



REDD and AFOLU - some policy choices and practical issues

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Summary

This Carbon Store paper proposes a sectoral approach to engagement of developing nations in quantified emission reductions in the agriculture, forestry and other land uses (AFOLU) sector in the period 2013 - 2017. It also proposes that carbon accounting and reporting by developed and developing nations for AFOLU under the Kyoto Protocol should converge starting in 2013.

It recommends that all developed nations, and all developing nations that want to generate tradable Kyoto units from AFOLU activities, should use the 2006 IPCC Guidelines for National Greenhouse Gas Inventories for AFOLU activity reporting from 2013.

Responding effectively to climate change will require stronger involvement over time of developing nations in substantial and sustained emission reduction strategies. Activities in the agriculture, forestry and other land uses (AFOLU) sector offer both significant mitigation opportunities and also substantial financial and sustainable development benefits to many developing nations.

These factors make the AFOLU sector suitable to pioneer a sectoral approach to quantified emission reductions in willing developing nations. The term sectoral approach is used here to include all or part¹ of a sector, provided that the accounting is national in scope and symmetric in accounting of relevant sources and sinks.

Accounting only for deforestation and forest degradation in developing nations would lead to unbalanced accounting through asymmetry. IPCC accounting and reporting principles require that accounting for deforestation be accompanied by accounting for afforestation and reforestation (A&R), and that accounting for forest degradation be accompanied by accounting for aggradation of forest carbon stocks etc.

Because of the technical difficulties associated with accounting for Article 3.4 activities and agriculture, a likely scenario is that accounting for afforestation, reforestation and deforestation (ARD) would be an initial step into AFOLU accounting for many developing nations. Accounting and reporting for forest management would be a logical next step to reporting on ARD, as monitoring and accounting capabilities improve.

Agriculture and agricultural and pastoral land and rangeland management are also major sources of emissions from developing nations, and also have great potential for implementation of measures to cost-effectively reduce emissions. The same measures can often support sustainable natural resource management, enhanced rural productivity and employment.

For the period 2013 - 2017 we suggest:

¹ For example one or more activities such as forest management etc.

- A phased and voluntary approach to AFOLU reporting by developing nations
- Early convergence of accounting and reporting of AFOLU activities in developed and developing nations based on the IPCC 2006 Inventory Guidelines for Agriculture, Forestry and Other Land Uses
- Scope of AFOLU activities being voluntarily accounted and reported by developing nations being limited only by capacity for adequate monitoring and reporting, and negotiation of the relevant baseline(s)
- The REDD approach of accounting only for deforestation and forest degradation being abandoned
- Afforestation and reforestation activities in developing nations being removed from the ambit of the CDM and temporary crediting being terminated
- Measurable, reportable and verifiable AFOLU activities in developing nations being recognised under a Sectoral Commitment Mechanism
- Tradable Kyoto units from AFOLU activities in developing nations (Sectoral Commitment Units and Removal Units) being generated against a national baseline for the relevant activities with the option initially to account only for afforestation, reforestation and deforestation
- The use of independently verified IPCC Tier 3 data collected at the project level being used to calibrate and validate national accounts
- Use of a 10 year base period (where relevant) instead of a base year, temporary exclusion from accounting of lands subject to major natural impacts on carbon stocks, and reporting of rolling average emissions being used to factor out non-anthropogenic effects
- Accelerated donor supported capacity building in national legal and property rights frameworks, stakeholder engagement and carbon monitoring and risk management capacity

We propose Carbon Rights as the central feature in intranational legal arrangements. A Carbon Right is the right to the benefits and responsibilities associated with change in landscape carbon density in a specified area of land, along with the right to ensure adherence for a specified period of time to a management plan for that land.

We recommend pooling and buffers to manage national and intranational risks associated with baseline shifting, measurement imprecision and the range of physical risks to stored carbon over time.

The paper is illustrated by boxed text referring to arrangements existing in or being put in place by Australia. Australia has been a front runner in AFOLU accounting because of its ability to meet the Kyoto target largely through reducing deforestation. It is now including reforestation (but not deforestation or forest management) in its national carbon trading scheme.

