Forest Protection and Regeneration in the Post-Kyoto Era

William Smith

Introduction

Climate Change is happening (IPCC, 2007). The discussion no longer focuses on if and when, but what to do now. Short term solutions are only the first step. Every short term mitigation plan must be accompanied with steps for long term adaptation. Protecting and regenerating the world’s forests could aid on both scales, if managed properly. Since Bali, into Poznan, and on to Copenhagen, proposals are being discussed about the role global forests will play in the post-Kyoto era of carbon sequestration. It seems likely that they will play a significant role, but the details are still being worked out. Political, financial, and social concerns must be addressed to make the strongest forest plan possible. Everyone agrees forests should be protected and regenerated if possible. The disagreements begin when determining how this will happen, where the funding will come from, who the funding will go to and what the verification process will be for how much carbon is actually sequestered by these protected forests.

In this paper I will outline the issues arising with the near term solutions being discussed, focusing primarily on REDD proposals (Reducing Emissions from Deforestation and [Forest] Degradation) and including suggestions for how this may be improved. However, a long-term solution needs to be in place that will be more successful in responding to these issues and increasing developing countries climate change adaptation and mitigation strategies relating to forest protection and regeneration. This is why I suggest the creation of an International Forest Protection Agency. The second half of this paper outlines what its functions and responsibilities should be.

Background

Deforestation accounts for almost 20% of global carbon emissions – more even than the entire global transportation

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<tr>
<th>TERMINOLOGY</th>
<th>Definition</th>
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<tr>
<td>AAU</td>
<td>Assigned Allowance Unit</td>
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<tr>
<td>Additionality</td>
<td>Whether a project is additional or would have been undertaken anyway</td>
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<tr>
<td>Afforestation</td>
<td>Conversion of non-forested land to forest</td>
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<td>AFOLU</td>
<td>Agriculture, Forestry and Other Land Uses</td>
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<td>CBD</td>
<td>Convention on Biodiversity</td>
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<td>CCS</td>
<td>Carbon Capture and Storage</td>
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<td>CER</td>
<td>Certified Emission Reduction</td>
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<td>CR</td>
<td>Compensated Reduction</td>
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<td>Deforestation</td>
<td>Destruction of forests</td>
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<td>FCPF</td>
<td>Forest Carbon Partnership Facility</td>
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<td>FLEG</td>
<td>Forest Law Enforcement Governance and Trade</td>
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<td>IPCC</td>
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<td>Leakage</td>
<td>Off-site effects of projects</td>
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<td>PB</td>
<td>Project by Project</td>
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<td>Permanence</td>
<td>Future release of carbon from a project</td>
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<td>REDD</td>
<td>Reducing Emissions from Deforestation and Degradation</td>
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<td>REDD (alternate)</td>
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<td>Reforestation</td>
<td>Replanting of forest land following harvest</td>
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Article 3 of the Kyoto Protocol makes provision for Annex I countries to take into account afforestation, reforestation, and deforestation and other agreed land use, land-use change, and forestry (LULUCF) activities in meeting their commitments. However, the focus of the Kyoto Protocol is solely on human induced changes in LULUCF. This is insufficient: "by considering only human-induced changes, the Kyoto approach discourages countries from accepting the responsibility and benefit of all carbon changes under their authority" (Plantinga and Richards, 2008). Since 1997, however, the lines have become increasingly blurred between what is man-made and what is natural. For example, a massive forest fire may have once been only the responsibility of nature, but today global human-caused climate change and human decisions regarding forest management play significant roles in the quantity and severity of fires and other natural disasters. The fourth IPCC report outlines the dangers of increases in the frequency and intensity of extreme weather events, such as forest fires, hurricanes, heat waves, and flooding (IPCC, 2007).

Kyoto offers neither a mandate for, nor a prohibition of, LULUCF being used for carbon credits. There is some guidance for proposed projects, but as of October 2008, only one forestry project had been approved as a CDM – not nearly the scale necessary to be effective against the carbon onslaught. Many involved in the post-Kyoto negotiations will attempt to take significant steps to ensure that forestry management becomes a viable tool in the toolbox of climate change solutions.

Steps were taken in this direction in December of 2007 when Papua New Guinea and Costa Rica, on behalf of the Coalition of Rainforest Nations – representing some thirty-plus tropical countries – introduced a proposal known as REDD (Reducing Emissions from Deforestation and Forest Degradation) which outlines the beginnings of a plan to vastly increase the use of forests in carbon sequestration. The basic idea REDD presents is that, in the post-Kyoto period, developed countries should pay developing countries to halt and, if possible, reverse the rampant deforestation occurring in the tropics for the further sequestration of carbon in one of the world’s largest natural carbon banks: rainforests.

