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Sustainable Forestry Investment under the Clean Development Mechanism

The Malaysian Case

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Abstract

In the light of the development of the Malaysian forestry sector in recent years, the article gives an overview over the current discussions around the inclusion of biological carbon sink projects under the Clean Development Mechanism (CDM) of the Kyoto Protocol, like forest definitions, additionality, baselines and permanence. Some new ideas are presented, the details of which need to be explored in detail in further studies. As a result, the article gives twofold recommendations: First, which issues international climate negotiators need to tackle in order to make forestry projects work in practice; and second, how and under which conditions CDM forestry can be supportive to the Malaysian development goals.

Zusammenfassung

Vor dem Hintergrund der Entwicklung des malaysischen Forstsektors in den letzten Jahren gibt der vorliegende Aufsatz einen Überblick über die aktuellen Diskussionen um die Einbeziehung biologischer Kohlenstoffsenken in den Clean Development Mechanism (CDM) des Kyoto-Protokolls. Stichwörter sind Forstdefinitionen, Zusätzlichkeit, Baselines und Permanenz. Der Autor unterbreitet in diesem Zusammenhang einige neue Vorschläge, deren Details Gegenstand künftiger Studien sein werden. Zusammenfassend gibt der Artikel Politikempfehlungen auf zwei Ebenen: Zum einen, welche Fragen die internationalen Verhandlungsführer lösen müssen, bevor Forstprojekte unter dem CDM zur Realität werden können. Zum anderen, wie und unter welchen Bedingungen CDM-Forstwirtschaft den malaysischen Entwicklungszielen zuträglich sein kann.

1 Introduction

When the 3rd Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) decided upon the Kyoto Protocol, they left much space for interpretation over the use of biotic systems for storing up carbon from the atmosphere (sinks). The Kyoto process nearly failed in the year 2000, when the COP 6 in Hague did not come to an agreement over the provisions on land use, land use change and forestry.(LULUCF) This article departs from the last stage of discussion as expressed in the Marrakech Accords.

One of the flexible mechanisms of the Kyoto Protocol is the Clean Development Mechanism (CDM). It allows industrialized country parties to use emission reduction projects in countries not committed to the quantitative limitations for greenhouse gas emissions, if those are additional to what would have happened in the climate investment's absence. The economic rational is that clean investment might be less costly in developing countries than domestic action in industrialized countries.

Today there are around 50 carbon sequestration projects in place that could become eligible for the CDM in the future; many more are still "in the pipeline". In part, developing countries went ahead and set projects on the ground for which they seek buyers. Provided they become registered as CDM projects, their carbon credits since the year 2000 will eventually become available for the fist commitment period. On the other hand, there are several risks for this kind of investment. For example, the forestry modalities tested on Malayan territory, reduced impact logging and enrichment planting, will not lead to crediting in the first commitment period.

The first part of this article resumes Malaysia's track record for forestry in the past ten years. It defines the perspective from which the sinks issue under the Kyoto Protocol will be reviewed. The following parts will explore forest definitions (part 3) methodological risks relating to additionality and permanence, and political risks (part 4 – 6). Risks specific to any forestry investment, like fire, pests or drought will not be considered in this article. Part 7 deals with cross-cutting issues and new proposals for further discussion. The article ends by offering recommendations to the Malaysian climate policy development with respect to forestry.

2 The Malaysian forestry sector

According to the Food and Agriculture Organisation's Forest Resource Assessment, natural rainforest still covers 60 percent of the Malaysian territory (FAO 2001).

Between 1990 and 2000, 11 percent of the forest cover was removed, at an annual rate of 237,000 ha – an area just about the total size of Puerto Rico. Malaysian logging companies have been in the center of harsh NGO criticism, not only for deforesting within Malaysia, but as well, because they expanded unsustainable activities to other countries all over the developing world (Sizer & Plouvier 1999, pp. 96-98). One of the main problems however is the limited availability of reliable data. High estimates situate forest loss by 400,000 ha (Anonymous 2001), while the Malaysia's First National Communication (MSTE 2000, p. 23) goes as far as to consider forests a net sink.

On the other hand, sustainable forestry has a history in the country, since the National Forest Department (NFD) was founded at the beginning of the last century (Wong 2001, p. 4). Sustainable forest management is the declared aim of the 1978 National Forestry Policy (NFP), which was revised in 1992 (ibid). Out of the totality of around 20 million ha forested lands, 14.32 million ha are sustainably managed Permanent Forest Estates (PFE), and 3.49 million ha are protected forests (Wong 2001, p. 3).

Shortly after the UN Conference on Environment and Development at Rio de Janeiro, the idea was taken up to make use of novel instruments for financing greenhouse gas (GHG) mitigation. Already in 1992, a climate cooperation between logging concession holder Innoprise and a US power company (New England Power) started a Reduced Impact Logging (RIL) on a relatively small area of 1,400 ha in the state of Sabah. While increasing operation costs by only 5 percent, as much as 50 percent of the collateral damage to standing vegetation could be avoided (Moura-Costa & Tay 1996). A second stage of this cooperation was initiated in 1996, encompassing 9,000 ha (Moura-Costa 2002, p. 13). Since 1992, the Dutch FACE foundation has engaged in a US$ 15 million forest reclamation project over an area of 25,000 ha, operated by Innoprise (Pinso & Moura-Costa 1993, Moura-Costa 2002, p. 13, Makundi et al. 1998, pp. 7-8), claiming 4.25 million tons of carbon uptake (Stuart & Moura-Costa 1998). Interestingly, none of the above projects are listed as "Activity Implemented Jointly" with the UNFCCC Secretariat.