Introduction

A very important recent development in the climate change negotiations has been the expressed willingness of some developing nations to account for reduced emissions from deforestation and forest degradation on a national basis. It is currently unclear to what extent this also implies willingness to be responsible for permanence of the emission reductions or to accept responsibility for performance against a sectoral baseline.

However, given that the emission reductions likely to be achieved through agriculture, forestry and other land uses could be both revenue positive and strongly supportive of sustainable development, willingness to accept responsibility for the longer term outcomes may be possible.

Therefore, it seems that parts of the AFOLU sector could be the subject of some form of emission limitation or reduction commitments from some developing nations. Any national commitments from developing nations are extremely significant and should be given strong encouragement and support by developed nations.

While it is clearly the role of the developed nations to lead in greenhouse gas emission reduction, it is equally clear that their efforts alone will be insufficient. Developing nations will also need to limit their emissions over time. It is vital that some developing nations, especially the middle and upper middle income countries, commence net emission reductions as soon as possible after net emissions from developed nations peak and start to decrease.

Encouragement and support from developed nations should include leading by example, and for this reason among others developed nations should undertake comprehensive accounting of all their major anthropogenic sources and sinks including from AFOLU. This should include, at a minimum, compulsory accounting by all developed nations for all managed forest lands (that is, accounting for forest management becoming compulsory) after 2012.

There is an emergent consensus reflected in the Bali Action Plan that improved management of terrestrial carbon stocks, including reduced emissions from deforestation and forest degradation in developing nations, must be a significant component of international approaches to mitigating climate change. It is also widely accepted that large scale, sustained, and additional carbon storage maintained through ecologically, socially and economically sustainable management of vegetation and soils is a desirable goal.

However, rewarding additional carbon storage or reductions in emissions in relation to management of vegetation and soils is a blunt instrument which will require nuanced national and international delivery frameworks to obtain the fullest range of collateral benefits, and for the credited carbon storage to be sustained.

Carbon accounting

We suggest that upon agreement between a developing nation and the CMP or its designated entity on a national reference scenario acting as a “cap” on emissions from a sector or activities within a sector, that the national government be issued Sectoral Commitment Units (SCUs - equivalent to AAUs²) sufficient to cover the agreed expected emissions over the following Commitment Period, plus (in the case of the AFOLU sector) additional units earned by REDD demonstration projects in the first Commitment Period.

Performance in reducing emissions and/or increasing removals against the reference scenario would result in the generation of Removal Units³ or retention/sale of unused SCUs, as would successful outcomes from REDD Demonstration Projects for emission reductions before 2013⁴.

While our focus here is on the AFOLU sector we see these arrangements as potentially applying to other sectors in developing nations as willingness and capabilities develop. We see the Clean Development Mechanism (being project based) as an inappropriate vehicle for recognition of sectoral emission reductions against a national sectoral cap. We recommend the establishment of a Sectoral Commitment Mechanism⁵ to facilitate developing nation sectoral activities.

We recommend that this body be assisted in its work in the AFOLU sector by a specialist unit established under the auspices of the IPCC as a global centre of excellence in AFOLU-related information and research. The first task of such a unit would be to consolidate the knowledge base on deforestation and forest degradation in order to establish a credible global deforestation and forest degradation baseline.

An outcome underpinned by this approach is that when national baselines are determined through a process which will inevitably involve some negotiation, the final outcome is that the national baselines are nested within a reasonably and independently determined global baseline. This would also better enable allowance to be made for future development pressure on forests in “high forest cover - low rate of forest loss” regions such as the Congo basin.

Establishment of a sectoral crediting mechanism for developing nations where they are prepared to accept long terms responsibility opens the way to participation by those developing nations in two Kyoto flexibility mechanisms, namely Emissions Trading and Joint Implementation.

² Alternatively AAUs could be issued.

³ If Removal Units are retained in the post-2012 period.

⁴ The quantum of Sectoral Commitment Units could also unperpin an intranational system of tradable development rights wherein forest conservation could compete with other land uses on an economic basis under a quantified domestic cap on sectoral emissions.

⁵ Acknowledging that either the Joint Implementation framework or the CDM could fulfill the role with appropriate refocusing.

Full crediting for afforestation and reforestation

If carbon storage in vegetation and soils is accounted against a negotiated cap on emissions from (at least) ARD with agreed provisions for developing nation responsibility, then there is no need for temporary or expiring credits.