The size of the total global carbon pool in forest vegetation is approximately 360 GtC (gigatones of carbon), 600% more than annual global carbon emissions from industrial sources at barely more than six GtC (IPCC, 2000). However, three problems prevent an easy accounting for forestry projects in a global carbon sequestration scheme: additionality, leakage, and permanence. Additionality refers to whether a project is additional or would have been undertaken anyway; leakage represents off-site effects of projects (the risk that forest protection in one area will just lead to deforestation in another unprotected area); and permanence describes the possibility of future carbon release from a project. A Harvard study examining potential carbon accounting methods "concludes that project-by-project accounting, as under the Clean Development Mechanism of the Kyoto Protocol, is fundamentally flawed due to problems with additionality, leakage, and permanence" (Plantinga and Richards, 2008). They support using a national inventory approach instead to mitigate some of these risks.

In 2007, the UN reported broad consensus on the idea that countries managing to reduce their national rate of deforestation below a reference rate should get compensated in proportion to the corresponding amount of avoided emissions. What form should this compensation take? The Coalition for Rainforest Nations (a diverse group of around thirty countries from Latin and South America, Africa and Asia) wants carbon credits whereas Brazil would like voluntary contributions from developing nations in addition to their Kyoto commitments. India, on the other hand, would like credits for conservation already accomplished – an idea the Coalition supports but Brazil is not in favor of (Bellasen and Schwartzman, 2007). The solution may be a combination of both incentives and requirements.

**Moving Forward**

All carbon reduction schemes need to have an eye on the long term while dealing with short-term issues, but forest protection plans must be especially cognizant of long-term issues in their accounting. To successfully provide for forest protection and regeneration, blueprints must include smart plans for the near future and a broad, all-encompassing scope for the coming decades, and even centuries. In regards to the former, the REDD proposals must be worked out to ensure maximum efficiency, as well as equity. However, REDD is not the final solution. There must be a long-term, sustained commitment to forest protection and this may only be ensured through the creation of a body whose sole purpose it is to supervise and manage forest protection and regeneration at this critical point in earth’s climatic history. In this paper, I propose that an organization known as the International Forest Protection Agency (IFPA) be created for this purpose.

**Improving REDD**

Before the IFPA can be formed and empowered, REDD is what we have to work with. That is what is being discussed in Poznan and a final version of REDD will appear in Copenhagen as the begin-
nings of forest protection in the post-Kyoto period starting in 2012. In the short term, this document must be as good as possible, taking into consideration the forested states of various nations and their needs. There have been many proposals tabled by both governmental and non-governmental organizations regarding these next steps. The Little REDD Book (Parker et al., 2008) was presented in the opening days of the Po Nan conference by the Global Canopy Programme and does an excellent non-partisan job summarizing and comparing the various plans on the table. These come from all over the world, and each contains their own strengths and weaknesses. Additionally, there are some important issues that are not presently being considered which should be.

**Capacity Building**

The first step for REDD will be to address capacity building among developing nations in regards to their ability to manage and protect forests. The IPCC identified some of the critical factors that these countries must come up to speed on, including “institutional and technical capacity to develop and implement guidelines and procedures; extent and effectiveness of local community participation in development, implementation, and distribution of benefits; and transfer and adoption of technology” (IPCC 2000). There are several areas that capacity must be established in to ensure forest protection: Law Enforcement, Sustainable Forest Management techniques and Agricultural.

Forest Law Enforcement Governance and Trade (FLEG) must play an increased role in the future of forest protection. With so much money flowing into the hands of developing countries, efforts must be taken to ensure that the money reaches the right hands and has a measurable impact on forest protection. The IFPA will include a law enforcement monitoring arm to ensure compliance with the international agreements. The governance part of FLEG must ensure that indigenous people's rights are being protected as part of true sustainable forest management. "For successful FLEG agreements, it is essential to start a political dialogue with producer countries focused on forest sector reform, increasing transparency, strengthening land tenure and access rights, and reducing corruption" (Parker et al., 2008).

With the increase in forest land that will result from these proposals, there may be increased pressure on current agricultural and marginal lands to produce enough food to feed the growing world population. Thus capacity must be built into these developing countries in regards to increasing their food supplies as a correlate of protecting their forest lands. This will include a combination of enhanced agricultural capacity education, as well as potentially the consideration of genetically modified crops that can thrive in marginal lands and produce more food per acre. REDD will no doubt have ripple effects in other sectors as well.

