
Understanding Land Use in the UNFCCC



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1. Introduction

1.1. Why was this Guide created?

The objective of this Guide is to increase the technical understanding of the treatment of land use under the United Nations Framework Convention on Climate Change (UNFCCC). The land use sector comprises land use, land use change and forestry (LULUCF) and agriculture, sometimes referred to collectively as agriculture, forestry and other land use (AFOLU). The Guide covers¹:

- Reporting requirements for land use in national greenhouse gas (GHG) inventories for all Parties;
- Rules used by Annex I² Parties in connection with commitments under the Kyoto Protocol (KP);
- Guidance provided to developing countries pursuing activities related to reducing emissions from deforestation, reducing emissions from forest degradation, conservation of forest carbon stocks, sustainable management of forests and/or enhancement of forest carbon stocks (REDD+).

The Guide aims to explain key decisions under the UNFCCC related to land use reporting and accounting (e.g. forest-related reference levels, natural disturbances, etc.). The Guide provides information on how issues are applied in practice and concrete examples to illustrate the challenges around reporting and accounting of land use. The Guide does not cover all the options that have been considered during negotiations that led to decisions under the UNFCCC and its Kyoto Protocol, and it does not opine on a future agreement and what options may be considered under the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP).

The authors of this Guide have sought to be fact based, objective, and without prejudice to particular national positions in the UNFCCC negotiation process. The Guide has been through a peer review process by a geographically and institutionally diverse range of stakeholders to ensure fair treatment of issues.

1.2. What is “land use”?

There are many ways to categorize land (see Figure 1, following page). These can vary from country to country based on how land is used. Furthermore, countries may define land-use categories in various ways; for example, the definition of forest land based on biophysical thresholds (e.g. minimum tree height, percent crown cover, minimum area) may differ by country³.

Land Use Categories. For the purposes of this Guide, we focus on the six land-use categories proposed by the Intergovernmental Panel on Climate Change (IPCC)⁴ in the *Good Practice Guidance for Land Use, Land-use Change and Forestry (GPG-LULUCF)*⁵ and in the *2006 IPCC*

¹ While equally important to other elements included in this Guide, Nationally Appropriate Mitigation Actions (NAMAs) are not covered as there is no specific guidance provided within the UNFCCC for design of NAMAs.

² The Convention, in Annex I, listed developed countries and “countries that are undergoing the process of transition to a market economy” whose responsibilities were differentiated from developing, or non-Annex I, countries.

³ The Kyoto Protocol requires countries to define forests within specific boundaries; reporting under the UNFCCC does not.

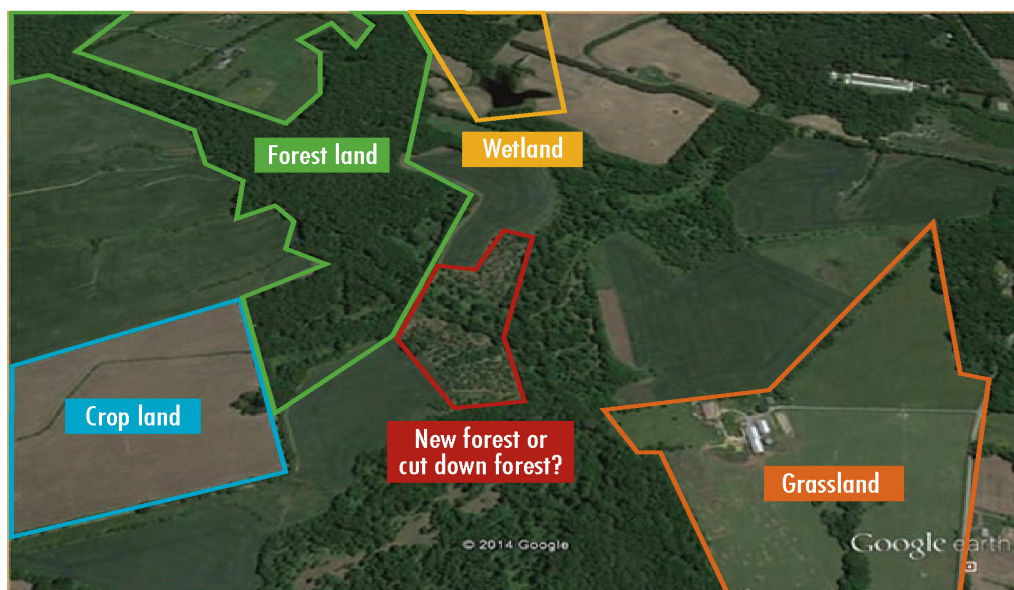
⁴ The IPCC is a scientific body under the auspices of the United Nations (UN). It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. For more information see: <http://www.ipcc.ch/>

⁵ Available at: <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html>

*Guidelines for National GHG Inventories, Volume 4, Agriculture Forestry and Other Land Use*⁶ (2006 IPCC Guidelines):

- Forest land
- Cropland
- Grassland
- Wetlands
- Settlements
- Other lands (e.g. bare soil, rock, ice, etc.)

Figure 1: Example of stratification of land into various land-use categories



The 2006 IPCC Guidelines use these categories for the purposes of estimating anthropogenic emissions and removals from land use, land-use change and forestry. The same six categories are used in the agreed UNFCCC Common Reporting Format (CRF) for submission of developed country (Annex I) national GHG inventories⁷ (see Table 4 in Section 2.1.2).

LULUCF Pools. For each of the six land-use categories, emissions and removals from the following pools are estimated:

- Living biomass (separate above- and below-ground values required by the KP)
- Dead organic matter (deadwood and litter)
- Soil organic carbon (mineral and organic)

In addition, wood products such as timber used in construction or furniture, referred to as harvested wood products (HWP) are reported as an additional pool under LULUCF (see Section 5 for more information on HWPs).

LULUCF vs. AFOLU. In addition to CO₂ emissions and removals from gains and losses associated with the LULUCF pools and the six land use classifications identified above, there are additional *agricultural practices* on farms, such as burning of crop residues, fertilizer application, rice cultivation, and emissions related to livestock (enteric fermentation and manure management) which produce emissions, mainly of methane and nitrous oxide (see Figure 2, following page). Such

⁶ Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

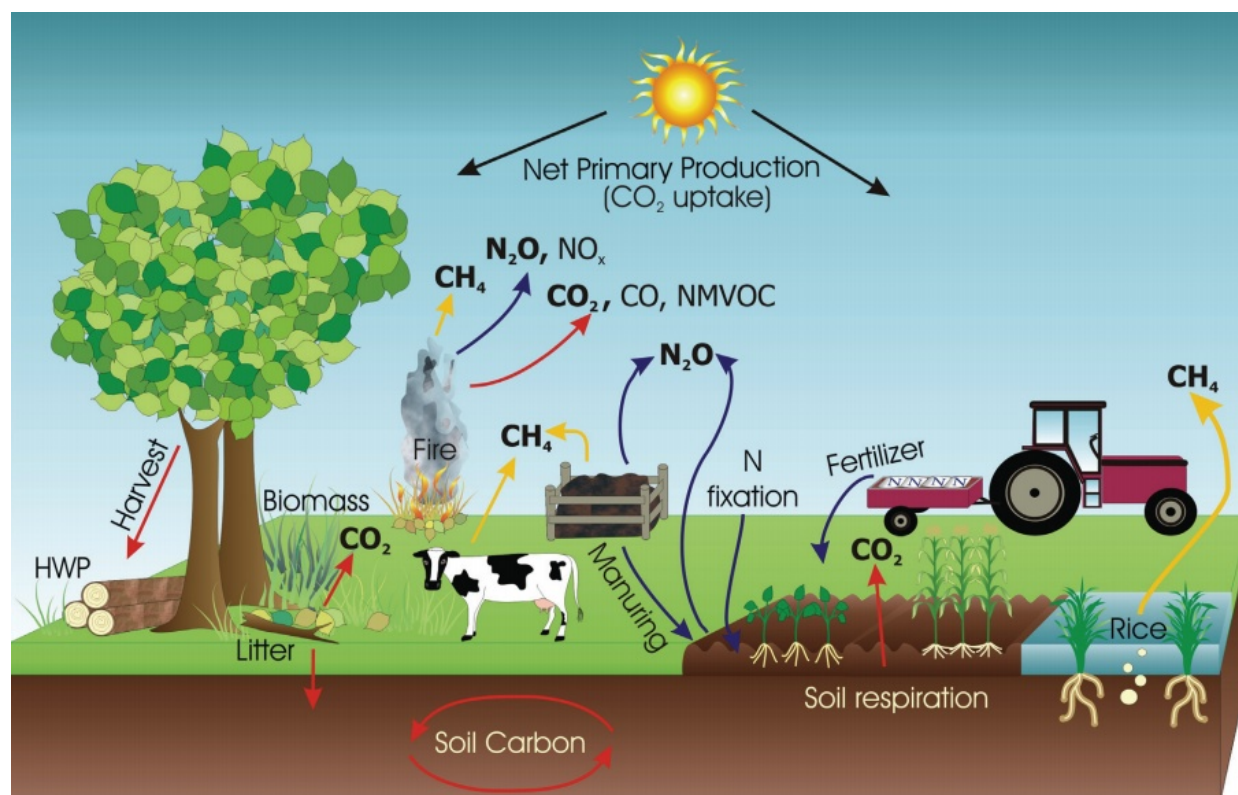
⁷ Available at: http://unfccc.int/national_reports/annex_i_ghg_inventories/reporting_requirements/items/5333.php

emissions were included under “Agriculture” in the *Revised 1996 IPCC Guidelines for National GHG Inventories*⁸ and the *IPCC Good Practice Guidance*, rather than LULUCF. There are also emissions associated with fuel combustion (e.g. machinery and transport of forestry and agriculture products); but these emissions are treated under the Energy sector.

