



Chapter 6

How do we set the reference levels for REDD payments?

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6.1 The issue

Among the most critical elements of a new global ‘reducing emissions from deforestation and forest degradation’ (REDD) regime is how to set national baselines or reference lines/levels.¹ Reference levels have profound implications for the environmental effectiveness, cost efficiency, and distribution of REDD funds among countries. Yet, there is no agreed-upon ‘formula’ for how to set them. Most REDD submissions to the United Nations Framework Convention on Climate Change (UNFCCC) suggest using historical deforestation, but many countries do not have reliable data on that. Similarly, there is strong support for including ‘national circumstances’, but the practical implications of that are yet to be worked out. Some might, due to the problems involved, ‘throw up their hands in despair at the idea of working out baselines’ (Pearce 2007: 2). But there is no escape; the unavoidable question is when (and how) to start crediting emission reductions.

¹ In some instances ‘baseline’ is used to refer to the clean development mechanism (CDM), while ‘reference line/level’ refers to REDD, a distinction *not* used in this chapter. Rather we apply the distinction between Business as Usual (BAU) and crediting baselines outlined here, and use ‘baseline’ in both, while the term ‘reference line/level’ is used in the meaning of crediting baseline.

The debate is also obfuscated by terminology, as the terms ‘baseline’ and ‘reference line/level’ refer to at least three different things. These are illustrated in Figure 6.1. First, baseline can refer to the *historical baseline*, that is, the rate of deforestation and degradation (DD) and the resulting CO₂e emissions over the past x years. Second, baseline can refer to the projected *business as usual* (BAU) scenario: how would emissions from DD evolve without the REDD activity? Third, baseline can refer to the *crediting baseline* (i.e. like an emissions quota). A BAU baseline is the benchmark for judging the impact of the REDD measures implemented (and ensuring additionality), while the crediting baseline is the benchmark for rewarding the country (or project) if emissions are below that level or not giving any reward or possibly invoking debits if emissions are higher (see Chapter 8 on liability).

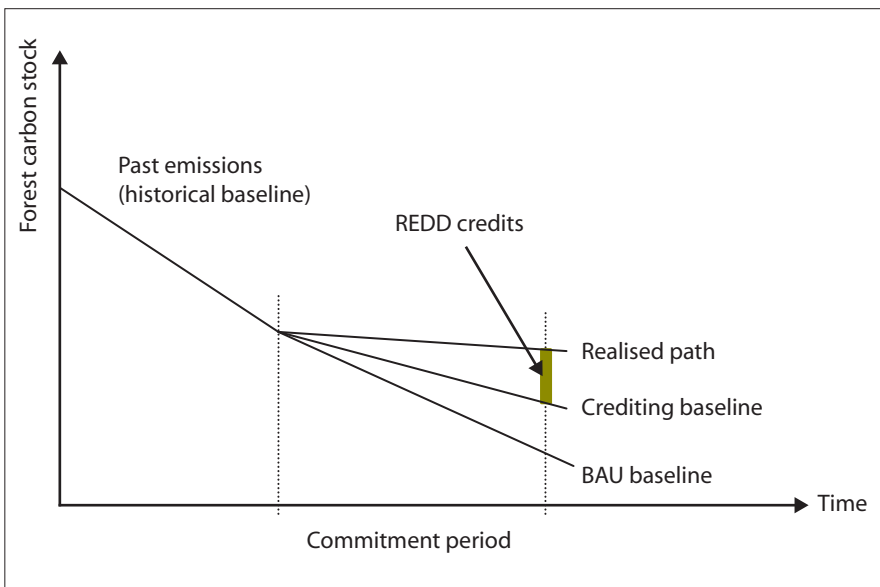


Figure 6.1. BAU and crediting baselines

This chapter therefore makes a distinction between *historical* baseline, *BAU* baseline, and *crediting* baseline. Although a distinction between BAU and crediting baselines is not made explicitly in submissions, it is useful to assess the arguments from two different angles: (i) Are they good predictors of future deforestation and degradation (BAU)? This could, in principle, be answered by scientists based on current knowledge on causes of DD; and (ii) Are these acceptable reasons for setting the crediting baseline? The latter is largely a political question, going well beyond the technical issues.

6.2 The business as usual (BAU) scenario

6.2.1 Historical national deforestation

The BAU scenario tries to answer the counterfactual and hypothetical question: what would deforestation be without REDD? Almost all submissions by the Parties, as well as the Bali Action Plan (COP 13), suggest that baselines should include historical national deforestation. The reference period is typically set to the average deforestation rate of the last 10 years, and updated every 3 years, as suggested in an early proposal by Santilli *et al.* (2005). The exact reference period may differ and some flexibility will be needed, for example, based on the availability of national forest inventories. But the choice of historical reference period can have dramatic impacts on the BAU scenario, and countries might strategically opt for reference periods that maximise REDD transfers.

