

Methodological concepts of REDD

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Briefing paper produced for the workshop “Managing Forests in Mekong Countries for Carbon Sequestration and REDD” Hanoi, 27 – 30 October, 2008

1 Introduction

In the current debate over Reduced Emissions from Deforestation and forest Degradation in developing countries (REDD), unanimity between the Parties to the UNFCCC has been found over the aim to integrate REDD into post-2012 climate policy. Nevertheless, the speed of the debate is slowed down by the discussion of financial and methodological issues. This article will give an overview over the methodologies of REDD project and program development.

Many methodological concepts were first tested for project approaches under the Clean Development Mechanism (CDM), and some of them are CDM-specific. However, there is a difference between a project-based mechanism and one with a sector-wide scope. Under REDD, both modalities are actually being envisaged.

The intention of this paper is to flag the main issues and to put them into context, not to go into detail of methodology development. The actual phase of demonstration activities started with Bali decision 2/CP.13 is aimed to provide experience on national and subnational activity scopes.

The keywords forest definition, additionality, baseline, leakage and permanence will seem familiar to readers experienced with the CDM. It should be considered however that these issues are changing in the light of new rules and circumstances, and little can be taken for granted, as we move from the first Kyoto commitment period towards a post-2012 climate regime.

2 Forest definitions

REDD addresses greenhouse gas emissions and uptakes in the land use sector. Under practical aspects, for the owner or user of land, there is no need to distinguish between forest and non-forest areas. Accounting for land use under the UNFCCC in developing countries has been segregated since the Marrakech Decision in 2001, where afforestation and reforestation was admitted as the only activities eligible for crediting under the Clean Development Mechanism (A/R CDM). Annex I countries – the developed country Parties to the UNFCCC – on the other hand, are free to account for all land use on their territories. According to monitoring capacities and uncertainties, different land use categories were distinguished as ac-

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counting compartments,, stipulated in Decision 11/CP.7. The definitions used in this decision were thought to be transitory and are valid for the first commitment period only. When A/R CDM was decided upon in Milan 2003 (Decision 19/CP.9), the industrialized countries' definitions for forest, afforestation and reforestation were adopted as eligibility criteria. Thus these definitions became exclusive towards any other climate-relevant land uses. Deforestation in tropical countries is the most obvious blank in accounting in the first Kyoto commitment period and was taken as the *Leitmotiv* for the debate on a wider inclusion of land-use based climate change mitigation in developing countries. Over time, the debate has broadened in scope to also cover degradation and forest management. The original sin however, the use of a white list of land uses as exclusion principle, was so far not addressed in the debate. The need to define degradation in the context of the REDD debate is a consequence of fragmented accounting for land-use based climate change mitigation in developing countries. Not only is a clear-cut distinction between land-based activities unrealistic, it will also encumber the transition of developing countries towards a status of developed countries under the Climate Convention. In order to achieve a level playing field of endeavors for land-based mitigation between parties, it would be wise to adopt a resource management view on agriculture, forestry and other land use that includes all relevant activities.

This said, we will move into the minefield of forest definitions:

The definitions for what a forest is under the Kyoto Protocol are very pragmatic. A forest is defined by threshold ranges for minimum area (0.05 – 1 ha), minimum crown cover density (10 – 30%), and minimum potential height in maturity (2 – 5m). Newly afforested stands or areas with seed sources that will eventually become forest are covered under this definition as well. As Annex I countries compare stock changes during the commitment period to a static one-year baseline for the year 1990, the need arose to define reforestation as activities commenced on areas that were non-forested in or after 1990. Afforestation however, was defined to be forestation of areas that were non-forested at least 50 years before the start of the activity. Functionally, for developing countries, this distinction is completely irrelevant. However, given the “forest potential” criterion, it has proven difficult to determine whether an area was a forest on 31 December 1989. The choice of forest definition thresholds for the first commitment period has been a key criterion for country eligibility to A/R CDM. Designated National Authorities for the CDM need to communicate these to the UNFCCC Secretariat.

