

CLIMATE CHANGE WORKING PAPER

Land Use and Forests (Sinks) Sector

This document provides additional information on land use and forest (sinks) issues to support the consultation on climate change policy options. This is an officials' working paper and is not Government policy.



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Other options for managing New Zealand's greenhouse gas emissions are discussed in the working papers: *Domestic Emissions Trading, The Use of Projects, Negotiated Greenhouse Agreements, and Levies to Reduce Greenhouse Gases, and Emission Charges*. Other working papers that are also available are: *Legislation to Ratify the Kyoto Protocol, Maori Issues and Assessment of Economic Modelling Work to Date*.

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Introduction

This working paper provides additional information on the issues raised in the “Issues and Options for Land use and Forests” section of the Government’s climate change consultation document - *Kyoto Protocol: Ensuring our Future*.

Before New Zealand can ratify the Kyoto Protocol, we need to think about a legislative framework to manage greenhouse gas sink activities. A fully operational system for managing sinks is not required to ratify the Kyoto Protocol; however, work should be sufficiently advanced to lend credibility to the ratification process. In this paper two particular significant issues are discussed; who should own sink credits and who should have responsibility for greenhouse gas emissions from forestry. The paper sets out some possible options and some possible elements for a system to manage sinks. Your views on these issues will help inform the Government’s final policy package for sinks.

For further information:

Other documents on forestry sinks issues are: [*Forest Sinks and the Kyoto Protocol – An Information Document and A Compendium of Submissions Received on Forest Sinks and the Kyoto Protocol – An Information Document*](#). (Click here to view).

These papers are available on the MAF and New Zealand Climate Change websites, see:

www.maf.govt.nz or www.climatechange.govt.nz

An additional paper (click here) presents the current state of negotiations at the United Nations on sinks issues. This paper is of particular relevance for the definitions of ‘forest’, the activities of ‘afforestation’, ‘reforestation’ and ‘deforestation’ and for the accounting treatment of forest sinks. The current negotiating text is available from: www.unfccc.int/resource/docs/cop6secpart/111.pdf

Background

A sink is a natural or manmade system that absorbs greenhouse gases from the atmosphere. To be regarded as a sink, a system must absorb and store more greenhouse gases than it emits. Both articles 3.3 and 3.4 of the Kyoto Protocol deal with sinks, each article is discussed in turn.

Article 3.3 – Forest sinks

Article 3.3 of the Kyoto Protocol refers to a restricted subset of sinks, so called “Kyoto forests.”

Kyoto forests are forests established after 1 January 1990 on land that did not contain forest on 31 December 1989.

Carbon stock changes in Kyoto forests must be accounted for over the Kyoto Protocol’s first commitment period, the calendar years 2008-2012. Over this period, New Zealand’s Kyoto forests will absorb and store significantly more carbon than they emit because of afforestation and reforestation activities undertaken since 1 January 1990. These forests are eligible for ‘sink credits.’¹

Under the Protocol, permanent removal of forests through ‘deforestation’² is treated in the same way as an emission of CO₂. New Zealand must account for deforestation emissions from all its forests over the commitment period.

The relationship between forests and emissions under the Kyoto Protocol may have implications for changes to or from certain types of land use. For example, a forest could potentially include stands of manuka/kanuka ‘forest’. If manuka/kanuka ‘forest’ were cleared for non-forest use purposes, then the associated emissions may need to be reported and accounted for. On the other hand, stands of manuka/kanuka that have reverted from pasture land since 1990 could be eligible for sink credits.

Article 3.4 – Additional sink activities

Article 3.4 of the Kyoto Protocol also provides a potential basis for claiming emission units from ‘additional’ sink activities, where the amount of carbon absorbed and stored as a result of the management of forests, croplands, and grazing lands, and of revegetation activities, has increased since 1990. Additional sink activities include the management of forests established before 1 January 1990 (so called non-Kyoto forests)³. It is not mandatory for countries to account for Article 3.4 activities in the

¹ In this document sink credits are also referred to as ‘emission units.’ Sink credits can be thought of as emission units derived from sink activities.

