

Understanding permanence in REDD



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Permanence in REDD

Policy on REDD and REDD+ is developing fast but there are a number of technical issues which still need to be ironed out. One of these issues is *permanence*.

The starting assumption of this Policy Note and for the main discussion it presents about permanence is that REDD and REDD+ will be carried out at national level and cover the whole forest area of participating countries, as was proposed initially by Costa Rica and Papua New Guinea and as envisaged by most Parties. The alternative model, in which REDD is internationally financed on the basis of individual projects, as proposed by a number of international NGOs such as Environmental Defense and The Nature Conservancy, may possibly be used for pilot purposes in the interim, but is unlikely to survive when national REDD programmes get fully operational. This is partly because of issues relating to leakage but mainly because most governments prefer to keep the REDD programme in their own hands rather than allowing projects to be individually funded and from outside, in a CDM type of approach. The project approach to REDD/REDD+ is therefore not discussed in this paper.

1. What is permanence?

The UNFCCC Special Report on LULUCF defines permanence as “the longevity of a carbon pool and the stability of its stocks”. Non-permanence of carbon stocks in forestry terms is usually used to describe a situation in which a forest has sequestered carbon but where that absorption has later been reversed because the forest has been removed again. The fear is that the carbon savings have thus been falsely credited: the carbon saved earlier has been simply released again to the atmosphere while the forest manager has been paid for reducing CO₂ levels in the atmosphere. Permanent reduction would therefore seem to require that the area remains forested or un-degraded permanently, or for the duration of the emission reduction agreement (Parker et al 2009: Dutschke with Angelsen, 2008), or until the peak in atmospheric carbon levels is passed, which is expected to be in 100 to 200 years from now (Dutschke 2005).

Forest carbon is seen as being inherently vulnerable, since trees can easily be cut or burned so that their accumulated carbon is re-released. This is conventionally considered to be different from the case of carbon from fossil fuels. For example, if an old power station is replaced by a modern one which is twice as energy efficient, the same number of kWhs may be produced from half the amount of fuel oil. Every year, a given quantity of fossil fuel is saved, and the related emissions are avoided. These savings are then implicitly considered permanent: as if once saved, they can never be lost again.

Seen from this perspective, it is not surprising that there has been considerable concern in the literature about forest carbon permanence. This concern has been expressed in very many submissions to the UNFCCC on REDD (for example, Australia’s submission (Australia, 2009)). The UNDP Collaborative programme on REDD (FAO/UNDP/UNEP, 2008) makes a special point about permanence as a delivery risk, stating that if there are any doubts about permanence (“lasting emission

reductions”), REDD investors will be hesitant to become involved or may impose conditions such as delayed payments. However, whether there is in fact any difference in permanence between fossil fuel saved and forest saved can be contested, as we show in this Policy Note.

Much of the focus of the discussion about forest carbon has been about ensuring and insuring permanence, which are different concepts, although they are often confused. *Ensuring* permanence relates to creating conditions under which forest remains forest, for example by strict enforcement of forest protection law, or by continued payment of incentives to the local communities to not cut the trees, or by reducing conditions, such as tenure insecurity, that are often related to deforestation, or by carefully constructing the contract to make sure it is in the land owners interest to retain the forest (Palmer, Ohndorf and MacKenzie, 2009). *Insuring* permanence on the other hand relates to making sure that any carbon lost is not credited, or that the credits are replaced by others when any loss occurs. Often this involves consideration of who is liable, morally and financially, for replacing the losses. A variety of interesting instruments have been proposed to deal with insurance and liability, including temporary carbon credits (as used in CDM A/R projects), a ton-year approach, credit buffers and risk pooling as well as various kinds of direct insurance (Dutschke and Angelsen, 2008).

2. The flaw in the argument

Although it is understandable that observers wish to ensure forests remain forests, in fact the thinking behind the idea of the non-permanence of reduced emission is flawed. The muddle results from confusing the idea of carbon stocks with that of carbon flows.