Table 1: Risks resulting from forest definitions

Definitions	Low end	High end
Minimum area 0.05 – 1.0 ha	<ul style="list-style-type: none"> ▪ Monitoring risk ▪ No biodiversity contribution ▪ Less A/R, higher FM opportunities 	<ul style="list-style-type: none"> ▪ Monitoring risk (1 ha is still small)
Minimum crown cover 10 – 30%		<ul style="list-style-type: none"> ▪ Savannah-like vegetation unprotected
Minimum height 5 – 10 m	<ul style="list-style-type: none"> ▪ Bush land and shrubs count as forests 	
Young stands with the above potential	<ul style="list-style-type: none"> ▪ Age of tropical forests is difficult to estimate. 	

Changing forest definitions between periods is explicitly envisaged in Decision 11/CP.7, with views to finding “biome-specific definitions for future commitment periods”. This would mean that different definitions would apply within one country, the benefit of which is discussible. A split national definition between periods in any case requires split accounting forever after.

Thus, definitions do not need to be uniform between countries, even when in close cooperation. Time consistency is a higher value, which makes a definition change between periods questionable. The definitions applied during the first commitment period in developing countries do not pose much obligation on consistency for post-2012, because during the A/R CDM phase national-scale inventories have not yet started. Once these have been chosen and county-wide accounting has started, it will be practical however not to change them any longer.

3 Additionality

The concept of additionality stems from project-based compliance mechanisms of the Kyoto Protocol. Articles 6 (on Joint Implementation), similarly to Article 12 (on the Clean Development Mechanism) stipulates that “Any such project provides a reduction in emissions by sources, or an enhancement of removals by sinks, that is additional to any that would otherwise occur”. The *otherwise* scenario is business as usual (BAU). The non-mandatory Additionality Tool provided by the CDM Executive Board has become a standard procedure in mitigation project development. There is a specific version for A/R CDM projects. The main avenues for the additionality check are (1) whether the mitigation project is economically less attractive than the business-as-usual investment on the area, and (2) whether carbon finance will help overcome social and regulatory investment barriers, and the (3) common-practice test. Although economic additionality is often disputed, this regularly refined procedure has proven successful for project-based mechanisms.

Additionality under a sectoral approach is more difficult to determine. Sectoral incentives will likely make mitigation an attractive investment and facilitate barrier removal. This may lead to the paradoxical situation that individual activities, which directly produce carbon benefits, will

not be eligible for crediting, while the enabling framework may claim additionality. Sector activities may come from corporate or state incentives.

When it comes to policies and measures (PAMs), additionality is impossible to determine. PAMs are motivated by a variety of interests. The state by definition is not a profit-maximizing economic actor, and many of the barriers encountered by individual projects are effectively maintained or removed by the state. This does not mean that REDD PAMs are necessarily no-regret. Over-exploitation of natural resources systematically benefits certain social classes. Any politician touching the social equilibrium risks punishment by voters and pressure groups. Monitoring and enforcing laws may bring about higher costs than short-term economic benefits. The auxiliary construct in this case is a reference emission level.