"Large-scale implementation of REDD could have implications for food prices, if it takes land out of food production. Higher food prices would positively affect net producers but would negatively affect net consumers. In addition, REDD may affect local commodity prices by increasing the price of land (with either positive or negative poverty implications, depending on the distribution and security of tenure) or by reducing the availability of non-timber forest products (for example, if people are excluded from forests conserved through REDD mechanisms)" (Miles and Kapos, 2008).

Thus capacity enhancement will need to be multi-faceted and cannot focus on forestry alone to protect forests. Developed countries must aid developing countries in comprehensive planning, including land uses for forestry, agriculture, and development. Restrictions on development into forested regions could have the beneficial side-effect of driving denser, urban development patterns which in turn could support transit oriented development (TOD) in these regions. Dense, transit-oriented urban developments release far less carbon emissions than sprawling suburbs or rural regions.

**Financing**

Capacity building will be expensive and will need to be part of the first phase of REDD. When the IFPA gets up and running, this will fall under the organization's financial structure and management. Until then, and in order to make REDD effective, I suggest building capacity by creating a new fund which will consist of voluntary financial contributions to developing countries. Donations to this fund will reflect positively on a country's reputation. As a vital component of forest protection, and thus carbon sequestration, these donations will be usable either as reduced-value carbon credits or as a form of CDM. This will increase the incentives to supply these needed funds. With reduced-value carbon credits, the donor does not receive a one-to-one value of carbon credits for his donation. Since it is only indirectly related to climate change, these funds can qualify for something like 40 cents on the dollar toward carbon credits.

Indigenous People's rights must be considered. On Nov. 14, 2008 in Baguio City, Philippines, 25 indigenous peoples' leaders gathered to discuss the REDD proposal and adopted a Global Indigenous Peoples Strategy on REDD, which is related to the UN Declaration on the Rights of Indigenous Peoples, and includes recommendations for governmental and other actors involved in the development and implementation of REDD activities. These debates and discussions continue into Poznan. In the rush for REDD funds, governments might move people, through force or removal of services such as schools and hospitals. Care must be taken to avoid this. One method possible will be to tie funding to observed compliance with the UN Declaration of Indigenous People's rights. In a similar vein, access to funds could be tied to compliance with the Convention on Biodiversity (CBD) - historically an agreement which developed countries have not been very successful in complying with.

Forests have differing levels of CO₂ storage. REDD funds would be most directed toward those forests with higher levels of carbon storage and may result in a funding shift away from other areas where their value lies in watershed protection, rural economic development or biodiversity instead of CO₂ absorption. It will be important for other funding mechanisms to target the protection of those forests as well. Investments must be prioritized within and between countries to ensure that sustainable forestry management occurs or continues to occur across the board. REDD funds will likely have the effect of applying deforestation pressure to forests with less carbon storage (mitigation) value, but perhaps other types of high adaptation values (Miles and Kapos, 2008). When the IFPA is established, ensuring that all uses of forestland are protected will be an essential part of its mandate.

**Comparing Approaches**

The scope of the 33 governmental and non-governmental proposals described in The Little REDD Book agree that participation in REDD should be voluntary (Parker et al., 2008). With sovereignty
issues reigning supreme throughout climate change debates, this will of course be the case. However, the incentives for participation must be strong enough to attract all, or at least a vast majority, of forested nations. If several opt out, the issue of international leakage will be greatly increased as displaced deforestation will make its way to the non-participating nations.

Most of those proposals argue for a baseline year to be established which their forest protection and regeneration efforts will be measured against, such as forest cover in 1990 or 2002 for example. The following chart establishes four types of countries depending on where they fall in their current level of forest cover and their current deforestation rates. Each quadrant has a different idea of how forest protection should be done in order to maximize the benefits to themselves and other countries similar to them. The final proposal must take all their concerns into account, while also maintaining the principles of equity. For example, why should those countries who have been deforesting heavily benefit more than those who have been so good at protecting their forestlands?

<table>
<thead>
<tr>
<th>HIGH DEFORESTATION RATE ( &gt; 0.22%/yr)</th>
<th>LOW DEFORESTATION RATE ( &lt; 0.22%/yr)</th>
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<tbody>
<tr>
<td>LOW FOREST COVER (&lt; 50%)</td>
<td>HIGH FOREST COVER (&gt; 50%)</td>
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<tr>
<td>Quadrant I e.g. Guatemala, Thailand</td>
<td>Quadrant III e.g. Papua New Guinea, Brazil, Congo (DR)</td>
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<tr>
<td>Madagascar</td>
<td>No. of Countries: 10</td>
</tr>
<tr>
<td>Forest area: 28%</td>
<td>Forest area: 39%</td>
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<tr>
<td>Forest carbon total: 22%</td>
<td>Forest carbon total: 48%</td>
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<tr>
<td>Deforestation annual 48%</td>
<td>Deforestation annual 47%</td>
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<tr>
<td>Quadrant II e.g. Dominican Republic, Angola, Vietnam</td>
<td>Quadrant IV e.g. Suriname, Belize, Gabon</td>
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<tr>
<td>No. of Countries: 15</td>
<td>No. of Countries: 11</td>
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<tr>
<td>Forest area: 20%</td>
<td>Forest area: 13%</td>
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<tr>
<td>Forest carbon total: 12%</td>
<td>Forest carbon total: 18%</td>
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<tr>
<td>Deforestation annual 1%</td>
<td>Deforestation annual 3%</td>
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(Source: Parker et al. 2008)