Fossil fuels underground are gradually (or not so gradually) being brought to the surface and burned for energy. Clean energy technology does not stop this process, but slows it down, reducing in any one year the amount of carbon that is pumped into the atmosphere. Credits (e.g. CERs) are issued every year for the savings brought about by the clean technology in that year; we are paying for a reduced flow, not for the state of the stock itself. If the power plant suddenly goes out of business and is replaced by less efficient alternatives, no more CERs are issued, but the owner is not considered to have cheated on the carbon (though his investors may have lost out financially): what has been saved, has been saved. And in the end, we will probably use up all the stores of fossil fuel that can be economically extracted. Through the use of clean technology, we are just extending the end date, which is a benefit for the environment. Estimates for the date at which we will run out of fossil fuels range from 100 to 400 years.

The situation as regards REDD is entirely analogous. There is pressure to cut forests everywhere because of demand for forest products and for land. What we are trying to do with REDD is to slow down this rate. Any year in which we succeed in reducing the average rate of loss compared to the baseline or reference scenario, there

is a gain for the environment, *even if the original rate of loss is later resumed*. There would only be a net loss if the rate of deforestation went on to *exceed and overtake* that of the reference scenario by more than the gains in the year of the savings (see Figure 1, adapted from Myer 2008). Credits for reductions would only be issued for years in which the rate of forest loss is less than that of the reference scenario, i.e. when the slope of the broken line is less steep than the solid line. Hence if credits for reduced deforestation are issued periodically based on ex-post measurements (just like the CERs issued for energy projects), for every period in which a country is able to show that its forest emissions are lower than the reference scenario, there should be no problem of permanence. Eventually however, the sad fact is that we will probably cut down all the forest that it is economic to cut down¹, just as we will one day use up all our accessible fossil fuels.

The concept of crediting reductions in rate of loss of stock, delaying and spreading the emissions out over a longer period, is very clear and logical, although, apart from the excellent exposition by Myer (2008), it has not been widely understood. It was noted in passing by Alvarado and Wertz-Kanounnikoff (2008, p12) who do not elaborate on the consequences. The Little REDD Book (Parker et al. 2009), which is rapidly become the bible of the REDD world, presents various proposals for dealing with non-permanence but does not touch at all upon the question of whether permanence is a real issue for REDD or not. Interestingly however a number of carbon trading support organisations are aware of the situation. The Meridian Institute for example states that reduction of emissions under REDD is fundamentally different from the creation of new stocks of carbon under CDN A/R, and akin to reduction of emissions from power stations (ICF, 2009). The Carbon Markets and Investors Association also suggests that REDD credits are quite different from A/R credits and should be viewed as intrinsically permanent, just like emissions reductions from avoided fossil fuel burning (CMIA, 2009).