It is vitally important to reward afforestation and reforestation with fully fungible Kyoto units because strategies to increase reforestation and to reduce deforestation and unsustainable forest management are inter-related and strongly complementary. Arguably, strategies to conserve forest carbon (and biodiversity and other natural forest values) are likely to fail without reforestation at scale. Conflict over the use or conservation of remnant natural forests indicates that we have already overcleared in relation to national and global needs for forest services.

Moreover a consequence of much past deforestation is vast areas of degraded and unproductive land which need reforestation to improve land condition, provide local livelihoods and ecosystem services and contribute to meeting industrial timber and biofuel needs. At best, REDD will slow the net rate of forest loss, unless accompanied by a commensurate effort in reforestation. In short, we can best save what forest we have if we establish more.

Agroforestry can be a substantial source of wealth for both local consumption and cash trade. It can also sustain carbon stocks at elevated levels over extended timeframes compared to most conventional farming activities, and certainly compared to abandoned and/or degraded land.

Industrial forest plantations are also capable of good growth and productivity on lands which are sub-optimal or marginal for other land uses, and can improve other catchment values. Biodiversity conservation can also be assisted, particularly if use is made of ecoforestry models such as the establishment of multispecies forest plantations, mosaic planting or enrichment with biodiverse patches, or combinations of these techniques.

Recent studies indicate that nearly two thirds of the world's wood comes from planted forests, which occupy only around seven percent of the world's forested area. Strategies to dramatically increase the area of planted forests (under sustainable management) are therefore capable of delivering a range of important outcomes.

These potentially include reducing reliance on natural forests to produce the same industrial product output, reducing the economic driver for unsustainable forestry practices, producing locally for local consumption of timber, fibre and food, sustainably providing feedstock for new biofuel and other emergent sustainability industries and improving catchment and biodiversity values.

All these opportunities based on reforestation need a strong commercial driver and are only likely to be implemented on a significant scale (in relation to global emission reduction and other environmental, social and economic needs)

by reforestation's incorporation into emissions trading regimes with full fungibility of the resultant emission reduction units.

Expiring credits (tCERs and ICERs) are a failed experiment and are unnecessary to the extent that developing nations take responsibility for credited biocarbon storage.

Acceptance by developing nations of national responsibility, combined with effective national carbon risk management strategies, can deal with the issues of intranational leakage, additionality and permanence. They can do so equally well in respect of sequestration by new forests and emissions from the loss of natural ones.

The EU Environment Council, in contributing to the EU Council position on the Copenhagen negotiations at the end of 2009, has recently suggested goals of reducing gross tropical deforestation by 50% by 2020 and halting global forest cover loss by 2030. The adequacy of these goals is debatable but they serve to underline the scale of present forest cover loss and the task of reversing it. More economically compelling approaches are urgently required⁶.

Scope of accounting

Comprehensive accounting approaches are important for completeness in national reporting of anthropogenic emissions and removals, and to provide a driver (at both national and sub-national scales) to reduce anthropogenic emissions and increase removals from land use wherever possible.

However, many developing nations will find implementing the systems for comprehensive accounting for AFOLU challenging and will probably start with a sub-set of possible land uses, possibly limited to ARD. With expanded support it should be possible for rigorous and/or conservative carbon accounting relating to ARD to be undertaken post 2012 by many or even most willing developing nations.

Developing nations should also be allowed, on an opt-in basis, to undertake accounting and reporting of additional land uses or land use changes and agricultural activities as long as such reporting is national in scope, of complete activity sets⁷, symmetrical in reporting of sources and sinks, and supported by IPCC monitoring and reporting methodologies.

⁶ This applies to carbon storage in grasslands, cropping lands and rangelands, as well as to forests.

⁷ The term "activity sets" is here used to refer to activities which need to be accounted together in order to provide balanced accounting of a whole process. For example AR and D, revegetation and devegetation, or degradation and aggradation of carbon stocks through forest management.

Accounting methodologies

Use post-2012 by all Parties of the IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use is recommended to bring reported activities in all nations into a common and best practice accounting and reporting framework.

Greenhouse gas accounting systems should be transparent, consistent, comparable, complete, accurate and verifiable in recording and reporting changes in carbon stocks and/or changes in greenhouse gas emissions by sources and removals by sinks. Where accounting is not complete for a sector, it should at a minimum be complete in respect of activity sets and symmetric in accounting of sources and sinks (and as complete as practicable).

