

**Making Forests Competitive**  
*Exploring insurance solutions for permanence*

**Concept paper**

*by the*

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&  
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## Contents

I. Introduction.....	3
II. What is non-permanence? .....	3
III. Consequences of non-permanence and temporary credits.....	4
IV. Post-2012 solutions to address non-permanence.....	5
V. The potential of insurance-based solutions.....	6
VI. The state of play on forestry and insurance .....	9
VII. Possible content of the UNEP FI side event in Poznan.....	12

## I. Introduction

Carbon markets have so far been a successful economic tool in the fight against climate change. However, carbon markets have largely failed to tackle emissions from the forestry sector. Due to a series of issues that are peculiar to terrestrial carbon sinks, the inclusion of forestry in international (UNFCCC, Kyoto Protocol, subsequent Accords and Modalities) and national mechanisms (EU Emission Trading Scheme) remains patchy and complex. These concerns revolve around the issues of *permanence*, additionality, leakage, measuring and monitoring, and risks of project-based changes in carbon stocks or greenhouse gas (GHG) emissions.

Considering that 15-20% of total anthropogenic emissions are from the forestry sector, approaches to avoid dangerous climate change will be virtually impossible without an efficient mechanism to contain and reduce forest emissions. Notwithstanding an imminent decision on a REDD (Reducing Emissions from Deforestation and Degradation) mechanism, the *full integration* of forests into the international carbon markets will likely and increasingly become a pressing issue. The full integration of forests – whether in the context of LULUCF (Land Use, Land-Use Change and Forestry) activities under the CDM (Clean Development Mechanism) or REDD – will specifically require an approach that addresses the issue of non-permanence in an environmentally credible *and* financially practical manner.

The first section of this paper provides an explanation of the concept of *non-permanence* and how it has been dealt with under current CDM modalities. It identifies their weaknesses and explores possible solutions going forward – notably the potential for insurance-based solutions. In the second section, the state of play on forestry-related products and activities by the private insurance sector is captured by a sample survey involving the 18 member companies of the UNEP FI Insurance Working Group. The paper concludes with a set of key, open-ended questions that need to be addressed with clarity and certainty if insurance is to be considered a viable alternative for forest carbon. It is proposed that these questions be addressed at the UNEP FI side event at the 14<sup>th</sup> Conference of the Parties (COP) in Poznan this December.

## II. What is non-permanence?

Non-permanence refers to the reversibility of carbon sequestration by the biosphere. Among all climate change mitigation activities, only those related to forestry, land-use, and land-use change entail the sequestration of carbon from the atmosphere into so-called ‘GHG sinks’. Unlike the reduction or avoidance of GHG emissions (per all other types of climate change mitigation activities), GHG sequestration into biomass is not permanent since, sooner or later, the sequestered carbon will be re-released into the atmosphere. In the case of forestry, this can result due to fires, natural hazards, pests, land-use decisions, and other events.

For countries with emission limitation commitments (countries included in Annex 1 of the UNFCCC), the Kyoto Protocol accounts for the non-permanence of carbon stocks through the annual reporting of GHG inventories, which ensure that all emissions – including those resulting from the reversal of carbon sequestration – are accounted for in the balance of GHG emissions and removals.

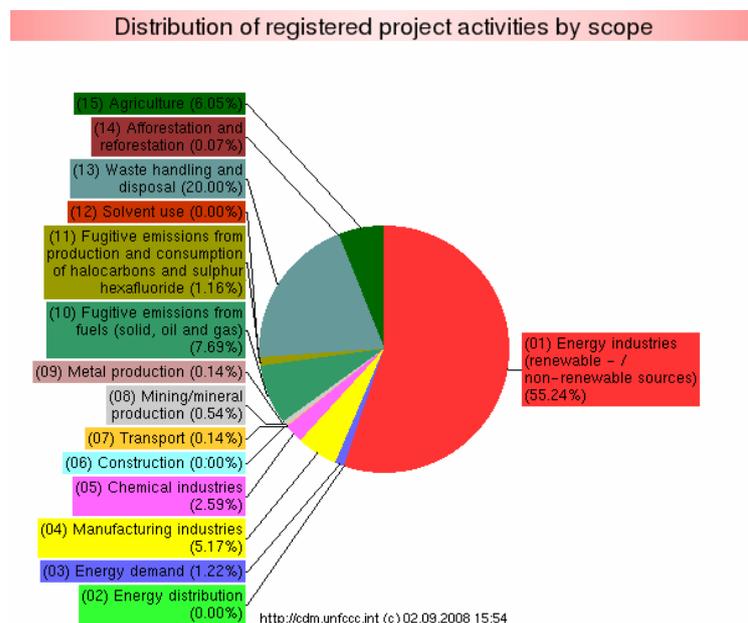
Non-permanence is therefore not an issue in the context of the Joint Implementation or the domestic mitigation activities of Annex 1 countries, but in CDM projects that take place in countries that do not have emission limitation commitments. These countries are consequently not required to account for any re-emission of carbon to the atmosphere even if, as the rules permit, a preceding increase in local carbon stocks had been used by an Annex 1 country to meet its mitigation commitments.

