

Protecting forests to mitigate global climate change

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1. Introduction

Forests are our most important terrestrial storehouses of carbon and play an important role in controlling our climate. Yet, in many parts of the world forests are degraded and destroyed to expand agricultural lands, gain timber or clear space for infrastructure or mining activities. Tropical deforestation has severe consequences for loss of biodiversity, flooding, soil degradation and threats to the livelihoods and cultural integrity of forest-dependent communities. It is also a major contributor to global climate change. At a worldwide scale, global change pressures (climate change, land-use practices and changes in atmospheric chemistry) are increasingly affecting the supply of goods and services from forests.

The international climate regime accounts for the role forests play in influencing our climate. By storing carbon forests can help mitigate climate change, by releasing carbon they contribute to the increasing concentrations of greenhouse gases in the atmosphere. Both the UN Framework Convention on Climate Change (“UNFCCC”) and the Kyoto Protocol list general obligations relating to land use, land use change and forestry, or “LULUCF” in the lingo of climate change negotiators. Parties to the treaties are mandated to promote sustainable forest management, forest conservation and the promotion of forests as sinks. However, these rules are neither binding nor sufficiently concrete to have triggered any significant forest conservation. The significance of carbon storage and release in biological systems makes it therefore mandatory that a post-Kyoto climate regime includes incentive for forest conservation.

The present paper will look at the relationship between forest degradation, deforestation and climate change. I will start with summarizing the impact of climate change on forestry ecosystems on one hand, and tropical deforestation and impact on climate change on the other. Moving from there to institutional and regulatory issues, the paper will then describe the current climate change regime and how it deals with the “LULUCF” issue, followed by a view into the future and how the incentive framework for conservation and afforestation should be set in a post-Kyoto regime. Finally, I will look at the connection between bioenergy and forest conservation. The paper concludes with an outlook of the possible impacts of an international climate regime on changes in land use patterns.

2. The impact of climate change on forests

Climate change impacts on forest ecosystem can have positive and negative impacts: Owing to the multiplicity of geographical, social, and economic conditions, change can bring positive effects to one area and community, negative to another. The impact of a changing environment on the individual plants needs to be distinguished from the impact on the surrounding ecosystem. Trees are affected by climate change in the following ways:¹

¹ See: IPCC (2000), Land Use, Land-Use Change, and Forestry: IPCC Special Report (eds. Watson, R.T., Noble, I.R., Bolin, B., Ravindranath, N.H. Verardo, D.J., Dokken, D.J.), Cambridge University Press,

- Hydrology and water resources: Climate change will change rainfall patterns. In many regions groundwater recharge will be affected. Deforestation and the degradation of forestry systems will increase the vulnerability of the water sector. On the other hand, reduced water supplies will affect forest ecosystems.
- Temperature increase may lead to an increased photosynthetic activity of plants. It will also cause high level of transpiration, leading to additional water loss.
- The impact of increased concentration of carbon dioxide in the atmosphere depends on the plant species and the surrounding ecosystem. Increased CO₂ concentration in the atmosphere has often a fertilizing effect of stimulating photosynthetic activity. High CO₂ concentrations can also increase the water efficiency of plants. On the negative side, CO₂ concentrations may affect the plant tissue with potential detrimental effects on the metabolism of the affected plants.

Ecosystems are highly vulnerable to climate change. The combination of temperature and rainfall patterns characterizes an ecosystem in a certain area. A change in these variables will cause a change to that ecosystem as it adapts to the new conditions. The impact on the competitiveness of the various species will lead to a change in the composition of species. Stress caused by a change in the conditions of the ecosystem may also increase its vulnerability for pests and fires. Climate change related impacts thereby add to air and ground water pollution – and indiscriminate logging.

3. Tropical deforestation and climate change

Being affected by climate change, forests also play an important role in addressing climate change: by storing carbon they help to off-set the effects of anthropogenic greenhouse gas emissions. Forest ecosystems contain the majority (approx. 60%) of the carbon stored in terrestrial ecosystems² and account for 90% of the annual carbon flux between the atmosphere and the Earth's land surface.³ In many temperate ecosystems, forests act as net carbon sinks, sequestering more carbon than they emit. Tropical deforestation on the other hand is responsible for up to 25% of the total human-caused greenhouse gas emissions each year.⁴ Deforestation is also one of the main reasons for the rapid extinction of forest species.

