and facilitate monitoring.** Existing tools include the IUCN management categories, governance types and Red List, and the UNEP World Conservation Monitoring Centre (UNEP-WCMC) World Database on Protected Areas (WDPA).
- ✓ **Often have established systems for measuring effectiveness.** Techniques are well advanced<sup>8</sup> and could be modified to include carbon accounting. Systems of certification are being discussed<sup>9</sup>
- ✓ **Have in many cases already invested in start-up costs.**
- ✓ **Are often supported by management plans.** These can facilitate rapid responses to new conditions.
- ✓ **Have staff and equipment that provide management expertise and capacity.** These often include an agency linked to a ministry; standards; and staff; so that REDD could use existing infrastructure
- ✓ **Can draw on existing funding.** Most protected areas have funding, including government budget, and often also from the Global Environmental Facility, bilateral donors and NGOs. Additional funding is needed to help establishment or to increase effectiveness, but is building on existing resources.
- ✓ **Are backed up by networks of experts ready to provide advice and assistance.** This includes particularly the IUCN World Commission on Protected Areas, development agencies and NGOs

**Evidence of effectiveness:** protected areas work more effectively than other approaches in maintaining vegetation and carbon. Most research looks at deforestation but some considers degradation:

- ✓ **Conservation International:** a study on threats facing 92 protected areas in 22 tropical countries concluded that most protected areas are successful in protecting ecosystems<sup>10</sup>.
- ✓ **WWF and The World Bank:** a survey of 330 protected areas around the world using a consistent methodology, found biodiversity condition consistently scoring high<sup>11</sup>.
- ✓ **University of Queensland:** a global meta-study assessed management effectiveness evaluations from over 2300 protected areas and found that 86% met their own criteria for good management<sup>12</sup>.
- ✓ **Indiana University and Ashoka Trust for Research in Ecology and the Environment.** research found lower rates of land-clearing in protected areas compared to surrounding areas<sup>13</sup>.
- ✓ **Duke University:** research across four tropical areas assessed natural vegetation changes. Overall, protected areas were effective; forest cover was often “strikingly higher” than surrounding areas<sup>14</sup>.
- ✓ **World Bank:** a recent global review shows that tropical protected areas, especially those conserved by indigenous peoples, lose less forest than other management systems<sup>15</sup>.
- ✓ **UNEP World Conservation Monitoring Centre:** forests in protected areas accounted for just 3% of tropical forest losses from 2000-2005 in countries studied, which is far better than average<sup>16</sup>.
- ✓ **Stanford University and partners:** studies in the Amazon found that protected areas, indigenous reserves and national forests generally, but not invariably, afforded protection against logging<sup>17</sup>.

Preliminary studies by UNEP-WCMC show that **protected areas contain at least 15% of terrestrial carbon**<sup>18</sup>. Many institutions assume that protected areas will be a part of REDD<sup>19</sup>. WWF has carried out a number of studies of potential of protected areas for REDD<sup>20</sup>, including one with Stanford University<sup>21</sup>.

**The downside of using protected areas:** the mechanism is not perfect however and protected areas sometimes fail to deliver expected benefits or raise important social concerns; some but not all of these challenges paradoxically add to their suitability for classic REDD projects with demonstrable additionality:

- ✓ **Threats to protected areas:** theory does not always match practice and protected areas are in many places under threat and losing values, including through vegetation and thus carbon loss.
- ✓ **Social backlash:** protected areas are coming under increasing criticism for their social impacts<sup>22</sup>, particularly loss of land and resources to local people<sup>23</sup>.
- ✓ **Degazettement:** although permanence is an explicit requirement, in practice governments and others sometimes downgrade levels of protection, excise parts of a protected area or completely remove legal protection and convert the land or water into other uses.
- ✓ **Risk of failure:** fears have been expressed that introduction of REDD projects could, if they fail, create or increase a backlash against protected areas amongst resident or neighbouring communities.