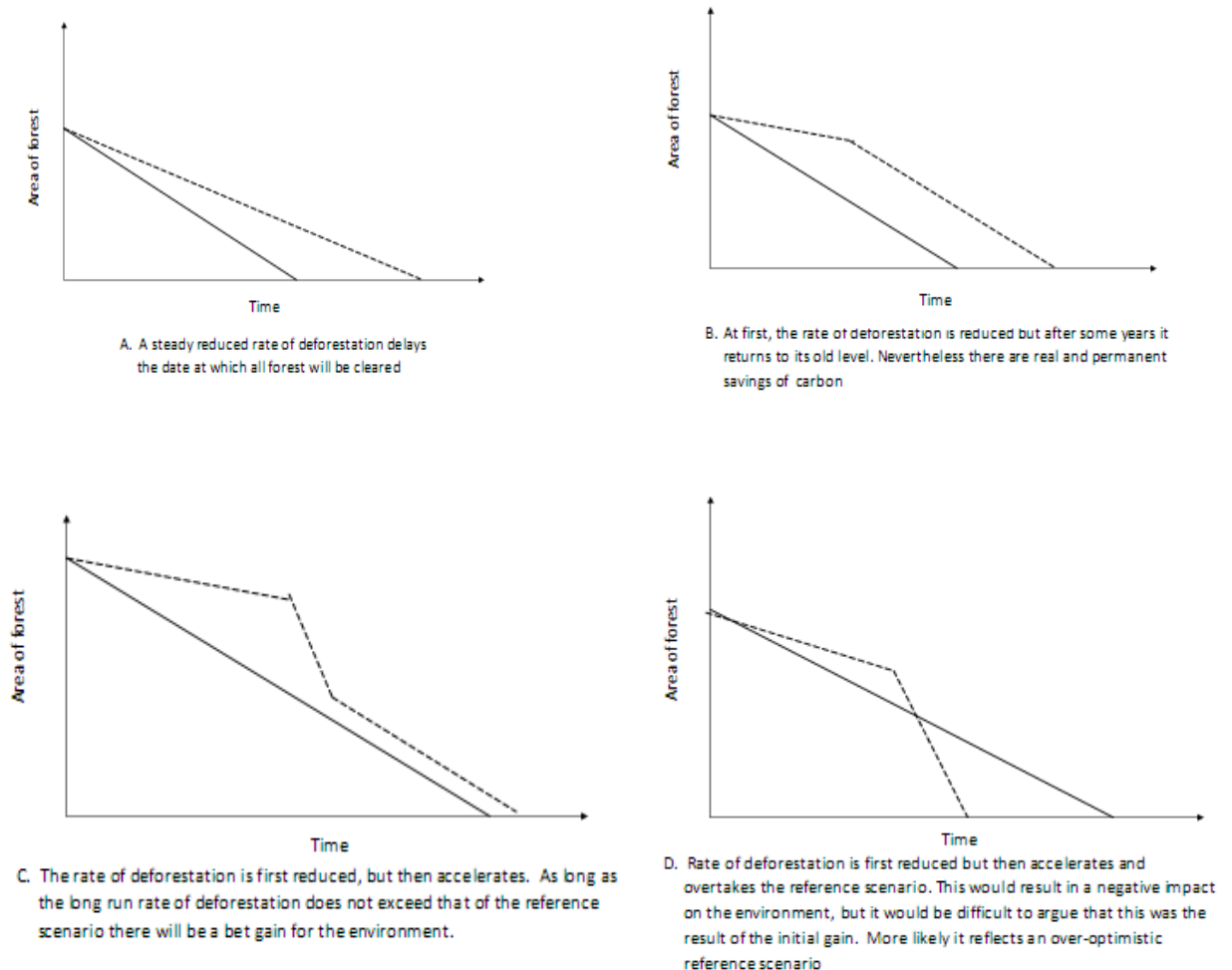
In summary, reduced emissions due to lowered rates of deforestation and forest degradation should be treated as permanent savings, because their long run impact on the atmosphere is the same as that of any fossil fuel savings. Indeed, it could be argued that the main difference between reduced fossil fuel emissions and reduced D&D emissions as regards permanence is that for the former there is (barring carbon capture and storage) no way they can be returned underground, while forest emissions could always, at least in theory, be recovered by the re-establishment of trees somewhere on surface of the planet.

This is not to say that stock itself might not have a value; of course, it does. However, valuing stock is a different issue from valuing rate of change of emissions, and different mechanisms might be required to provide incentives for this (see section 7).

¹ Barring non-market barriers such as strictly enforced forest protection codes.

Figure 1 Hypothetical rates of change of forest area under REDD

The reference scenario is shown as a solid line, the broken line is the trajectory of forest loss in the future. As long as the trajectory does not cross the reference scenario there will be a net environmental gain.