Cambridge, UK; Schimmel, D. S. et al. (2001), Recent patterns and mechanism of carbon exchange by terrestrial ecosystems. *Nature* 414: 169-172; Robledo, C. and Forner, C. (2005), Adaptation of forest ecosystems and the forest sector to climate change, *Forests and Climate Change Working Paper 2*, FAO, Rome; Körner C. and Arnone, J. (1992), Responses to elevated carbon dioxide in artificial tropical ecosystems, *Science* 257:1672-1675; Kellomäki, S. and Wang, K.-Y. (2000), Modelling and measuring transpiration of Scots pine with increased temperature and carbon dioxide enrichment, *Annals of Botany* 85: 263-278.

² IPCC (2000), *Land Use, Land-Use Change, and Forestry*. A Special Report of the IPCC, (eds. Watson, R.T., Noble, I.R., Bolin, B., Ravindranath, N.H. Verardo, D.J., Dokken, D.J.), Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

³ Winjum, J. K., Dixon, R. K., and Schroeder, P. E. (1993), Forest management and carbon storage: An analysis of 12 key forest nations, *Water, Air, & Soil Pollution*, 70(1 - 4), 239-257.

⁴ Using 1990 as the baseline and taking into account emissions of carbon dioxide, methane, nitrous oxide, and other chemically reactive gases that result from deforestation and subsequent uses of the land. See Houghton, R.A. (2005), "Tropical deforestation as a source of greenhouse gas emissions" in Moutinho P.

Deforestation results from a variety of cultural and economic factors.⁵ Demographic pressure, infrastructure and agricultural expansion are among the main drivers of conversion of forests to other land uses.⁶ Another reason for loss of forests is the unsustainable extraction of forestry products. This includes both legal and illegal logging activities as well as the extraction of fuel wood and other forestry products. Where forests are poorly managed and timber and wood products are extracted without restoring the loss, forests degrade until they are lost.⁷

Deforestation is responsible for 90% of all greenhouse gas emissions related to LULUCF since 1850.⁸ The highest deforestation rate can be observed in tropical Asia, followed by Africa and South America. Forests are cleared fastest in Brazil, India, and Indonesia.⁹ With current deforestation rates, Indonesia is expected to have lost its primary forest by 2012. On the other hand the forest coverage is growing in the Caribbean. Additional greenhouse gas (methane) emissions result from the drainage of peatlands for palm oil and timber plantation.¹⁰

Tropical forests account for slightly less than half of the world's forests. Yet, tropical forests store as much carbon in their soils and above-ground biomass as boreal and temperate forests combined. Trees in the tropics store in average about 50% more carbon per hectare than trees outside the tropics.¹¹ While temperate forests hold more carbon stored in the soil, tropical forest concentrate the carbon in the trees. Because only a fraction of soil carbon is lost when trees are felled, deforestation in tropical countries leads to a greater release of carbon than the equivalent deforestation in temperate zones.

Measures to manage and protect forests offer significant climate change mitigation potential:

and Schwartzman S. (eds.) Tropical deforestation and climate change, IPAM, Instituto de Pesquisa Ambiental da Amazonia, Environmental Defense, Belen, Brazil, Washington DC, USA.

⁵ Lovera, S. (2003), Going to the roots: addressing the underlying causes of deforestation and forest degradation, see: <http://www.fao.org/DOCREP/ARTICLE/WFC/XII/MS12B-E.HTM>; Lanly, J.-P. (2003); Deforestation and forest degradation factors, <http://www.fao.org/DOCREP/ARTICLE/WFC/XII/MS12A-E.HTM>; both accessed on 10 January 2007.

⁶ Kaimowitz and Arild show that agricultural expansion (soy, beef) is one of the main causes of deforestation in Latin America. Kaimowitz, D. and Arild, A. (1998), Economic models of tropical deforestation: A review. Center for International Forestry Research, Bogor, Indonesia.