How good is past deforestation to predict the future one? First, due to poor time series data for most developing countries, we do not know as much as we would like to know. Second, what we know suggests that past deforestation is not a precise predictor of future deforestation (New Zealand submission, April 2008). Unlike emissions from fossil fuels, which are closely linked to one variable (gross domestic product, or GDP), deforestation is ‘multicausal’ and can be highly variable from year to year. It can also show systematic trends over longer periods (5-10 years) which depart from past deforestation. Annual fluctuations are of less concern and can be addressed by, for example, using running averages (e.g. last three years) or mechanisms to address non-permanence and liability (see Chapter 8).

The more serious issue is when historical deforestation systematically under- or overestimates the rate of deforestation in a BAU scenario. The forest area (change) may follow a pattern suggested by the forest transition (FT) theory (Mather 1992; Angelsen 2007): initially, the country is characterised by a high percentage of land under forest cover and a low rate of deforestation. Then deforestation accelerates, slows down, forest cover stabilises and eventually starts recovering. This pattern is illustrated in Figure 6.2. Some countries at early stages in this transition, such as Papua New Guinea and the Democratic Republic of Congo, can be expected to have high forest area values and low, but accelerating, deforestation rates. Others in the middle of the transition, such as parts of Indonesia and Brazil, will have high rates, but these are expected to slow down as forest is getting scarcer. Finally, countries late in the forest transition, such as China and India (and a number of high-income countries), have increasing forest areas.

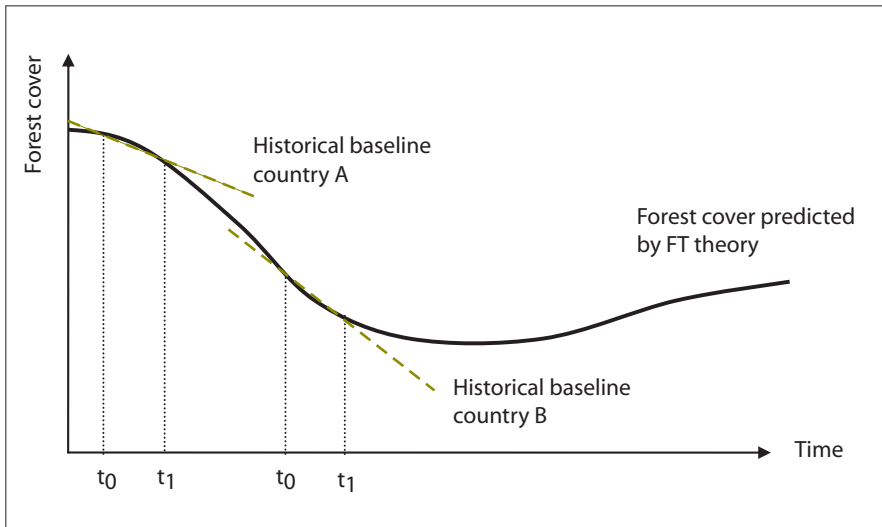


Figure 6.2. The forest transition and historical baselines

FT is not a ‘law of nature’, and the exact pattern is influenced by national context, global economic forces and government policies. Yet, it depicts a broad trend. Figure 6.2 illustrates the problem of setting baselines based on historical deforestation only. An extrapolation of historical rates *underestimates* future BAU deforestation for countries at the early stages in the transition, while it *overestimates* BAU deforestation for countries at the later stages.²

6.2.2 National circumstances

The second element of baseline-setting suggested in the Bali Action Plan (and several submissions) is to take ‘national circumstances’ into account. There is still a need to identify which factors constitute legitimate national circumstances (cf. Canada submission, March 2008). One prominent proposal in the debate (e.g. by Coalition for Rainforest Nations) is to include a *development adjustment factor* (DAF). A practical application of this might be that countries with low levels of GDP per capita will get more generous baselines, which may be justified by several arguments: (i) the poorest countries are presumably at an earlier stage in FT, and therefore deforestation (and degradation) is likely to accelerate rather than slow down in a BAU scenario; (ii) the capacity to implement REDD may be inversely related to GDP per capita, and larger transfers are needed; (iii) based on the UNFCCC principle of ‘common but differentiated responsibilities’ the REDD requirements should be lower for the poorest countries; and (iv) REDD should contribute to a transfer of resources to the very poorest countries (co-benefits).