Currently, forestry projects under the CDM are limited to reforestation and afforestation. REDD concepts, excluded from the CDM but now being discussed as an element of the Bali Roadmap, focus primarily on geographic locations with the highest deforestation rates and highest carbon stocks per land unit of forest, namely, the tropics and sub-tropics. This means that if a REDD mechanism is put into place as part of a post-2012 agreement, it will likely focus on countries without binding GHG reduction and limitation commitments. Thus, the issue of non-permanence is bound to be as significant in a REDD context as it is in the debate on LULUCF activities under the present CDM.

Under current CDM modalities, certified emissions reductions (CERs) generated through forestry-based activities are *temporary* and must be replaced by Annex 1 countries using them (either upon termination of the project activity or upon rerelease of the captured carbon into the atmosphere) with carbon credits equivalent to the amount of carbon stocks reversed. Alternatively, Annex 1 countries can use temporary credits with a standardised validity of five years, where such credits have to be replaced in the succeeding period, regardless of what happens to the underlying project in the meantime.

### III. Consequences of non-permanence and temporary credits

Despite the large potential of forestry-related activities as a cost-effective way to mitigate climate change and unleash other developmental and environmental benefits (which are key criteria for CDM eligibility), the role of reforestation and afforestation under the CDM has remained insignificant, as the following chart and table depict:



HFCs, PFCs & N2O reduction	95	2%	132484	24%	768556	28%	143730	74%
Renewables	2465	62%	195768	36%	928317	33%	25372	13%
CH4 reduction & Cement & Coal mine/bed	641	16%	98787	18%	538678	19%	15132	7,8%
Supply-side EE	412	10%	65691	12%	297873	11%	8439	4,3%
Fuel switch	132	3,3%	43897	8,04%	207202	7,4%	1261	0,6%
Demand-side EE	188	4,7%	6940	1,27%	34926	1,3%	616	0,3%
Afforestation & Reforestation	27	0,7%	1780	0,3%	13646	0,5%	0	0,0%
Transport	7	0,2%	711	0,1%	3938	0,1%	129	0,1%

Of all CDM projects sent for validation, only 27 are afforestation and reforestation projects, a mere 0.7% of the total. As of 1 October 2008, not a single CER had been issued for a forestry activity. The failure of forestry-related projects under the CDM is underscored by the following reasons:

- The poor reputation of forestry projects in the light of the non-permanence issue and the fact that expiring credits entail liability risks which need to be managed:

*‘LULUCF projects cannot physically deliver permanent emissions reductions. Applying these in a company-based trading system would impose great liability risks on Member States and is contrary to the intentions of the EU ETS to steer the EU towards a low-carbon economy’ (European Commission)*

- Consequently, CERs from forestry projects are excluded from the EU ETS, the biggest private compliance market in place, and the biggest destination market for CERs. This scenario is likely to remain unchanged in the post-2012 EU ETS phases.
- The temporary character of forestry CERs coupled with the inaccessibility to the biggest carbon market in the world result in a situation of weak demand and low prices which make forestry projects under the CDM unattractive. In 2007, forward forestry credits were traded at around 2-3€/tCO<sub>2</sub>e, which is 65-80% less than other CERs. It is clear why:

*‘For an investor, the effect of buying expiring credits is equivalent to postponing compliance with reduction obligations to a future commitment period. Effectively, the use of tCERs<sup>1</sup> in a given commitment period increases the buyer’s carbon-credit requirements for the subsequent commitment period when the tCERs expire and have to be replaced.’<sup>2</sup>*

*‘Those who buy temporary credits are thus betting that credit prices will fall in the future: their anticipation is that waiting today and buying a permanent credit tomorrow is cheaper than buying a permanent credit today. So far, such buyers have been very few: indeed, most market actors expect carbon prices to rise in the future.’*

#### **IV. Post-2012 solutions to address non-permanence**

The fundamental question is: how can the environmental credibility and long-term reliability of forestry projects under the CDM or an eventual market-based REDD regime be

<sup>1</sup> Temporary CERs is abbreviated as ‘tCERs’.