⁷ According to Arild and Kaimowitz, cases where logging conduces to deforestation primarily occur in Asia, whereas unsustainable exploitation of forests for wood extraction primarily occurs in Africa. See footnote 5.

⁸ Houghton, J., Ding, Y., Griggs, D., Noguier, M., Van der Linden, P., Dai, X., Maskell, K. and Johnson, C. (2001), Climate Change 2001: The scientific basis; summary for policy makers, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) Cambridge, CUP.

⁹ Forest and Agricultural Organization, FAO (2001), Forest Resources Assessment 2000, Forestry Paper 140, FAO, Rome, Italy.

¹⁰ Hooijer, A., Silvius, M., Wöste, H., Page, S., Peat-CO₂ -Assesment of CO₂ emissions from drained peatlands in SE Asia, Delfts Hydraulic Report, Q3943 (2006), Delft, Netherlands.

¹¹ Houghton, R.A. (2005), Tropical deforestation as a source of greenhouse gas emissions, in: Moutino, P., Schwartzman, S. (eds), Tropical Deforestation and Climate Change, IPAM, Instituto de Pesquisa Ambiental da Amazonia, Environmental Defense, Belen, Brazil, Washington DC, USA.

1. Biomass can store excess carbon. Afforestation, upgrading of ecosystems, regeneration, and sustainable forestry management leads to an absorption of CO₂ from the atmosphere. Immature forests act as carbon sinks even without human interference.
2. Forests and terrestrial ecosystems need to be conserved and protected to reduce the greenhouse gas emissions from the release of CO₂ previously stored in terrestrial biomass.
3. The production of biomass can act as an energy source and biological productions can be substituted for materials requiring energy-intensive production (e.g. aluminium and concrete). Sustainably harvested fuel wood is emissions neutral because the carbon released through burning the wood is compensated by an equivalent amount absorbed by forest growth.

However, accumulation of carbon should not be the only objective in forest management. Looking at forests exclusively from the carbon perspective does not do justice to the role of forests. Looking at them this way is no different to looking at them from the perspective of the value of the timber. Managing forests and allowing the increase of forest area, forest age and tree size can have beneficial impact on the forests biodiversity and ecosystem function. Additionally, natural forest fire regimes should not be altered. Even where activities are being undertaken to protect the carbon stored in a forest, these activities should meet a set of defined criteria to ensure that they are environmentally and socially robust for the long term.

4. LULUCF in the UNFCCC and the Kyoto Protocol

The UNFCCC and the Kyoto Protocol both acknowledge the vital role that forests play for the global climate. However, they fail to set an adequate incentive framework which would trigger significant afforestation on one hand, discourage deforestation and encourage conservation on the other.¹² During the negotiations leading up to and subsequent to the Kyoto Protocol, there was considerable concern that carbon off-sets may become void in cases where human action or natural events, such as wildfires, reversed the carbon benefits. This was called the permanence risk and it is main difference between emission removals generated by the LULUCF sector and emission reductions generated by the industrial sectors.

Parties decided that “direct human-induced”, i.e., “net changes” in GHG and removals by sinks since 1990 may be used to meet part of the Parties emission commitments.¹³ Countries have to (Article 3.3 KP) or may (Article 3.4 KP) account for the change in carbon stock.. Furthermore, Art. 6 and 12, which define the project-based mechanisms JI and CDM refer directly (JI) or at least indirectly (CDM) to carbon sinks. With respect to JI the Parties decided that the overall liability of a country to comply with its targeted amount of emissions would act as sufficient insurance against the potential loss of carbon due to ‘non-permanence’.¹⁴

¹² See for more detail: Streck, C. and Scholz, S. (2006), The role of forests in global climate change: whence we come and where we go, *International Affairs* 82 (5): 861-879.

¹³ Those ‘net changes’ must be “measured as verifiable changes in carbon stocks in each commitment period”

¹⁴ These reductions in emissions and removals have to be both, ‘additional’ to what would otherwise have occurred without the project and ‘supplemental’ to domestic action aimed at meeting the Parties’ respective reduction commitments.