² Note that the forest transition describes changes in forest area, while we are interested in changes in forest carbon stocks. At early stages carbon-rich forests tend to be lost, while the increase at later stages tends to have lower carbon densities (tons carbon per hectare).

An extension of the proposal to include national circumstances is to use more elaborate models to predict deforestation based on country-specific factors. The literature on cross-country deforestation regression models has included a number of variables, and some of these are potential candidates for inclusion in a formula for setting baselines (Angelsen and Kaimowitz 1999). These factors include population density and growth, forest area, economic growth, commodity prices, governance variables, and location (tropical and regional).

One problem with the modelling approach is that it is based on *predicted* values of, for example, population and economics growth and commodity prices. An extension of this approach, suggested by Motel *et al.* (2008) is to estimate the impact of government policies *ex-post*, that is, at the end of the crediting period when that information is available. Countries then get rewarded for good policies and efforts ('Compensated Successful Effort').

The modelling approach raises several issues. First, for most countries the time series data needed are poor or nonexistent. Second, deforestation modelling history suggests that cross-country models are not robust, i.e. no clear answer can be expected. Third, it is questionable whether a 'black box' baseline figure will be acceptable to the parties.

6.2.3 Historical global deforestation

Another option, originally put forwards in the Joint Research Centre proposal of Achard *et al.* (2005), is to use historical *global* deforestation rates to set individual *country* baselines. They suggested that countries with a rate of deforestation lower than *half the global average* use that as a national baseline, while countries with a higher deforestation rates use a national historical baseline. Different scenarios can also be generated by differing the weights put on historical *global* deforestation and *national* deforestation (cf. Strassburg *et al.* 2008).

The inclusion of global deforestation in setting national baselines is based on two critical assumptions. First, it is assumed that differences in rates of deforestation reflect differences in policies, and countries should not be rewarded (punished) for bad (good) policies by getting higher (lower) baselines. Indeed, a central element in many submissions is to 'reward early action'. While policies are important, for most countries experiencing low deforestation this is primarily a result of other factors, for example, stage in FT driven by economic development and forest scarcity, rather than deliberate conservation policies (Rudel *et al.* 2005).

Second, the proposal assumes some global convergence in deforestation rates, and that 'over the long run all developing countries would deforest at the average global rate' (Eliasch 2008: 136). This is equally problematic and lacks

empirical evidence to support it. On the contrary, the evidence tends to favour the theory of FT (Rudel *et al.* 2005; Chomitz *et al.* 2006), in which case there is no global convergence, but rather distinct phases of forest cover change and slowly increasing forest cover characterising the last stage.

6.3 Crediting baselines

The BAU baseline is the benchmark to assess the impact of REDD policies and measures, while the crediting baseline is the benchmark to reward the country (or project) with REDD credits or other forms of payment. One might, of course, decide to set the crediting baseline equal to the BAU baseline, which is indeed the implicit assumption commonly made. But the distinction between the two is conceptually important, although by doing so one steps into one of the most contentious issues in climate negotiations: to what extent should developing countries bring an own, uncredited REDD contribution to a future climate agreement?

There are three major reasons for not equating the BAU baseline and the crediting baseline. First, an overall aim of the UNFCCC process is to limit global greenhouse gas (GHG) emissions compared with a BAU scenario. The emissions reduction responsibility assigned to different countries (and reflected in their crediting baselines) must, unavoidably, add up to the global target. Second, there is a genuine fear that including REDD credits into the compliance (offset) market will flood that market, i.e. lower the carbon price and crowd out other mitigation activities (see Chapters 3 and 5 for a further discussion). Setting the crediting baseline tighter than the BAU baseline will reduce the number of credits brought to market. Third, some of the reductions might be achieved through policies and measures (PAM) and non-market approaches funded by ODA.

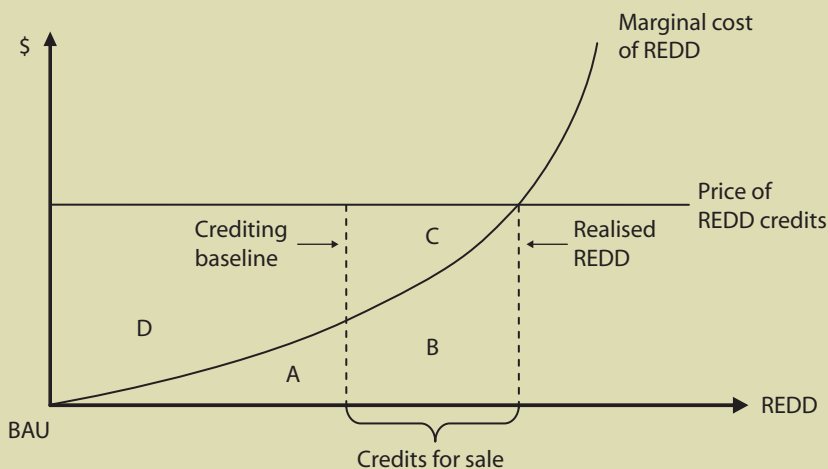
Some policy reports such as the Eliasch Review (2008) suggest a soft entry for REDD into a climate agreement, based on no-lose and limited liability, and then gradually increasing commitments. This is also reflected in a Greenpeace submission (March 2008), which suggests increasing responsibility of REDD countries to reduce emissions as their economic circumstances and the global climate regime evolve.