² Deforestation is the conversion of forest land to another land use e.g. dairy farming.

³ ‘Management’ in this context is defined broadly. The current negotiating text defines forest management as “a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biodiversity), economic and social functions of the forest in a sustainable manner.”

first commitment period 2008-2012. Countries can elect to account for them should they wish.

For forestry the distinction between articles 3.3 and 3.4 is that article 3.3 deals with 'new' forests created since 1990, while article 3.4 deals with management practices for forests established before 1 January 1990.

New Zealand will need to decide whether it will be practical and in our interests to elect to account for sink credits and debits arising from forest management, cropland management, grazing land management and revegetation. In New Zealand's case, preliminary analysis shows high uncertainty and measurement problems with verifying the carbon content of these carbon pools, and points to the difficulties of accounting for these activities in the first commitment period.⁴ However, the design of systems to be included in legislation for Kyoto forest sinks and deforestation over the first commitment period should be sufficiently flexible to accommodate 'additional' sink activities under Article 3.4. New Zealand has a cap on the credits it could claim for forest management activities over the commitment period of 1 million tonnes of carbon.

Pre and post 1990 established forests distinction

Under the Kyoto Protocol, a clear distinction is made between forests established before 1990 and Kyoto forests (forests established from 1 January 1990). A system to manage Kyoto forest sinks would provide the means for:

- New Zealand to receive additional emission units, based on the carbon stored in 'Kyoto forests' over the first commitment period 2008-2012 (estimated to be about 110 million tonnes of CO₂ equivalent or 30 million tonnes of carbon)
- obligations to be placed on 'responsible parties' to hold sufficient emission units to offset CO₂ released into the atmosphere through harvesting or deforestation of Kyoto forests

A system to manage non-Kyoto forests (forests already in existence on 1 January 1990) would provide the means for:

- obligations to be placed on responsible parties to hold sufficient emission units to offset emissions of CO₂ into the atmosphere over 2008-2012 from deforestation since 1990, where the land is not replanted but converted to some other land-use.
- credits to be gained (potentially) under article 3.4 for management of non-Kyoto forests

⁴ This analysis is contained in a report commissioned by MAF - "[An Assessment of the Significance to New Zealand of Article 3.4 Activities under the Kyoto Protocol](#)", 8 June 2001, Manaaki Whenua Landcare Research, Forest Research, AgResearch, Crop and Food research Ltd, Piers MacLaren and Associates Ltd, National Institute of Water & Atmospheric Research.

Government decisions and international negotiations

No decision has yet been taken on the final design of the system to manage sinks and the role that the Government might take in that system. However in January 2001, the Government agreed that those undertaking sink activities would receive some (undefined) proportion of the benefit from emission units derived from sinks.

The Government also decided that all or most of the emission units derived from sinks should be tradable within an international emissions trading system. This means that domestic emitters would have to purchase emission units at the international market price. In this way, emission unit revenues are maximised and emitters receive the proper price signals to make efficient buy-or-abate decisions.

In July 2001, the Government released a *Sinks Information Document* to assist the forestry sector to become involved in the development of New Zealand's domestic climate change policy for sinks.

In July 2001, at COP6 in Bonn, the international rules under the Kyoto Protocol for forest sinks were clarified. Agreement was reached on:

- clear and appropriate definitions for sinks activities
- a clear system to account for Kyoto forests with no constraints or discounts on the use of forest sink emission units and inclusion of an accounting framework to deal with harvesting of very fast growing plantation forests during the first commitment period 2008-12 (harvest of Kyoto forests in the commitment period would not accrue any more debits than the credits earned over the same period)
- a clear accounting framework for forest management (of non-Kyoto forests) and agriculture soils management under article 3.4 of the Kyoto Protocol
- protection of the intellectual property rights associated with forestry growth models used for measuring sinks and
- use of sinks in the Clean Development Mechanism (CDM) under article 12 of the Protocol to be constrained by a cap and limited to afforestation and reforestation activities. Further methodological work is required to address specific concerns about sinks in the CDM.