Until 2000, a project on a 55,000 ha area was an integrated sustainable forestry development plan[1] together with the private logging contractor Samling (FOMISS – Forest Management Information System Sarawak). This project was financed by the German Society for Technical Cooperation (GTZ). Samling took advantage of the state

1 www.forestry.sarawak.gov.my/forweb/sfm/fres/ip/fomiss/fomiss.htm

government's selling logging concession for 100 years, under the condition that the loggers commit to sustainable forestry practices (brü 1999). When the GTZ project ended in 2000, it was heavily contested by the World Rainforest Movement for conflicting with indigenous rights (Bujang 1999) .

The Eight Malaysia Plan for the period 2001 – 2005, is guided by the principle of reducing harvesting of existing forests, fostering rehabilitation and reforestation of degraded lands, agro-forestry, and promoting biodiversity. During this period, 365,000 ha of forestland will be newly developed (Wong & Thereseira 2001, p. 5). Certification to the standards of the FSC (Forestry Stewardship Council) has become the rule for exported wood, even though there is lament that the market does not reward sustainable production – on the contrary, NGO campaigns have led to the unfair situation that even FSC certified tropical wood remains banned, while temperate timber, which in many cases is not produced in a sustainable manner, is preferred by European and Japanese consumers (Chan 2001, p. 42-43).

The paradoxical situation of good policy intentions on the one hand and environmental degradation on the other is frequent in developing countries, and deforestation is too complex an issue to be halted within one or two decades. For the purpose of the present article, it is worth noting that Malaysian policy is supportive to sustainable land use practices. The problem is in the definition of afforestation and reforestation, and missing deforestation statistics over longer time series with sufficient spatial resolution. As logging concessions are granted over a certain percentage of the stands, they are no proxy for the point in time when deforestation occurred

3 Forestry definitions under the CDM

Land use, land use change and forestry (LULUCF), as discussed under the Climate Convention subsume a huge variety of antropogeneous action deemed to increase natural carbon stocks, all of which were defined in the Marrakech Accords (FCCC/CP/2001/13/Add.1, -/CMP.1). All of these are available for Annex I countries under Articles 3.3. and 3.4 of the Kyoto Protocol. For non-Annex countries however, the forestry related project modalities *afforestation* and *reforestation* (A&R) were the only ones to be made eligible for the first commitment period in the Marrakech Accords.

There are however no explicit definitions of A&R for the CDM. The Annex I definition of a *forest* according to Marrakech is a certain minimum area (0.05 ha – 1.00 ha) with a

crown cover of a certain density (10 – 30 percent) of a certain array of minimum heights (2 – 5m). This variability pays tribute to the high regional differences between forest types and biomes. Each Annex I country needs to pick the most suitable values for its situation within the above ranges of definitions. This procedure is chosen only for the first commitment period, and it has the following important risks:

1. For countries with a high landscape variability, there may not be any single adequate choice.
2. If the rules for accounting change between the first and the second commitment period, there will be no comparability among the targets for both, even if removal units cannot be transferred from one period to the other.

For non-Annex I countries under the given circumstances, forest definitions bear the following complications:

1. Data availability is one limiting factor: For any particular area, there are hardly any forest cover time series available for developing countries that go longer than 15 years back. Even though remote sensing has made considerable progress, pixel resolutions as high as 0.05 ha (500 square m!) are currently unachievable for reasonable costs. In tropical areas, establishing comparability among satellite images is made especially difficult as large cloud areas may cover complete landscapes most of the time. In the Brazilian Amazon, Greenpeace denounces loggers are clearing areas below 6.7 ha, as those cannot to be detected by the Landsat monitoring in place (Campanili 2001).
2. Where there is no explicit clear-cut, but rather a slow degradation, it is extremely hard to tell the point in time of land use change from forest to woodland.
3. Setting the forest cover threshold too low will limit the country's ability to offer A&R projects.
4. If too high a forest cover threshold is defined for a host country, afforestation measures may destroy natural forests systems. There are however two safeguards against exploiting the forest definition: One would be if an environmental impact study were compulsory (which is currently not the case on the international level). The other is a proper monitoring system. In most cases, the removal of the initial vegetation stock and the baseline assumption of stable vegetation will over-compensate any carbon gains from afforestation.

5. A forest cover threshold too high will further exclude agro-forestry from the modalities available under the CDM.
6. The temporary limit of 31 December 1989 was set for Annex I countries to prevent large-scale deforestation before the commitment period. A similar perverse incentive for non-Annex countries could be circumvented for developing countries if any carbon removals on the project area from the year 2000 onwards were to be accounted for as project emissions. On the other hand, forest restoration and afforestation are not available in deforestation hot spots under this regulation where they are most needed.

There is no determination under the Marrakech Accords, whether orchards, palm oil or rubber plantations or mangroves are accounted as forests. Line plantations, trees planted in strips, for wind shelter, along riversides or highways, could under the current definitions qualify as forests as well (FAO 2002).

While from climate negotiation's experience, an analogous treatment for developing countries' forests can be expected, this would not necessarily be the case (Sussman & Leining 2002, p. 4). The alternative for non-Annex I countries consisted in either defining forests in a forward-looking way that is consistent with other international agreements or introduce some pragmatic distinctions for the first commitment period.

The first option of anticipating future common definitions would be an enormous piece of work The resulting definitions needed be consistent with the ones of the Food and Agriculture Organization FAO, the International Forum on Forests IFF, and the Biodiversity Convention CBD, just to mention the most important ones. A recent FAO workshop has identified the criteria for such forest definitions. Apart from being biome-specific, these definitions would have to be:

- *"clear, concise, objective and unambiguous in the context used;*
- *information-rich (…) and not driven by exceptions;*
- *practical and easily applicable in all countries so that data collection, meaningful reporting and verification are possible and cost-efficient;*
- *easily adaptable to national systems;*
- *consistent over time and harmonized over space (and international process);*
- *seamless with related non-forest definitions …;*

- *constructed or harmonized in such a way that the current reporting requirements from countries are reduced."* (FAO 2002, p. 4)

The second option would not be too demanding, as it would only be valid for the first commitment period. The definitions for forestry, afforestation and reforestation would need to be adapted to match developing country realities. E.g. the minimum area should be in the range of 1 – 10 ha, according to the country size and tracking facilities in place.