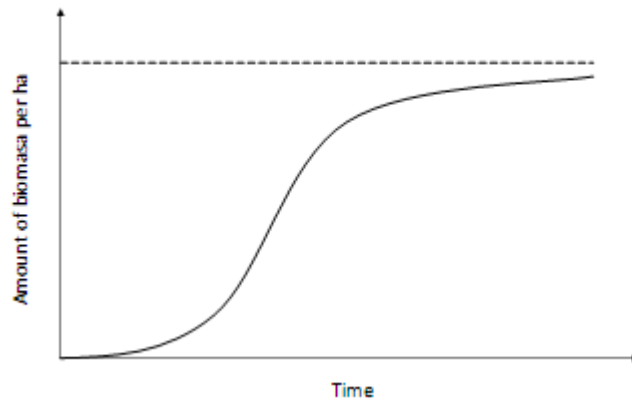


3. Why is permanence in REDD different from permanence in CDM A/R?

The reason why permanence in REDD is different from permanence in CDM A/R projects is because under CDM credits are issued for the changes in carbon stocks (and GHG removals), not for the change in the rate of loss of carbon stocks (and associated GHG emissions). Temporary credits (tCERs or ICERs) are used in CDM A/R projects because in the case of A/R, reversal of the achieved sequestration can take place, in which case the reduction of carbon in the atmosphere is nullified. In an A/R project, a new sink is created which grows and absorbs atmospheric carbon, typically following an S shaped curve over time (Figure 2). At a certain point in time no more carbon will be absorbed, but (at least for the life length of the temporary credit) credits continue to be issued (which will not be the case under REDD+), and at the end of the crediting period the CERs have to be renewed or replaced. If the

trees are cut down at some point, the stock is clearly lost and crediting automatically ceases.

Figure 2 Typical growth function of a forest: an asymptotic curve



4. What happens under REDD+ when forest stocks increase, for example by forest enhancement?

One of the major effects of managing forests which have earlier been degraded is that not only is the degradation process halted, but the forest regenerates itself, increasing the biomass and carbon stock, through what is known as forest enhancement. This has been described in some texts as “negative degradation”, as it tips the rate of change in the change of carbon stocks from a negative (from a high rate of emissions to a lower rate of emissions) to a positive (from net emissions to net removals of carbon from the atmosphere). This additional growth will, under good management, continue until the biological maximum is reached (as in Figure 2)².

However, the additional carbon stock which is created by forest enhancement may of course at some point be removed, just as stock in A/R projects may be cut, and the question then is whether this forest enhancement should be treated in the same way as CDM A/R as regards permanence and crediting, or as reduced D&D.

If forest enhancement is simply considered to be a removal and holding of CO₂ out of the atmosphere, then it would have to be treated as potentially having a limited life time. In the case of an A/R CDM project, this is necessary because the boundary of the project is small, and should that forest be lost, the carbon is lost. Under REDD+ however the ‘project’ boundary is the national boundary, and losses and gains in rates of emissions all over the country are added up and compared against a national

² In fact, if the forest is undisturbed, although the accumulation of additional above ground wood biomass stock slows down over time, carbon stock will continue to increase through deposition of litter and soil formation. See Schulze, Wirth et al., (2000) for example. Moreover Lewis et al. (2009) have shown that the above ground biomass of trees in totally undisturbed tropical rainforest grows at a rate of around 0.5 tons per hectare per year.

baseline. If in one part of the country the emission rate is reduced while in another part it is increased by an equal amount, the overall gain is zero and the country will not receive any credits. Under this calculus, the rate of forest enhancement in one part of the country - growth of forest stock - could simply be considered to be negative degradation and included in the total assessment of rate of change of stock. Unlike for the case of A/R, only the enhancement effect (the annual growth, during the growth period) would be accounted and credited, not the standing stock that is created, as is customary in A/R crediting.

This approach is quite different from allowing CDM A/R projects to be credited with permanent credits rather than temporary credits, because what is being credited is not the stock, as in A/R, but the rate of change in emissions from all forests taken together, compared to a baseline rate of emissions.

5. The key to insuring forest carbon permanence is annual crediting of rate of change

Insuring permanence here refers to making sure that any carbon that is credited under REDD represents a real and improvement as regards carbon in the atmosphere. The permanence issue in REDD and REDD+ will be resolved if what is credited is not the stock itself but the net reduction in the rate of loss of the stock, compared to a baseline or reference scenario, taking into account both reductions in degradation and enhancement of forest stock with improved management. For this, the stock that is being considered needs to be aggregated over a large area (a whole country, or perhaps a whole state or province in a very large country). Essentially it requires a national REDD approach rather than a project-based approach. In any year in which this net rate of change of forest carbon is an improvement over the reference scenario, credits should be paid. In years in which the net rate of change is equal to that of the reference scenario, no credits should be issued.