Possible elements of a system to manage forest sinks

The following discussion presents a possible framework for a system to manage forest sinks under the Kyoto Protocol. No decisions have been taken about how a system might operate in New Zealand, so we are seeking comment on the proposals set out below.

The legal nature of emission units derived from sinks

Emission units would be generated or created by eligible sink activities e.g. planting and replanting in Kyoto forests.⁵ Emission units would be created by statute, enabling them to be traded independently from the trees or land from which they were derived.

An emission unit would represent one unit of greenhouse gas emissions sequestered in a Kyoto forest, and would be denominated as one tonne of CO₂ equivalent. Each emission unit would exist electronically and have a unique serial number. Emission units would be able to be used to offset an equivalent amount of emissions, and would remain valid during the commitment period until used. Emission units unused at the end of the first period could be held or “banked” for use in subsequent commitment periods.

It may be necessary to make application for emission units voluntary, because the compliance and administrative costs for small forestry blocks could be greater than the benefits provided by emission units (this will be dependent on the level of costs, and the international price for a unit of carbon). However, obligations to hold emission units for harvesting and deforestation would presumably be mandatory.

In order to be tradable, emission units may have certain characteristics. In particular, an emission unit may be proprietary in nature, so that a holder can have ownership over it. The general law relating to commerce and trade could apply, including the Fair Trading Act 1986 and the Commerce Act 1986.

The taxation implications for the allocation and trading of emission units derived from sinks are being examined by the Government.

Options for allocation of emission units derived from sinks

As stated above, the Government previously agreed that some proportion of the benefit from emission units derived from sinks should accrue to ‘those undertaking sink activities.’ Those undertaking sink activities are either forestry rights owners or owners of the underlying land on which Kyoto forests are planted.

The Forestry Rights Registration Act 1983 provides for the creation and registration of rights to establish, maintain and harvest trees. However, that Act does not provide the necessary framework for the sequestration capability of trees to be identified, registered and traded. This would need to be established under new legislation.

There are several options regarding who would be the principal “responsible party” and the initial legal owners of emission units derived from sinks e.g.:

- Option 1: The Government could retain all emission units and related responsibilities from Kyoto forests; or

⁵ See the glossary section for definitions of forest, afforestation, reforestation and deforestation.

- Option 2: The Government could devolve a proportion of the emission units and related obligations to land/forestry rights owners and retain a proportion to hold or sell; or
- Option 3: Land/forestry rights owners could receive all emission units and related obligations.

Any decision on the proportion of emission units to be held by the Government can only be made following decisions on the nature of the system to be implemented. This decision would need to consider the desirability of incentives to protect and enhance sinks and reservoirs, plant new sinks, and participate in a sink scheme that would also impose obligations. While most forest planting occurs because of the potential value of the timber, the Protocol can provide for additional incentives through the realisation of the carbon value in forests.

It is accepted that forestry rights owners and landowners have a direct incentive to make decisions regarding the future of their forests. Establishing forestry rights owners or landowners as the principal owners of emission units would provide the strongest additional incentives to protect and enhance sinks, plant new sinks, and participate in a sink scheme that would also impose obligations. This additional incentive would be reduced if a portion is withheld and would be absent if all emission units were retained by the Government.

In determining the proportion of benefit to apportion to those undertaking sink activities, the Government must also consider its role and responsibilities as a signatory to the Kyoto Protocol. The Government could, for example, use emission units:

- to meet verification /auditing costs;
- to cover liabilities for some/all eligible forestry emissions;
- to manage risks arising from fire/biosecurity damage in Kyoto forests; and
- for other “public good” reasons.

Criteria for allocation of emission units derived from sinks

The criteria for allocating emission units have yet to be determined. Eligibility and verification tests are likely to be part of any application process to receive emission units.