However, and in spite of the shortcomings of the current forest definitions depicted above, the Group of 77 and China, which represents the non-Annex I countries, has decided not to confuse the regime with another set of definitions for the first commitment period and to adopt the Annex I provisory definitions for the first commitment period.[1]

Under current regulations, reforestation will be by far the most frequent case, because it hardly makes any sense to take the trouble to prove the area was non-forested in 1950, when it can be proven for 1990. Afforestation in this sense will thus occur in regions whose natural vegetation cannot be considered a forest. The definition of the crown cover density that constitutes a forest for the purposes of the CDM will ultimately rest with the host country government.

In theory, reforestation could include several sub-types of forest-related investment, like restoration of degraded forests, creating buffer zones around national parks or introduction of agro-forestry systems. These modalities however are complicated by the 1990 timeline on the one hand and the definition of forests on the other. Thus the most likely case of A&R will be massive uniform plantations. These show a high internal rate of return in the tropics and therefore occur in many regions under business-as-usual conditions. A&R have thus an innate problem of project additionality.

4 Additionality

Additionality is a qualitative instrument that distinguishes between eligibility and non-eligibility of a certain project under the CDM. Its purpose is to avoid free riding of business-as-usual projects that seek subsidies from carbon credits, while – on the

1 Personal communication Chow Kok Kee, Aug. 5, 2002

counterpart – activities that increment the respective host countries' emissions would not be accounted for.

4.1 Types of additionality

There are some conditions that would define an investment in greenhouse gas mitigation to be business as usual.

- First of all, an investment can be legally required, e.g. a certain part of any acquired area needs to be reforested, like in the case of the Brazilian forest reserves. In this case, the investment is necessary, independently from its commercial return.
- "Green" investment can be internally profitable, be it by reducing inputs, or by increasing the product's marketing value. Certification to FSC standards for instance is nearly imperative for wood imports to European countries.

On the other hand, there are potential barriers to the investment, which means that the respective investment would need an additional incentive.

1. The perceived control risk (incidence of control measures multiplied with the expected fines) might be lower than the savings from non-compliance.
2. The interest rate for the "green" investment obtained by the enterprise might be prohibitive or, due to a restrictive financial system, no project finance is obtained at all.
3. There may even be a simple lack of interest or fantasy in the way of a climate-friendly investment being effectuated, which has a lot to do with the entrepreneurial philosophy and perceived market conditions.
4. State bureaucracy may hinder new investment.

These barriers gain utmost importance in developing countries. In practice, a muddle of these conditions is found. There is legal uncertainty combined with the need for increased efficiency and a lack of prevision for component costs. Adding GHG reduction as an environmental service, is new and promising, but uncertain business on the other hand. The banks' restrictive lending praxis could be eventually be overcome by international lenders, were there not the government's bureaucratic requirements for foreign direct investment. These respective conditions can hardly be quantified and separated one from the other.

On the other hand, if an investment has no profitability besides producing GHG offsets *and* is not legally required, the activity will stop immediately at the end of the project lifetime. But then it will hardly produce any co-benefits for the host country. Ideally, a CDM project can anticipate future state of the art or future environmental legislation. At the end of its lifetime the project case will meet the baseline, or say, business-as-usual practices will have attained the same level of emission reduction. In these cases, CDM projects can help pioneering into a desirable direction, and, as long as they are pioneers, receive carbon credits as a prime.

A&R have an inborn problem of financial additionality, because they enjoy a rate of return that makes them commercially viable in principle. Actual rates of return depend on a variety of factors, like the quality of the project site, land prices, the selection of appropriate species, the soil management, protection against fire and plagues, adequate thinning and disbranching, and – last not least – choosing the right moment for harvesting, when wood prices are high. It is extremely complicated to predict exact rates of return, but a reasonable managed plantation should reap around 5 to 7 percent of internal rate of return (IRR) over its lifetime. If the lack of profitability were a criterion for project implementation under the CDM, it would be fairly easy to downsize return previsions of this type of long-term investment. Given the low actual carbon prices however, carbon improves the IRR by no more then 1 or 2 percent. When compared to logging natural forest resources, A&R may even be less profitable, as long-term investment is required.

4.2 Political obstacles

Host countries' policies and measures execute crucial effects on any project's survival, but as well for its baseline calculation. However, these effects tend to be contradictory. While a supportive political environment enhances the project's chances for survival, it tends to spoil the reference scenario. This problem is general to all CDM project forms and modalities. If, for instance, electricity is subsidized, the probability of emission reduction measures to occur for economic reasons without any external benefit is minimal. The difference between reference and project case will thus be very high and profitable in the sense of the generation of Certified Emission Reductions (CER), often referred to as *carbon credits*. The same occurs if a country does nothing to prevent deforestation or even primes activities that lead to deforestation, like cattle production. On the other hand, Article 4 of the UN Framework Convention on Climate Change obliges every country Party to take appropriate measures to mitigate climate change.

Therefore, baseline development should in principle not be biased by political framework conditions. If policies and measures to mitigate climate change are not in place in a country, it will hardly attract any JI or CDM investment.