This proposal suggests that rather than considering the change based on some baseline forest cover, the yardstick used to measure forest protection and regeneration should be some percent of potential forested area that is actually forested. Countries will be ranked by where their percentage falls compared to other countries. If that rank increases, you get credits. This may incentivize the sabotage of other country's forest lands – not the desired outcome. An alternative would be to establish tiers with a country's percentage, which would place that country on a certain tier. If a country move up in tiers, that country gets more access to development funds.

Lower tier countries will have funds tied to forest development before they can use the money for anything else. Those with lower percentages have more ability to increase than those who have been historically good about preserving their forestlands, but it is that latter group who stands to benefit from this scheme – as they should. To determine the amount of forest-able land a country has, researchers could use remote sensing, which has already been proven to work well for determining total forested cover.

With a baseline system, for example, Brazil would be held for reforesting up to and past what its forest cover was in some baseline year such as 1990. The percentage system would entail an assessment of Brazil’s potentially forested area (let's say 1,000,000 acres) and then assess how much is actually forested (again, let's say 850,000 acres). This would put its percentage of forested area at 85%. If this is the 12th best percentage in the world and they increase their forested area percentage to the 10th best, they would get more money. Rather than a ranking though, the tier system would be set so that, say, countries with 90-100% are in Tier 1 and get a certain amount of money. Countries with 80-90% are in Tier 2 and get a little less, and so on. Thus Brazil in this example would have to increase to the next highest tier (minimum 90%) to get more money from the IFPA.

As REDD develops, there are a few pitfalls that must be avoided. As it is bound to ramp up slowly, there needs to be the right incentives in place to ensure forest protection. We cannot afford to create perverse incentives that may make it profitable for countries that won't be measured for a few years to cut forests down now. To do this we should rely on graduated assessment of forest cover since 1990, with heavier weighting on the near end. Any deforestation occurring after Copenhagen, but before REDD gets fully underway, counts against baseline.

As far as baseline is concerned, sub-national, project-by-project approaches may be valid in the early phases as national capacity is ramped up, but under full REDD, only national inventory accounting will be acceptable. The National Inventory approach was first suggested by Anderson and Richards (2001). This means that measurements are taken for each country as a whole, eliminating intra-country leakages. However:

"The problem of intercountry leakage to non-participating countries persists; however, this is not a problem particular to NL. Whenever there is less than full participation in an international treaty, there is the potential for unregulated actions by non-participating countries to counteract the treaty's objectives" (Plantenga and Richards, 2007).

There is also a third way to measure successful forest protection, beyond sub national or project by project approaches: global accounting. This will not work if there are many non-participating nations, but could be a feasible tool to reward historically low emitting nations.

Finally, REDD needs to be an addition to, and not a substitute for, large cuts in a country's emissions. This could be enforced by requiring countries or companies to purchase equal (or some standard ratio) amounts of REDD and certified emission reduction (CER) credits and not all of one or the other as they develop. Forest protection and regeneration is only one piece of the climate change solution. An overload of forest credits could decrease the efficiency of other efforts being worked on towards adaptation or mitigation. Perhaps the debates in Poznan will further clarify the structure REDD will eventually take. Hopefully, these concerns outlined above will be worked out in the final agreement to be determined in Copenhagen in 2009.
Forest Protection and Regeneration in the Post-Kyoto Era

IFPA

The most effective way to ensure protection of the world’s forests – for carbon sequestration as well as considerations of biodiversity, water issues, and local concerns – is to establish a single agency with that as its sole mission. This is too complex and important an issue to be divvied up amongst UN power players with funding coming from different sources and no unified vision. This agency will be known herein as the International Forest Protection Agency. The formation of such an organization allows for the correction of previous shortcomings within other international bodies.

The time is right – with the nations of the world coming together under the banner of finding solutions to climate change and with previously underrepresented countries and peoples forming coalitions and finding their voice – to establish an equitable approach to a resource that, though it may grow in one place or another, is truly a global asset and must be protected for all current and future generations.