For the CDM the issue became more complicated. It took almost six years of assessment and negotiation before a final agreement¹⁵ on the definitions and modalities for the use of LULUCF projects in the CDM was reached at the 9th session of the Conference of the Parties to the UNFCCC in 2003 in Milan. LULUCF in the CDM was limited to afforestation and reforestation projects and the use of sinks projects in developing countries restricted to only one per cent of a country's Kyoto obligations.¹⁶ The protection of existing carbon pools (avoided deforestation) was finally declared to be non-eligible as a CDM project category.¹⁷

This means that while there is an incentive to restore and conserve temperate forests in industrialized countries, the most important source for emission from the LULUCF sector - tropical deforestation - is currently not covered under the Kyoto Protocol and there is no incentive for developing countries to protect their forest resources.

5. The carbon market and payment for environmental services

Until today many of the benefits provided by forests are considered as global commons, freely available for everybody. Purification of air and water, stabilizing soil, creating the conditions for a rich biodiversity, producing pharmaceutical substances and acting as carbon storehouses is considered as an unlimited and free service provided by forests. No ownership right and consequently no monetary value are being assigned to these services. The value of a forest is often captured alone in the value of those items that can be assigned and traded: the timber and the land on which the trees stand. This also means that those that control or have access to forests often have a greater incentive to clear the forest than to conserve it.

Applying the logic of the market, forest services need to be priced for people to acknowledge their true value. Schemes that envisage the payment for "ecosystem services" try to address market failure by creating incentives to conserve, protect and restore forests. Assigning value to emission reductions or removals (carbon storage) by creating tradable carbon credits is the most developed and promising approach to assigning value to standing forests.

The carbon market relies on emission trading and the transfer of carbon credits. CDM and JI allow countries to invest in emission reducing projects in countries where the abatement cost for emission reductions are lower than in their own economies. In return for their payment, the investors or purchaser of carbon credits receives a right to the carbon credits generated by the project. These carbon credits can be used to meet compliance obligations under the international or national regulatory regimes. The carbon market created under the Kyoto Protocol and a number of regional and national emission trading schemes is worth billions of dollars each year.¹⁸

¹⁵ All rules governing A&R projects apply to only the first commitment period of the Kyoto Protocol and will have to be revisited before the second commitment period.

¹⁶ See Decision 17/CP.7 on 'Modalities and procedures for a clean development mechanism' FCCC/CP/2001/13/Add.2, paragraphs 7(a) and (b).

¹⁷ The inclusion of this category in limited circumstances in small scale CDM projects is currently being debated amongst the Parties.

¹⁸ According to the World Bank, more than USD10billion have been traded in international carbon markets in 2005. Kapoor, C., Ambrosi, P., State and Trends of the Carbon Market 2006, IETA – The World Bank, Washington, DC. <http://carbonfinance.org/docs/StateoftheCarbonMarket2006.pdf> (accessed 10 January 2006).

Because the Kyoto Protocol does not address forest conservation or the prevention of deforestation, tropical countries are restricted in their opportunities to benefit from the CDM. The Kyoto Protocol thus fails to set an incentive to protecting natural forests in developing countries. Most of the off-sets generated by LULUCF projects are therefore traded in the so-called voluntary or retail market. Companies invest in voluntary off-sets for marketing purposes, to meet certain CSR promises, or out of true environmental concern. More and more individuals seek to off-set their carbon “foot print”.

5. Future considerations of forestry under a climate regime

In December 2005 negotiations on a post-Kyoto agreement started in the context of the UNFCCC and Kyoto Protocol annual meetings. At this occasion Papua New Guinea and Costa Rica put forward a submission to further consider whether and how incentives to reduce tropical deforestation could be included in the future climate regime under the UNFCCC or the Kyoto Protocol. This submission created a lot of interest and earned significant support. It started a process of discussions focused on how to address emissions from deforestation in developing countries. Since then a number of ideas and technical approaches on how to expand the carbon market to create incentives for forest conservation have been tabled and are being discussed (in the unfortunate snail pace of climate negotiations) as part of a post-Kyoto agreement.