Eligibility tests would relate to the ‘qualifying’ forestry activities and rules agreed internationally under Article 3.3 of the Kyoto Protocol. To claim emission units derived from sink activities, responsible parties would need to demonstrate that their forest was a Kyoto forest established through either afforestation or reforestation on land that was not in forest on 31 December 1989.

Verification tests would relate to the accurate measurement, reporting and audit of the carbon content in Kyoto forests.

Emission units derived from sink activities would be allocated in exchange for the land/forestry rights owner satisfying these information requirements and demonstrating that they are the eligible legal entity.

General obligations

While the applications for allocation of emission units derived from sinks could be voluntary, New Zealand has a mandatory obligation to report and to account for increases and decreases in carbon stock. This national obligation could be accounted for through the placement of the point of obligation. 'Point of obligation' is the term used to identify the person or organisation (such as a business) that has a legal responsibility to monitor and report emissions and, at the end of each reporting period, to hold and retire a quantity of emission units equal to emissions.

Points of obligation or 'responsible parties' for forestry emissions would have the same obligations imposed on them as would emitters in other sectors. In addition, forestry points of obligation would be required to measure, report and verify carbon sequestration in order to claim emission units. The detail of general obligations to be placed on a point of obligation for forestry would be provided in regulations. For example, points of obligation would be required to:

- register with the national registry and hold an account for emission units with sufficient emission units to cover their emissions over the period
- verify and accurately report emissions and sequestrations to the national inventory in accordance with rules established in regulation
- disclose information for effective compliance.

Options for a point of obligation for forestry

The point of obligation in the forestry industry would have to account for emissions from deforestation and for reductions in the carbon stocks of Kyoto forests.

- a point of obligation for Kyoto forests would need to report reductions in carbon stock over the course of the normal harvest regeneration cycle, including acts of deforestation
- a point of obligation for non-Kyoto forests would only need to report reductions in carbon stock from deforestation.

Points of obligation must have the capacity to trade emission units and must be legal entities against which sanctions (for non-compliance with reporting or other requirements) can be effective. A point of obligation could be:

- Option 1: the Government; or
- Option 2: the landowner; or
- Option 3: the forestry rights owner.

Option 1 – The government as point of obligation

The Government or a government entity could be responsible for emission obligations arising from deforestation. This would be most logical if the Government retained some or all of the emission units generated from Kyoto forests, which would compensate for any costs arising from harvesting and perhaps deforestation.

This approach would have the advantage of avoiding perverse incentives for premature harvest prior to 2008. However, it would not provide any incentive against deforestation during the commitment period, and if the Government retained emission units, land/forestry rights owners would lack additional incentives for new planting. This approach would also expose the Government to fiscal liability if there were a future significant conversion of forest land to non-forest land.

Option 2 – Land owners as point of obligation

Placing emissions obligations on landowners would create a direct incentive to replant non-Kyoto forests following harvest. If emission units are allocated then landowners would also have an incentive to weigh up the benefit of emission units from a Kyoto forest on their land against the obligations that occur if and when it is eventually harvested.

For forests already planted, landowners will benefit from any emission units allocated and would be adversely affected by obligations, while forest owners would be unaffected. Consideration needs to be given to existing contractual arrangements between landowners and forestry rights owners. In some cases, contracts may require, following harvest, the return of land ready for replanting.

Any emissions obligations on forestry conversions after 1 January 2008 may create an incentive to deforest non-Kyoto forests prior to that date to avoid obligations. Premature harvest could cause disruptions to the forest products industry (this is the ‘perverse incentive’ referred to above).

As with Option 3 below, the nature and tenure of the legal relationship between the landowner and the forestry rights owner would need to be considered in relation to the allocation of emission units and obligations.

Option 3 – Forestry rights owners as point of obligation

Placing emissions obligations on forestry rights owners may create the most direct incentive to replant non-Kyoto forest following harvest. It would also encourage those owning Kyoto forests or contemplating planting Kyoto forests to weigh up the benefit of emission units against the obligations if and when a Kyoto forest is eventually harvested. An effective reporting, verification and audit system would be necessary to track carbon stock changes, whether positive or negative.