The IFPA’s mission statements, management structures, and funding mechanisms are all tabula rasa – blank slate. This work represents a first attempt to establish the direction such an agency may take, and an expose of the varied and multiple benefits such an agency would bring to climate change solutions for both mitigation and adaptation.

The mission statement for the IFPA will state that forests are to be protected for their roles in carbon capture through sustainable forest management, biodiversity, water supply management, local economic development, and in consideration of the rights of indigenous peoples who dwell there. Some may want the IFPA to be primarily concerned with carbon capture, with the other goals as secondary concerns, but this must not be the case. The IFPA will also continue supporting capacity building efforts in forestry and related fields.

Beyond carbon sequestration, forests supply vital ecological services to their local environments, such as biodiversity conservation, livelihoods, and watershed protection (Miles and Kapos, 2008). “Deforestation leads to all kinds of environmental problems: biodiversity loss, soil degradation, water cycle disruption... and about 350 tons of CO₂ emissions per hectare destroyed” (Bellassen and Schwartzman, 2007). For decades environmental groups, politicians, and conservation-minded individuals have been striving to protect tropical rainforests for these reasons. Now their value has been recognized in the fight against climate change – and far more serious money will be spent on anything relating to climate change issues than on traditional environmental concerns. Linking the carbon-focused funding from whatever new source will arise with the actions additionally supporting these other co-benefits provided by the world’s forests will be imperative. This will a classic no-regrets approach and for this alone it could garner wide spread support.

Technology requirements

In order to fulfill its mandate, the IFPA must have rigorous methods of monitoring and verifying that forest protection has been accomplished. This will be the jurisdiction of the IFPA because many developing tropical nations (with the exception to some extent of India and Brazil (Skutsch et al., 2007)) do not have the capacity to regularly measure themselves. Considering that nations around the world will all be simultaneously needing this service, the IFPA could be stretched thin. The most effective way to provide such monitoring is through remote sensing. There are currently several satellites in orbit which are capable of assessing, at some level, the forested acreage of each country. However, they have technological limitations which reduce the efficiency and accuracy of such measurements.

Aerial remote sensing, through LiDAR rather than optical measuring instruments, overcomes these technical limitations, but without the wide coverage that satellites offer. They can be very effective however. For example, an “airplane-mounted system, using dual cameras and collecting imagery that can be viewed in 3D, has been demonstrated to reduce costs of conducting forest inventories, particularly for highly variable, widely spaced, or inaccessible sites (Brown et al 2005, Brown and Pearson 2005) and for dense forests (Pearson et al 2005b)” (Gibbs et al., 2007).

On the short term, a combination of satellite big-picture imaging and aerial sampling can be performed to get a general idea of forest cover. However, this will be insufficient, carrying too much margin of error. Technological advancements are being made in regards to satellite LiDAR, however. NASA plans to launch a LiDAR capable satellite in 2014. NASA is, of course, an agency of the American government, and this could provide a conflict with those who may deem using it as another stranglehold the developed countries have on the developing countries. There must be transparency in its operation and usage – something the United States has experience with through other scientific programs such as Landsat. An assessment must be made as to its effectiveness and the scope with which it will be able to measure forest cover. If it is also deemed inefficient, the IFPA may need to generate support for further technological developments, possibly even creating a dedicated satellite resource for use in global forest monitoring.

Currently, NASA is partnering with the University of Maryland and the Friedrich-Schiller University of Jena (located in Germany) in a research venture to design a “Carbon 3-D” satellite. This bills itself as “an international mission for global 3-dimensional mapping of biomass for an improved understanding of CO₂ balance” (www.carbon3d.uni-jena.de, 2008) and would be an invaluable tool for any REDD or IFPA assessments. Currently, this venture is merely proposed, without funding. Satellite analysis alone will be insufficient. As with all remote sensing tools, there will be an additional ground-truthing requirement to ensure accuracy.

Management Structure

The management structure of the IFPA must ensure equitable representation from northern and southern nations, as well as developed, developing and potentially a third group as well (some combination of Newly Industrialized Countries and Emerging Markets). This will occur with an alternating secretary – two-year term for a developed nation representative followed by a two-year term for a developing nation representative followed by a two-year term for the third nation-type representative, and so forth. The council under the secretary will be composed of an odd number of nations for voting purposes. The least number of representatives (by one) will come from the nation-type representing the secretary’s seat at that time. In addition, indigenous people must be represented alongside those from the developed and developing nations on this council and potentially in the secretary seat.
Forests in Developed Countries