National and subnational carbon accounting approaches

The Carbon Store sees a two-way flow of information and data between national and project level carbon accounts as fundamental to balanced and accurate carbon accounting and reporting at both levels.

National level accounting for the AFOLU sector (or part thereof) may start with estimates based on IPCC Tier 1 and 2 methods (and the principle of conservatism). A very significant opportunity to inform such national estimates (or models) with Tier 3 data is where this can be (or has been) collected using approved methods in the field at the project, catchment and bioregional levels. This approach leverages private sector, donor and fund-based resources committed to project scale activity.

Project level accounting typically involves mapping, stratification and sampling, field survey, and plot or transect measurements being taken to enable carbon stocks estimation. It may include development of methodological tools such as allometric equations, root to shoot ratios or other relevant values for new species. It is important that it is collected to a standard which meet the needs of those compiling the national carbon accounts.

This project level (Tier 3) data can provide valuable assistance to calibrate and validate national level accounting, which is necessarily more based on remote sensing and more or less sophisticated modeling. It can improve the accuracy of national accounts through enhancing the reliability of modeling and the usefulness of remotely sensed data.

For these purposes it needs to use methodologies accredited by the national carbon accounting body and it must be subject to independent verification.

There is a danger of modeling approaches being relied on without sufficient calibration to the full range of circumstances in which the model is applied. The use of unvalidated or insufficiently validated models, combined with risk and sensitivity analysis which tests the effect of varying the input parameters

can produce a “gamers delight” where subtle changes in strategic inputs produce considerable effects in resulting carbon stock estimates. It is therefore important to explore how robust Tier 3 data can be used to systematically inform and improve modeled national estimates.

Given the short timeframes over which developing country monitoring capacity is being developed and the potential for progressive improvement of estimates, it may be acceptable in the short term to allow for “provisional” baselines and monitoring reports. An acceptable “provisional” baseline and initial monitoring report could be recognised when it becomes possible to report numerical uncertainty levels using IPCC good practice principles.

A short-term “credit reserve” could be withheld from markets pending finalization of the sectoral emissions baseline and the achievement of adequate monitoring and reporting capacity. The quantum of reserved credits could be based on the difference between the lower level of certainty of an estimate at a given confidence level (e.g. +/-40% of the mean at the 95% confidence level) of the current estimate and the lower level of uncertainty of a good practice estimate (say +/- 15% at the 95% confidence level).

Box 1. Project level and national forest carbon accounting in Australia

The Australian Commonwealth Government has implemented a “National Carbon Accounting System” (NCAS) to monitor change in terrestrial carbon stocks, with an initial emphasis on ARD activities and the 1990 baseline. Development of the system reflects the importance to Australia of the forest sector, especially reducing emissions from deforestation, to meeting its Kyoto target of (5X) 108% of 1990 levels during the first Kyoto Commitment Period.

The NCAS relies on pixel by pixel analysis and modeling of land cover change detected by Landsat imagery, using change analysis between national coverage mosaics compiled at several times from 1972 to the recent past, and including 1989 and 1991 to help estimate emissions and removals in the Kyoto base year.

Annual AR&D inventories are derived through detection of land use change and subsequent modeling of carbon stock changes in the various land and vegetation carbon pools using software called FullCAM. FullCAM estimates carbon flows between the different carbon pools and the atmosphere, assisted by sub-models including for carbon in the soil, in wood products, in relation to site productivity over time etc.

The System has had significant calibration by reference to carbon stocks and canopy cover data collected through field measurement, higher resolution imagery etc. Such calibration is required for both interpretation of spectral signatures (where discrimination of canopy cover close to the 20% threshold and over a range of soil types is of particular importance) to give “activity data” and estimation of vegetation and soil carbon stocks per unit area to give “emission factors”.

The Australian Government has also developed a National Carbon Accounting Toolbox (NCAT) for use at the project level by farmers, foresters and other project stakeholders. The Toolbox uses essentially the same modeling framework, inputs and default values as the NCAS. In the context of the imminent introduction of an emission

trading scheme in Australia, the Commonwealth has indicated that it is likely that the NCAT will provide the standard methodology for the estimation of sequestration by reforestation projects eligible under the scheme (deforestation and forest management have been excluded from scheme coverage).

