Selling carbon from tropical forests and peatlands

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Summary

Official and voluntary carbon trade schemes preventing carbon loss from deforestation and land degradation can function much better within a context of sustainable land use. It is suggested here that a framework for sustainable land use can help to decrease problems related to 'leakage' and 'additionality' in carbon schemes. Such a frame is a tool to link carbon schemes to rural development and protection of biodiversity of global importance and increase the performance of carbon schemes. In the paper special reference is made to carbon trade options for peatlands in Central Kalimantan, Indonesia.

Key index words: sustainable land use, carbon trade, leakage, additionality, tropical forest, peatland

Introduction

As with any commodity the price setting for carbon requires a demand, which reflects the scarcity of the commodity. There is no doubt that the Kyoto protocol and the recent attention to climate change played an important role in creating a sense of urgency. This has also been key to the development of voluntary trade schemes. But whether or not in the near future carbon credits from forests areas and peatlands can be traded at any significant level in the world has yet to be seen. Options to trade in carbon sequestration in forests under the Clean Development Mechanism (CDM) have not been an unequivocal success.

Under the Kyoto agreed CDM mechanism, payments are already eligible for sequestration of carbon through reforestation projects but so far it has proved difficult to arrive at viable projects. Transactions costs are high and the procedure complicated.

Also, the newly created 'Reduced Emissions from Deforestation and Forest Degradation' (REDD, UNFCCC, Decision-/CP.13) that provides a possibility to reduce carbon emission via avoided deforestation, may suffer from issues such as 'leakage' and 'additionality'. So even if trade becomes possible following the REDD or any other mechanism and, even when below ground carbon stocks from peat are included in the equation, several questions remain: what are the risks involved, what prices can be made, and will these prices cover costs in regions where mining activities offer high one-off profits with a barely manageable resource afterwards?

In this paper we suggest that solutions can be found by embedding the carbon agenda in sustainable rural development.

Payments for carbon credits

Payments for carbon credits to landowners will be based on a historic benchmark of the deforestation rate in comparison to the rates to be achieved during project implementation. It will be upon the National Governments to decide how individual projects contribute to the decrease of deforestation, and which part of the national carbon budget will be allocated to the project. In most cases payments are provided upon delivery in the future, leaving the landowner with all risks related to performance.

To assess the actual carbon stock in forest projects is relatively easy. Models such as CO_2FIX model are already available for forests. Monitoring and evaluation of changes in below ground stocks is more difficult. For peatland procedures are currently being worked out under the EU CARBOPEAT project (Wösten, 2008).

The main focus in this paper is on the risks of delivery of the carbon credits and income within a context of sustainable land use. In all cases, the risks involved relate to the natural dynamics of forests (fires, pests etc.) and to the risks related to human systems (fires, illegal logging, legal status, etc.). The first set of risks is fairly predictable, but the risks related to human systems are more difficult to assess.

With regards to the chances of success for projects with the aim to sequestrate carbon we will follow the reasoning presented by Bos *et al.* (2006), which states that sustainable land use options must be defined taking on board criteria for profitability, environmental gain and social acceptance. So, in order to succeed projects it is postulated that carbon projects not only provide environmental gains, but also provide economic and social benefits to local stakeholders. A tentative indication of the revenues will be given.

Three issues

In any scheme rules are needed. The most obvious is that those who sell the carbon are indeed the owner and eligible to sell the commodity. Furthermore, any added value to the commodity should be reflected in the price. Added value can originate from changes in the land use plan (Government) and changes in the behaviour of the local community (stop illegal logging or slash and burn). The

rules of the trading scheme should take into account issues such as leakage and additionality. Finally, in order to be successful, the system should generate enough revenues for a sound business case.

Leakage: theory and reality

Leakage refers to negative effects outside the carbon trade project. In the trading scheme carbon credits should only be generated in projects that provide additional emission reductions compared to a business as usual scenario. There is an ongoing debate on the issues of leakage and additionality. Leakage in REDD is thought to be prevented by a country base 'wall to wall' approach in which a country wide land cover data set will be used to monitor increase or decrease of deforestation. The reallocation of the national carbon budget to the project level will be based on the overall decrease in deforestation. This approach, although simple in theory, will demand significant efforts. At this stage it doesn't seem realistic to expect developing countries to provide reliable data sets at this scale. Whether or not the costs related to such a monitoring system in terms of human resources and budget will live up to the benefits is questionable. Furthermore, it is unlikely that, in developing countries, budgets like these can be made available with higher priority than, for example, budgets for basic education, poverty alleviation, health care and infrastructure development.