Because replanting does not necessarily immediately follow harvest, for non-Kyoto forests a time period would need to be specified within which replanting (or

promotion of natural regeneration) must take place in order to gain exemption from emission obligations⁶.

As with Option 2 above, this option would also provide an incentive to harvest prior to 1 January 2008 to avoid deforestation obligations over the commitment period.

Carbon accounting and measurement methodologies

Carbon accounting methodologies and measurement would be provided in regulations.

The actual methodology for measurement and accounting may depend upon the level of devolution of emission obligations.

If emission units were fully retained by the Government, then it is possible that the methodology used could remain at a very high level, e.g.:

- modelling based on areas derived from satellite observations combined with national averaged figures for carbon accumulation in vegetation and/or a physical sampling methodology based on a randomised national sampling regime in association with areas derived from satellite.

If emission units are fully or partially devolved to land owners/forestry rights owners then the methods for accounting may need to become more site specific, e.g.:

- physical measuring of forest areas within defined legal boundaries and developing regionally specific carbon models and
- establishing an internationally acceptable auditing process

Whichever system is used there will be a need for the Government to monitor the extent of afforestation, reforestation and deforestation. This will require the establishment of an “inventory” to act as a repository for all information collected and to monitor at a national level the changes in carbon sequestration as a result of Article 3.3 forest definitions.

Institutional arrangements: National Registry, National Inventory and audit

Establishment of a National Registry and National Inventory

A National Registry would ensure accurate accounting of the issuance, holding, transfer, acquisition, cancellation, retirement and carry-over of emission units.

The establishment of the registry is a requirement of the Kyoto Protocol. Its primary function is to account for changes in New Zealand’s assigned amount. Accounting

⁶ Most commercial replanting takes place within 12 months of harvest, though in some cases up to 18 months is required in order to achieve sufficient control of weeds and other re-growth prior to planting.

for assigned amount is how New Zealand demonstrates internationally that it is complying with its target under the Protocol (i.e. that New Zealand's greenhouse gas emissions do not exceed the assigned amount held in the registry).

Under an emissions trading regime, legal persons (including organisations) would be allowed to hold an emission unit account in the national registry for trading emission units. The appropriateness of eligibility requirements for account holders will need to be considered. (See working paper "Domestic emissions trading" for more detail about a domestic emissions trading regime.)

A point of obligation would be required to hold an emission unit account and be subject to the ongoing obligation to retire sufficient emission units to cover eligible emissions.

The National Inventory would estimate greenhouse gas emissions and removals by sinks to show compliance with the Protocol. The national inventory would also record entity data on emissions (including deforestation emissions) for points of obligation under a domestic emissions trading regime. A National Inventory and the national system⁷ that underpins it are a pre-requisite for participation in international emissions trading. (For more information about the proposed National Register and National Inventory, see the working paper "Legislation to ratify the Kyoto Protocol".

New Zealand is already required to annually report national inventory data under the United Nations Framework Convention on Climate Change (UNFCCC).

Audit of points of obligation

There would need to be provision for a regulator to periodically audit activities that lead to reductions in carbon stock for which New Zealand is accountable (i.e. deforestation followed by land conversion, and harvesting of Kyoto forests). Similarly, audits could also check the system's rigour regarding claims to and verification of emission units.

Periodic audits would guard against over-claiming of emission units and under-reporting of emissions.

Compliance with the system

The compliance, liability and penalties regime would provide clear standards of behaviour for points of obligation and a comprehensive set of penalties for failure to comply. Coupled with an audit process, the aim of the system is to encourage reporting by points of obligation.

⁷ A national system (the institutional and legal arrangements for the national inventory) is a requirement of Article 5 of the Kyoto Protocol.

Conclusion

The Government has not yet taken decisions on the detail of a sinks management system that might apply in New Zealand, but it will need to do so if New Zealand is to ratify the Kyoto Protocol.

This paper sets out a discussion of two key issues:

- who should own sink credits, and
- who should have responsibility for greenhouse gas emissions from forestry

The paper also maps out some broad proposals for a practical system to manage sinks.