The Commonwealth argues that “using only the NCAT would provide consistent low cost estimates that are aligned with the national account and would reduce the risk of permits being issued for sequestration for which Australia does not receive international recognition” However this is only true where accounting of forest stands uses unmodified FullCAM parameters (that is, where the implementation of NCAT is the same as in NCAS).

FullCAM does not currently provide parameters for the range of species or species combinations likely to be established, or take into account a range of factors such as local soils, planting stock genetics etc which may influence actual growth of individual tree stands. FullCAM estimates are based on site characteristics (e.g. soils and climate) which may in some cases be mapped at a fairly coarse scale.

The Government has indicated it will “consider the standard of evidence required to modify default NCAT settings and to have accepted within NCAT data on new forest types (for example, some biodiverse plantings), new management practices or new emissions or removals estimates currently not represented in the national account”.

It is to be hoped that the Government will grasp the opportunity for substantial further calibration of the NCAS through use of independently verified project level data collected through approved methodologies.

Non-anthropogenic effects

The Carbon Store believes there is a need to use a significant period (such as 10 recent years) as a base period, rather than the 1990 base year, to address interannual variability, and that this could be used post-2012 where relevant.

There is also a strong case for the temporary exclusion of lands to mask out the effects of natural events such as wildfire or insect attack which cause major non-human induced impacts on biotic carbon stocks.

Consideration should also be given to rolling average rather than annual accounting and reporting, again to mute the effects of interannual variability and non-anthropogenic affects.

Baselines and monitoring

AFOLU activities reported for Kyoto purposes need to be restricted to those for which adequate baseline establishment and monitoring capacity exists (and which are otherwise measurable, reportable and verifiable) with allowance for the set of activities to be expanded over time as capacity improves

Significant developing nation government, bilateral and multilateral resources are already being used to develop the capabilities of government and other agencies for remote sensing, field measurement and modeling of carbon stock

changes in forests. These efforts will probably need to be expanded in order to enable the widest participation in AFOLU activities by developing nations.

Greater emphasis may need to be placed on:

- radar image analysis to enable forest cover mapping in areas of persistent cloud cover
- the use of airborne radar and high resolution optical instruments to enable better detection and analysis of the effects of forest degradation (where this occurs without actual deforestation)
- expanded programs of field measurement and ground truthing, both by project level activity and through targeted collection by national agencies
- cost effective emission monitoring tools for broader agricultural activities related to livestock, soil carbon, burning practices etc

Net-net accounting against a 1990 base year suffers the significant drawback that it does not allow for interannual variability to be managed as an accounting issue. However net-net accounting against a base period of 10 recent years is probably preferable to gross-net accounting which risks rewarding business as usual activities.

Whatever approach is used there will be a need to determine baselines for developing nations with a wide range of national circumstances in relation to the expected future stability, or positive or negative change in their managed terrestrial carbon stocks. That is, there is a need to adopt new methods for determining baselines for the AFOLU sector for developed nations for the period after 2012, and also for developing nations that choose to account on a national basis for the sector or some part of it.

It needs to be recognised that while science can inform negotiations on national baseline rates of deforestation and forest degradation in developing nations, only negotiation can resolve issues such as likely future scenarios for forest cover or carbon stocks loss or gain. We see two things as being important to facilitating such negotiations.

1. The existence of a state of the art information base on global and national trends relevant to carbon stock change in forests.
2. Fungible emission reduction units being issued for afforestation and reforestation to enable nations which have low forest cover and low deforestation rates, but are actually or potentially reforesting at scale, to participate effectively.

The Carbon Store sees agreement on baseline rates of emissions and removals from the ARD activities being possible for willing developing nations by 2012. Baseline rates of forest degradation and associated emission rates can be agreed later as better information becomes available.

National mitigation strategy implementation issues

National governments are responsible for establishing the frameworks for benefit sharing, risk management, property rights, market rules, regulatory oversight and national carbon accounting systems.

Where nations accept responsibility for future maintenance of carbon credited against a baseline, it is particularly important that they put in place arrangements to ensure that the risk they take on is well managed at the sub-national scale. This will generally mean ensuring robust risk management by commercial operations which store and/or protect terrestrial carbon stocks.

