

Forests and climate change agreements

Andrea Brandon and Nigel Searles

Abstract

All forests play a key role in the global carbon cycle, which is why they are included in international climate change agreements. In this paper, we present a brief explanation of the key differences between reporting and accounting obligations for forests under these agreements and provide a summary of the carbon stock and change that has occurred in New Zealand's forests since 1990. We explain how New Zealand met its first legally binding emissions reduction target for the period 2008 to 2012, and present carbon budgets and forestry projections where available for the periods 2013–2020 and 2021–2030.

Forestry reporting and forestry accounting

Understanding how forests are treated in the international climate change agreements that New Zealand has signed up to can be difficult, as each has different reporting obligations. The agreements themselves can be difficult to understand and ambiguous because consensus in the negotiations is often reached at the expense of clarity. There must also be a degree of flexibility provided in the agreements to allow for national circumstances.

The carbon stock change occurring in all managed lands, including forest land, is reported annually under the United Nations Framework Convention on Climate Change (UNFCCC). The signatories to the UNFCCC are

required to report all carbon stock change occurring in managed forests. However, not all of these stock changes are fully accounted for internationally within the current forestry accounting settings under the Kyoto Protocol, the legally binding accounting instrument of the UNFCCC.

Three key principles sit behind the current forestry accounting rules for managed forest land under the Kyoto Protocol. From a given reference point or base year (i.e. 1990 under the Kyoto Protocol) the rules intend to:

- Reward the establishment of new permanent forests (post-1989 forests, also known as 'afforestation and reforestation' under the Kyoto Protocol)
- Penalise permanent forest loss (deforestation of all forests)
- Reward improved and/or penalise poor forest management practices in existing forests (pre-1990 forest, also known as 'forest management' under the Kyoto Protocol).

New Zealand considers all its land area managed (this is not universally applied by other countries however), so therefore its National Greenhouse Gas Inventory reports carbon stock change across all land use categories on an annual basis. While New Zealand reports the stock change occurring in all managed forests under both the UNFCCC and the Kyoto Protocol, not all are fully accounted for internationally.

Table 1: Based on April 2016 NIR submission (1990–2014) (1) under the UNFCCC (units are in Mt of CO₂-e)

Land use category	1990–2007			2008–2012		2013–2014		1990–2014
	Stock 1.1.1990	Stock 31.12.2007	Stock change	Stock 31.12.2012	Stock change	Stock 31.12.2014	Stock change	Stock change
Natural forest	9,267	9,355	88	9,380	25	9,390	10	123
Planted forest (2)	1,084	1,760	676	1,883	123	1,922	39	838
Shrubland	737	693	–44	686	–6	684	–2	–53
Other land uses (3)	6,936	6,746	–190	6,745	–1	6,747	2	–189
Total	18,025	18,555	530	18,695	140	18,744	49	720

Note: (1) www.mfe.govt.nz/publications/climate-change/new-zealand-greenhouse-gas-inventory-1990-2014; (2) Includes harvested wood products; (3) Includes emissions from deforestation

Table 2: 2013–2020 projections for forestry accounting quantities and the whole sector (LULUCF) (units Mt CO₂-e)

Projections 2013–2020 (Mt CO ₂ -e)	2013	2014	2015	2016	2017	2018	2019	2020	Total
Forestry accounting (NZ's Net Position Report) (1)	12.7	11.9	13.7	15.7	15.8	12.6	12.7	13.0	108.1
LULUCF (BR) (2)	26.8	19.2	18.5	18.5	18.6	18.1	21.5	24.2	165.4

Notes: (1) www.mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/latest-2020-net-position; (2) www.mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/nzs-national-communication-and-biennial-report

Within a given accounting period, afforestation, reforestation and deforestation are fully accounted for, but forest management is accounted for, in New Zealand's case, against a business-as-usual reference level. This means for forests that already existed in 1990 only the amount of carbon stock change that is either above or below that expected is accounted for. In addition, there is a cap on the credits that can be earned from forest management but no cap on the debits.

Forests in the National Inventory of Greenhouse Gases 1990–2014

Since 1990, New Zealand's Land Use, Land-use Change and Forestry (LULUCF) sector has been a net sink of carbon, removing the equivalent of 720 million tonnes (Mt) of CO₂ from the atmosphere over this time period (see Table 1).

Accounting for forestry emissions under the Kyoto Protocol

2008 to 2012

New Zealand met its target under the first commitment period of the Kyoto Protocol (CP1, 2008–2012) with a surplus of 123.7 million units (see https://unfccc.int/files/kyoto_protocol/reporting/true-up_period_reports_under_the_kyoto_protocol/application/pdf/true-up_period_report_by_new_zealand_2015.pdf).

New Zealand's carbon budget for CP1 was 309.6 million units (the target to limit emissions in CP1 to 1990 levels). Gross emissions during the period were 372.8 Mt of CO₂ equivalents (CO₂-e), which created a shortfall of 63.2 million units. Gross emissions includes emissions from agriculture, energy, industrial processes and waste. CO₂ equivalents or CO₂-e describes different greenhouse gases in a common unit and here includes methane and nitrous oxide as well as CO₂.

Forestry activities contributed 71.6 million units towards the national accounts, leaving a surplus of 8.4 million units for the period. At the end of the true-up period, the additional period for fulfilling the commitments for the first commitment period of the Kyoto Protocol, New Zealand also held a further 116.1 million Kyoto units in its national accounts. These were derived from various activities including transfers

and trades, with the majority obtained as surrenders via the NZ ETS (see www.mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/nzs-net-position-under-kyoto-protocol/update-net).

The accounting quantity for forestry of 71.6 million units was calculated by estimating the amount of CO₂-e removed from the atmosphere by forests established since 1990 less the emissions occurring from deforestation activities over the period. During the same period, the entire LULUCF sector removed 140 Mt CO₂-e.

2013 to 2020

New Zealand's carbon budget for the 2013–2020 period is 509.8 million units (the target to limit emissions to 5% below 1990 levels by 2020).

Based on the most recent information available, the accounting quantity from eligible forestry activities is projected to be 108.1 million units (see Table 2). Recognising the surplus of 123.7 million units from CP1, New Zealand expects to hold 741.6 million units at the end of the 2013–2020 period. Gross emissions are projected to be 655.9 Mt of CO₂-e, therefore New Zealand currently projects a surplus of 85.7 million units for the period 2013–2020. During this period, LULUCF is projected to remove 165.4 Mt of CO₂-e from the atmosphere (see Table 2).

Post-2020

New Zealand's carbon budget for 2021–2030 is 610.9 million units (see www.mfe.govt.nz/climate-change/nz-ets-and-nzs-carbon-budget-in-the-2020s). Gross emissions are projected to be 846.1 Mt CO₂-e over the period, creating a shortfall of 235.2 million units. Projections for the contribution that forestry will make towards meeting New Zealand's 2021–2030 emissions reduction target are not currently available. During the 2020s, LULUCF as a whole is projected to continue to provide a net sink of CO₂, with currently available estimates projected to remove the equivalent of 166.8 Mt of CO₂-e from the atmosphere.

Andrea Brandon and Nigel Searles are Senior Analysts working with the Land Use and Carbon Analysis System at the Ministry for the Environment based in Wellington. Corresponding author: andrea.brandon@mfe.govt.nz.