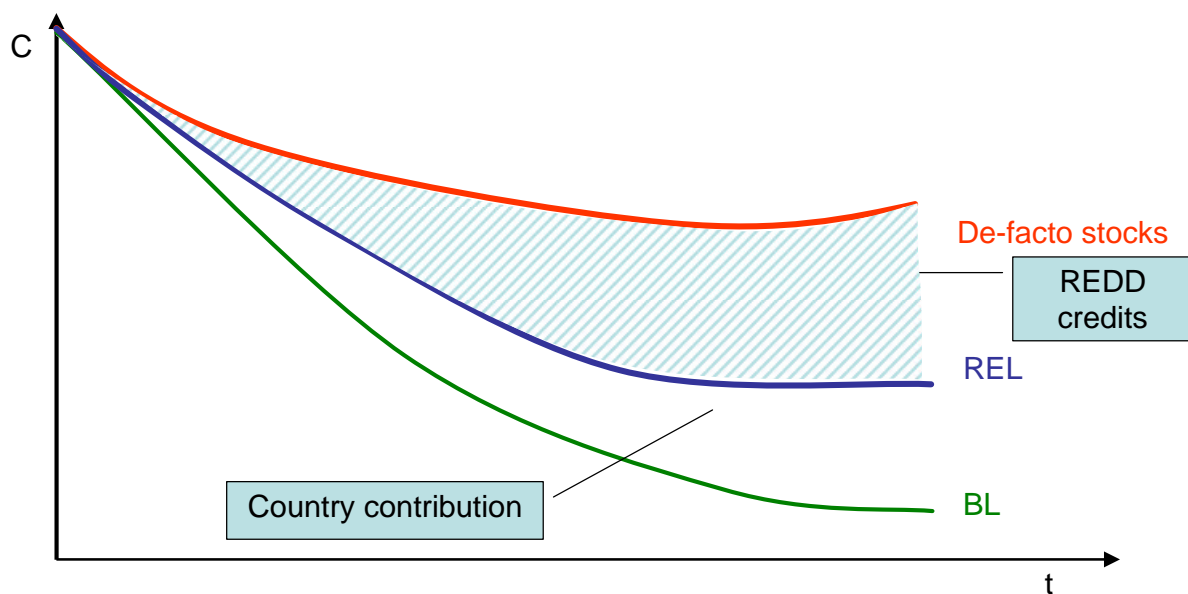
4 Reference emission level

Quantification of climate benefits critically relies on the determination of the baseline, or the null hypothesis of measurement. There is an overlap between the terms “baseline” and “reference level”. In project development, the baseline is the emission / removal profile of the BAU activity. There are different approaches on how to determine the baseline, historically or present incentive-based. Indicators may be static, dynamic, or monitored, as appropriate. In any case, in the background of any baseline determination, there is an assumed BAU scenario, to which the baseline needs to link back. This seems logical, but repeatedly proposed methodologies have been turned down, because they were inconsistent between additionality and baseline determination. A national baseline however will have to dispense with the additionality test on the BAU scenario. This makes a country baseline extremely vulnerable to criticism. With the erratic variations of deforestation that can be observed for many countries over the last 20 years, baseline determination depends on which timeframe to choose when projecting past developments into the future. A sliding average over 10, 5, or 2 years will in many cases lead to extremely divergent results. A valid baseline will only be obtained when the model is coupled with measurable variables like soy prices in the case of Brazil, or palm oil prices in the Indonesian case. The mechanism found for giving credibility to national inventories of Annex I is a random peer review process by other countries. The same could apply to an argued national baseline assumption.

In the past, national emission targets for Annex I countries were adopted based on pure provision. The target to reduce emissions by 7 percent below the values of an arbitrarily chosen year is a political declaration, unfounded by empirical evidence. For many countries, like Russia, Belarus, or Ukraine, the target was deliberately negotiated too high, thus creating “hot air” emission allowances that these countries sell to other parties. In the case of the US, the 7-percent target was an over-estimate of the willingness to pay in the situation of population growth and bullish economic development. In both cases however, there is no benchmark for determining, whether the efforts for emission reduction are additional or not. On the

other hand, a pure baseline calculation would be criticized for its BAU assumptions, and it would under-estimate the force of a declared political goal. The middle ground between both options for target formulation is a reviewed baseline, combined with a proper reduction pledge. This could look like illustrated in Figure 1 for forest carbon stock development over time. The reference emission level (REL) is the declared political goal to maintain forest carbon stocks at a certain level above the reviewed baseline. Only in case the carbon stocks remain higher than the REL, credits will be generated. This model embodies an unaccounted national element of mitigation.