In a 'wall to wall' approach risks for buyers of carbon credits indeed decrease, as well as the options for free riders. To overcome problems with an ambitious wall to wall approach an alternative is to take off with a number of projects on an individual basis. From the initial experiences a learning process will allow to decrease costs in future and provide better chances for a wall to wall approach. From a sustainable land use perspective the latter approach is much more credible, because it allows time to sort out complicated social, legal aspects and develop economic perspectives (price setting).

Additionality: credits overlapping with or incentive for forest conservation?

The 'additionality' principle requires that the carbon offset, in comparison to a 'no project situation', adds to the decrease of carbon dioxide content in the atmosphere. This ignores, apart from carbon emission, all other problems related to deforestation and land degradation. These other problems, for example, illegal logging and lack of sustainable income from forestry can only be dealt with in a framework of sustainable land use.

A sustainable land use framework should also include indicators, providing standards of social and economic performance, which should be in place in order to get results (Bos *et al.,* 2007; Box 1).

Also, with respect to tropical forests, social and economic perspectives have to be taken into account, in particular, with respect to the relevance of the additionality principle. It is especially relevant for tropical forests, where revenues from sustainable forestry are low or even negative. It is acknowledged that in the first coupe one-off profits can be made. In other words mining is profitable, but sustainable forest management hardly is. With rotation periods of over 30 years cost/benefit ratios cannot be expected to be satisfactory (Diemont *et al.,* 2001). Alternatives such as palm oil plantations, however, provide a net annual income of 500 - 1000 US$ per hectare and with these economically attractive opportunities one cannot expect that a legal status is sufficient to prevent deforestation. In other words, the legal protection status linked to the additionality principle should not prevent a forest owner from receiving carbon payments from a sustainable land use perspective. Carbon credits could create an incentive for forest protection. The real problem is whether or not carbon payments are sufficiently competitive to prevent deforestation.

Furthermore, poverty contributes to deforestation and that is why illegal practices cannot be stopped merely by legislation. It is estimated that 100 millions of people depend upon tropical forest resources for their livelihood, whereas income generated by forest resources can provide a livelihood for a few million people only. Poor people have no other choice than to overexploit the forest resource, including peat resources (Silvius *et al.,* 2003). The Millennium Development Goals stress the need to decouple this negative link between poverty and environmental degradation, including deforestation and degradation of tropical peatlands. Approaches to develop the sustainability paradigm into an operational tool for sustainable land use and supply chains of forest and agricultural commodities production are becoming available gradually (e.g. Bos *et al.,* 2007, Cramer *et al.,* 2007).

Box 1

Institutions matter and legislation should reflect cultural backgrounds and economic perspectives everywhere in the world. In Europe, many of the land resources were not privately owned but commonly used lands. The presence of these common lands was in the view of legislators a situation which should be changed as it prevented an increase of agricultural productivity of the land. The idea was that private landownership could also contribute much more to economic growth. The resistance of small farmers was disregarded because they were considered ignorant and even thought actively to oppose economic growth! This view categorically discredited common landownership. What were the facts? In places like Normandy in France and also in the Netherlands, common land was already privatized without legislation as early as the 13th century. For the simple reason that private capital was looking for opportunities and improvement of land (in particular drainage) was a good investment. In the UK, legal privatization and enclosure of the land was also in many cases a success. But sometimes agricultural productivity of the land was not really an option. For instance, in France and the Netherlands, large areas of common land were too marginal to improve and legislation introduced did not improve the land for nearly one hundred years. (Hoffman, 1996). So, also in history long before the paradigm of sustainability, examples are available, which support the view that there is a need to balance spatial legislation with economic and social realities.

Costs and potential revenues: a business case for poverty alleviation?

The question is: what are the costs and revenues of carbon schemes? Or, in fact, what is the impact on income upon delivery of carbon rights for landowners, local people and (regional) government?

The situation in Indonesia is that there are approximately 20 million hectares of more or less marginal degraded (alang-alang) land, which could be used for cash crops such as oil palm. Potentially, these resources are sufficient to cover demands for a few decades. At present, we estimate that the land price is in the region of 1000$US per ha, reflecting an annual rent of about 50$US per ha (discount rate 5%). Taking into account that there are alternative options for cash crops outside of forest areas, income generated from a carbon scheme may be an attractive proposition for a nation or region, providing additional national income. It is also clear that there is interest from government, for instance, in Indonesia, depending on the price (Box 2).