6.3.1 No-lose systems

One option to ensure REDD country participation is to initially develop crediting baselines around a 'no-lose' system, similar to the 'sectoral no-lose targets' proposed by Ward *et al.* (2008) and others. The no-lose assumption is underlying much of the current REDD negotiations (although rarely explicitly stated using that term).

What does ‘no-lose’ mean in practical terms? Obviously, a crediting line set equal to the BAU scenario, and with no liability (‘baseline and credit’) would be ‘loss proof’ for REDD countries. But this is just a sufficient and not a necessary condition. REDD countries may still have net benefits from participating in systems with crediting lines that are tighter than the BAU scenario, as explained in Box 6.1. The reason is as follows: REDD countries have an incentive to reduce deforestation up to the point where the marginal cost of reductions (i.e. the national supply curve of REDD) is equal to the international compensation, for example, the market price for REDD credits.

Box 6.1. ‘No-lose’ crediting baselines



The marginal costs of reducing deforestation and degradation starts at zero in the BAU scenario, and they increase as reductions become more costly (e.g. increasingly profitable agricultural land uses are being excluded). Given an international price for REDD credits, the country will reduce emissions up to the point where the marginal costs equal that price (realised REDD). The total cost of these reductions is equal to the area $A + B$. A crediting baseline is given, and the country receives revenue from selling REDD credits for reductions beyond the crediting baseline, i.e. equal to the area $B + C$. Thus, the country's net gain equals $C - A$. If the crediting baseline is set equal to BAU, the country will gain the area $C + D$, which can be termed the *REDD rent*.

A key question is how large the crediting baseline must be in order for the country to have a positive net gain. If the marginal cost curve is linear, the answer is that the crediting baseline must be more than one half realised REDD. But empirical studies show that the marginal cost curve for REDD is convex, as illustrated in the figure. Thus the crediting baseline can be set further to the right, i.e. it can be less than one half realised REDD, and the country still benefits.

But for the initial and cheapest emission reductions that price is higher than the costs, which generates what may be termed a *REDD rent* (area C + D in the figure). Because of this rent, a country can get a positive net benefit even if some of the initial reductions are not paid for, that is, the crediting line can be tighter than the BAU line. Thus ‘no-lose’ crediting baselines can imply some uncredited emissions reduction.

6.3.2 ‘Common but differentiated responsibilities’

The Bali Action Plan includes the principle of ‘common but differentiated responsibilities’, a long-standing UNFCCC principle also included in some REDD submissions (e.g. Papua New Guinea, August 2008). As noted before, the proposal of a DAF, where crediting baselines are set more favourably for the poorest countries, can be seen as a practical application of this principle to ‘allow for certain amounts of deforestation to occur for the purpose of a country’s socio-economic development’ (Alvarado and Wertz-Kanounnikoff, 2007: 15).

The practical implications of this principle remain to be worked out. One possible inference of this principle is that every country has a responsibility, i.e. should bring some uncredited efforts to the negotiation table, while rich countries should bring more to the table. The exact implications will be the subject of intense late-night negotiations, and are not discussed further.

6.3.3 Further refinements

Given the uncertainty of setting baselines, one practical approach suggested by Schlamadinger *et al.* (2005) is to use a *corridor approach* with an increasing percentage of the reductions being credited. For example, a reduction in deforestation and degradation from 0.8% to 0.7% per year (or the equivalent in GHG emissions) gives carbon credits worth only 20% of the estimated emissions reductions, while reductions from 0.7% to 0.6% give credits equivalent to 40% of the estimated reductions, and so on.

Deforestation and degradation that occurs as a result of natural processes and events, e.g. hurricanes, should also be kept outside the crediting. This would be in line with the definition of deforestation as the direct, human-induced conversion of land from forest to non-forest (UNFCCC Decision 11/CP7). At the same time, an agreement should provide incentives for better managing ‘seminatural’ risks such as fire.