The Carbon Store suggest two primary means by which the risk of unintended and uncompensated release of credited carbon can be managed:

1. strong legal frameworks and arrangements to assign appropriate responsibility and liability at the sub-national level
2. pooling of projects and their outcomes with a “risk management buffer” of credits held across the pooled projects

Legal frameworks

In order for carbon market stakeholders to have confidence that carbon in vegetation and soils will remain stored, it is necessary that future management of the relevant land and vegetation to support this outcome is legally locked in for a specified period. It is this which gives rise to a reasonable expectation of the particular environmental outcome being achieved and sustained, even though the land may be sold or otherwise pass to a new owner.

This right (here called a Carbon Right) to enforce agreed management against any owner of the land (along with the right to deal in the atmospheric benefit) represents a new form of property in most legal jurisdictions.

Biotic storage and long term protection of stored carbon not only entail longer term arrangements but also often impose positive obligations for the implementation of a management plan on one or more parties to a carbon project or transaction. For these reasons, it will be necessary in many jurisdictions for new legislation to be enacted which gives legal effect, consistent with existing legal frameworks, to such arrangements.

An effective system of Carbon Rights is in turn dependent on a robust system of property rights generally. It is to be hoped that carbon finance can be an effective driver for the consolidation and better enforcement of rural and forest property rights generally. This must include those of indigenous, forest dependent and forest dwelling communities for both ethical and practical reasons⁸.

⁸ There are compelling arguments in the REDD literature that local stakeholders including indigenous, forest dependent and forest dwelling communities must be involved in all stages of forest regeneration or forest protection projects for both equity and practical reasons.

Box 2. Carbon Rights in Australia

Legislation to underpin the generation of carbon credits from land and forests in Australia is to a significant degree the province of State Governments and Queensland, New South Wales, Victoria, Tasmania, South Australia and Western Australia have already passed laws to allow for recognition of rights which could in general be called Carbon Rights in relation to carbon in vegetation and (in some cases) soils. However, because of differences in land and property law in the different jurisdictions, approaches of differing quality, complexity and legal effect exist in the different States.

Property can be divided into real and personal property. Real property is essentially land or fixtures on land. Land is considered to be a defined area of the earth's surface, potentially including space above or below, and because it is a defined three dimensional space, it is considered to be indestructible and immovable. Personal property or chattels, on the other hand, are movable, destructible objects.

Both real and personal property can be further divided into tangible and intangible categories. Real, intangible property includes easements and *profits a prendre*. An easement is a form of property conferring certain rights upon the owner in relation to land without ownership of the land itself, such as a "right of way" across the land. Easements are also referred to as "incorporeal hereditaments". A *profit a prendre* is a similar form of property right and generally confers upon its owner the right to enter land and take away certain defined produce of the land.

Tangible personal property or chattels refers to physical objects (other than land and fixtures to land) capable of ownership and possession. Intangible personal property (also called a "chose in action") is where the owner enjoys the benefit of something but that thing is not in his or her possession.

Finally, given that property is created by law, different forms of property may be distinguished by the legal sphere within which the interest is recognised and/or enforceable. Thus there are common law interests, equitable interests and statutory interests. Statutory interests are of particular relevance in discussion of Carbon Rights, because this form of property is created and defined by statute (presently by State legislation).

Carbon Rights are useful to the extent that management of the land can be expected to provide a durable carbon sequestration and/or storage outcome.

For this reason it is desirable to be able to have an agreed management plan registered on the land title, so that the land and vegetation management which is expected to lead to the desired environmental outcome survives change in land ownership. Legally, this means that the clear ability to have positive and negative covenants (agreements) regarding land management to support ownership of Carbon Rights is highly desirable.

It is important that a Carbon Right cover both vegetation and the land on which it is growing. This is because the land and vegetation function together, and changed management of one is likely to lead to changes in the other. Accurate and balanced carbon accounting therefore requires accounting of the soil and vegetation together. It

is also important that the owner of a Carbon Right has not just the rights and benefits associated with the sequestration and/or storage of carbon in land and vegetation, but also the responsibilities and liabilities associated with such storage.