But is it attractive for the business? The one-off profit of mining the forest is estimated at 5000 $US/ha which is equivalent to an annual rent of 250 US$/ha (discount rate 5 percent). In order to keep the forest industry from actually mining the forest, the alternative should at least be as profitable. Another issue is that once cleared, the former forest area can be used for cash crops (e.g. by the palm oil industry) practically free of charge. The alternative of buying out local stakeholders, or to rent land from them, costs about 50 US$/ha per year. When, and this is often the case, mining the forest and the reasonably profitable follow up as a plantation are in one hand, we need at least 300 US$ to relocate effectively these businesses elsewhere outside of forest land. The 50 $US/ha/year payments to (poor) local stakeholders who depend on 'degraded forest' resources (Silvius *et al.,* 2003) can be seen as their opportunity costs. If paying them off leads to subsequent unemployment, alternative sources of income have to be developed (www.biorights.org).

Experience with forestry or land degradation projects with potentially high risks compared to industrial projects is limited. Problems such as conflicting laws, lack of legal procedures, land owner rights, poverty levels and high opportunity costs obstruct the take-off of land use projects and these issues are probably not fully addressed in a calculation of opportunity costs.

What can be the additional income generated for governments with tropical rain forest for instance? Assuming 200 million ha of tropical forest and depending on poverty levels and population density a mean price of 20 dollar ha^{-1} (1-40 $ ha^{-1}) rents to be paid to forest owners must amount to about 4 billion $US per annum. Through mechanisms such as those proposed by Global Eco Rescue it may indeed be possible to generate a business case (Box 2)

Box 2

What can be the income generated from carbon in tropical forests? Taking into account 200 million ha of tropical forest, a deforestation rate of 2.5 percent and 100 ton carbon ha^{-1} a decrease in emission of 1.5 billion ton CO_2 can be achieved. With a price starting at 3 dollar per ton CO_2 this would generate annually 4.5 billion dollar equivalent to an income of 15-20 dollar per ha. (Annual rents requested in Cameroon and Indonesia are between 1 and 20 $/ha.). Additional mechanisms, such as proposed Global Eco Rescue, ploughing back 65 percent of any future revenue, may generate much more regional income and under this optimistic scenario carbon trading may become a business in developing countries.

The case for restoring tropical peatlands: conservation and production

With respect to degraded peatland the income generated via carbon credits could be substantial and even compete with income generated by cash crops such as oil palm. For example, raising the water table in the over drained peatland in the Ex Mega Rice Project (EMRP) from a depth of 1 metre to 50 cm below ground level, annual carbon emission can be decreased by 75 ton CO_2 ha^{-1} (Wösten, 2008), which may deliver a gross annual income of a few hundred dollars per hectare. This income may increase up to more than 1000 $ ha^{-1} taking in account the decrease of fire risk.

In peatlands where it is not possible to raise the water table, such as rapidly degrading peatland, it could be wiser to use the land for oil palm or pulp wood plantations. These land uses can make a considerable contribution to decreasing carbon emissions. Fire prevention in these systems is more effective than in the common lands and drainage can be controlled to provide the requirements of the crops some of whose products can be used as a substitute for fossil fuel.

In this respect, it is not wise to make categorical statements on, for instance, the cultivation of oil palm on peatland (Cramer criteria, 2007 and Silvius *et al.*, 2006), suggesting that by definition no palm oil for bioenergy should be derived from feedstock planted on peatland.

Discussion and conclusions

There is a huge interest in the world to act with respect to climate change by reducing greenhouse gas emissions. Options which contribute are a decrease in fossil energy use and prevention of deforestation and land degradation. In this paper we discussed the need for carbon credit schemes to adapt a sustainable land use frame, taking into account the costs and revenues involved for various stakeholders. It is hoped that the solutions suggested will help to construct a roadmap for preventing carbon emission from deforestation, which simultaneously must provide options for economic growth and sustainable regional development in tropical forest areas. Summing up the conclusions and points for discussion:

1) Credits for reduced emission should include social, economic and environmental benefits.
2) Leakage prevention can be done technically, but costs and human resources might be a stumbling block in developing countries. Discussion: should this become

an input for the knowledge transfer discussion under the Climate Change negotiations.

3) We argue that REDD options (or similar) could provide an economic incentive for sustainable forest management and should not be skipped/killed before they have really started because of assumed constraints from the additionality principle
4) Revenue from REDD, including carbon in peat, seems to lead to a sound business case, whereas in forest mechanisms such as developed by Global Eco Rescue ploughing back part of the future income may open new windows.
5) Don't forget cash crops as tools for preventing emissions from degenerated peatlands.

Acknowledgements

The discussions with John Embiricos and Tom Houston (Global Eco Rescue) and suggestions from Gert-Jan Nabuurs (Alterra) are appreciated.

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