6.4 Assessment based on the 3E criteria

The 3E criteria for assessing various proposals of REDD models include their carbon effectiveness, cost efficiency and equity and co-benefits (see Chapters 2 and 11). The effectiveness and efficiency arguments are mainly the same, thus these are collapsed in Table 6.1.

Table 6.1. Assessment of proposals based on effectiveness/efficiency and equity

	Effectiveness/efficiency	Equity (international distribution)
Historical national deforestation	Low-deforestation (and forest-rich) countries may opt out of an agreement	Poor and forest-rich countries to lose, others to gain
Historical global deforestation	Risk of hot air from low-deforesting countries	High-deforesting countries to lose, low-deforestation countries to gain
National circumstances (country-specific factors)	May improve effectiveness if done well	Depends on which factors are considered
	Risk of lower overall reductions	Some (poor?) countries unable to negotiate favourable baselines
Development adjustment factor (higher crediting lines for poor countries)	More attractive for poor country participation	Benefits poorest countries

The baselines have implications for effectiveness in a number of ways. If they are set too tight, a country may consider the net benefits too small and too uncertain to participate. For example, if countries at the early stages in FT (low deforestation and forest rich) are not given a crediting baseline above historical rates of emission, the incentive to participate will be smaller. More generally, giving out more generous baselines may be needed to buy broader participation, but also increases the risk of giving out ‘tropical hot air’ (below).

Another way in which crediting lines have effectiveness implications is through the impact on the global market of carbon credits (assuming REDD credits are allowed to enter that market). Many environmental nongovernmental organisations (e.g. Leach, 2008) point to the risk of ‘market flooding’ by supposedly cheap REDD credits. This is indeed a possible scenario, but the means for avoiding that are also readily available: (i) reduce supply of REDD credits by tightening baselines; (ii) increase demand by simultaneously introducing REDD credit and imposing tighter global targets for GHG emissions reductions (mainly demand from Annex I countries); and (iii) introduce managed (limited but gradually increasing) fungibility, e.g. a gradually expanding cap on REDD credits put on the market (Chapter 5).

The second option is indeed a major argument for including REDD in a new climate agreement: by introducing a low-cost mitigation option, global targets can become more ambitious.

A related fear is for ‘tropical hot air’, that is, REDD credits that do not reflect any additional efforts being put on the market. One should note that ‘hot air’ is not created by inclusion of low-cost emissions reductions as such, but only to the extent that crediting baselines for emissions are inflated and set above the BAU baselines (no additionality). The risk is real that a large number of criteria for setting baselines (e.g. various national circumstances) may result in such inflated baselines, undermining the effectiveness of the system as well as its long-term credibility.

Similarly, using *global* deforestation rates to set national baselines entails a high risk of creating ‘hot air’ from low-deforesting countries. Many are likely to receive crediting baselines above their emissions in a BAU scenario, while REDD buyers expect to pay for *real* reductions.

The distributional implication of different criteria for setting baselines is large. Simple back-of-the-envelope calculations suggest that the difference for some of the largest tropical forests countries may be several billions of US dollars per year, which is also shown in scenarios for various methods of baseline setting (e.g. Strassburg *et al.* 2008).

Allocating baselines based solely on historical national rates of deforestation may make income-poor and forest-rich countries (at the early stage in FT) lose out. Using global historical rates may make high-deforesting countries (in the intermediate stage in that transition) lose out. Including a DAF would benefit the poorest countries and make the REDD mechanism more pro-poor.

6.5 Conclusion

Baselines are critical elements of a new REDD regime, for both overall effectiveness and international distribution and equity. There are clear conflicts of interest among (groups of) countries, and (partly for that reason) the question is politically sensitive. Almost all submissions use historical deforestation as the point of departure, and most also suggest that ‘national circumstances’ and ‘rewarding early action’ be taken into account. These principles remain to be operationalised. One step forwards in the debate is to better distinguish between the two types of baselines discussed in this chapter: (i) the prediction of deforestation and degradation in a BAU scenario; and (ii) the crediting baseline, which will be based on the BAU plus a set of political considerations, as well as the country’s strength at the negotiation table.

A key dilemma facing negotiators is that generous baselines, based on 'country-by-country' assessments to take national circumstances into account, may create 'hot air', which undermines the environmental integrity (overall reductions in GHG emissions) and the credibility of REDD. On the other hand, tight crediting baselines may make an agreement unacceptable for REDD countries. In short, the balancing act is between the risk of 'tropical hot air' and participation of REDD countries.

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