<sup>2</sup> Source:

<http://www.proyectoforma.com/Documentos/GuidebooktoMarketsandCommercializationofCDMforestryProjects.pdf>

safeguarded, and forestry credits be made more competitive and attractive from an investor's perspective?

An often-cited alternative, particularly by carbon market practitioners<sup>3</sup>, to the concept of temporary credits is the deployment of insurance (and other financial risk management instruments) to guarantee the permanence of carbon sequestered by, in essence, non-permanent forests.

Innovative approaches explored by the voluntary markets can serve as an example. Many voluntary certification schemes (VCS) such as the Voluntary Carbon Standard, Carbon Fix, or Greenhouse Friendly have developed approaches based on credit buffers and pools in order to produce *permanent*, thereby *competitive*, forestry credits. The Voluntary Carbon Standard withholds part of the emissions reductions from each forestry project so that the rest can be sold as permanent credits. Should a project collapse (its emission reductions therefore only being temporary) a corresponding amount of credits would be debited from the pool to replace those of the deficient project.

*'The VCS approach for addressing non-permanence is to require that projects maintain adequate buffer reserves of non-tradable carbon credits to cover unforeseen losses in carbon stocks. The buffer credits from all projects are held in a single pooled VCS buffer account. The number of buffer credits that a given project must deposit into the pooled VCS buffer account is based on an assessment of the project's potential for future carbon loss.'*<sup>4</sup>

The advantage of this buffer approach over temporary crediting lies in its simplicity and the fact that it allows VCS projects to produce permanent voluntary carbon units (VCUs) that are fully fungible regardless of the type of project that generates them.

## V. The potential of insurance-based solutions

From a risk perspective, carbon credit buffers and pools are similar to insurance: the credits can be loosely viewed as the conventional risk premium; the pooling of risks and the corresponding premiums generated is fundamental in insurance schemes to mitigate risk by smoothing out variations in claims.

The basic disadvantage of the buffer approach is that despite serving its purpose, it does so at a considerable 'opportunity cost' – forested land that could be monetised is unutilised. A more cost-efficient form of insurance could therefore enhance investment prospects. This situation creates an ideal opportunity to apply both time-tested and innovative insurance solutions to forests.<sup>5</sup> A fundamental question is if the risk of non-permanence is insurable or not. The theory of insurability states that the following conditions must be fulfilled<sup>6</sup>:

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<sup>3</sup> Presentation by Jan Fehse, Principal Consultant, EcoSecurities Global Consulting Services at the ICF Conference in Edinburgh, 23 April 2008:

<http://www.charteredforesters.org/upload/file/Fehse%20-%20Forestry%20in%20International%20Carbon%20Markets.pdf>

<sup>4</sup> VCS guidance document for Agriculture, Forestry and Other Land Use Projects:

<http://www.v-c-s.org/docs/AFOLU%20Guidance%20Document.pdf>

<sup>5</sup> [http://www.cincs.com/sitebuildercontent/sitebuilderfiles/cincs\\_forest\\_for\\_the\\_trees\\_2008.pdf](http://www.cincs.com/sitebuildercontent/sitebuilderfiles/cincs_forest_for_the_trees_2008.pdf)

<sup>6</sup> Source: <http://opus.zbw-kiel.de/volltexte/2003/1145/pdf/235.pdf>

- Risk pooling – the existence of many independent and identically distributed exposure units. Losses occur with a high degree of randomness;
- The maximum possible loss is very limited;
- The average loss amount upon loss occurrence is small;
- The average time interval between loss occurrences is short, losses occur frequently;
- The insurance premium willing to be paid for the coverage is high enough;
- There is a low possibility of moral hazard;
- Coverage of the risk is consistent with public policy; and
- The law permits the coverage.

Given that conventional forestry insurance products are already in place, it appears that insuring the ‘permanence of timber’ over a limited period of time should fulfil the above criteria. The question therefore is whether insuring the ‘permanence of carbon’ could fulfil these as well. The following table<sup>7</sup> seeks to provide answers:

<b>Criterion</b>	<b>Practicability issues</b>	<b>CERs insurable?</b>
Risk pooling – the existence of many independent and identically distributed exposure units.	<p>As stated above, under the CDM, only a few forestry projects have been planned or implemented. The underlying reason is partly explained by the temporary nature of credits and the resulting unattractiveness of forestry projects.</p> <p>The argument of this paper is that if a post-2012 regime would allow the issuance of fungible credits based on having the permanence of carbon stocks insured, the number of forestry projects would increase given their enhanced financial attractiveness.</p> <p>This ‘chicken or egg’ dilemma could be resolved by a two-tier project certification process where, by default, forestry CERs would remain temporary unless project participants</p>	Not clear, but in principle yes.