These problems illustrate why REDD schemes could be suitable in protected areas: by reducing carbon losses from protected areas (and thus providing additionality), providing incentives against degazettement and increasing support from local communities.

Many countries are now looking at REDD options inside and outside protected areas. **Peru** already has 19.1 million ha of protected areas, 14.86% of the country, but is also losing 260,000 ha of forest a year, releasing 127 Million tonnes of CO<sub>2</sub>. Around half national greenhouse gas emissions are from deforestation. The government is now collaborating with WWF on developing some REDD projects<sup>24</sup>, while others are being developed directly by indigenous peoples' organisations.

## Potential role of existing protected areas

Unless the likely rules for REDD policies change significantly, not all protected areas will be suitable, even if they are accepted in principle, due to the need for **additionality**: i.e. because funding going to existing, well-managed protected areas will not necessarily add any additional carbon sequestration. Ideally, a country-wide REDD system, based on reducing national emissions, could distribute REDD financing to the protected area system rather than to individual protected areas. But there are situations even within existing proposals where support for protected areas could produce additional carbon benefits.

**Options for using existing protected areas for REDD:** These are mainly linked to: implementing protection in “paper parks”; improving **management effectiveness**; **avoiding de-gazettement** and introducing **restoration** management to improve carbon sequestration. These are described below:

**Implementing protection in “paper parks”:** some protected areas are announced by governments but not implemented, because they are not defined in legal terms or because infrastructure, such as boundaries, staff, plans and equipment, is absent. These are called “paper parks” and defined as: *A legally established protected area where experts believe current protection activities are insufficient to halt degradation*<sup>25</sup>. These are not useless: it can take years of effort to get this far and announcing intent is enough to provide some protection. But they are imperfect and their carbon stocks are at relatively high risk in consequence, so that funding conversion of paper parks into full protected areas could meet additionality needs.

**Improving management effectiveness:** despite data that show protected areas generally work well, there are exceptions and many protected areas could work better. Improving effectiveness is a way of proving additionality, by reducing losses and thus enhancing carbon sequestration. Much habitat degradation is illegal, including in protected areas<sup>26</sup>; REDD investments are wasted if the areas are later degraded. One key use of REDD funding in protected areas would be to halt illegal logging and other causes of forest loss.

**Avoiding de-gazettement:** although protected areas are in theory set up forever, there is a growing problem of de-gazettement and some countries appear to view protected areas as temporary designations. WWF believes that biodiversity conservation on its own is not enough to secure the political will to continue long term protection of relatively large areas of land and water: the *Arguments for Protection* project looking at wider protected area benefits is one result<sup>27</sup>. Carbon benefits give extra reasons for governments to halt de-gazettement of protected areas and thus to secure their carbon.

**Introducing restoration management:** many protected areas are established in degraded ecosystems or have been degraded since gazettement. In these cases restoration can increase carbon storage<sup>28</sup>. Restoration might include active planting or management but more usually involves the protection of areas to allow natural regeneration or possibly modifications in the water table to increase the ability of peat to store carbon. It is a future possibility for REDD type schemes but not being discussed at present.

**Implications:** including carbon storage in protected area management has a number of implications:

- ✓ Choice of site will be critical and some kind of dispute mechanism, or arbitrator, may be needed
- ✓ If implementation of a paper park or improved management effectiveness of an existing protected area is to be used, this will mean setting a baseline against which to measure progress and a set of targets for increasing protection and sequestration of carbon
- ✓ This implies that tools used to measure management effectiveness are able to give good information on carbon stocks and capture, which may mean some modification of those tools used at present
- ✓ As the first aim of protected areas is to provide nature conservation, care must be taken to make sure that carbon management does not undermine biodiversity protection