Note: In the remainder of this text, when Agriculture (with a capital A) is used, it refers to the non- CO_2 emissions cited above related to agricultural practices, and not to CO_2 emissions or removals from croplands, which are included in LULUCF.

In the 2006 IPCC Guidelines, LULUCF and Agriculture are merged into a two-part volume referred to as AFOLU (Agriculture, Forestry and Other Land Use). The UNFCCC has adopted the 2006 IPCC Guidelines for Annex I Parties reporting from 2015; until now, agriculture and LULUCF have been addressed separately. The difference between LULUCF and agriculture is mainly that removals and carbon storage are possible (as well as emissions) in LULUCF, whereas there are only emissions in agriculture. This tends to make LULUCF more complicated (see Section 2.1.2 for more information).

Figure 2: Illustration of land uses that result in emissions and removals⁹



1.3. Why is land use different from other sectors?

Below are some ways in which LULUCF differs from energy, industrial processes, waste, and Agriculture emissions that are reported under the UNFCCC. These differences explain the complexity of LULUCF, and underlie the reason why UNFCCC continues to separate LULUCF in its reporting.

⁸ Available at: <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html>

⁹ Pictorial representation from 2006 IPCC Guidelines, Volume 4, available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_01_Ch1_Introduction.pdf

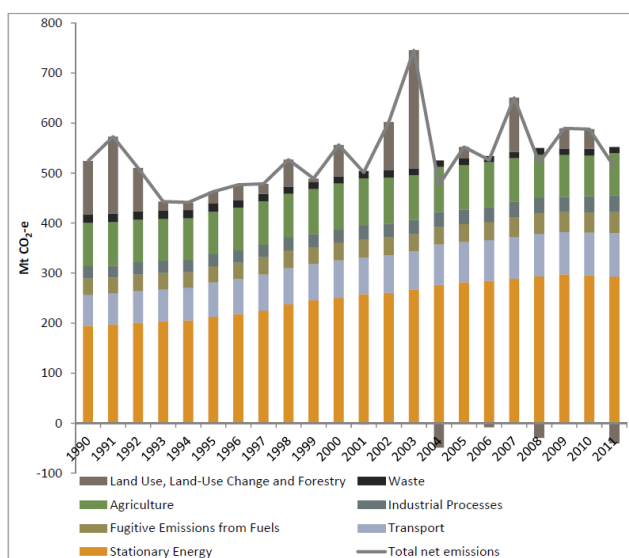
Land use can act as a sink or a source. Unlike other sectors, land use includes both emissions and removals of CO₂. For many developed countries forest land is a net sink, although for a few it constitutes a net source. See Section 1.4 for more details.

Stocks versus fluxes. In some cases, to estimate emissions and removals in land use the difference in carbon stocks is measured (called the stock-difference method) instead of looking directly at the fluxes (i.e. measures of emissions over an interval of time), as in the other sectors. Different land uses have different carbon stocks; when converting from one land use to another land use it is assumed that the carbon stocks over time will reach the average carbon stocks of the new land use, and emissions and removals of CO₂ can be estimated on this basis.

Natural effects can be relatively large. The impact of droughts, floods, wind storms and wildfires on the net-balance of emissions and removals from land use can be significant and may in some years exceed the impacts of management practices on the same ecosystems. Some extreme, natural events have low predictability and variable frequency and magnitude, and are manageable only to a limited extent¹⁰. See Section on Natural Disturbances for more information.

Figure 3: The effect of wildfires on Australia's GHG Inventory¹¹

Australia's GHG inventory illustrates how natural disturbances result in high year-to-year variability and unpredictability of emissions in the LULUCF sector, on an order of magnitude that is significant for Australia's net total GHG flux. Wildfires, in particular, constitute a major natural hazard for the country. In 2003, Australia experienced the largest area burnt by wildfires since 1990, over 4.5 million hectares—an area three times that burned in 2007, the 2nd most severe fire year for the country. Such fires resulted in anomalously high emissions from 'forest land remaining forest land' in Australia's GHG inventory.



It is difficult to separate natural and anthropogenic effects. The IPCC states that it is difficult to distinguish causal factors in the land sector that result in emissions or removals. For example, emissions from fires may originate from either natural causes (e.g. climate cycles, lightning), or indirect and direct human causes (e.g. past forest harvest activities, unintended spread of deliberately set fires or, in some parts of the world, climate change), or a combination of causes¹².

Trends can be cyclical. While other types of emissions may also have cyclical trends, for example those that tend to follow economic ups and downs or variations in seasonal weather, emissions from land use can experience more regular cycles related to timber harvesting (e.g., those linked to forest

10 Canaveira, Paulo (2014). Options and Elements for an Accounting Framework for the Land Sector in the Post-2020 Climate Regime. Terraprima Report to the Swiss Federal Office for the Environment, February 2014.

11 Australia's Sixth National Communication on Climate Change (2013), and Australian National Greenhouse Accounts (NIR 2011, Vol. 2 published April 2013).

12 IPCC Guidelines, Volume 4 (AFOLU), Chapter 1 (Introduction), p 14-15. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_01_Ch1_Introduction.pdf

age structure) or replacement of perennial tree crop systems. Such cycles can cause difficulties if the length of a time of a mitigation commitment is shorter than a full cycle or if a single base year (that does not reflect the average emissions over one cycle) is used as a reference level, particularly for smaller countries that cannot average out effect over large areas of land. *For more information, see the Section on Baselines and Reference Levels.*

Legacy effects. Both natural disturbances and past-management decisions, in particular actions that affect the age distribution of plantation forests (e.g. harvesting or reforestation) can have a long-term effect on carbon fluxes, including sequestration rates, from decades to hundreds of years later. There are even more significant legacy effects associated with the draining of peatlands that continue to emit large quantities of CO₂ for decades as layers of organic soil accumulated over millennia are subject to aerobic decomposition.

The legacy impacts on emissions are not exclusive to the land use sector. For example, energy emissions in most countries are influenced by the existing stock of capital invested in certain technologies and fuels (including the most polluting ones) that reflect choices made over many years before governments made any policy changes justified by concerns about climate change. Policies to change technology, introduce renewable sources of energy, or promote fuel switches will take time to have a visible impact, while older technology and fuel choices are not yet decommissioned or reconverted to other less emitting sources¹³. What is exclusive to land use is the cyclical legacy effects related to harvest and replanting in forests identified in the previous bullet.

Saturation. The term saturation is used to indicate that, at some point, the sink on an area of land which has storage capacity may fall to zero as the carbon pools approach a steady state where gains due to growth are balanced by losses due to decay¹⁴. However, more recent evidence suggests that many ecosystems continue to trend upward in carbon content indefinitely.¹⁵ Countries with older forests may view their forests and soils more as a risk than an opportunity in terms of mitigating climate change, fearing it more likely that they will lose carbon rather than gain it in future. This is particularly true if a net-net accounting approach (see Section 3.1.1) is used, i.e. a country may underperform if it is unable to continue current rates of growth.