The best way to level out incentives for "bad policies" is to set a benchmark for the factors that influence the reference scenario. Cooperative implementation can and should help the host country to achieve the political goal of sustainable development. Therefore, another element that helps to impose the benchmark is a transitional phase-out of factors that skew the reference scenario. Taking the example of deforestation and depending on the magnitude of the problem, a period should be defined in which the government could achieve reducing predatory logging activities.

There is however a multitude of political factors that can influence the baseline. In the following, we shall examine two categories of policy elements that could enter standardization efforts. While the first are directly cost-related conditions, the second are non-monetary issues.

4.3 Opportunity cost related political conditions

In the first category of political conditions are the ones that increase the opportunity costs for non-forest uses of a given area. Not all of them can be overcome by a CDM project. If there is a political will to use the same area for infrastructure purposes, like airfields, roads, housing, hydropower or military utilities, the project will not receive approval by the host country.

Subsidies are a "soft" obstacle for project development that can be removed if carbon prices make up for the difference. Reliability is a major factor in this context. The sheer announcement to phase out subsidies can lead investors to look for alternative land uses. On the other hand, clear price signals are needed for carbon credits in order to compensate for the expected loss of subsidies. The sum of the net present value of the internal rate of return of the reference investment plus the subsidies needs to be smaller then the same sum of the forestry IRR plus the returns from the certified carbon credits over the CDM project lifetime. This leads to the following observations:

1. Given that commodity prices are in the same range of uncertainty on both sides of the equation, an investor would disregard both types of subsidies and compare return rates for the core products.
2. In the actual stage, most subsidies have a higher certainty than the complicated Kyoto market *in statu nascendi* for emission permits.

3. Risk adversity is typical to agricultural behavior, and land uses like cattle farming can bring about a gain in prestige for the farmer, the "cattle subculture", which Alice LeBlanc described for the case of Costa Rica. Therefore, the difference in return between reference and project case needs to be considerable (LeBlanc 1997, p. 18).
4. Alternative (reference case) land uses tend to have shorter lifetimes than forestry. It would be most logical to go on with business as usual until the market stabilizes and then start a forestry project on the basis of better knowledge.
5. For domestic investors, long-term project finance is difficult to obtain in developing countries. This adds to the cash-flow problem, which is typical for forestry, where most of the investment is done in the beginning, and the returns only come in when the trees are harvested.

Drawing on these observations, we can make the following assumption on the most likely case for forestry investors and for a supportive policy environment.

The ***typical CDM investing enterprise*** will have access to international finance, be it because it is a domestic actor active in exportation or because it places the project as an FDI from abroad (observation 5). As it diversifies its investment portfolio, cash-flow problems play a minor role. It will have acquired forestry experience beforehand and can assess the risks and market chances related to this type of activity (observation 1). Beyond their hardly quantifiable monetary value, carbon credits are an asset that contributes to the enterprise's public image, which relies rather on environmental values than on the production itself (observations 2 and 3). This actor is not necessarily monolithic, but could be as well any kind of cooperative among various landowners. This last option implies however high transaction costs and will hardly emerge only to carry through CDM projects.

In the actual stage of carbon price uncertainty, it would be unwise for a ***supportive project country authority*** to increase the project baseline gains by going on subsidizing alternative land uses – the "perverse incentive". As a solution to this dilemma, the Argentinean national focal point does not admit CDM projects to receive direct national subsidies. For long-term investment, political reliability is the best argument. This increases the internal rate of return. In this sense, forestry projects are less sensitive to short-term political opportunism than other emission reduction projects. If unilateral implementation is a political priority, authorities should undertake and foster enabling activities, like the foundation of project cooperation and carbon marketing agencies and finance consultancy by domestic research institutions. While gradually reducing

subsidies for activities that lead to deforestation and land erosion and enforcing higher compliance, the government could hedge financing or create an internal demand for carbon credits by offering an adder in national currency for a predefined period, before the market has stabilized. As the latter measure is directly linked to the certification process, it does not question investment additionality.

4.4 Non-monetary political obstacles

In the second category of political framework conditions we find the non-monetary obstacles posed by ***institutional failures***, like bureaucracy and corruption, or simply political resilience. The easiest case is when a government does not support a specific project type or modality on its territory, which is a clear regulatory signal. The worst impediment however is the infinite delay of approval. In this case, the project developer has already incurred costs and stands by with resources to start the project. In the case of forestry, these costs can be especially important, as land contracts are done, taxes are to be paid on the lands, and no alternative land use can be risked while waiting. On top of the consultancy costs, there may be a loss in confidence for the enterprise. Eventually bribes may add to the transactions costs. In most cases, it is hard to tell the individual reason for the delay, but most of these reasons can be subsumed under the lack of institutional capacity. Therefore, the weaker the government, the stronger the enterprise counterpart needs to be. Institutional failures can for individual projects neither be removed nor be considered in the baseline. They simply add to the host country risks.

Environmental legislation is crucial for determining the project baseline. Land use changes that are due to environmental laws can, in principle, not account as additional in the sense of the Kyoto Protocol. However, legal uncertainty is a typical feature of developing nations. Here, laws do not necessarily serve their purpose expressed in the preamble. Their sense can eventually be to secure the income of controllers and lawyers, while window-dressing for international institutions or investors. As long as bribes stay below the costs for compliance or penalties, the legal practice will not change. Besides, this practice differentiates the law according to the influence of its subjects. Legal uncertainty is however nothing a democratic host country government could be willing to admit. Hence, law implementation problems can either not be considered at all for CDM baselines, which penalizes good environmental legislation, or be standardized across countries. As a proxy, the effective implementation of a law from its entry into force takes at least the same time as the law project for being discussed in parliament. Presidential or administrative directives can, as a rule of thumb,

not be expected to be fully implemented before five years time, which normally exceeds their lifetime. In the concrete project design credits resulting from law implementation failures need to be factorised and exactly identified. Credits eventually earned by early compliance could be discounted over this period from 100 percent in year one to zero percent after the end of the transitional period. In some cases, the law itself stipulates an adaptation period during which there will be no penalties for non-compliance, and which could then be taken as the business-as-usual case.