**New tools**: some new tools will be needed, along with modifications to existing instruments, including:

- ✓ **Carbon storage and sequestration potential**: quick methods for estimating amount of carbon stored and amount of potential new carbon dioxide captured by particular mixtures of ecosystems within protected areas (ideally these should be agreed/approved, say by IUCN World Commission on Protected Areas (WCPA), the CBD and methods sanctioned by the UNFCCC)
- ✓ **Protected area management effectiveness assessment**: existing systems will need to be modified to include assessment of carbon potential and management needs; WWF has already started this process in the METT and RAPPAM protected area management effectiveness systems
- ✓ **Assurance of carbon management**: REDD schemes will need some independent verification that targets are being met. This will mean either developing certification schemes (already a project for the WCPA) or modifying existing certification schemes such as that of the Forest Stewardship Council
- ✓ **Funding streams**: some additional funding will be required, either through official REDD schemes or from the voluntary carbon market.

Analysis of the potential of the Amazon Region Protected Areas Programme (ARPA) in **Brazil**, which was created by the Brazilian government in 2003, showed that the 61 protected areas supported by ARPA are preserving a forest carbon stock of about 4.6 billion tons of carbon (18% of the total stock protected in the Amazon). Analysis on the level of deforestation threat shows that these areas have a direct potential in reducing potential emissions from deforestation of 1.1 billion tons of carbon; i.e. the total released from deforestation by 2050 if they did not exist<sup>29</sup>. A recent workshop between WWF and Stanford University explored some of these options in detail<sup>30</sup>.

Research in East Kalimantan, **Indonesia**, looked at 18 protected areas and calculated the amount of greenhouse gases that could be saved by reducing deforestation within these areas through better management, equalling over 300 million tonnes of CO<sub>2</sub> over a decade<sup>31</sup>.

### **Potential role of new protected areas**

*Creating new protected areas is at first sight a clearer way of showing additionality, but it is unlikely that REDD will be applicable where protected areas are set up in places that are not under threat, because in these cases absence of protection will not necessarily mean carbon loss. Nonetheless, there are a number of options for integrating new protected areas within the frameworks currently being discussed.*

**Conditions under which new protected areas might be suitable for REDD schemes**: new protected areas are likely to meet existing proposals about additionality if they were in places where there are current or near-future threats to the integrity of the ecosystem, and thus where protection status might be expected to cut down vegetation loss in the short term. This could include, for example:

- ✓ **Ecosystems under immediate threat** of clearance for agriculture, timber or other reasons, by legal or illegal means – for example forests on the development frontier
- ✓ **Ecosystems where management changes could help to secure or increase carbon stores** even in conditions where there was no threat of total loss – for example peatlands that are drying out or forests are suffering increased fire risk due to mismanagement
- ✓ **Cultural ecosystems that have degraded** beyond the point where they are of agricultural value and where protection and restoration is an option for storing carbon and increasing ecosystem services

**Links to the CBD Programme of Work on Protected Areas**: initiatives to expand protected areas should be linked to the *Programme of Work on Protected Areas* (PoWPA), which aims to complete ecologically-

representative protected area networks. The PoWPA is the only CBD programme with precise, time-bound targets. It recognises the need to address climate change but not in detail. At the 10<sup>th</sup> Conference of Parties in 2010, proposals will aim to strengthen links between the CBD and carbon sequestration in the UNFCCC. Proposals, suggested by IUCN-WCPA after a workshop in South Korea, are outlined below.

**Climate change proposals from WCPA for COP-10 of the CBD (key extracts)**

**Climate change** (Activity 1.4.5 and COP 9 Decision IX/18): **The role of protected areas in carbon storage, mitigation through sequestration and ecosystem-based adaptation needs to be better recognised and quantified**, particularly with respect to the involvement of indigenous peoples' and local community conserved areas and international discussions on avoiding deforestation and forest degradation within the Kyoto Protocol of the UNFCCC and follow-up instruments. These issues require more emphasis in PoWPA, through a supplementary set of targets and activities... In addition, **PoWPA should be deployed as a major mitigation and adaptation tool by the UNFCCC** including a joint implementation plan. **It is recommended that:** CBD COP10 strongly endorses the inclusion of protected area systems and surrounding landscapes/seascapes in international agreements regarding climate change response strategies, including for both mitigation and adaptation purposes, and using appropriate mechanisms. In particular, parties should promote and incentivize expanded protected area systems that protect carbon stocks in forests, mangroves and other carbon-rich biomes while conserving biodiversity and involving and respecting the rights of indigenous peoples and local communities.