The long and often controversial history of the climate change negotiation shows that addressing the issue of deforestation has to take into consideration a number of important issues:

- The reluctance of developing countries to assume binding caps on emissions
- The right for a country to pursue its goals of sustainable development as it sees fit
- The consideration of forests as sovereign asset, and related problems to ownership and legal title of forests and tradable credits
- A science based approach that considers monitoring and methodological issues, permanence and liabilities
- Environmental integrity and effectiveness
- Avoidance of perverse incentives
- Economic efficiency

Participation in emission trading should be an opportunity for developing countries rather than a constraint. Creating tradable carbon removal/reduction assets through voluntary participation in emission trading de-links the achievement of an environmental benefit from the obligation to achieve such benefit. By developing a scheme which relies on the creation of property rights associated with existing carbon stocks, developing countries can create additional income by protecting their forest resources.

In order to create an incentive framework which rewards activities in developing countries to increase biological carbon storage, an expansion of the CDM beyond afforestation and reforestation to include such activities as revegetation, ecological restoration, and improved forest and agricultural management is necessary. Methodological insecurities that led to a limitation of the CDM to afforestation and reforestation have decreased. By only crediting narrowly-defined afforestation and reforestation activities, the CDM is excluding many of the most important land use types, which have the potential to deliver significant GHG mitigation and ancillary benefits (including, conserving soil, restoring biodiversity habitat, protecting

watersheds and improving water quality, creating sustainable livelihoods and increasing food production).

This is particularly important as sequestering carbon in afforestation and reforestation may result in a sub-optimal over-plantation of fast growing alien species with a potential negative impact on biodiversity. Destruction of primary forests has been accompanied by an expansion of secondary and plantation forest.¹⁹ In many parts of the tropics, extensive forest areas have been transformed into monoculture plantations. These plantations store carbon. However they do not make up for the loss of biodiversity and forest ecosystem services.

The UNFCCC and the Kyoto Protocol do not advocate the use of an ecosystem approach which could be used to protect biodiversity needs. However, the Convention on Biological Diversity does provide relevant guidelines for the sustainable use of forests. To avoid the clearing of mature forests and their replacement them with younger fast-growing trees, the incentive to afforest needs to be complemented with an incentive scheme rewarding forest conservation.

However, even with all necessary modifications, the current baseline-and-credit approach of the CDM does not represent an adequate mechanism to avoid further deforestation. Establishing a deforestation baseline is complicated for various reasons. First, exact data to determine a deforestation baseline are hard to obtain when unplanned and illegal logging activities in forests have to be taken into account. Second, in a period where actual deforestation turns out to be less than the baseline calculated as business as usual then the rewarding of avoided emissions may not be additional but form part of the baseline emissions. Third, for the majority of forestry projects it would be difficult to define project boundaries, determine title to carbon credits, and monitor the emission reduction. The project specific and baseline oriented approach of the CDM is both limited in scope and too complicated to serve as a basis for a scheme that will efficiently protect forests. It is therefore mandatory to complement the CDM by a more comprehensive forest conservation mechanism.

Such mechanism could either build on the full accounting of the carbon stock in tropical forests or set relative reduction targets. In the first case, countries would be rewarded for permanently conserving parts of their forest ecosystem by allowing them to trade a corresponding amount of carbon credits. An approach would reward compensation to developing countries that avoid further deforestation. It could either be linked to the execution of specific projects or on a commitment between countries.²⁰

¹⁹ Smith, J., Sabogal, C., de Jong, W., Kaimowitz, D. (1998), *Bosques Secundarios Como Recursos para el Desarrollo Rural y la Conservación Ambiental en los Trópicos de América Latina*, Bogor, Indonesia, Center for International Forestry Research (CIFOR).

²⁰ For a comparison of some of the approaches, see Streck, C. and Scholz, S. (2006), *The role of forests in global climate change: whence we come and where we go*, *International Affairs* 82 (5): 861-879; Prior, S., Streck, C., O'Sullivan, R., *Incentivising avoided deforestation – a stock based methodology*, *Paying for Ecosystem Services – a Carbon Stock Based Approach*, Submitted to the UNFCCC by the Centre for International Sustainable Development Law as well as the submissions to the UNFCCC on the subject accessible under http://unfccc.int/parties_and_observers/ngo/items/3689print.php, accessed 10 January 2007; Moutinho, P., Santilli, M., Schwartzman, S. and Rodrigues, L. (2006), *Why ignore tropical deforestation? A proposal for including forest conservation in the Kyoto Protocol*. Unasylva. Submitted.