5 Baselines

Among the additionality tests for greenhouse gas emission compensation projects, the baseline is the most important and at the same time most flexible instrument. It allows for gradual answers to the question if an enterprise leads to additional emission reductions to what would happen in its absence. In forestry, "emission reduction" needs to be seen on a broad scale, because carbon fixation in biomass and soils retires CO_2 from the atmosphere *after* having been released. As will be shown, the construction of reference scenarios for forestry bears no peculiarity over industrial reduction projects. There are, however, many in-between cases and actual project designs will in practice consist of two or several sub-types or modalities. This is important to notice, as baseline projections will have to be split according to the specific case.

The longer a baseline's lifetime, the higher its error margin. Therefore, the Marrakech Accords determine two possible types of baseline validity: Or ten years, with the necessity for a completely new baseline study in case the project shall go on, or the seven-year option, where the initial baseline can be re-validated twice, making it valid for up to 21 years. If however the project is expected to be pioneering and be massively followed within the first seven years of its existence, the reference case might not be approved any more. As forest projects with mixed modalities have a variety of baselines, depending on the individual modality, it might be wise to choose different lifetimes for different baselines.

Plantation forestry has four main aspects, the average soil and vegetation pool, the leakage/ spillover effect, and the fossil fuel substitution effect of biomass use. Pools of carbon embodied in long-lived products cannot be considered for the first commitment period.

a) New plantations on grasslands constitute a **carbon pool** over long periods of time, if this type of land use is sustained and the soils are not depleted. The case is different

however for carbon stocks in soils, which build up only slowly over the whole project lifetime, like understory, stumps, roots and inorganic carbon in the form of humus. These can make up to 40 percent of the carbon gains. Their existence is more interesting in order to prove no soil depletion is going on, but, depending on carbon prices, may not be verified, because they would accrue only slowly and would require several baseline revisions and / or renewals.

b) **Leakage** may occur where is a lack of arable lands. Competing uses, like cattle grazing might lead to the extension of the agricultural frontier and drive deforestation. This does not necessarily depend on population density, although this is an important aspect. Unequal land distribution, which is often coupled with under-use of arable lands, frequently leads to an over-use of marginal areas. Part of a plantation project might therefore be capacity building measures to intensivate the existing land-use and the parallel protection of lands that are unsuitable for agricultural use. **Spillover** is a benign external effect of plantations, also called *positive leakage*. Plantation products can substitute wood from natural forests and thus reduce deforestation. On the international market for wood products, there is an increasing demand for certified wood. In the author's opinion, wood certification by the standards of the FSC and/or ISO 14,000[1] is indispensable as a precondition for spillover to occur anyway. Leakage and spillover will both occur at the same time, but will not necessarily level each other out, so that both could be ignored. Although not really part of the reference scenario, they require a sensitivity analysis on how the current land-use could be influenced by the planned project. This analysis needs to determine measurement points for positive and negative land-use related side effects.

c) **Boundaries** are pivotal in determining leakage. If activities on the area are displaced or if any of the project partners change their emissions patterns in other operations in consequence of the project implementation, the project needs to account for those as well. Logging concession holders that engage as project partners in forest restoration might be unwilling to do so.

d) **Biomass** from these plantations can substitute fossil products in many ways, be it as packaging material, for energy production or for durable wood products that substitute the use of metal or plastic. On the contrary of forest crediting, these

1 The International Standardization Organization's environmental standards. Both standards, FSC and ISO 14,000 are complementary to one another

substitution effects cannot be reverted, which makes them comparable to energy efficiency measures.

How do baseline issues influence the decision which type of baseline modality to pick? If carbon credits only accrue during the first years until reaching the average line, it is reasonable to choose one seven to ten year baseline, although the project duration itself will be several times longer. If certifying goes on over the project's lifetime, the baseline risk is considerably higher.

6 Permanence

Although most of the forestry projects that are actually designed assume the "eternity" of carbon credits, this assumption is unlikely to be accepted once crediting rules are decided upon. The reason is that CDM host countries cannot be held responsible for carbon stocks on their territory forever, long after the credits were used to compensate Annex I surplus emissions, while Annex I host countries will have to account for any future removals in its national inventory. Thus, there is a need for the CDM to limit liability by attributing value to temporary carbon stocks in vegetation.

The rationale behind limiting the temporal responsibility for land use related CERs is the assumption that there is any value in postponing emissions. This value has three main aspects:

1. The idea that a slower pace in temperature increase allows for biotic systems to adapt rather than to a rapid global warming. This depends on geological and biological assumptions.
2. The idea that we can define the decay of the global warming push of every single CO_2 equivalent of greenhouse gas emissions. In this context, the bundling of diverse greenhouse gases in the emissions basket (Annex A of the Kyoto Protocol) is unfortunate, because this decay varies between 40 years in the case of methane and several thousand years in the case of fluoride gases.
3. The idea that a slower increase of the damage curve lowers costs. This depends on the assumption of a positive discount rate for future damages. This discount rate may rely either on one or more of the following convictions that are closely related to one another:
    a. Future generation will be able to cope easier with today's global warming problems.

b. Future emission reduction targets (meaning the Kyoto-type quantitative overall emission reductions) will be economically no more demanding than they are today.

c. As in other economic issues, there is a simple time preference for the delay of costs and the near-term realization of incomes that results from expected future interest rates.

In the actual state of discussion, non-permanent mitigation can either lead to non-permanent certificates that need to be replaced once the project ends, or made permanent by definition, departing from the decay time of the global warming push triggered by the emission of an equivalent amount of CO_2 to the atmosphere ("equivalence period" Moura-Costa & Wilson 2000).