Non-permanence. Non-permanence relates to the risk that terrestrial carbon can be released into the atmosphere due to natural and/or anthropogenic (i.e. human) causes. This is of particular concern when the CO₂ removed from the atmosphere enters the accounting system to demonstrate compliance with the committed emission reductions (e.g. as part of a national commitment) and is subsequently released and emitted into the atmosphere.¹⁶ *See Section 6.2 on non-permanence for more information.*

Emissions and removals are distributed. The largest source of emissions, the energy sector, tends to originate from “point-sources” (e.g. a power plant, cement factory, etc.). In contrast, land spans large areas and involves multiple stakeholders in its management, which has consequences for both the management, and estimation, of emissions and removals. Measures to manage

13 Canaveira, Paulo (2014). Options and Elements for an Accounting Framework for the Land Sector in the Post-2020 Climate Regime. Terraprima Report to the Swiss Federal Office for the Environment, February 2014

14 Schlamadinger et al, “A synopsis of LULUCF under the Kyoto Protocol and Marrakesh Accords”, Environmental Science & Policy 10 (2007) 271-282.

15 Stephenson, N.L. et al, “Rate of tree carbon accumulation increases continuously with tree size”, Nature (Jan 2014); Luyssaert, S. et al, “Old-growth forests as global carbon sinks”, Nature (Sep 2008); Pan, Y. et al, “A Large and Persistent Carbon Sink in the World’s Forests”, Science (Aug 2011).

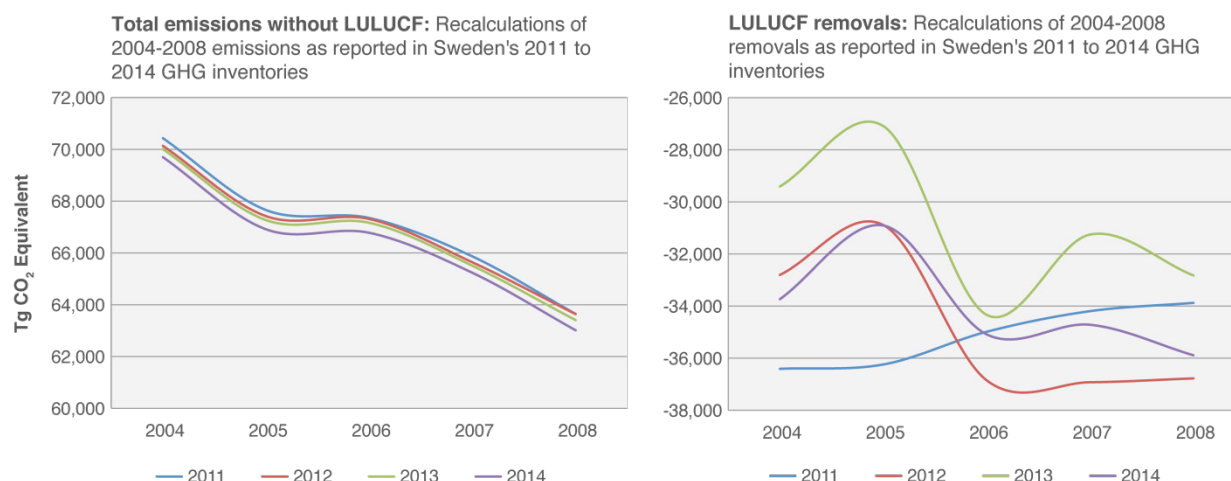
16 Such non-permanence risk is currently only treated within the Clean Development Mechanism for afforestation and reforestation, but not in other sectors.

emissions tend to become more difficult with more actors involved; this is particularly true in countries where land tenure is unclear and land is used by multiple communities. Estimation of emissions and removals also becomes more difficult and, in many cases, cannot be done in the same manner as other sectors that use production data from national statistics. For the land use sector, countries often do not have national statistics, e.g. for soil carbon, and therefore use proxies for carbon stocks and their fluxes for different land uses in order to estimate emissions and removals. This knowledge is constantly improving and leads to frequent and often quite large recalculation of historic emissions (see below for more detail on recalculations). Recalculations can be large because it involves the entire land surface and because terrestrial carbon stocks are very large compared to the annual net emissions.

Recalculations can result in significant changes in reported emissions/removals. The UNFCCC allows and encourages (as part of good practice) countries, over time, to improve methodologies for estimating emissions and removals. GHG inventories typically report on emissions/removals for a historic time period (e.g. 1990 to the present). These time series are a central component of the inventory, providing information on historical emissions and trends and are important for tracking the effects of measures and actions to reduce emissions at the national level¹⁷. However, countries must ensure consistency, i.e. apply a self-consistent methodology and data (e.g., emission factors), when reporting time series data. Therefore, if a country changes or improves its methods in a particular year, or improves its data, the GHG inventory for that year, where representing a historic time series, should recalculate the entire time series (e.g. dating back to 1990) using the new methodology and/or data.

An example of time series recalculations is provided (see Figure 4), from Sweden's GHG inventory data, illustrating how changes in data or methods can be more significant in the land use sector versus other sectors and add a lower level of predictability to average emissions/removals over a commitment period.

Figure 4: Comparison of recalculations in Sweden's national GHG inventory¹⁸



17 2006 IPCC Guidelines, Volume 1, Chapter 5 (Time Series Consistency). Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

18 Data from Sweden's national GHG inventory submissions (2011-2014). Available at: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php

Uncertainties can be high. Uncertainties associated with land use are significantly higher than those in the energy and industrial sector, although other sources, particularly waste disposal and Agriculture, can also have large uncertainties. As an example, Table 1 provides a comparison of the level of uncertainties for various sectors, based on an aggregate analysis of 15 Annex I European Union countries. Fuel combustion is the largest source of emissions (nearly 80%), but has very low uncertainties. While LULUCF uncertainties are relatively high, emissions comprise only 2.8% of total gross GHG emissions, and therefore would not significantly affect the overall uncertainty of the inventory. Agricultural uncertainties are commonly dominated by the uncertainty in nitrous oxide from fertilizer application, and this may in fact dominate the overall national level uncertainty. Consistent application of inventory methods will reduce the trend uncertainty, as illustrated below.

Table 1: Comparison of Uncertainties by Sector for EU-15 GHG emissions¹⁹

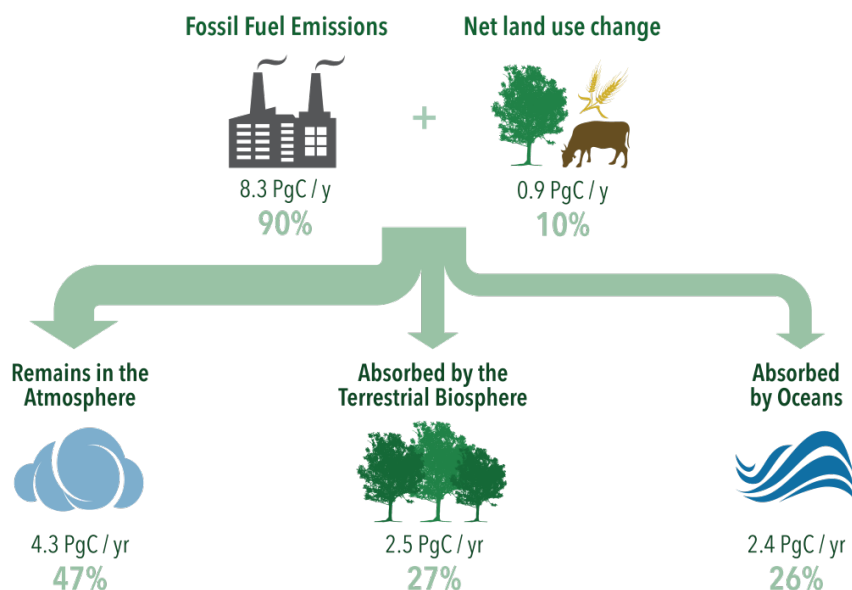
Sector	1990 emissions (Gg CO ₂ Eq.)	2011 emissions (Gg CO ₂ Eq.)	% contribution to gross emissions (in 2011)	Level uncertainty	Trend uncertainty
				estimates based on member state uncertainty estimates (%)	
Fuel combustion	3,182,229	2,853,395	78.8%	1.2%	0.4%
Fugitive emissions	91,122	42,066	1.2%	12.1%	7.1%
Industrial Processes	347,030	250,674	6.9%	9.0%	7.0%
Solvents and other product use	8,012	5,417	0.2%	38.1%	5.5%
Agriculture	433,047	368,929	10.1%	75.9%	7.4%
Waste	171,330	101,593	-3.9%	26.3%	12.7%
LULUCF	-128,679	-142,485	2.8%	31.7%	25.2%