PoWPA has failed to raise the funds originally envisaged. Inclusion of REDD funding would allow PoWPA to address the aims of biodiversity conservation and climate mitigation, along with climate adaptation.

**Implications:** selecting protected areas partly on their carbon values will need to be carefully managed:

- ✓ Additional factors will have to be taken into account when selecting sites, which may mean modifications to site-selection tools
- ✓ Care will need to be taken that REDD funding does not distort protected area identification and prioritisation processes, so that e.g. important "low carbon" sites are ignored or downplayed
- ✓ REDD funds should therefore in most cases not be the sole funding source for new protected areas
- ✓ At a national level, it will be important that government departments in charge of protected areas work closely with those charged with reducing climate change

**New tools:** in addition to some of the tools discussed under the section on existing protected areas, new or modified site selection tools may be required, including:

- ✓ **Gap analysis:** modification to national or regional systems of gap analysis (the methodology of identifying gaps in a protected area network)
- ✓ **Software:** modification to software responsible for site selection and prioritisation, such as MARXAN, to include consideration of carbon sequestration

In **Indonesia**, WWF is working with other partners including the government, The Nature Conservancy and aid agencies in Australia and Germany to investigate REDD options<sup>32</sup>. WWF is working in the peat forests of Kalimantan, part of the island of Borneo, to run demonstration activities in four districts, looking at methodology development, institutional arrangements and community engagement. Efforts are focusing on logging concessions but also community forests and extensions to two protected areas, Betung Kerihun National Park and Danau Sentarum National Park<sup>33</sup>.

## Finance mechanisms within a country

*One important issue relates to how REDD funds can be disbursed to protected areas. A sudden influx of money can swamp agencies unless there is sufficient capacity to handle the additional work; it can also sometimes lead to waste and corruption. A number of options for routing funds exist, depending on circumstances. Those supplying REDD funding will almost certainly require safeguards to be in place.*

Several REDD funding options are under consideration for moving REDD financing into a country<sup>34</sup>:

- ✓ **Voluntary schemes:** operating at a national or international scale, raising funds through Overseas Development Assistance, other public sources or private and NGO sources
- ✓ **Direct market mechanisms for REDD credits:** traded alongside existing certified emission reductions (CER) and could be used by companies in Annex 1 countries to meet cap-and-trade targets
- ✓ **Hybrid market-linked mechanisms:** implemented through an auction process or a dual market application between REDD and CER

Funds are probably better than markets for protected areas because they are more flexible, have lower transaction costs and are suitable for a systematic approach. International funding sources through various forms of public donation (such as the Amazon Fund) could go to both stocks and flows of carbon (i.e. REDD+) whereas at present funding from markets will probably just go to flows (REDD). However the major debates are focused on markets at present and funds from these sources are likely to increase, so it is important to understand how to work with these mechanisms.

REDD funding could also in theory either be at a system level and disbursed according to need, or to individual sites; from the perspective of protected area management the former is probably more desirable.

There are various options for moving money within country. In the case of protected areas, it is likely that no single financing mechanism will work, because of the many governance structures operating. But most countries have a protected area agency and this will be the likely channel for REDD funds. The existence of such agencies, with infrastructure and staff (and often experience in dealing with foreign governments and NGOs) is an additional advantage of protected areas for REDD. However, if other bodies have rights over a protected area, such as other government departments, trusts, indigenous peoples and communities, either the protected area agency could disburse to these groups, or funds might be transferred through other departments (e.g. departments of indigenous affairs) or through NGOs.