Obviously, the most conservative approach is to assume the complete loss of carbon fixation after the end of the project. This would then entail liability regulations between credit seller, buyer and certifier. The Colombian Proposal builds upon this idea and declares all sequestration CERs non-permanent. After the end of the contract, the investor needs to either renew the contract or replace all CERs with other emission allowances (buyer liability). The realization of the proposal requires the institution of *expiring CERs* by the COP. It results in a type of "borrowing" emission reductions from future periods. The advantage for the developing country partners is that after the end of the contract there are no more obligations on the area. The same area can even be used for new carbon fixation projects, which would then eventually conflict with baseline settings used in the first place. Another criticism is contributed by Kerr & Leining (2000, p. 3): the Proposal foresees payback of the credits only at the end of the lifetime, even if any casualty destroys the forest before, a provision that could lead to a loss in environmental integrity.

The stock change accounting method can be subsumed under the Colombian Proposal, because the liability questions would end up in a similar arrangement, only that registry procedures and enforcement can be expected to be more costly, because it is theoretically based on infinite sequestration.

Ton/year accounting draws on the second aspect of valuing postponed emissions. After the equivalence period, the environmental value of one ton of CO_2 is valued equal to a "real" emission reduction. Estimates for the equivalence period after which sequestration is supposed to lead to permanent reduction, vary between 55 and 100 years (Watson et al. 2000, pp. 320-321). These definitions depart from the definition of

the *global warming potential* (GWP) over a timeframe of 100 years, an arbitrary value chosen by the IPCC to operationalize the comparison between different greenhouse gases (Ellis 2001, p. 23). If this approach of ton/year accounting were to be adopted, the COP needed to define this decay period. Advantages of this methodology are that it makes permanence calculable. Forest projects can be made comparable among each other, using size and lifetime as parameters. Crediting would however be very slow, if only the pro ratio time equivalent was annually attributed. The low net present value (NPV) would certainly deter investors.

A variety of ton/year accounting is CER leasing (Dutschke 2001), which attributes credits fully as carbon fixation is progressing, but leaves CERs in the property of the host country. During the contract period, the project needs to be insured, after its end, the investor needs to replace the credits with other emission allowances. The significant difference to the Colombian Proposal is that credits suffer a linear depreciation. The later they are used, the lesser is their value. The later the project ends (by contract closure or failure), the lower is the value they need to be compensated with. Eventually, the CERs can be leased again, at a lower rate, or eventually be used for the fulfillment of future own obligations of the respective developing country.

This last aspect gains utmost importance with Malaysia's political goal to turn a developed country in 2020. Although this will not happen as an automatic consequence, it seems likely that there will be pressure on the country to enter the Annex I in the 3rd or 4th commitment period. From that point in time onward, Malaysia will be held responsible for additions to and removals from its terrestrial carbon stocks. How this liability translates into future target-setting is a field that remains completely unexplored at the moment. This however is only one aspect of transition from non-Annex to Annex I country. The pending Kazakh demand to enter Annex I will provide insight on how to handle the relating problems.

7 Combinations and open questions

Many questions around LULUCF under the CDM still remain open. This is why investors like the Dutch CERUPT program are still careful about A&R. Other issues are generic for the whole CDM, but gain specific interest for forestry projects.

7.1 Multilateral, bilateral, unilateral CDM – anything goes

There is no real need to limit flexibility in terms of project design and partnership, as long as the principle of Kyoto Article 12 are obeyed ("Real, measurable, and long-term benefits … and …[r]eductions in emissions that are additional to any that would occur in the absence of the certified project activity"). If reforestation is a national concern and if funding can be proven to be additional, a policy program. can be designed as a CDM project. As a consequence, the system boundary needs to be drawn around the country as a whole. Funding could be offered to multilateral donors, like the Prototype Carbon Fund (PCF), Annex I national entities (e.g. the Dutch Agency Senter) or direct investors. Which option to chose depends on the concrete situation and on the project size (Baumert et al. 2000). An investor can in many cases facilitate the transfer of technology. In the case of tropical forestry however, most of know-how is located in developing countries themselves. Notable examples for think-tanks in tropical forestry are the Brazilian School of Agriculture ESALQ at the University of Sao Paulo, the CATIE Center for Investigation and Education on Tropical Agriculture at Turrialba/Costa Rica, and - last not least - the Malaysian Forest Research Institute FRIM at Kuala Lumpur. South-South implementation could take advantage of this fact, e.g. if Malaysia and Indonesia offered joint projects along their common frontier. The assumption by Wong & Thereseira (2001) that only bilateral implementation suited best national interests cannot be verified with the experience from the PCF or the AIJ pilot phase.

7.2 Official development assistance and CDM forestry

There are widely differing views on how to interpret the Marrakech prohibition of a "diversion of official development assistance" (UNFCCC 2001, Decision 17/CP.7) as part of the additionality criterion of the CDM. Kete et al. (2001) recommend not to use official development assistance (ODA) for the creation or acquisition of credits, but to finance capacity building for host countries.

In the context of A&R projects, ODA can play a special role: The CDM paradox consists in the fact that eligible LULUCF projects may contribute little to sustainable development.

- Areas closest to the "deforestation arch" will not be available for CDM A&R activities. As a consequence, CDM cannot stop ongoing degradation in an early stage.

- "Creating forest fragments away from the remaining blocks of forests" (Sussman & Leining 2002, p. 13) is of little help in restoring biodiversity.

Thus, ODA activities could enhance the sustainability contribution of CDM projects by concentrating in forest protection and restoration around the deforestation hot spots. CDM activities on the other hand could create buffer zones of plantation forestry in areas that were deforested before 1990 (or whatever other time limit might apply for the CDM)[1] and are therefore eligible under the CDM.