<http://www.joanneum.at/REDD/links2.php>, accessed 10 January 2007.

Regardless how the design details will look like, it is important that any post-Kyoto LULUCF agreement takes into account the:

- Creation of a system that rewards:
 - Decreasing deforestation
 - Sustainable forest, land, and wetland management
 - Restoring of forests
 - Sustainable use of biomass²¹
- Establishing a reliable accounting system which includes the flux of biological carbon;²²
- Promotion of sustainable development and an inclusive climate regime;
- Harmonization with the Convention on Biological Diversity and the Convention to Combat Desertification.

6. Managing timber and biomass

Forests are primarily managed for timber production. Unsustainably managed forests degrade and are eventually converted into other land uses. Legally or illegally, forests are primarily cleared for the extraction of timber and fuel wood. Logging does not necessarily trigger deforestation as logging companies are not seeking a change in the use of the land. However, wrong or weak regulatory frameworks, environmental neglect and economic considerations may facilitate not only the degradation of land but also land conversion as a consequence of logging.

Further improving institutional and governance structures and supporting developing countries in the enforcement of forest laws will be necessary to reduce illegal logging and establish robust and sustainable forest management frameworks. A carbon market mechanism could help to offset the short time economic loss resulting from not cashing in the timber. Changing the harvesting patterns allowing the trees to grow longer and retaining older trees through successive harvests can significantly increase the carbon storage capacity of a forest.²³ The carbon market could set the right incentives to lengthen harvest cycles.

If wood products are used as a source of renewable and efficient source of energy and materials, forests can also help to reduce energy related emissions. The simplest manner to cut greenhouse gases is to substitute wood for other energy sources. However, there is an inherent conflict between using the biomass and leaving carbon in a standing forest. While the carbon stored in forests yields immediate climate benefits, the longer time benefits may come with managed forests which allows for the production and extraction of biofuels. Whereas forests with a particular biodiversity value should be fully protected, the most effective way to reduce greenhouse gas emissions may be found by exploring even more effective ways how wood can be

²¹ Schlamadinger, B. et al. (2006), Options for including LULUCF activities in a post-2012 international climate agreement, A workshop report, pg. 10, http://www.joanneum.at/Carboinvent/post2012/Bird/Schlamadinger_et_al_2005.pdf (accessed 20 July 2006).

²² Ward, M. (most recent version from February 2006), A Scenario For a Future Climate Change Regime For LULUCF. http://homepages.paradise.net.nz/murrayw3/documents/pdf/Future%20LULUCF%20scenario_May%202005.pdf (accessed 16 July 2006).

²³ For the pacific north west of the US see: Wayburn, L.A., Franklin, F.J., Gordon, J.C., Binkley, C.S., Mlandenoff, D.J., Christian Jr., N.L. (2000), Forest Carbon in the United States: Opportunities and Options for Private Lands, The Pacific Forest Trust, Inc., Santa Rosa, US.

used to cut fossil fuel emissions. If removed from sustainably managed forests, biomass generated energy can be carbon neutral as it does not release any additional carbon dioxide to the atmosphere. Wood based products can also be used to replace more energy intensive building and construction materials such as aluminium and concrete.

However, the large scale plantation of biofuel crops can lead to increased deforestation. Today oil palm plantations cover millions of hectares across Malaysia, Indonesia, and Thailand. Palm oil is becoming an increasingly important agricultural product for tropical countries around the world, especially as crude oil prices top USD70 a barrel. According to a report by Friends of the Earth-Netherlands, Indonesia, currently the world's second largest producer of palm oil, had oil-palm plantations covering 5.3 million hectares of the country in 2004.²⁴ In recent years, vast areas of natural forest have been cleared across tropical Asia for oil palm plantations. This conversion has reduced biodiversity, increased vulnerability to catastrophic fires, and affected local communities dependent on services and products provided by forest ecosystems.