Although funding shortages are often a block on progress, a sudden influx of funds can also be a problem: with challenges of transparency and accountability; corruption risks; and lack of capacity to use money effectively. These challenges will apply to any REDD funding and to any aid funding. Those charged with disbursing aid are demanding more monitoring and accountability. Whichever agency is chosen to channel REDD funds will be required to follow detailed reporting procedures and probably develop some level of third party verification. An important element of this will be to monitor that funds are having the desired impact in terms of carbon sequestration in protected areas as already referred to above.

**Implications:** clear finance mechanisms will be needed, in the case of protected areas this implies:

- ✓ The protected area agencies have the capacity and political power to play this role
- ✓ If not that some other sympathetic and capable body can be found
- ✓ Development of funding mechanisms is still under consideration; protected area agencies and relevant ministries should be engaging in these discussions

Experience to date suggests that countries will use very different mechanisms to introduce REDD. For example, preparatory work in the **Democratic Republic of Congo** is under a National Coordination, involving a National Coordinator, International Technical Assistant and UN REDD Lead Technical Advisor although there is also a Climate and REDD Working Group drawn from civil society. In **Tanzania**, the lead partner will be the Forest and Beekeeping Division of the Ministry of Natural Resources and Tourism. In **Papua New Guinea** REDD coordination is controlled by the Office of Climate Change and Environmental Stability under the Prime Minister's Office, with other partners including the Papua New Guinea Forest Department, Division of Environmental Conservation and National Forest Research Institute.

### Stock-flow approach

The most damning criticism of the approaches to REDD as described above is that it is simply rewarding (and encouraging) bad management; only countries or areas that already have serious deforestation or threats to forests get money, while those that have already protected their forests or invested in protected areas get nothing. There is a built-in perverse incentive for governments and others to put forests under pressure in order to access REDD funds. In addition, there are fears that putting a premium on forests will put further pressure on relatively "low carbon" ecosystems like grasslands and savannahs, which are already being converted into tree plantations and losing soil and vegetation carbon stocks in the process<sup>35</sup>.

A number of options have been suggested for addressing this paradox. One growing in popularity is the **stock-flow approach**, which is suitable where there is high forest cover and low deforestation<sup>36</sup>. It proposes a "payment for performance" regime where payments are linked directly to reduction in deforestation or maintenance of certain levels of carbon stocks. This could either be determined through international accord or through some kind of national arrangement. The approach separates incentives for lower deforestation from maintenance of existing carbon stocks and negotiates a common price to be paid to avoid emissions from deforestation. A proportion of REDD funds would be distributed as a dividend per tonne of standing forest carbon stock. The system is not perfect and new iterations are still being proposed. Nonetheless, it remains one of the best options yet proposed to reward countries for good rather than bad management.

**Implications:** it is clear that some process to address these paradoxes is needed:

- ✓ Developing such proposals could be a focus of action between the CBD and UNFCCC following changes in POWPA after the CBD 10<sup>th</sup> Conference of Parties in 2010, discussions should involve research organisations such as Wood Hole and the Center for International Forestry Research

Concerns have been expressed that countries like the **Democratic Republic of Congo** will lose out under REDD, because of their current high forest cover, low emissions from other sources and urgent need to develop<sup>37</sup>, along with concerns of lack of coordination between agencies<sup>38</sup>. Research by the Woods Hole Research Centre suggested that one way of addressing this problem would be to separate out carbon stocks and flows as described above<sup>39</sup>.