The 33 proposals in The Little REDD Book also agree that REDD funds should only be accessible to developing countries (Parker et al., 2008). However, developed countries, such as Russia, Canada and the United States, have vast forest resources that need to be protected as well. Russia especially has been seeing a recent increase in deforestation and there is high risk that Siberian forests may be significantly affected by the effects of climate change. American and Canadian forests are already feeling the burn, literally. Climate change is directly responsible for the heavy increase in forest fires in North America (Westerling et al., 2006; San Diego Declaration, 2006; Liu, 2006). Both countries have been hard hit by recent bark beetle infestations, also another side-effect of warming climates (Logan, 2005), resulting in hundreds of thousands of acres of beetle-kill trees just waiting for a lightning strike to set them off. This was further noted during the recent European Forest Week: “carbon emissions from forests are more than double what the fire, storms, insect infestations and forest dieback (e.g. as is occurring in the Russian Federation) may be increasing, thus reducing the positive net carbon balance of the region’s forests” (FAO and UNECE, 2008).

This REDD focus on developing countries will be a good starting point, especially due to the higher rates of tropical deforestation. However, in the long run, the IFPA must also consider these northern, developed country’s forests at risk. Boreal forests can be just as good at sequestering carbon as tropical rainforests if managed properly.

With the developed countries, capacity building will not be the issue it is with developing countries, but their forests must still be protected under the authority of the IFPA. These promises to share aid among developed countries, after the first decade or two of REDD, in their attempts to protect their forests from development pressures and climate change induced catastrophes may appeal to the developing country’s representatives in these early negotiating periods.

Mitigation and Adaptation

Forests serve both mitigation and adaptation functions. By the time the IFPA is established (hopefully before 2020), adaptation solutions will certainly be popular, but mitigation of further effects will still help. Carbon sequestration performs the prime form of climate change mitigation offered by biomass, while the protection of strong, diverse ecosystems that are more resilient to climate change forms the basis for adaptation strategies.

The goal of the UNFCCC, the Kyoto Protocol and all other legislation and negotiation to date has not been to reduce carbon dioxide in the atmosphere. That is just the means which they debate. The goal is to reduce the effects all that extra CO2 and other GHGs have on the planet. This is why forestry is so vital. Not only can it reduce the CO2, but forests can also help local communities adapt to some other negative effects of climate change, such as reduced water supply. The IFPA agency must be concerned with adaptation as much, if not more than, mitigation. Many mitigation efforts may be coming too late, but it’s never too late to adapt. Countries that are most vulnerable to climate change would be among the most benefited by increasing their forest cover.

Financial Mechanisms

“The United Nations Framework Convention on Climate Change (UNFCCC) is considering the introduction of a financial mechanism to reduce emissions from deforestation and forest degradation (REDD) in developing countries’ (Miles and Kapot, 2008). Naturally, there is an active and intense debate surrounding the economics of these proposals. Anti-deforestation could be accepted as a financial mechanism in the post-Kyoto negotiations. Funds allocated must be partitioned into different categories to correlate with the different phases capacity building, reducing deforestation, extending conservation. Beyond REDD, financing for the IFPA must be established. Financial investments in IFPA startup costs can be used as reduced-value carbon credits, but beyond that there will need to be a regular source of income for the organization.

The UK’s Eliash Review released a report titled “Climate Change: Financing Global Forests” in October that was distributed in Poznan at COP 14. This report “assesses the impact of global forest loss on climate change and explores the future role of forests in the international climate change framework, with particular emphasis on the role of international finance.” Eliash claims a market mechanism is the only way that this issue can really be paid for.
If a market-based carbon trading mechanism is established, this could lead to larger financial investment over a longer time frame than if a simple grant funding mechanism were agreed upon. CO₂ credits from forestry are already being traded on the global voluntary markets. As of mid-2007, forestry projects accounted for the largest share – about 36 percent – of the carbon credits sold on the voluntary carbon market (Hamilton et al., 2007) but that won't be enough. A mandatory system must be enacted. Anywhere from $1.2 billion to as high as $10 billion could be raised for forest conservation in this fashion – extremely high numbers considering that the World Bank only granted a total of $257 million for forest biodiversity conservation projects in 2002 (Miles and Kapos, 2008). However, this doesn't even come close to being competitive with forestry exports from the developing world which were worth almost $40 billion in 2006 (FAO, 2008). An agreement on REDD could establish a market for those who wish to protect their forests, and provide the financing to do so. Indonesia, for example, stands to earn billions of dollars if REDD takes effect due to their large areas of peat land in the country – one of the highest CO₂ absorbing ecosystems. If Indonesia could curb the burning of these lands, they could generate many tons of CO₂ credits to sell.