Beyond the loss of forest ecosystems, the current production practice for palm oil often causes more damage to the environment. In 2001 Malaysia's production of 7 million tons of crude palm oil generated 9.9 million tons of solid oil wastes, palm fiber, and shells, and 10 million tons of palm oil mill effluent - a polluted mix of crushed shells, water, and fat residues that has been shown to have a negative impact on aquatic ecosystems. The extensive use of pesticides and herbicides adds additional pressure to the environment.²⁵

To address the growing problems of sustainability in the palm oil industry, the Roundtable on Sustainable Palm Oil (RSPO) was established in Kuala Lumpur in 2003. A non-legally binding 'statement of intent' signed by over 40 companies and organisations was established to promote sustainable palm oil production through implementing better management practices. Its members comprise oil palm producers and growers, traders, 15 retailers including the Body Shop (a UK based ethical cosmetics chain), and environmental and social organisations, including the WWF. The RSPO develops training modules for plantation managers and small-holders, and monitors practices such as integrated pest management, land use planning and waste management.

7. Conclusion: the 2020 scenario

Forest and biodiversity conservation are intrinsically linked to climate change mitigation and adaptation: Together with the forests, we lose our biggest terrestrial carbon storage and a system regulating and influencing the freshwater household and rainfall patterns. It is therefore necessary that a post-Kyoto regime includes a comprehensive carbon accounting mechanism that provides the necessary incentive framework for conserving not only temperate and boreal, but – and in particular - tropical rainforests.

²⁴ Milieudéfensie, Friends of the Earth Netherlands and the Swedish Society for Nature Conservation (SSNC) (2006), Kalimantan Border Oil Palm Mega-Project. <http://www.milieudéfensie.nl/globalisering/publicaties/index.htm#palmolie-rapport> (accessed 8 January 2007).

²⁵ Butler, R.A., Why is oil palm replacing tropical rainforests? Why are biofuels fueling deforestation? mongabay.com. 25 April 2006, http://news.mongabay.com/2006/0425-oil_palm.html (accessed 8 January 2007).

Official development assistance and government funding will not suffice to provide the necessary financing to make a meaningful contribution to forest conservation. Neither have ODA based funding mechanisms a history of leveraging significant amounts of private funds. It is therefore unlikely that such mechanisms will serve to create a robust incentive framework for longer term conservation measures.

By assigning value to the standing forests, carefully designed market mechanisms provide the most promising option to mobilize finances for conservation. Market mechanism and emission trading schemes assigning value to tropical forests have to be carefully designed and integrated in a robust international and national framework. Safeguards and independent control mechanism must be put in place to avoid perverse incentives, “paper tons”, and corrupt policies.

The LULUCF sector is often claimed to undermine the environment by promoting large-scale plantations, reducing biodiversity, or relying on genetically-modified or non-native species that replace rare native species. These kinds of projects should not benefit from environmental funding, and mechanisms have to be designed (or refined) to exclude them from being eligible for carbon finance. From a biodiversity perspective, carbon finance is one of the few funding sources of sufficient scale which is able to support the large-scale restoration and conservation of degraded habitat that is critical to the survival of threatened species.

Forests do not only store carbon, they also hold the potential to generate significant amounts of energy. Biomass systems are usually fueled by waste wood, from logging operations, forest thinning, low-grade wood, and/or sawmill residues. These systems assign commercial value for wood waste benefiting both the forest as well as the global climate.

Finally, forests and forest conservation will play a significant political role in the negotiations of a post-Kyoto agreement. Any effort from the United States to curb climate change will include forestry and other LULUCF measures. Integrating LULUCF into a future climate regime will therefore be a condition to engage the U.S. and Australia in future negotiations, as both have been strong advocates for the inclusion of land use in international climate policy.

From a development perspective, LULUCF carbon finance projects represent one of the only means that many of the world’s poorest people (including most of Africa) will be able to meaningfully participate in, and benefit from, the global carbon market. For the first time, they have the promise of being able to sustainably capture an ecosystem-service value associated with their land, instead of being forced to liquidate these natural resources just to survive.

Brussels, 11 January 2007