## Comparing protected areas to other REDD mechanisms

*If protected areas are used as vehicles for REDD funding they will have to prove themselves against other funding mechanisms, particularly to private land-owners, companies, other land-use strategies and strategies from other sectors including mining, transportation and industry. In particular, protected areas as REDD mechanisms will have to compete with other land-use based REDD mechanisms, such as forestry, and with alternative land uses; the latter will often have powerful backers in industry and government.*

Research suggests that there will be some realistic investment opportunities. For example, the value of converting a hectare of forest for oil palm compared to keeping it for carbon credits showed a strong economic bias towards conversion: net present value of (US\$3,835-9,630 as compared with \$614-994)<sup>40</sup>. Indeed, estimates of emissions reductions under REDD depend critically on the extent to which agriculture in tropical forest frontiers generates leakage<sup>41</sup>. Research on prices in the Brazilian Amazon found that REDD was reasonably competitive with cattle ranching but less so with soybean cultivation. Evidence from Brazil and Indonesia suggests that financial returns on a number of land uses, expressed in terms of net profits per tonne of CO<sub>2e</sub>, are below the market price for carbon: i.e. forest carbon provides attractive investment opportunities<sup>42</sup>. However, there is still enormous variation in estimates and global simulation models tend to produce higher REDD prices than empirical models<sup>43</sup>.

In particular, studies have not yet compared costs of implementing REDD in protected areas with other REDD mechanisms. Such studies are urgently needed if protected areas are to provide a viable tool for REDD and climate change mitigation through the UNFCCC.

In the case of protected areas it is also important to recognise that REDD investments supply at least three benefits simultaneously:

- ✓ Climate change mitigation in terms of carbon sequestration
- ✓ Climate change adaptation through provision of ecosystem-based adaptation benefits
- ✓ Biodiversity conservation and other protected area values (ecotourism etc)

REDD payments would thus be contributing a carbon sequestration portion of investments in natural ecosystems that fulfil multiple functions, including wider ecosystem services. The Economic of Ecosystems and Biodiversity (TEEB) study addresses the wider values of ecosystems and looks at the benefits of protected areas<sup>44</sup>. Worldwide, over a billion people depend on protected areas for a significant percentage of their livelihoods<sup>45</sup>. They supply food<sup>46</sup>, clean water<sup>47</sup>, jobs, medicines<sup>48</sup> and other services important to the poor<sup>49</sup>. They provide hazard mitigation<sup>50</sup> and maintenance of genetic diversity<sup>51</sup>, which benefit society more broadly. Protected areas also provide non-material and economic goods and services, such as the protection of places for faith communities<sup>52</sup>. These benefits should also be taken into account. A study for TEEB suggested, for example, that tropical forests supply US\$6,120-16,362/ha/yr (2007 prices) of which climate regulation makes up \$1,965-3,218<sup>53</sup>.

### Implications

- ✓ More research is urgently required here: first to get more consistent figures for the costs of REDD as compared with alternative land management options and secondly on the relative costs of REDD utilising protected areas compared with other REDD mechanisms.

### New tools

- ✓ Several studies of costs of REDD are available and tools are starting to be developed, such as the Open Source Impacts of REDD Incentives Spreadsheet (OSIRIS). Development and application of these is now an urgent priority.

**Colombia**, for example is one of many countries relying on locally-collected traditional medicines as a major resource for meeting primary health care needs<sup>54</sup>. The Orito Ingi Ande Medicinal Plants Sanctuary was proposed by indigenous communities in South-western Colombia. It covers 10,200 ha of tropical rainforests and Andean forests. Conservation strategies focus on preserving the shamanic tradition of local peoples and on the protection of the associated medicinal plants. The protected area fulfils the aims of local indigenous healers to: “regain possession of our territories and sacred sites. The forest is for us the fountain of our resources. If the forests disappear so will medicine and life”<sup>55</sup>

## Conclusions

Protected areas have until now been largely ignored in RREDD negotiations although interest is now growing fast. Those interested in bringing protected areas within REDD mechanisms are having to steer a route between the ideal and the possible, although the limits of what is possible are changing all the time. Protected areas offer a number of important advantages that could give them a head start over other potential REDD mechanisms or other climate mitigation options. However protected areas still need some new tools and policies developed if they are to maximise their potential and, critically, clearer comparative evidence of costs and benefits are required.

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