Additionally, the World Bank cannot be the organization controlling forest carbon credit trading. That institution must be a truly neutral, north-south venture and one that considers indigenous peoples' rights as well as carbon and other values of forests. The World Bank began positioning itself to be that institution by establishing the Forest Carbon Partnership Facility (FCPF) – a framework for trading REDD credits – prior to last year's COP13 in Bali. However, "NGOs attending the Bali summit called for the FCPF not to be launched, due to serious shortcomings with the Facility, including its flawed governance structure, lack of transparency, the lack of attention to the Bank's poverty mandate and overall reliance on market-based mechanisms to pay for REDD" (Aber-ECO, 2007).

The forested nations of the world, many too strapped for resources to adequately protect their woodlands, may soon be in a position to reap the financial benefits of climate change. For too long, the ecological services provided by global forests, both to the communities surrounding them and the world as a whole, have been undervalued. Establishing a value to these functions, measurable in a market and exchangeable for cash, invites much-needed investment. Here is an opportunity to both battle climate change and restore millions of acres worldwide to ecologically important forestland. This is an opportunity that must be capitalized on. The influx of Climate Change funds should be used in such a way that they protect, maintain, and re-establish forests by maximizing the co-benefits provided by the forests in addition to sequestering carbon.

REDD funds may be used to support the principle of "equity" outlined in the UNFCCC and have great potential to contribute to rural economic development in developing countries as well as reduce GHG emissions. However, finding ways to distribute REDD funds equitably will be difficult, facing resistance from various interests. Perceptions of infringement on local sovereignty may result in political resistance to individual REDD schemes (Peket et al., 2005). Information on the benefits must be distributed and well-communicated to avoid such issues.

Many municipalities and businesses have been on the leading edge of efforts to reduce climate change and its effects by instituting programs that appeal to the green-leaning attitudes of their stakeholders and citizens. They also represent an excellent supplementary source of funding potential for forest protection. Part of the new post-Kyoto agreement should contain language that encourages member countries to create new laws or programs aimed at requiring (or incentivizing in some way) that all new projects assess their carbon footprint and purchase carbon offsets equal to or exceeding that impact. In this way, all new development could be carbon neutral.

On a small scale, this has begun to happen. The Massachusetts Bay Transportation Authority (MBTA), for example, submitted in 2003 its long-range capital planning document (the Program for Mass Transportation) which contained information for each planned project’s projected percentage reduction in weekday CO₂ emissions.

If this requirement is instituted in just a few of the developed countries, it will vastly increase global demand for carbon offsets. By enabling forestry projects to count as carbon credits would flood the market with cheaper credits at a time they are needed most. This would bring the private investment to countries who are trying to increase their forested acreage, as a supplement to the individual country contributions flowing into the proposed IFPA for REDD through whatever other mechanism is enacted. Some are concerned that these cheaper forestry credits will reduce the level of funds available for pollution abatement from industrial sources. (REDD-Monitor, 2008) However, if anything is done right in the post-Kyoto period, there should be a vast increase in demand for carbon credits and initially this will not come from industrial abatement.

What about small-scale forest production? REDD funding mechanisms could adversely affect small producers and land-owners due to potentially high costs such as compliance or verification services: "concerted efforts are required to ensure equitable benefit distribution; robust systems of accountabilitiy; effective conflict resolution; and support for small-scale REDD" (Peket et al., 2005). This could be addressed by forming coalitions or partnerships among these smaller interested parties within each country. Thus scattered small-scale forest protection becomes large-scale effective carbon sequestration. The IFPA will be responsible for aiding in the creation of such coalitions.

Further Considerations

Forests sequester carbon, and in the framework of the post-Kyoto negotiations, this is their prime value. What if a new technology arises in the next decade that vastly outperforms forests when it comes to carbon sequestration? Suddenly, forest protection and regeneration as part of the solution to climate change becomes far less appealing. Certainly, this will not affect the importance forests have traditionally played in environmental negotiations (such as biodiversity, watershed protection and local economic development), but these co-benefits will lose a valuable ally if forests become less competitive as carbon banks.