<sup>7</sup> Elaborated on the basis of: <http://opus.zbw-kiel.de/volltexte/2003/1145/pdf/235.pdf>

	secured adequate insurance coverage.	
Losses occur with a high degree of randomness	Comparable to standard timber insurance.	Yes, in principle.
The maximum possible loss is very limited	The maximum possible loss is limited to the amount of carbon removed.	Yes.
The average loss amount upon loss occurrence is small	Comparable to standard timber insurance.	Yes.
The insurance premium willing to be paid for the coverage is high enough	Depends on who would pay the premium.	Yes, if the investor pays.
There is a low possibility of moral hazard.	Similar to standard timber insurance.	Yes.
Coverage of the risk is consistent with public policy.	Similar to standard timber insurance.  'Many developing countries, particularly LDCs [least developed countries], may not have the public policy infrastructure to support such specialized insurance policies. Existing public policy structures also may not encourage the reduction of risks and losses. Hence, insurance companies, being risk-averse are not likely to want to underwrite policies for projects in such situations.'	Only in moderate to low-risk countries.
The law permits the coverage.	Similar to standard timber insurance	Yes

Insurance schemes have the potential to become environmentally credible and financially attractive alternatives to the concepts of temporary credits and credit buffers, particularly since the financial attractiveness arising from the permanence and fungibility of credits is often put forward by carbon market practitioners and project developers.<sup>8</sup>

<sup>8</sup> « Trading Carbon », Vol 02 / Issue 05 / June 2008, p. 16

This thinking appears to be supported by research commissioned by the US Environmental Protection Agency (Subak, 2003)<sup>9</sup>.

The research involved revenue comparisons of different approaches (i.e. temporary credits, carbon buffers, and insurance) by calculating the net present value of the carbon credits generated by a hypothetical forestry project under the following assumptions:

- Buffer – land reserve: initially 35% of total project area removed at 0.7% annually
- Project crediting period: 50 years
- Expiry period: 5 years
- Insurance premium: 0.7% of cumulative carbon value
- Discount rate: 8%
- Annual carbon uptake: 3t per hectare
- Carbon price: USD 30 / t

These assumptions yielded the following results:

<b>Net present value (in USD)</b>	<b>After 10 years</b>	<b>After 25 years</b>	<b>After 50 years</b>
Temporary credits	271	722	1100
Buffers through land reserves	413	687	811
<b>Insurance</b>	<b>583</b>	<b>899</b>	<b>1100</b>

*The financial advantage of the insurance approach compared with temporary credits and credit buffers is illustrated by the research results displayed in the table above.*

## **VI. The state of play on forestry and insurance**

In order to have a better understanding of the viability of insurance-based solutions, a sample survey involving member companies of the UNEP FI Insurance Working Group,<sup>10</sup> comprising 18 leading international (re)insurance groups headquartered in 14 countries, was conducted for this paper. The responses are not necessarily limited to the country the parent company is domiciled (e.g. a few subsidiaries in other countries responded). The survey focussed on the forest insurance products being offered, and does not encompass internal mitigation efforts involving forests (e.g. carbon offsets via reforestation projects), where a good number of the respondents are involved.

<sup>9</sup> Source: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6W88-48S4GGH-1&\\_user=5836698&\\_rdoc=1&\\_fmt=&\\_orig=search&\\_sort=d&\\_view=c&\\_version=1&\\_urlVersion=0&\\_userid=5836698&\\_md5=de35f31ba51d601007e9e6ba35079288](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6W88-48S4GGH-1&_user=5836698&_rdoc=1&_fmt=&_orig=search&_sort=d&_view=c&_version=1&_urlVersion=0&_userid=5836698&_md5=de35f31ba51d601007e9e6ba35079288)

<sup>10</sup> The UNEP FI Insurance Working Group comprises Achmea (Netherlands), AIG (United States), Allianz (Germany), AXA (France), Folksam (Sweden), HSBC Insurance Brokers (United Kingdom), Insurance Australia Group (Australia), Interamerican Hellenic Life (Greece), Lloyd's (UK), MAPFRE (Spain), Munich Re (Germany), Norwich Union (United Kingdom), RSA (United Kingdom), Storebrand (Norway), Swiss Re (Switzerland), The Co-operators Group (Canada), Tokio Marine & Nichido Fire Insurance (Japan), and XL Capital (Bermuda).