7.3 Modality mix and external financing

Likewise the above example, an integrated landscape planning makes most sense for sustainable development and enhance the credibility of CDM investment. Therefore, special attention should be given to mixed modality projects.

- Projects that take care of linkages within the production chain, e.g. use of firewood from thinning for energy production,
- Projects that combine A&R with deforestation avoidance, even if the latter is not being credited,
- Projects that create public awareness.

These projects do not develop autonomously, because multiple baselines and monitoring requirements make them more complicate to handle. Besides ODA, a variety of funds can be made available for co-financing. These could come from non-governmental organizations (NGO) on nature protection, from voluntary reduction programs in non-participating Annex I countries, like the US or Australia, or from the World Bank's BioCarbon Fund, which is actually fundraising for activities that go beyond the Marrakech limitations. This last development might even open a window of opportunity to account for activities started today in the second commitment period, when they become available under the CDM.

What is more, a potential host country could enhance the utility of CDM investment by installing additional requirements, such as a contribution in credit shares to a forest conservation and restitution fund. Investors' willingness to pay will depend on country risk assessment and on the internal logic of such a contribution. In our example,

1 See part 3 of this article.

acceptance of a environmental services fee will be higher than for an undirected investment tax.

8 Political risks for CDM forestry

In the run-up to Marrakech, land use, land use change and forestry (LULUCF) have often been perceived as a "loophole" for cheap fulfillment of emission reduction obligations. Implicitly, the Protocol allows for correcting the Annex I country targets upward, using LULUCF emissions and sequestration where applicable (gross-net problem WBGU 1998, pp. 4-8). Furthermore, many environmental NGOs the Group of 77 and China, and the European Union condemned LULUCF projects for not contributing to the North-South transfer of know-how, occupying large areas and contributing to deforestation. It is undeniable that large countries like China and India with their high-emitting energy production patterns saw good chances to make the most of energy-related projects, while in land use they would have more competitors. The non-Annex countries interested in LULUCF can be grouped in two main fractions; countries with a low-emitting energy production, like most of the Latin American countries, and countries whose energy consumption is so low they offer virtually no potential for emission reduction projects. The latter fraction can be found among most of the African nations. First land use projects carried through in Costa Rica and Honduras indicated that their carbon price could be extremely low, thus crowding out many technical emission reduction options. As a result, Article 12 of the Kyoto Protocol was not explicit on which project types to include. The coalition of forest project objectors between part of the G 77, most environmental NGOs and the European Union achieved to give forestry options a certain smell of cheating.

COP 7 at Marrakech has generously allowed Annex I country targets to be enlarged by a wide array of land use options up to individual limits agreed upon in the negotiations and restricted eligible project modalities for the CDM. Since then, polemics around forestry projects have calmed down, but carbon prices plumbed down as well. Still, precise rules and regulations that shall apply for CDM forestry will only be defined at COP 9, at the end of the year 2003. Potential forestry investors encounter a complex regulatory environment:

The use of forestry related CERs is limited to one percent of each Annex I country's base year emissions (FCCC/CP/2001/13/ Add.1 D, paragraph 14), but this limit is so high, it would allow for 230,000 ha of CDM plantations only for German investors, they

would have to start very early in order to reach this level. CERs can be accounted retroactively for projects started from 2000 onwards (FCCC/CP/2001/13/Add.2, decision 17/CP7, paragraph 13), which could be an incentive to strive for early credits. On the other hand, land use projects started after Marrakech will only produce credits after COP 9 at the end of 2003, which adds a high degree of uncertainty for pioneers.

Another deterring factor is that all rules and regulations for LULUCF will be reassessed for the second commitment period. Second period targets will be negotiated from 2005 onwards, and the sinks issue will arise anew. Long-term investment like forestry however is dependant on a reliable political environment.

9 Conclusion and recommendations

The development of forestry options within the CDM has been a long and winding road. The lengthy discussions over the basics of land use, land use change and forestry are all but over; they will restart in 2005, when targets and mechanisms for the second commitment period are negotiated. For the first commitment period, spirits have calmed down, and the discussion is more about methodology, part of which was reflected in this article.

The few A&R projects started between 2000 and the end of 2001 incurred the highest risks, but will be able to account for sequestration achieved since project initiation. All others will have to wait until rules and modalities will have been determined in November 2003. Then again, these projects will need to register before 2006 in order to achieve retroactive crediting.

Depending on the actual project design, CDM forestry investment can reap high secondary benefits, thus contributing to the development of a positive public image of this project type. Many actors, among them environmental NGOs and European governments have manoeuvred themselves into a dead-end road with their strict opposition against forestry options. Now is the time to help them out and build coalitions. This means, some investment into lobbying will be necessary to assure future eligibility of long-lived forest projects.

Project designers should be very conservative in their assumptions and prepare for non-permanent CERs, eventually in combination with the ton/year approach and a long equivalence period. Forestry investment never promises high returns. Carbon credits are an experimental market, and the most investors can gain is experience. Properly

designed, diversified forestry projects have the highest chance to survive the ups and downs in international climate negotiations.

With the aim of facilitating sustainable forestry development as part of the CDM, Malaysian negotiators should consider the following proposals:

a) The perverse incentive of removing natural forests in order to gain credits from reforestation could be circumvented, if all carbon removals since 2000 needed to be accounted for. In future, this extended accounting period could be generalized to be 10 years before project start.

b) Small-scale forestry projects should be privileged in the same way as small-scale energy. Agro-forestry or social forestry involve a large number of stakeholders and, despite their high externalities, have little chances to be realized under the current transaction cost scenario.

c) Reduce uncertainties for project developers – forestry is long-term business. The least they can expect is that the currently available project modalities remain eligible for future commitment periods and that the individual projects approved for the first commitment period will continue producing credits independently from upcoming forest redefinitions.

d) Periods for crediting, baseline revision and temporary CERs should be standardized. In order to facilitate long-term commitment to carbon sequestration, it could be of help to enhance the maximum crediting period for sink projects over the ones available for reduction projects.