1.4. Why is land use important and what is its relative contribution to GHG emissions?

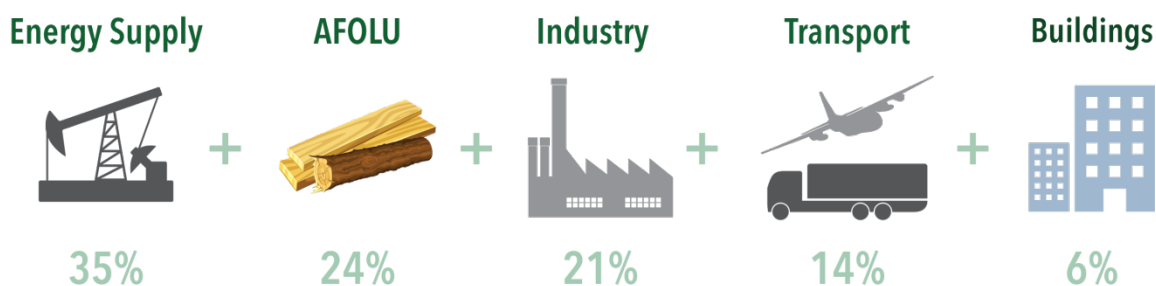
Our planet's terrestrial ecosystem both absorbs and emits significant amounts of greenhouse gases. This arises from the role of the land sector as a biological reservoir of carbon, as part of the atmosphere-ocean-land system illustrated in Figure 5 on the following page. This exchange of greenhouse gases between land and the atmosphere takes place regardless of human activities, but can also be impacted by anthropogenic activities, i.e. the land reservoir of carbon can be increased or decreased due to human activities within the limits of available land area, nutrients, precipitation and wind which all determine boundaries for sequestration of CO₂. Climate change is also impacting these boundaries, for example some areas will have improved growth conditions or longer growing seasons, and others will experience a drier climate and more limited growth. Changes in pest and diseases affecting vegetation as well as changes in the frequency of forest fire and extreme wind storms are also likely to affect the land as a reservoir of carbon and its emissions and removals of greenhouse gases.

Land currently sequesters around 27% of global CO₂ emissions, a similar amount to oceans, with the remaining 47% of emissions accumulated in the atmosphere (see Figure 5, following page)²⁰.

¹⁹ European Environment Agency, *Annual European Union greenhouse gas inventory, 1990-2011 and inventory report 2013: Submission to the UNFCCC Secretariat*, 27 May 2013.

Figure 5: Global atmospheric CO₂ budget, 2002-2011

AFOLU currently accounts for approximately 24% of global emissions (see figure 6). Annual GHG flux from land use and land-use change activities accounted for approximately 4.3 to 5.5 GtCO₂eq/yr, or about 9 to 11% of total anthropogenic greenhouse gas emissions while annual GHG emissions (mainly CH₄ and N₂O) from agricultural production in 2000 to 2010 were estimated at 5.0 to 5.8 GtCO₂eq/yr, comprising about 10 to 12% of global anthropogenic emissions. Furthermore, land related mitigation, including bioenergy, could contribute 20 to 60% of total cumulative abatement to 2030, and 15 to 40% to 2100²¹.

Figure 6: Greenhouse gas emissions by economic sector²²

For Annex I countries, the land use category most often selected as a *key category*²³—i.e. categories that provide a significant contribution, either to the total GHG emissions or removals of the country, or to the trend in emissions—is forest land (see Table 2, following page).

20 Ciais, P., C. Sabine, G. Bala, L. Bopp, V. Brovkin, J. Canadell, A. Chhabra, R. DeFries, J. Galloway, M. Heimann, C. Jones, C. Le Quéré, R.B. Myneni, S. Piao and P. Thornton, 2013: Carbon and Other Biogeochemical Cycles. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, Table 6.1.

21 IPCC Working Group III contribution to the IPCC 5th Assessment Report *Climate Change 2014: Mitigation of Climate Change, Chapter 11 Agriculture, Forestry and Other Land Use (AFOLU)*. Note the version cited was accepted but not approved in detail by the 12th Session of Working Group III and the 39th Session of the IPCC on 12 April 2014 in Berlin, Germany. Publication of the final WG III report is due in late 2014.

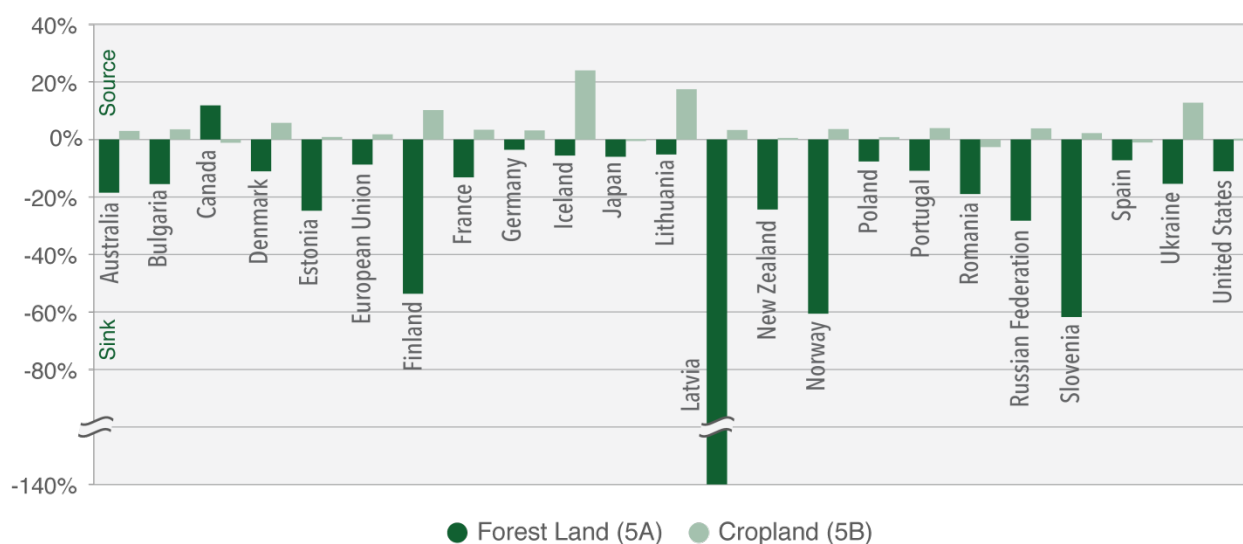
22 IPCC Working Group III AR5 Summary for Policymakers Final Draft, April 2014.

Table 2: Number of Annex I countries that reported selected categories as a key category in 2011 (43 total)²⁴

Category	Number
Forest land remaining forest land	39
Land converted to forest land	13
Cropland remaining cropland	20
Land converted to cropland	12
Grassland remaining grassland	9
Land converted to grassland	9
Wetlands remaining wetlands	0
Land converted to wetlands	3
Settlements	15
Other land	3

Figure 7 illustrates the percent contribution of forest land and cropland emissions and removals for a representative sample of Annex I Parties in 2011 as a percentage of total gross emissions (without LULUCF). There is a significant difference among countries in the relative contribution of LULUCF to total emissions, although for most developed countries, forest lands constitute a net sink. For some countries, CO₂ removals from forest land offset more than 30-40 percent of their total emissions from other sectors, while for others only a few percent. Figure 7 also shows that cropland, for most countries, constitutes a net source of emissions.

Figure 7: Importance of Forest land (5A) and Cropland (5B) in 2011 compared to total emissions without LULUCF in selected A1 countries²⁵



23 A key category is one that is prioritized within the national inventory system because its estimate has a significant influence on a country's total inventory of greenhouse gases in terms of the absolute level, the trend, or the uncertainty in emissions and removals. Whenever the term key category is used, it includes both source and sink categories (IPCC 2006).