## Survey questions

1. Is your company providing forest insurance products?
2. If yes, what types of forest insurance products are you offering, and to which countries are you offering them? How has the uptake of these products been? Have the underwriting results been favourable?
3. If you are not offering forest insurance products, what are your reasons?
4. Are you considering offering forest insurance products? If yes, what is your timetable and to which countries do you intend to offer them?
5. What is your company's thinking on alternative risk transfer and financing solutions for forests (index-based insurance, catastrophe bonds, etc.)? Have you considered such solutions? Do you think these are viable? What does your company think to be the most critical barriers to forest insurance becoming a major line of business/market? How can these barriers be overcome? Please answer these questions from three angles:
  - Insurance perspective (risk management, underwriting, claims management, etc.)
  - Investment perspective (insurers as institutional investors)
  - Policy and regulatory perspective

## Overall results and key findings

1. Seven of the 18 (re)insurance groups (40%) surveyed provide forest insurance in varying degrees (e.g. differing scopes of coverage in terms of perils insured against, as well as their geographic reach).
2. Fire is the insured peril common across all providers of forest insurance. Depending on the geographic location, the cover can include other perils such as windstorm, heavy snowfall, hail, pests, and/or earthquake.
3. While there were no comprehensive country lists provided and taking into account the country bias of the survey itself (limited to members of the UNEP FI Insurance Working Group headquartered in developed countries), based on examples of locations where forest insurance is provided, it can be inferred that most forestry insurance products are offered in mature markets (e.g. Australia, Belgium, Japan, France, Germany, the Netherlands, Norway, Spain). However, it also indicates that the geographic spread is expanding to emerging markets (e.g. Brazil, Chile, Mexico and Russia).
4. Most providers of forest insurance focus on private, commercial and industrial forest plantations, not public and natural forests. The primary reason is the more sophisticated risk management systems (e.g. watchtowers and firebreaks, fire-fighting personnel, equipment and procedures) in place for privately-owned forests, where there is a clear financial interest from the owners.
5. Meanwhile, a few are either in the process of (or at least open to) tailoring existing or developing new forest insurance products – including coverage for forest carbon.
6. So far, forestry has not been a major line of insurance business and, as such, not a major source of premium income for majority of the respondents.
7. The main reasons for the lack of appetite in insuring forestry risks are its high exposure to catastrophic losses and high accumulations (exacerbated by climate change),

technically-inadequate pricing levels, insufficient risk management practices (both loss prevention and loss control), and loss assessment challenges. Also, a number indicated that they do not possess the technical expertise to underwrite forestry risks, and that this line of business is presently not part of their overall strategy and core business. In the area of carbon, the accurate valuation of forest carbon appears to be a major obstacle.

8. On balance, underwriting results<sup>11</sup> have been mixed. Some commented that their underwriting results have been favourable, while others indicated the contrary. Nevertheless, there is a noticeable trend towards increasing the uptake of current forestry insurance products and developing new ones.
9. An interesting finding are long-standing state-run and mutual forest insurance schemes in certain countries (e.g. Japan, Netherlands, Norway), which appear to have achieved meaningful success, although more comprehensive and updated statistics are necessary in order to arrive at more accurate observations. These schemes appear to fill gaps unaddressed by mainstream private commercial insurers.

In Japan, 1994 fiscal year statistics reveal that the premium income generated by the government-run forest insurance scheme (JPY 2,516,352,000), overseen by the Ministry of Agriculture, Forestry and Fisheries, was nearly six times larger than that of the private insurance industry. The premium income of the government scheme has grown since then and remains significant today. In terms of underwriting results, in 1994, the government scheme registered a fairly decent loss ratio of 44%. In 2004, it was approximately 13%. Nevertheless, it was commented that loss ratios fluctuate from year to year and the potential for catastrophic losses in a single year, which can easily wipe out years of favourable underwriting results, remains to be a major concern.

In Norway, the mutual forest insurance company, Skogbrand, founded in 1912 and currently with 40,000 members/clients, insures about 80% of privately-owned forests in the country. In the past four years, the combined ratio has ranged from 48% to 74%, while loss ratios were from 9% to 25%. About 70% of the losses are due to hurricanes, with the balance largely due to fire. The annual premium income is relatively small though at around EUR 1.7 million.