Comments are invited on all aspects of sinks management during the current consultation process. Feedback received will help the design of more detailed proposals in 2002.

Glossary

Afforestation	The Kyoto Protocol defines 'afforestation' as "The direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources."
Assigned Amount	Binding emission reductions targets specified in the Kyoto Protocol. Targets are based on 1990 base year emissions, calculated as a quantity of allowed emissions, or initial assigned amount. More broadly, "Assigned Amount" includes any of this initial assigned amount that remains within the country, plus initial assigned amount from other countries, plus additional assigned amount from sinks (sink credits) plus emission credit units from projects in developed or developing countries. All forms of assigned amount will be tradable.
Carbon sequestration/absorption	Generally refers to capturing carbon – in a sink, so as to keep carbon out of the atmosphere.
Clean development mechanism (CDM)	One of the Kyoto implementation mechanisms designed to assist both developed and developing countries by allowing certified emissions reductions accruing from projects in developing countries to contribute to compliance with Protocol commitments by developed countries.
Commitment period	A range of years within which parties to the Kyoto Protocol are required to meet their GHG emissions reduction target, which is averaged over the years of the commitment period. The first commitment period is 2008-2012.
Deforestation	The Kyoto Protocol defines 'deforestation' as "The direct human-induced conversion of forested land to non-forested land."
Emission unit	A legal allowance that authorises a point of obligation to emit a unit of greenhouse gas emissions. The unit is likely to be denominated as 1 tonne of CO ₂ equivalent, and could be "banked" for use in future commitment periods.
Emissions trading	<p>Domestic Emissions Trading - "Emissions trading" refers to a regulatory regime in which specified businesses and other organisations would have obligations to report their emissions and to hold or purchase a corresponding number of emission units. The units would be tradable, and those with obligations could decide how much to reduce emissions and how many units to purchase. Responsible parties who deforest land, or who harvest "Kyoto" forests, would also have obligations to acquire the necessary number of emission units (or sink credits) for the carbon released upon deforestation or harvesting.</p> <p>International Emissions Trading – Transfer of assigned amount between Parties listed in the Kyoto Protocol, either between governments or between persons within these countries that have been authorised to trade.</p>
Forest The definition of a forest must give each country flexibility to take into account differing national circumstances. In this sense the definition here gives	The Kyoto Protocol defines 'forest' as "A minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 metres at maturity in situ. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands

scope for countries to choose three variables, tree height, tree crown cover and forest area.	and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 metres are included under the definition of forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest.
Greenhouse gases (GHGs)	Trace gases in the atmosphere whose properties relate to the transmission or reflection of different types of radiation. The increased concentration of such gases in the atmosphere, which contributes to global warming, is a result of the use of fossil fuels, the emission of pollutants into the atmosphere and deforestation. The greenhouse gases covered by the Kyoto Protocol are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.
Kyoto forest	A forest planted since 1 January 1990 on land that was previously non-forest.
Non-Kyoto Forest	Or 'pre-1990 forest', refers to forests already in existence on 1 January 1990.
Point of obligation (in a domestic emissions trading system)	A point of obligation is a person or organisation (such as a business) that has a legal responsibility to monitor and report emissions and, at the end of each reporting period, to hold and surrender a quantity of 'emission units', equal to their emissions.
Reforestation	The Kyoto Protocol defines 'reforestation' as "The direct human induced conversion of non forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989."
Sink	Any natural or man-made systems that absorb and store GHGs, including CO ₂ from the atmosphere. To be considered a sink, a system must be absorbing more CO ₂ than it is releasing so that the store of carbon must be expanding.
Sink credit	A unit "certificate" representing a specified amount of greenhouse gas absorbed in a "Kyoto forest" over a specified time period. Sink credits would be equivalent to emission units and could be used to meet emission obligations under the emissions trading system. A sink credit would be likely to represent 1 tonne of CO ₂ absorbed after 1 Jan 2008. Also referred to as 'emission units' derived from sink activities.