In 2005, the IPCC estimated the economic potential of Carbon Capture and Storage (CCS) as being between 10% and 55% of the total carbon mitigation effort until year 2100 (IPCC, 2005). CCS would take place deep within the earth, the ocean or as converted to a solid in the form of mineral carbonates. Each proposal comes with its own set of risks. The most promising option would be deep within the earth, but it remains to be seen just how secure this would be. The world's oceans are already acting as a CO₂ store, and it is unknown what their maximum potential may be, not to mention what CO₂ sequestration in the ocean may do to this ecosystem. In its 2007 Carbon Sequestration Atlas, the National Energy Technology Laboratory (NETL) reported that North America has enough
If a market-based carbon trading mechanism is established, this could lead to larger financial investment over a longer time frame than if a simple grant funding mechanism were agreed upon. CO₂ credits from forestry are already being traded on the global voluntary markets. As of mid-2007, forestry projects accounted for the largest share - about 36 percent - of the carbon credits sold on the voluntary carbon market (Hamilton et al., 2007) but that won’t be enough. A mandatory system must be enacted. Anywhere from $1.2 billion to as high as $10 billion could be raised for forest conservation in this fashion - extremely high numbers considering that the World Bank only granted a total of $257 million for forest biodiversity conservation projects in 2002 (Miles and Kapos, 2008). However, this doesn’t even come close to being competitive with forestry exports from the developing world which were worth almost $40 billion in 2006 (FAO, 2008). An agreement on REDD could establish a market for those who wish to protect their forests, and provide the financing to do so. Indonesia, for example, stands to earn billions of dollars if REDD takes effect due to their large areas of peat land in the country – one of the highest CO₂ absorbing ecosystems. If Indonesia could curb the burning of these lands, they could generate many tons of CO₂ credits to sell.

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REDD funds may be used to support the principle of "equity" outlined in the UNFCCC and have great potential to contribute to rural economic development in developing countries as well as reduce GHG emissions. However, finding ways to distribute REDD funds equitably will be difficult, facing resistance from various interests. Perceptions of infringement on local sovereignty may result in political resistance to individual REDD schemes (Peck et al., 2005). Information on the benefits must be distributed and well-communicated to avoid such issues.

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Further Considerations

Forests sequester carbon, and in the framework of the post-Kyoto negotiations, this is their prime value. What if a new technology arises in the next decade that vastly outperforms forests when it comes to carbon sequestration? Suddenly, forest protection and regeneration as part of the solution to climate change becomes far less appealing. Certainly, this will not affect the importance forests have traditionally played in environmental negotiations (such as biodiversity, watershed protection and local economic development), but these co-benefits will lose a valuable ally if forests become less competitive as carbon banks.

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storage capacity at our current rate of production for more than 900 years worth of carbon dioxide. While the potential may be there, the technological and financial limitations are currently still there as well.

No matter what scientists say about potential future developments in carbon sequestration technology, the value of forests in this role is indisputable. However, plans should not be made on the basis of a potential future development. Action against climate change needs to occur immediately, with an eye on the long-term future. Forest protection accomplishes this, whether new technologies emerge that do it better or not. At the very least, as long as forest protection for sequestration is linked to forest protection for the slew of other ecological services they provide, this post-Kyoto LULUCF proposals become a no-regrets decision both in the short term, and in the long run.

Conclusion

Much work still needs to be done to adequately protect forests, both in the developing and the developed worlds. The definitions of what is "good forest land" must be determined. Currently, the FAO includes monoculture plantations in its definition of forestry and these do not serve the interests of biodiversity. Will this be adequate? What other tactics can be used to enhance the value of forests as carbon sinks? Wood can be used as a substitute for other materials, such as metals and plastics, reducing the carbon impact of processing those materials and establishing long-term carbon retention within the wood product. Can this substitution be implemented successfully in a world of glass and steel skyscrapers? There are technological limitations to overcome: "some carbon sequestration activities are too costly to measure on a comprehensive basis, including changes in carbon stored in agricultural soil carbon and wood products." (Plantinga and Richards, 2007). Also, forest sector policy makers and climate change policy makers must put their heads together and ensure efficient and accurate communication and information sharing is established. The input of forest sector specialists must be gathered and considered – something which did not happen to any great extent under the Kyoto-protocol.

Forest protection and regeneration will play a role in the coming years as climate change strategies are developed. The extent of that role is still being debated, but their importance beyond carbon sequestration must not be overlooked. Not only can they serve successfully in that role, but they provide invaluable adaptive functions as well.

The biggest issue for policymakers and negotiators will be establishing the proper funding mechanism. If worldwide development projects ARE held accountable for their carbon footprints and the price of carbon does drop, REDD and IPPC carbon credits could be an invaluable immediate way to fulfill global demand. Judging by their popularity in the voluntary markets, the future for forest credits in a mandatory market is bright – and adding in the role they may be able to play as a source of income for poor countries makes their appeal almost limitless.

NOTE: The economic and ecologic merits of this plan have not been scientifically determined. This plan was arrived upon after examining the strengths, weaknesses and gaps in the multitude of other similar concepts being discussed (in Poznan even as this paper was being written) and hopes to provide additional food for thought on the issues as a climate neutral future is determined by our world leaders.

References