10. While forest insurance products have been underwritten via traditional, indemnity-based insurance policies, some are also exploring the viability of alternative risk transfer and financing solutions including catastrophe bonds which source capacity from and transfers peak risks to the capital markets.
11. On (re)insurers being institutional investors, at this juncture, only a few seem to be looking into forestry as an alternative asset class. The interest in forestry appears to lie in enhancing portfolio diversification, its potential low correlation to mainstream asset classes, and its long maturation, which could be a suitable match for those seeking long-term investments.
12. On climate change policy and regulation, it was remarked that there is a need for consistent national regulatory frameworks for forests, aside from an international regulatory framework. The major opportunity for forests under the CDM (and presumably under a REDD regime), as well as the voluntary offsetting market was also

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<sup>11</sup> Premiums less losses and expenses incurred, including acquisition costs (e.g. commissions to intermediaries). Loss ratio is the ratio of the losses incurred to the premium received. Combined ratio takes into account expenses incurred in addition to the losses incurred. A combined ratio below 100% therefore indicates underwriting profitability.

recognised, with the main concerns being double-counting, safeguarding of the principle of additionality, and the need for scientific rigour in the application of carbon valuation methods. Further, there seems to be preparedness to support the full integration of REDD into climate change policy and the carbon markets.

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Overall, if one were to view the UNEP FI Insurance Working Group as a representative sample of the leading players in the private insurance industry, then it would be reasonable to deduce that a lot of work definitely needs to be done in scaling up forest insurance products globally. Forest insurance is therefore a largely untapped opportunity, and the climate change challenge creates a very strong stimulus for the insurance industry to unleash innovation.

## **VII. Possible content of the UNEP FI side event in Poznan**

Despite the perceived higher cost-efficiency of an insurance-based approach vis-à-vis other alternatives, there are key aspects that need to be addressed:

- How can the insurance industry overcome the huge risk management and underwriting challenges in order to intensify efforts in scaling up forest insurance products?
- What are the roles of governments, NGOs and other public sector actors in scaling up current forestry insurance products and fostering and incentivising market-based carbon-focussed solutions? Can public-private partnerships be forged?
- Would (re)insurers be able to provide coverage for permanence given the considerably longer time horizons needed (e.g. several decades)? Traditional forestry insurance (covering the timber) is usually negotiated and renewed on a relatively short-term basis (e.g. annual) However, in the case of carbon, at the time of issuance, it must be certain, from an environmental standpoint, that insurance coverage will be available at least until the completion of the project. Would multi-year forest insurance schemes, perhaps even mirroring the long-term horizons of life insurance policies, be feasible?
- How could projects in developing countries and least developed countries, which lack the public policy and private insurance market infrastructures to underpin such specialised insurance solutions, get insurance coverage?
- Compared to the concept of temporary credits, insurance is fundamentally a *risk transfer* rather than a risk removal instrument (although (re)insurers have the capacity to encourage sustainable behaviour through risk management practices, particularly loss prevention measures). The possibility of insurers becoming unwilling or unable to indemnify losses remains an important issue. This stimulates a number of questions: How can permanence be truly guaranteed – for instance, in the light of insurance contracts containing clauses on loss deductibles? How can the possibilities of liabilities falling back to the insured (as a consequence of moral hazard, the insurance company becoming insolvent, etc.) be dealt with?
- Who bears the liability? The overall benefit of an insurance-based approach lies in the issuance of credits from afforestation and reforestation (A/R) activities (and eventually

REDD) which are permanent and fungible with all other CERs. This means that the seller of credits must be held liable for the project's entire crediting period. In developing countries, this could lead to problems associated with moral hazard, depending on the environmental laws in place: *'...if liability does not involve proof of negligence or fault, depending on the environmental law of the respective country, the insurance company will have to pay for any loss, giving rise to the problem of moral hazard.'* (Wong & Dutschke, 2003).

- Much of the discussions on afforestation and reforestation, as well as avoided deforestation, focus on the question of whether these should be undertaken on a project or programmatic basis. Could insurance schemes be feasible for, say, nationwide programmatic efforts?
- In forested developing countries, the underlying causes of deforestation are mostly systemic failures such as poor governance, corruption, 'rent-seeking' behaviour and activities, lack of transparency and accountability, and ineffective judicial systems and law enforcement. Are insurance schemes feasible in the context of these adverse circumstances?