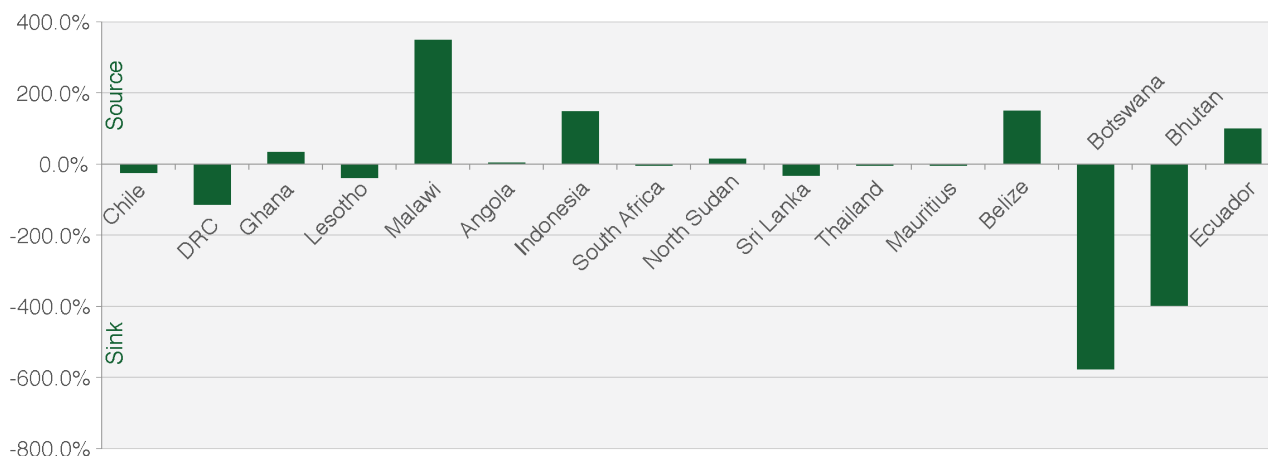
24 Source: UNFCCC Synthesis and Assessment report 2013. Available at: <http://unfccc.int/resource/webdocs/sai/2013.pdf>

25 Source: The UNFCCC Data Interface

Note: Emissions are presented as a positive value as this is addition of GHG to the atmosphere while removals are a negative value as this is subtraction of GHG from the atmosphere.

Unlike the majority of developed countries where (managed) land is a net sink, for many developing countries, particularly those with large areas of forests, land use and forestry can be responsible for a significant portion of their emissions. There are few official national data on *emissions* from land use from developing countries — unlike many developed countries that report annual emissions to the UNFCCC, most developing countries have only submitted one or two GHG inventories through their National Communications²⁶. From this information, several examples are provided in Figure 8 that illustrate the range of circumstances derived from national submissions regarding the relative importance of land use (as compared to gross national emissions from other sectors). Accuracy of data summarized in the figure is likely to vary significantly but was not assessed here.

Figure 8: Relative importance of LULUCF, as compared to total gross emissions without LULUCF in selected non-Annex I countries (reporting years vary from 2000 to 2006)



²⁶ The complete list of non-Annex I submissions is available at: http://unfccc.int/national_reports/non-annex_i_natcom/submitted_natcom/items/653.php

2. Guidance for reporting and accounting land use under the UNFCCC

This section covers the existing guidance provided by the UNFCCC for all countries to *report* emissions and removals from land use. This section also covers the additional set of rules for both reporting and *accounting* emissions and removals that Annex I Parties to the Kyoto Protocol apply related to their quantified emission reduction commitments. Finally, the Conference of the Parties (COP) decisions on REDD+ have introduced another set of voluntary reporting guidance for developing countries wishing to take forest-related actions under REDD+.

2.1. Reporting under the UNFCCC

2.1.1. Guidance for reporting land use under the UNFCCC

Under the UNFCCC, all Parties have commitments to promote mitigation actions and to report anthropogenic emissions by sources and removals by sinks, including from the land use and forestry sector²⁷. Reporting is accomplished through the submission of national reports (National Communications and National GHG Inventories, biennial reports or biennial update reports). The required contents and timetable for submission of such reports differ for Annex I and non-Annex I countries (see Table 3, following page).

Guidance on how to estimate anthropogenic emissions and removals in the land-use sector is contained in the *1996 Revised IPCC Guidelines* and the *2006 IPCC Guidelines*. In 2001 as part of the Marrakesh Accords (COP 7) Parties invited the IPCC to prepare “a report on good practice



guidance and uncertainty management relating to the measurement, estimation, assessment of uncertainties, monitoring and reporting of net carbon stock changes and anthropogenic greenhouse gas emissions by sources and removals by sinks in the land use, land-use change and forestry sector”²⁸. As result of this invitation the IPCC produced in 2003 the **Good Practice Guidance for Land use, Land-Use Change and Forestry (GPG-LULUCF)**²⁹.

In 2003, COP 9 decided that Annex I Parties should use the *GPG-LULUCF* for preparing their annual **national inventory reports (NIR)** under the Convention from 2005. *GPG-LULUCF* is also used for reporting under the KP for the first commitment period (see below). Non-Annex I Parties were encouraged to apply the *GPG-LULUCF*, as appropriate and to the extent possible, in the preparation of their GHG inventories in **national communications**³⁰. In 2002 the UNFCCC’s Subsidiary Body on Scientific and Technical Advice (SBSTA) invited IPCC to revise the 1996 Guidelines, with the aim of completing the work by 2006. They produced the *2006 IPCC Guidelines*, which the COP has decided are to be used for developed country reporting after 2014. Non-Annex I parties (including countries participating in REDD+) are encouraged, but not obligated, to use the new Guidelines.

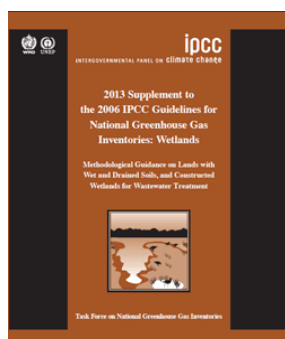
27 UNFCCC Article 4 paragraph 1a and 1d.

28 Decision 11/CP.7 paragraph 3 (b).

29 Available at: <http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf.html>

30 Decision 13/CP.9 paragraph 2 and 5 respectively.

The IPCC has also developed the **2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement)**³¹ following an invitation from the UNFCCC to “undertake further methodological work on wetlands, focusing on the rewetting and restoration of peatland”³². The Wetland Supplement “extends the content of the 2006 IPCC



Guidelines by filling gaps in coverage and providing updated information reflecting scientific advances, including updating emission factors. It covers inland organic soils and wetlands on mineral soils, coastal wetlands including mangrove forests, tidal marshes and seagrass meadows and constructed wetlands for wastewater treatment. The coverage of the 2006 IPCC Guidelines on wetlands was restricted to peatlands drained and managed for peat extraction, conversion to flooded lands, and limited guidance for drained organic soils” (IPCC). Annex I Parties are encouraged to use the *Wetlands Supplement* in preparing their annual inventories under the Convention from 2015³³.

In addition to reporting emissions and removals from LULUCF in the NIR, Annex I Parties also have reporting requirements for LULUCF under the **biennial reports (BR)**, in particular when describing their economy-wide emission reduction target³⁴. Non Annex I Parties are encouraged, in the context of the **biennial update reports (BUR)**³⁵, to *include, as appropriate and to the extent that capacities permit, in the inventory section of the biennial update report, tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF*³⁶. A summary of requirements for reporting under the UNFCCC, which should include emissions and removals from land use, is provided in Table 3.

Table 3: Summary of reporting requirement under the UNFCCC

	Annex I	Non-Annex I
National Communications	Periodic (every 4 years); almost all Annex I Parties have submitted their 6 th national communication.	Periodic (every 4 years); the first was due within 3 years of ratification; a second and, where appropriate, 3 rd has been encouraged by the COP. Most non-Annex I Parties have submitted their 2 nd National Communication.
National GHG Inventories	Annual submission including: <ul style="list-style-type: none"> • CRF tables • National Inventory Report³⁷ 	Should be included as part of the National Communications (every 4 years)
IPCC Guidance	Starting in 2015, Annex I shall use the 2006 Guidelines and updated CRF tables; plus the 2003 LULUCF-GPG and 2013 Wetlands Supplement	1996 Guidelines may be used along with the 2003 LULUCF-GPG; 2006 Guidelines (and 2013 Wetlands Supplement) are encouraged.
Additional reporting (including national GHG inventories)	Biennial reports; first submission by January 2014	Biennial update reports, first submission by December 2014 (Least Developed Countries may submit at their discretion)

31 Available at: <http://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html>

32 Paragraph 72 of SBSTA 40 report (FCCC/SBSTA/2010/13), available at: <http://unfccc.int/resource/docs/2010/sbsta/eng/13.pdf>

33 Decision 24/CP.19 paragraph 4.

34 UNFCCC biennial reporting guidelines for developed country Parties (Annex I of Decision 2/CP.17), available at: <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf#page=4>

35 UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention (Decision 2/CP.17, paragraphs 39-42 and annex III).

36 Decision 2/CP.17, Annex III Paragraph 6.

37 The NIR includes “a comprehensive description of the methodologies used in compiling the inventory, the data sources, the institutional structures and quality assurance and control procedures” (UNFCCC website). See the submitted NIR from Annex I at: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/7383.php

2.1.2. The scope of reporting under the UNFCCC

Reporting on land use under the UNFCCC (e.g. through national communications and national GHG inventories) is **comprehensive**, i.e. includes all categories of land and all pools (see *Section 1.2*). In the *Revised 1996 Guidelines*, Agriculture (see *Section 1.2*) was addressed in a separate module (Module 4) from Land-use Change and Forestry (Module 5), whereas the *2006 Guidelines* combine both Agriculture and LULUCF into a single volume (i.e. Volume 4 of the Guidelines) called “*Agriculture, Forests and Other Land Use*” or AFOLU.