Carbon Rights as described above are clearly a form of real property or rights over land and registrable on land title. In legal jargon they can be characterised as intangible real property (incorporeal hereditaments). Carbon credits are quite different. The term generally means something that can be used to offset or nullify an equivalent greenhouse gas emission and the liability, if any, associated with that emission. In any case, a carbon credit is essentially intangible personal property (a "chose in action").

A further distinction is that carbon credits are quantifiable (usually denominated in tonnes of CO₂e) whereas a Carbon Right is not. A Carbon Right is the right to (and responsibility for) whatever carbon exists in a defined area of land. It is a relationship of ownership, and it is ownership of something which is subject to natural fluctuation, to increase and decrease.

A factor to be considered in relation to registering a management plan on a land title is that traditionally it has not been possible to register a positive covenant on a land title, except for those which are for the benefit of governmental or statutory bodies. This has been because common law has strongly tended to repudiate the enforcement of positive obligations on a party who is not a party to the agreement (such as a future owner of land).

Thus Carbon Rights are an area of new law. A Carbon Right will be ineffective unless it provides for positive obligations on the land and forest manager and/or owner over extended timeframes (and therefore binds future owners). It is unsurprising that legislators have struggled, and administrators of the new carbon laws still struggle with interpretation.

Carbon pooling and risk management

The principal means recommended to address the risk of future re-emission (or recalculation) of credited terrestrial carbon stocks is to withhold a risk reserve, or buffer, for the specific purpose of absorbing such impacts, across a diversified portfolio of projects (a "carbon pool").

This "buffered pool" approach is used under the Voluntary Carbon Standard and has been used in a significant number of voluntary projects, including the *Minding the Carbon Store* avoided deforestation project managed by the author in 2006.

While spatial dispersal and diversification of vegetation within a carbon pool is a risk management strategy in its own right, impacts on the carbon stored in a pool can and will occur. Fire, drought, severe storms, insect attack and disturbance by human activity cause significant damage to forests and most of these factors are projected to have greater impacts due to climate change in the future.

Insurance is one way to manage these risks and cover the costs of purchasing emission permits to cover emissions caused by damage to the forest. However, the risk extends over long timeframes and becomes worse over time as emission permit prices rise and climate change exacerbates processes causing physical damage to forests. For these reasons it could be problematic to rely on conventional insurance because premiums will rise with additional risk.

An alternative or additional approach is to reserve a proportion of the stream of credits from each property and use these reserved credits for the purpose of self-insurance at the pool level.

There a number of possible ways of holding and managing “buffer credits” including holding buffer credits in reserve in a registry (a “static buffer”) or of managing them dynamically to provide further emission reduction and other benefits (similar to a “Green Investment Scheme”).

A dynamic buffer approach was pioneered in the Minding the Carbon Store project. In that case, by agreement with the major customer and the scheme regulator, up to 40% of the buffer credits could be sold as long as the proceeds were re-invested in other emission reduction projects which would yield further credits from more diverse sources.

This approach results in the risk management buffer becoming a revolving fund with potential benefits in diversifying the source of buffer credits held, amplifying the original project’s developmental and climatic benefits, and expanding the quantum of buffer credits held.

If buffering is to be relied on it will be important to develop a more robust risk analysis to determine how much of a buffer is required. This question is closely related to, and would need to be addressed in conjunction with, the question of the length of time (term) of Carbon Rights agreements which transfer ownership of the rights and responsibilities associated with carbon in forest and land to a carbon pool. We have argued since 1999 that the period should be 100 years after the last project credit is generated.

Buffers could also be combined with more conventional insurance approaches, and a “buffered pool” would be likely to enjoy lower premiums than an unbuffered pool or individual growers or single reforestation projects. The global insurance and reinsurance industry is an interested and active player in relation to climate change risk issues.

Conclusion

The approaches outlined in this note by no means exhaust the issues to be addressed in relation to accounting for agriculture, forestry and other land uses under the Kyoto Protocol in the near future, but it is hoped that they can contribute to and perhaps broaden the discussion.

One thing which is abundantly clear is that a sustained effort at global re-greening is urgently required for a range of compelling reasons, and is mandated by the United Nations conventions on climate change, biodiversity and desertification.

To underscore its importance, it is worth recalling that an ineffective approach to addressing our current unsustainable patterns of food production and natural resource management may in the future amount to genocide against the unborn.