Figure 1: Country baseline and reference emission level



Understating emissions in the REL makes mitigation unattractive for developing countries. Overstating them will lead to spurious emission reductions, which eventually will burden the atmosphere with additional GHG loads.

The baseline issue is different for subnational activities (SNAs). For them, it will be easier to assess a baseline emission scenario, taking into account however increasingly positive state incentives for their activity. Bottom-up baselines will necessarily be more detailed, and monitoring will be to a higher degree of certainty. A national baseline will be the umbrella for all subnational baselines. However, it is likely that bundles of SNAs will join in sectoral umbrellas, so that several levels of REDD activities may exist in the end. As the state takes over the ultimate liability for staying below the reference emission level, it is the last instance to decide, which SNAs are eligible on its territory, and that no double-counting occurs. It will also take interest in subnational baselines to be conservative. This situation resembles the one of mitigation projects within Annex I countries (Joint Implementation), where all emission reductions sold abroad need to be subtracted from the national target.

In the REDD debate, most proposals depart from no-lose REDD commitments by developing countries in the first place, in order to facilitate broad participation. If a country fails to comply with its target, no consequences arise. Only once emission credits are sold, there needs to be liability for the carbon stocks built up or protected. Assuming annual measurements over a commitment period, debits against the REL in one year can be carried over to the subsequent year. The same procedure between periods however would infringe with current practice under the Kyoto Protocol not to allow *borrowing* of emission reductions from future periods.

5 Leakage

Leakage is understood to be an effect on greenhouse gas flows that occurs outside the boundaries of the implementation unit. These may be positive (spill-over effects that increase mitigation) or negative (increased emissions due to indirect effects of the activity). Only the latter are of concern.

With national REDD activities; leakage may only occur outside national borders. International leakage is an inborn risk of partial participation in the climate regime, and it is not specific to forestry. Activity leakage within countries is likely if no alternative income is provided for loggers. Market leakage occurs if the REDD activity decreases the supply of goods and services from the forest, and prices go up, so that higher market distance is tolerable for loggers, because prices for timber or cash crop increase. Protecting large areas will also have local effects on land prices, leading to higher opportunity cost for unused lands.

Similar to competing baseline determination between different levels of activity, leakage from SNAs will make the achievement of national REDD targets more difficult. Therefore, a conservative leakage discount for SNAs is in the interest of national authorities in charge of REDD.

Discounting carbon benefits is the second-best solution. The best solution is to avoid leakage from occurring in the first place. This can be done by wisely combining different land management activities. Landscape management goes beyond the fragmented view lamented above under the issue of “definitions”. Table 2 exemplifies how combinations of different activity types may bring down the leakage risk.

Table 2: Limiting leakage by activity combinations

	A/R	Averted D
Averted D	Reforestation secures forest frontiers, provides sustainable timber	
SFM	Sustainable management & extension of old-growth plantations	Providing timber & non-timber forest products from natural forests

The same is true for the international framework: The higher the participation in the climate regime and the more sustainable land management is encouraged worldwide, the lower the risk of international leakage.

6 Permanence and liability

One of the major concerns in the REDD debate is the permanence of emissions reductions. How can we make sure that a forest area saved today will not be destroyed tomorrow? Who should be held liable if that happened? How can REDD contracts and financial mechanisms be designed to ensure permanence?

Permanence is a relative concept. Nothing in the world is permanent. Therefore, the concept needs to be defined for the purpose of climate policy, which is to stabilize greenhouse gases in the atmosphere until the middle of this century. Under this aspect, an effect that lasts for 50 years would be more than sufficient. There is much evidence for the existence of a so-called forest transition curve: Deforestation is a transitory phase of economic development. If an incentive system achieves maintaining forest carbon stocks above BAU over the next 20 – 30 years, they will very likely remain stable for a much longer time.