To facilitate reporting and comparability of information in national GHG inventories, **common reporting format (CRF) tables**, including for LULUCF and Agriculture, were developed and revised over the years. More recently the CRFs were revised for application in the context of AFOLU³⁸, due to the request for Annex I Parties to use the *2006 IPCC Guidelines*³⁹ from 2015. There are, however, few differences between the new CRF tables and those used until 2014 – both contain reporting for Agriculture and the six land categories for LULUCF and harvested wood products (see Table 4). In terms of reporting, national inventories will continue to have two separate chapters: one for Agriculture and another for LULUCF⁴⁰.

Table 4: Common reporting formats for agriculture, land use, land-use change and forestry used in national GHG inventory reports

	Currently Used CRF Tables For use with 1996 IPCC Guidelines and the 2003 LULUCF-GPG ⁴¹ (adopted at COP-11, for use starting 2007)	New CRF Tables For use with 2006 IPCC Guidelines (adopted at COP-19, for use starting 2015 by Annex I countries)
Agriculture	<ul style="list-style-type: none"> • Enteric fermentation • Manure management • Rice cultivation • Agricultural soils • Prescribed burning of savannahs • Field burning of agricultural residues • Other 	<ul style="list-style-type: none"> • Enteric fermentation • Manure management • Rice cultivation • Agricultural soils • Prescribed burning of savannahs • Field burning of agricultural residues • Liming & Urea application⁴² • Other carbon-containing fertilizers • Other
Land Use, Land-use Change and Forestry	<ul style="list-style-type: none"> • Forest Land • Cropland • Grassland • Wetlands • Settlements • Other Land • Other (e.g. Harvested Wood Products) 	<ul style="list-style-type: none"> • Forest Land • Cropland • Grassland • Wetlands • Settlements • Other lands • Harvested wood products • Other

38 CRF tables for AFOLU reporting are available at:

http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/vnd.openxmlformats-officedocument.spreadsheetml.sheet/set_2_afolu_final_16nov13.xlsx

39 Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

40 Appendix of Decision 24/CP.19 (Outline and general structure of the national inventory report). Available at: <http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf>

41 The LULUCF categories were only introduced with the 2003 LULUCF-GPG while the *1996 IPCC Guidelines* focused on both land categories and activities: Changes in forest and other woody biomass stocks; Forest and grassland conversion; Abandonment of managed lands; CO₂ emissions and removals from soil and; Other.

42 Liming and Urea application have always been included in IPCC Guidelines, but were previously addressed elsewhere.

2.1.3. UNFCCC reporting and the Managed Land Proxy

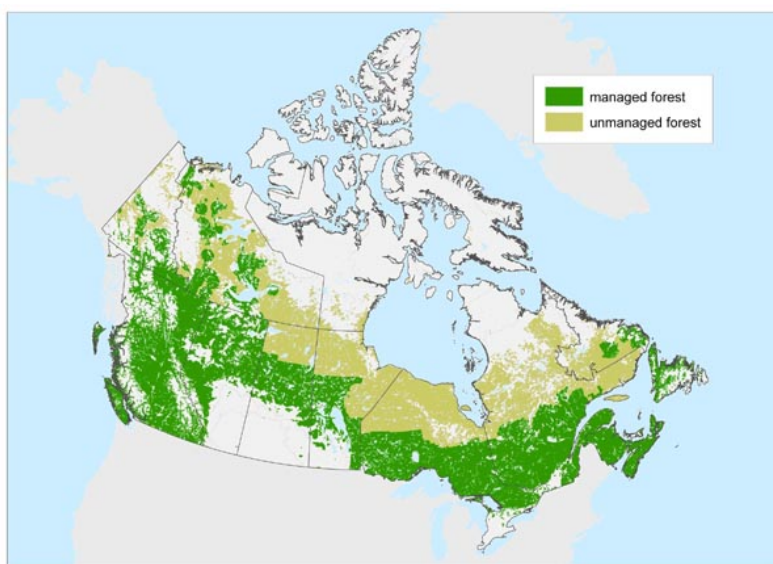
The Managed Land Proxy. In 2003 the IPCC reported that *the scientific community cannot currently provide a practicable methodology that would factor out direct human-induced effects from indirect human-induced and natural effects for any broad range of LULUCF activities and circumstances*⁴³. For this reason, the IPCC (in the 2003 *GPG-LULUCF* and 2006 *Guidelines*) adopted the use of estimates of GHG emissions and removals on managed land as a proxy for the estimation of anthropogenic emissions and removals. Countries designate areas of land as “managed” and “unmanaged” (see definition below). In effect, this means that all emissions (or removals) that occur on land designated as “managed” is included in the reporting under the UNFCCC and counted as anthropogenic. This is the managed land proxy. This approach was adopted with the rationale that the vast majority of man-made effects occur on managed lands.

“Managed land is land where human interventions and practices have been applied to perform production, ecological or social functions” (2006 IPCC Guidelines)

Countries are expected to describe the methods and definitions used to determine areas of managed and unmanaged lands and apply them consistently over time. Emissions and removals from unmanaged land do not need to be reported. However, it is considered a *good practice* for countries to “quantify, and track over time, the area of unmanaged land so that consistency in area accounting is maintained as land-use change occurs” (IPCC, 2006).

For example, the United States considers around 8% of its total land area as “unmanaged”, or inaccessible to society due to the remoteness of the locations. Similarly, Canada has designated around 34% of its forests as “unmanaged”⁴⁴ (see Figure 9).

Figure 9: Managed and unmanaged forest land in Canada⁴⁵



43 IPCC Statement on its response to decision 11/CP.7 paragraph 3(d) – LULUCF Task 3, available at: <http://www.ipcc.ch/graphics/speeches/sbsta-19-statement-to-decision11.pdf>

44 Canada's 6th National Report on Climate Change, available at:

http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/can_nc6_br1_eng_rev.pdf

45 Canada's National Inventory Report, 1990-2012, Part 2, Figure A3-9, page 108.

2.2. Reporting and accounting under the Kyoto Protocol

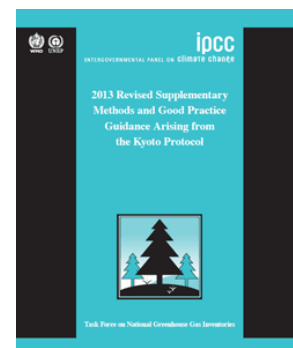
The **Kyoto Protocol** calls for each Annex I Party (to the KP), in achieving its quantified emission limitation or reduction commitments (i.e. QELRCs, or targets), in order to promote sustainable development to implement policies and measures including the protection and enhancement of sinks and reservoirs... [and] promotion of sustainable forest management practices, afforestation and reforestation⁴⁶. Consistent with this it has provisions for the treatment of LULUCF in the context of Annex I Parties meeting their commitments under the Protocol.

2.2.1. Kyoto Protocol reporting

The changes in carbon stock or GHG emissions relating to LULUCF activities by Annex I Parties under Articles 3.3 of the KP and elected under Article 3.4 (see next section on Scope of KP Accounting) must be reported for each year of the commitment period, beginning with the start of the commitment period, or with the start of the activity, whichever comes later.

For the 1st commitment period (2008-2012), emissions and removals by LULUCF activities have been reported using guidance provided by the CMP⁴⁷ in accordance with several decisions (see Table 7 in *Section 2.2.4*). In addition, to help Parties with reporting, Chapter 4 of the *GPG-LULUCF* provided “Supplementary Methods and Good Practice Guidance arising from the Kyoto Protocol”.

As a consequence of the new set of rules for the 2nd commitment period⁴⁸, the IPCC was invited in 2011 “to review and, if necessary, update supplementary methodologies for estimating anthropogenic greenhouse gas emissions by sources and removals by sinks resulting from land use, land-use change and forestry activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, related to the annex to this decision, on the basis of, inter alia, chapter 4 of its *Good Practice Guidance for Land Use, Land-Use Change and Forestry*”⁴⁹. This resulted in the **2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (KP Supplement)**⁵⁰, which revises and updates Chapter 4 of the *GPG-LULUCF*.



At CMP 9 (2013), Parties agreed that the *KP Supplement* shall be applied in the 2nd commitment period of the Kyoto Protocol, in a manner consistent with the relevant decisions (see Table 8 in *Section 2.2.4*).