But what happens if, after a period of reductions, the net rate of loss later becomes greater than that of the reference scenario (as for example shown in D in Figure 1)? It might appear that this is a case of non-permanence, and that credits issued for the reductions in the earlier period would need to be replaced. But even this is not true; at least, it would only be true if the initial reduction in emissions *provoked* the subsequent rebound over and above the reference scenario, for which no rational reason is likely to be found in reality. If the rate of deforestation increases significantly compared to the reference scenario, this can only indicate that the reference scenario was not properly constructed in the first place.

6. The key to ensuring forest carbon permanence is also annual crediting of rate of change

Ensuring permanence here refers to making sure that forest is not lost. In reality, this can never be totally ensured (although of course it can be insured). However there are many measures that can be taken to make the risks lower. Regulations on forest use can be more strictly enforced. Management agreements can be drawn up that enable forest to serve multi-purposes and not just carbon saving, since if it provides other values it is more likely to be useful to people and be preserved. Tenure uncertainty can be sorted out, since lack of clarity of ownership correlates with deforestation. But these measures on their own may not be sufficient.

Although REDD+ will almost certainly be operated as a national programme, in which gains and losses across the country are assessed against a national reference scenario or base line and credits issued to the country as a whole on that basis, within the country it is highly likely that the government will implement different measures in different places (an internal set of projects) to bring about the required reductions in emissions. In particular, the state may have to provide incentives, for example in the form of Payments for Environmental Services (PES), to encourage individual forest owners and managers to manage forest sustainably in areas that are at risk of deforestation or degradation. Many of the REDD Readiness capacity building plans submitted to World Bank's FCPF programme propose just such measures. The modalities of such internal programmes, however, would be arranged entirely by the country itself, and would not be subject to UNFCCC regulation³. Rewards for reduced rates of emissions brought about by the actors concerned could be provided by the government to the social actors in many different forms, and not necessarily on the basis of tons carbon saved; flat rates per hectare are much more common under PES because they are easier to administer.

Incentive payments under PES schemes are usually intended to cover the opportunity costs to communities or individuals of retaining forest. Calculations of the opportunity cost of forest conversion (Stern, 2006 Greig Gran, 2006, Chomitz, 2006) have given figures which not surprisingly spread over a large range, depending on what the alternative land use is. These opportunity costs are usually calculated by discounting the future stream of benefits of agricultural production over 30 years. The implication is that this sum of money could be made over to the landowner today, compensating him for his future losses in not cutting the forest. Operationalising such a deal would however be very difficult; the contract will be impossible to enforce, or rather, the transaction costs of enforcement will be enormous.

Clearly, annual payments would offer ongoing incentives to the communities or individuals, provided the size of the payment is sufficient to counterbalance the annual opportunity cost of retaining the forest. From the point of view of the national government managing the incentive programme, costs would be spread out over many years, and could be met from the revenues gained by selling the credits for reduced forest emissions on the international market or to a global forest carbon fund. In the long run, and over the whole country, there would have to be some kind of balance between the cost to the government of paying the incentives to the social actors, and the income it could gain from the credits, but there would not have to be a one-on-one relationship in this regard, as long as the annual payments made to the forest users assist in ensuring that the forest remains forest.

³ UNFCCC is likely only to require very broad criteria in this regard, such as a guarantee to protect the rights of forest dwelling people, etc.

7. Permanence and the crediting of forest conservation

REDD+ explicitly includes forest conservation. While reduced D&D can be measured in tons per year against a reference scenario at national level, forest conservation by its nature implies stasis (the stock levels remain the same from year to year). With forest conservation, as with CDM A/R, it is the retention of the absolute stock that is to be credited, not change in rate of emissions, and therefore the question of permanence does arise. It is quite possible therefore that crediting of forest conservation, unlike that of reduced D&D, would require some type of temporary crediting or cover for liability in case of loss.

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