What are the risks that can jeopardise the permanence of carbon stored in forests? We distinguish between the following categories of risk (Wong and Dutschke 2003):

1. **Natural / ecological risk:** Erratic variations in carbon stocks, caused by natural events such as storm, drought, pests, or fire. These can be minimized by a modification of current forest insurance in the way that these replace not only the timber value, but also the one of the carbon lost.
2. **Climate change–related risk:** Climate change may lead to systematic carbon losses in certain regions. This is distinct from other types of natural/ecological risks in that it involves a new class of threats that may be more difficult to insure as historical experience is lacking. Accounting systems need to be designed, which factor out indirect anthropogenic influence.

3. **Demand-side risk:** Where the demand for agricultural crops is the main driver of deforestation, an increase in prices on the national or world market may drive up opportunity costs to levels above the carbon prices agreed, making forest conversion profitable. REDD contracts will therefore foresee a monitored price corridor for these commodities, above which additional payments will be due.
4. **Failure of project partners:** Risk related to non-performance of the project can be due to, for example, ineffective project management, insecure tenure rights to the forest (encroachment), or bankruptcy of project partners. Under a national-based REDD system the ultimate liability will fall on the respective host country.
5. **Political risk:** A change in government may lead to a change in or reversal of any prior approvals or commitments. The same may occur in the event of civil unrest. Depending on how the REDD mechanism will be ultimately designed a change in status from non-Annex I to Annex I country may also impact SNAs. The related risks can be minimized through broad participation in the climate regime and by international cooperation. Still, legal enforcement options against states are necessarily limited.

Once someone assumes liability for terrestrial carbon stocks, non-permanence may still be a threat, but its damaging effects to the atmosphere are being compensated for. This may be the case in the future, when developing countries will assume proper emissions targets for example within a cap and trade system. Before they will, there is a need to find intermediate solutions. The following is a toolbox of different liability mechanisms needed for achieving fungibility of carbon credits from land use and other sectors. Basically, two types of liability management are conceivable; temporally limited liability, and insurance models.

A) Temporally limited liability

- i. Temporary crediting is known from the afforestation and reforestation Clean Development Mechanism (A/R CDM). Temporary credits (tCER or long-term CER, in the CDM case) need to be re-verified every five years. If the underlying sequestration cannot be re-verified, the credits are not re-certified (tCER case) or will expire (ICER) respectively. For a variety of reasons, this model has not proven successful for A/R CDM so far, yet it may serve as an intermediate solution, before host countries assume liability.
- ii. Ton-year accounting predetermines a period over which the sequestration needs to be granted to be considered permanent. The buyer pays a pro-rata fraction for every year the carbon remains stored. Given that land-based project costs are mainly frontloaded and the high discount rate in developing countries, this is not a promising business model, unless coupled with facilitating financial mechanisms.

- B) **Insurance models** rely on a set-aside fraction of credits to replace occasional losses over a predetermined lifetime. This fraction needs to be higher for individual projects, because calamities like drought, fire or storm tend to act on the whole project area. Risk pooling of unrelated areas will for the same reason be more cost-effective. The larger the pool, the higher the risk diversification. The quality of the pool may however not be transparent for the credit buyers. Commercial insurance is likely the most cost-effective solution, which at the same time offers a homogeneous asset to the buyer of REDD credits.

Elements from both types of liability management can be combined to best fit the country or project circumstances. Additionally, states can manage their residual risk bilaterally or multilaterally. Forest Compliance Partnerships are proposed as a sectoral “bubble” between Annex I and non-Annex I countries. Under FCPs, Annex I countries would account for carbon removals and emission reductions in the land use sector of the non-Annex I partner country as if they had occurred in their own forests. This would increase the endeavour to foster readiness in the partner country.

7 Intra-national REDD arrangements

Similar to the institutional requirements under the CDM, a country wishing to participate in REDD needs to designate a focal point. This may be the UNFCCC focal point, the Designated National Authority (DNA) for the CDM, the Ministry of Forestry, or any new public or semi-public institution to be created.