2.2.2. The scope of Kyoto Protocol accounting

Kyoto Protocol accounting for LULUCF is based on an effort to reflect emissions and removals from **direct human-induced LULUCF activities**. It is based on two paragraphs of the Protocol:

- **Article 3.3**, which states that net change in GHG emissions by sources and removals by sinks resulting from afforestation, reforestation, and deforestation since 1990 *shall* be used to meet

⁴⁶ Article 2, paragraph 1a(ii).

⁴⁷ The CMP is the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol while the COP is the Conference of the Parties (to the United Nation Framework Convention on Climate Change).

⁴⁸ See Decision 2/CMP.7 taken in Durban in 2011.

⁴⁹ Decision 2/CMP.7 Paragraph 8.

⁵⁰ Available at: <http://www.ipcc-nggip.iges.or.jp/public/kpsq/index.html>

commitments; and

- **Article 3.4**, which states that additional activities to be defined *may* be used to meet commitments for the first commitment period⁵¹. For the first commitment period these additional voluntary activities were subsequently agreed to be forest management, cropland management, grazing land management, and revegetation.

Article 3.4 of the Kyoto Protocol gives Annex I Parties a choice to elect LULUCF activities beyond afforestation, reforestation and deforestation. This can be described as an *elective activity-based approach*, because Parties can elect different voluntary activities covered in the KP-LULUCF accounting system. Upon selection a Party is required to continue to report those activities in future commitment periods. In the 1st commitment period of the Kyoto Protocol 24 Parties elected Forest Management; 4 Parties elected cropland management; 3 Parties elected grazing land management and 3 Parties elected revegetation⁵².

For the 2nd commitment period Forest Management became mandatory while cropland management, grazing land management and revegetation remained voluntary (unless a country had elected to account for them in the 1st commitment period, in which case it becomes mandatory), and a new voluntary activity was added: Wetland Drainage and Rewetting⁵³. Parties will report which of the voluntary activities they have elected in their 2015 NIR. A summary of the extent of coverage of land use under the Kyoto Protocol in its first and second commitment periods is provided in Table 5.

Table 5: Mandatory and voluntary nature of LULUCF activities under the Kyoto Protocol

KP LULUCF Activities	1 st Commitment Period	2 nd Commitment Period
Afforestation (3.3)	Mandatory	Mandatory
Reforestation (3.3)		
Deforestation (3.3)		
Forest Management (3.4)	Voluntary	Voluntary (Mandatory if elected in 1 st CP)
Cropland Management (3.4)		
Grazing land Management (3.4)		
Revegetation (3.4)		
Wetland Drainage & Rewetting (3.4)	Not specified	

2.2.3. Land versus activity-based approaches

The land based approach to emissions estimation proceeds from the classification of all the managed territory of a country into the IPCC land categories described in Section 1.2. Emissions and removals are calculated on the basis of this classification and may be due to management practices on the land remaining in the same category, or due to changes from one category to another (such as conversion from forest to cropland, or vice versa). Since the IPCC land categories cover all the land, the land-based approach is associated with comprehensive coverage.

The activity-based approach to emissions estimation proceeds from identifying specific activities occurring on the land that influence GHG fluxes. This approach focuses on the anthropogenic

51 Upon election, the activity becomes mandatory for the subsequent commitment periods.

52 Annual compilation and accounting report for Annex B Parties under the Kyoto Protocol for 2013. Available at: <http://unfccc.int/resource/docs/2013/cmp9/eng/06.pdf>

53 If wetland drainage and rewetting is elected as a LULUCF activity under Article 3.4, the Wetland Supplement is used.

intervention and allows differentiation between activities (which is needed if only some are to be mandatory) but does not result in comprehensive coverage unless all activities happening on the land are included. Also because multiple activities may occur on a single area of land (sequentially and possibly simultaneously) a hierarchy amongst the different land use activities is needed to avoid double counting or omission. For example, under the Kyoto Protocol, Article 3.3 activities have higher priority than Article 3.4 activities. At the same time land which has previously been accounted for cannot leave accounting even if an elected activity no longer takes place on this land. For this reason tracking of land is more complex using the activity based approach.

In practice, as the activity approach becomes more comprehensive, the results tend to approximate those of the land based approach. The amount of land and/or activities reported will depend on the specific rules of each approach and the capabilities (and political willingness) of Parties to both identify managed land and/or elect LULUCF activities. Depending on these variables, each approach could achieve more, less, or the same level of coverage. However, the elective activity-based approach adopted by the Kyoto Protocol is less likely to be comprehensive in its coverage of emissions and removals than the Convention's land-based approach, as illustrated by the few Parties that selected voluntary activities like cropland management, grazing management, and revegetation in the 1st commitment period of the Kyoto Protocol.

The IPCC has provided guidance for both land and activity based approaches, and such guidance can be found in the following documents (Table 6).

Table 6: Guidance for estimating emissions using land-based or activity-based approaches

Methodological guidelines and guidance for land vs. activity-based approaches	
Land-based approach	<ul style="list-style-type: none"> • 1996 Guidelines (includes both land and activity based approaches) • IPCC 2003 Good Practice Guidance • IPCC 2006 Guidelines (Volume IV) • 2013 IPCC Wetlands supplement
Activity-based approach	<ul style="list-style-type: none"> • 1996 Guidelines (includes both land and activity based approaches) • IPCC 2003 Good Practice Guidance, Chapter 4 (updated by 2013 supplement) • IPCC 2006 Guidelines (Volume IV) • 2013 IPCC Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol • 2013 IPCC Wetlands supplement (Rewetting and Drainage methodologies)

2.2.4. Additional reporting requirements for Annex I Parties to the Kyoto Protocol

The application of reporting and accounting requirements, for Annex I Parties that are both UNFCCC and Kyoto Protocol Parties, mean that such Parties provide additional information for the LULUCF sector to meet KP requirements. The additional requirements are called *supplementary* because they are supplementary to the main greenhouse gas inventory. The requirements for such Parties are:

- **Reporting** of anthropogenic emissions and removals based on **land-use categories** (e.g. forest land; cropland; grassland; wetlands; settlements; and other lands) in the context of submitting national inventory reports to the UNFCCC;

- **Supplementary data** for accounting of anthropogenic emissions and removals from the mandatory and elected **LULUCF activities**, in the context of emission reduction commitments made by the Party under the Kyoto Protocol.

Table 7: LULUCF requirements for reporting (up to 2015) and accounting (1st KP commitment period)

Requirement/Guidance	Revised 1996 IPCC Guidelines	GPG LULUCF 2003	Decision 14/CP.11	Decisions 15/CMP.1 16/CMP.1 17/CMP.1	CRF tables
Reporting under UNFCCC	✓	✓	✓		LULUCF CRF Tables
Supplementary data for under the Kyoto Protocol	✓	✓	✓	✓	KP-LULUCF CRF Tables

Notes: ✓ Mandatory for Annex I Party

Table 8: LULUCF requirements for reporting (after 2015) and accounting (2nd KP commitment period)

Requirements/ Guidance	2006 IPCC Guidelines	2013 KP Supplement	2013 Wetland Supplement	Decision 24/CP.19	Decisions 2/CMP.6 2/CMP.7 6/CMP.9	CRF tables
Reporting under UNFCCC	✓		Encouraged	✓		AFOLU CRF Tables
Supplementary data for accounting under the Kyoto Protocol	✓	✓	✓	✓	✓	KPLULUCF CRF Tables

Notes: ✓ Mandatory for Annex I Party

Key decisions are briefly described in Annex I.

An example of differences in UNFCCC inventory reporting vs. Kyoto Protocol accounting

UNFCCC reporting is not organized by activity as in the case of the KP. Table 9 on the following page illustrates how reporting and accounting can be compared for the first commitment period of the KP (for afforestation, reforestation, deforestation, forest management, cropland management and grazing land management) with reporting under the Convention. This can create some inconsistencies between the systems. For example, if land is converted to another land use, such as cropland converted to forest land, the land will remain in this category for 20 years before it is moved to the category forest land remaining forest land. This means that afforestation that took place in 1990-1993 will now (in 2014) be reported as forest land remaining forest land, while under the KP it will still be under Article 3.3 afforestation.