On a national level, the Malaysian Forest Department could develop a pipeline of easily replicable projects with a widely standardized baseline. National and state policies should be revised to be supportive to project implementation, or even to offer CDM investment opportunities themselves. On the other hand, national CDM regulations can and should be creatively designed in a way to enhance the ancillary sustainability benefits of climate projects.

Further research will have to look into the question on how the liability for carbon stocks built up by CDM projects will be transferred in the context of an eventual Malaysian accession to the Annex I after 2020.

References

Anonymous (2001)
Good fellers, The Economist 8206, 27.01.

Baumert, Kevin A.; Kete, Nancy; Figueres, Christiana (2000)
Designing the Clean Development Mechanism to Meet the Needs of a Broad Range of Interests, World Resource Institute, Climate Notes, Washington

*brü (*1999)
In Malaysia ein Versuch gegen den Raubbau von Tropenholz Aber das Vorhaben nachhaltiger Forstwirtschaft ist schon wieder bedroht: Von der Hinwendung zum Ölpalmenanbau, Frankfurter Allgemeine Zeitung 14, 18.01.

Bujang, Mark (1999)
Sarawak: A Bioprospectors Heaven, Voices from the Forest

Campanili, Maura (2001)
Desmatamento na Amazônia preocupa ambientalistas, O Estado de São Paulo, 15.05.2001

Chan, Barney S.T. (2001)
The Private Sector and Sustainable Forest Management Southeast Asian Perspective, in: Chipeta, Mafa E.; Joshi, Mahendra (eds.), pp. 37-44

Chipeta, Mafa E.; Joshi, Mahendra (eds.) (2001)
The Private Sector Speaks: Investing in Sustainable Forest Management, CIFOR Center for International Forestry Research, Bogor

Dutschke, Michael (2001)
Permanence of CDM forests or non-permanence of land use related carbon credits?, Hamburg

Ellis, Jane (2001*)*
Forestry Projects: Permanence, Credit Accounting and Lifetime, OECD, Paris

FAO (Food and Agriculture Organization) (2001)
State of the World Forests, Rome

FAO (Food and Agriculture Organization) (2002)
Expert Meeting on Harmonizing forest-related definitions for use by various stakeholders, Rome 22-25 January, Proceedings, Rome

Kerr, Suzi; Leining, Catherine (2000)
Permanence of LULUCF CERs in the Clean Development Mechanism, Washington, D.C.

Kete, Nancy; Bhandari, Ruchi; Baumert, Kevin A. (2001)
Should Development Aid be Used to Finance The Clean Development Mechanism? Washington, D.C.

LeBlanc, Alice 1997
An Emerging Host Country Joint Implementation Regime: The Case of Costa Rica, New York

Makundi, Willy; Razali, Wan; Jones, Don Justin; Pinso, Cyril (1998)
Tropical Forests in the Kyoto Protocol Prospects for Carbon Offset Projects after Buenos Aires, Berkeley

Moura-Costa, Pedro (2002)
Forestry and the Climate Convention 10-years of evolution Oxford

Moura-Costa, Pedro; Stuart, Marc D. (2002)
Forestry-based Greenhouse Gas Mitigation: A short story of market evolution, Oxford
Moura-Costa, Pedro; Tay, John (1996)
Reduced Impact Logging in Sabah, Malaysia, Oxford
Moura-Costa, Pedro; Wilson, Charlie (2000)
An equivalence factor between CO2 avoided emissions and sequestration: Description and applications in forestry, Mitigation and Adaptation Strategies for Global Change 5. pp. 51 - 60
MSTE – Malaysian Ministry of Science, Technology and the Environment (2000)
Malaysia Initial National Communication Kuala Lumpur
Pinso, Cyril; Moura-Costa, Pedro (1993)
Greenhouse Gas Offset Funding for Enrichment Planting A Case Study from Sabah, Malaysia, Commonwealth Forestry Review 72
Sizer, Nigel; Plouvier, Dominiek (1999)
Increased investment and trade by transnational logging companies in Africa, the Caribbean and the Pacific Implications for the Sustainable Forest Management and Conservation of Tropical Forests, Brussels
Stuart, Marc D.; Moura-Costa, Pedro (1998)
Climate Change Mitigation by Forestry A review of international initiatives London
Sussman, Fran; Leining, Catherine (2002)
Priority Rules, Modalities, and Guidelines for Land Use, Land-Use Change and Forestry Projects in the Clean Development Mechanism Key Considerations for Negotiators Post-Marrakech, Washington, D.C.
Watson, Robert T.; Noble, Ian J.; Bolin, Bert et al. (eds.) (2000)
Land Use, Land-Use Change, and Forestry. A Special Report of the IPCC Cambridge, UK
WBGU – German Advisory Council on Global Change (1998)
The Accounting of Biological Sinks and Sources Under the Kyoto Protocol A Step Forwards or Backwards for Global Environmental Protection?, Bremerhaven
Wong, Jenny L.P. (2001)
The Role of Sustainable Forest Management in Climate Change Mitigation under the UNFCCC and the Kyoto Protocol - Malaysia's Case (unpublished)
Wong, Jenny L.P.; Thereseira, Gary (2001)
'For Thy Carbon Sink Remember'd Such Wealth Brings That Then I Scorn To State My Policy On Sinks', (unpublished)