There are some fundamental decisions to be taken right from the start:

- Whether or not to allow for SNAs;
- If so, which national or international stakeholders are eligible for carrying out SNAs
- What is the legal nature of REDD credits, who can hold them, how to transfer them, and how to regulate liability.

The REDD institution should identify priority activity areas for state and for private intervention (in case SNAs are permitted). Staffs need to be able to assess the quality of project proposals; this includes verifying the credibility of baseline assumptions and their lifetime. Under national REDD PAMs, the baseline for SNAs can be expected to be improving over time, meaning that the individual activity will receive less credit, once policies and measures are fully implemented. The baseline for SNAs is an implicit credit-sharing clause between the activity and PAMs that generate carbon benefits. Another implicit credit-sharing takes place when determining the discount to be applied on carbon verified to account for leakage. Differently from the CDM, the REDD state takes an interest to understate the baseline of and to overstate leakage from SNAs.

Explicit credit-sharing clauses may consist in:

- a) registration fees or taxes on REDD credits for the costs of the REDD infrastructure provided by the state;
- b) payback of subsidies or payments for environmental services;
- c) liability fees to cover the residual risk of project failure;

Additionally, national-scope monitoring capacity is required. Forest inventories, as regularly reported to the FAO need to be refined. Carbon reporting is also more data-intensive, even when done under the IPCC's low-tier criteria. As the data quality improves, the higher the confidence of reporting and the higher the potential carbon returns. This is a process that runs over longer periods. Even Annex I countries have a considerable gap in data quality.

The Bali Roadmap and the Bali REDD Decision avoid the term "project" for REDD mitigation, because these activities can take place on different levels. It is not only conceivable, but highly likely that subnational incentive systems that provide payment for environmental services (PES) will emerge as subnational REDD activity under the guidance of national PAMs. Below the PES level however, private activities can take place that try to benefit both from PES and from international REDD credits. Overlapping activities on different levels will require conflict-resolution mechanisms on the state level. Each cross-border project will have to be backed by a memorandum of understanding between the countries involved that regulates credit sharing, liability and a mediation procedure.

8 Supra-national arrangements

REDD has the potential to be a great relief for the world's climate, and to be big business, in case private-sector investment is encouraged by the forthcoming rules. Competition between host countries has already started. REDD capacity – or "readiness" – is crucial for attracting REDD investment. Transaction costs for state actors can be addressed by international cooperation. Building up joint monitoring capacities and common procedures increases credibility at the same time it decreases the likelihood of leakage. Cross-border activities, like biological corridors, can adapt best to landscape management necessities. There can be a joint REDD institution and monitoring capacities for groups of countries with common interests, like the Mekong states. In the actual phase, where no institutional rules have been given by the Conference of the Parties to the UNFCCC, any new ideas can be tested. There is ample space for creativity.

9 Resume

This paper has depicted some principles of methodology development for REDD. It is yet unclear, whether REDD credits can be used for compliance with national Annex I targets in

the future. REDD is likely to constitute a proper climate commitment by tropical and subtropical developing countries. The host-country involvement in compliance and liability will be much higher than we currently know it from the CDM. In parallel, CDM reform is underway, and the treatment of land-use accounting will be discussed anew for Annex I countries. Table 3 puts methodological and regulatory issues in context, going from the activity to the international level. The REDD decision expected for the Copenhagen Conference of the Parties needs to be open as flexible as possible to best adapt to different national circumstances.

Table 3: From activity to international level

Issue	Activity level	International level
Baseline	Independent validation, mediation	Inter-governmental review procedures
Leakage control	Combination of different land-use activities	Rewarding mitigation in all land-based activities, demand side management
Participation	Awareness-raising, capacity building	Capacity & institution building, transition mechanism between non-Annex I and Annex I
Permanence	Temporary crediting, credit buffers, pooling of risks	Broad participation, certification, border tax, climate stabilization