Table 9: Mapping of UNFCCC land use categories with Kyoto Protocol activities

UNFCCC Land use categories	Kyoto Protocol activities
Cropland converted to forest land	3.3 Afforestation and Reforestation
Grassland converted to forest land	
Wetlands, settlements and other land converted to forest land	
Forest land converted to cropland, grassland, wetlands, settlements and other land	3.3 Deforestation
Forest land remaining forest land	3.4 Forest management
Cropland remaining cropland	3.4 Cropland management
Grassland converted to cropland	
Wetlands, settlements and other land converted to cropland	
Cropland converted to other land use (wetlands, settlements and other land)	
Grassland remaining grassland	3.4 Grazing land management
Cropland converted to grassland	
Grassland converted to other land use (wetlands, settlements and other land)	
Wetlands, settlements and other land converted to grassland	
Wetlands remaining wetlands	Not included under the Kyoto Protocol
Wetlands converted to settlements and other land	
Settlements remaining settlements	
Settlements converted to wetlands and other land	
Other land remaining other land	
Other land converted to wetlands and settlements	

Article 3.4 revegetation under the KP typically include areas e.g. in settlements or other places where the vegetation cannot reach the threshold of a forest applied by the country; wetland drainage and rewetting is not comparable to the wetland remaining wetland under the Convention. While the latter typically includes natural and man-made lakes, rivers, water reservoirs and peat extracting areas, the definition of the KP activity wetland rewetting and drainage includes areas under cultivation such as drained areas used for agriculture (cropland and grassland) and forestry but also areas with peat extraction where a direct human-induced regulation of the water level is carried out. This will clearly overlap with areas possibly included under other activities. The definition for this activity makes it clear that this activity should only apply to areas not accounted for under other land-use activities.

2.3. REDD+

REDD+ is the acronym for “Reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries”. Since COP 11 in 2005 a range of UNFCCC decisions have provided guidance on REDD+, largely for developing countries interested in contributing to mitigation through forest-related activities and a framework for undertaking such

actions. This framework includes requirements for reference levels⁵⁴, social and environmental safeguards, and measurement, reporting and verification.

2.3.1. REDD+ measurement and reporting requirements

A number of COP decisions have provided guidance to developing countries on how to measure emissions and removals from REDD+ activities (see below for a discussion on the Scope of REDD+), and what should be reported to the UNFCCC. Key decisions are briefly described in Annex II.

Developing countries are requested to use the most recent IPCC guidance and guidelines, as adopted or encouraged by the Conference of the Parties as a basis for estimating forest-related emissions and removals, forest carbon stocks and forest area changes. Data and information used to estimate emissions and removals can be provided through the BURs. Countries may also voluntarily submit a forest reference level, as well as additional information in a “technical annex” to the BUR if the developing country is seeking to obtain payments for results-based REDD+ actions⁵⁵.

In addition, developing countries undertaking REDD+ activities are asked to present a summary of information on how safeguards have been addressed and respected (for more information on safeguards, see *Section 7*).

2.3.2. The scope of REDD+

REDD+ was initially introduced at COP 11 (Montreal, 2005) as reducing emissions from deforestation⁵⁶. At COP 13 (Bali, 2007) the scope was expanded to include consideration of degradation⁵⁷, with additional consideration to be given to the role of forest conservation, sustainable management of forests, and enhancement of forest carbon stocks⁵⁸. The expansion enabled a more complete inclusion of developing countries including those countries that were already heavily deforested, or were in the process of increasing total forest area. These countries would not have been able to participate if REDD+ was limited to reducing emissions from deforestation only. The scope of REDD+ activities was not finalized, however, until COP 16 in Cancun in 2010, when five REDD+ activities were spelled out⁵⁹:

- Reducing emissions from deforestation;
- Reducing emissions from forest degradation;
- Conservation of forest carbon stocks;
- Sustainable management of forests;
- Enhancement of forest carbon stocks

Countries are encouraged to undertake these activities “as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances” - i.e. countries can determine for themselves which activities to engage in and report on. However, the review process

⁵⁴ Reference levels will mean, unless otherwise stated, forest reference emission level or forest reference level.

⁵⁵ For further information on what is required in the technical annex see Decision 14/CP.19.

⁵⁶ See UNFCCC, Reducing Emissions from Deforestation in Developing Countries: Approaches to Stimulate Action, FCCC/CP/2005/MISC.1 (<http://unfccc.int/resource/docs/2005/cop11/eng/misc01.pdf>). Official support for including the issue on the COP's agenda was sent by Bolivia, the Central African Republic, Chile, Congo, the Democratic Republic of Congo, the Dominican Republic, and Nicaragua.

⁵⁷ See Decision 2/CP.13.

⁵⁸ See Decision 1/CP.13, paragraph 1(b)(iii).

⁵⁹ See 1/CP.16, paragraph 70.

of REDD+ reference emission levels or reference levels⁶⁰ submitted to the UNFCCC will require a country to justify why any pools or activities were omitted (i.e. deemed insignificant)⁶¹, implying that significant activities and pools cannot be excluded⁶².

These five REDD+ activities do not all neatly correspond to UNFCCC reporting categories, nor to KP LULUCF activities. For example, sustainable management of forests and reducing emissions from forest degradation could both overlap with the Kyoto Protocol's forest management or UNFCCC reporting under the category *forest remaining forest*. Table 10 below illustrates how REDD+ activities may be best compared to UNFCCC reporting categories (through IPCC Guidelines) and KP accounting through Articles 3.3 and 3.4.⁶³

Table 10: Mapping REDD+ activities into IPCC categories and KP accounting activities

UNFCCC identified REDD+ Activities	IPCC categories	Kyoto Protocol accounting
Reducing emissions from deforestation	Forests converted to other lands	Deforestation
Reducing emissions from degradation	Forests remaining as forests	Forest management
Conservation of forest carbon stock	Forests remaining as forests	Forest management
Sustainable Management of Forests	Forests remaining as forests	Forest management
Enhancement of forest carbon stock	Other lands converted to forests, Forests remaining as forests	Afforestation, Reforestation, Forest management

2.4. Differences in current land coverage

Currently, there are different treatments of land use across the UNFCCC. A summary of them is provided in Table 11 on the following page. These treatments may not be comparable as they apply to different sets of Parties, and were created for different purposes and scales.

⁶⁰ For more information on REDD+ REL/RLs see Section 3.2.

⁶¹ Warsaw COP Decision 13/CP.19, Annex paragraph 2(f).

⁶² It is worth noting that Decision 12/CP.17 agreed on a stepwise approach to national forest reference (emissions) levels to enable developing countries to improve reference (emissions) levels over time by incorporating better data, improved methodologies and additional pools over time.

⁶³ Advice on how REDD+ activities can be estimated using IPCC inventory guidance is provided by the Global Forest Observations Initiative in its Methods and Guidance Document, available at:

http://gfoi.org/sites/default/files/MGD_copyedited09042014.pdf

Table 11: Summary of land use in the UNFCCC

	UNFCCC reporting (All Parties)	Kyoto Protocol 2 nd commitment period (CP) QELRC ⁶⁴ (Annex I KP Parties)	Kyoto Protocol CDM (non-Annex I)	REDD+ (developing countries)	NAMAS (non-Annex I)
Purpose	Reporting only	Legally-binding economy wide targets; liabilities if commitment unmet	Incentives provided for non-Annex I	To contribute to mitigation action in the forest sector and to seek results-based finance ⁶⁵	To enhance mitigation action
Scale	National	National	Project	National, or subnational ⁶⁶ as an interim step	Not specified
Scope	Comprehensive coverage of LULUCF: <ul style="list-style-type: none"> • Forest land • Cropland • Grassland • Wetlands • Settlements • Other land Non CO ₂ emissions from agricultural practices ⁶⁷	Mandatory activities: <ul style="list-style-type: none"> • LULUCF • Afforestation • Reforestation • Deforestation • Forest management Comprehensive coverage of agricultural practices Voluntary (unless elected in the 1 st CP): <ul style="list-style-type: none"> • Cropland management • Grazing land management • Revegetation • Wetland drainage and rewetting 	Allowed activities: LULUCF <ul style="list-style-type: none"> • Afforestation • Reforestation Non CO ₂ emissions from agricultural practices	Activities involved: <ul style="list-style-type: none"> • Deforestation • Forest degradation • Forest conservation • Sustainable management of forests • Enhancement of forest carbon stocks 	Not specified: A wide range of activities in the land use sector have been submitted.

Benefits in relation to coverage of the current system. Current approaches to national GHG inventory reporting are based on guidelines developed by the IPCC and benefit from years of GHG inventory submission and review. Most Annex I Parties have been reporting such GHG inventories to the UNFCCC since 2003. Current accounting rules, e.g. under the Kyoto Protocol, and guidance for REDD+ provide Parties with a degree of flexibility. This flexibility can be seen in the elective approach of LULUCF activities to meet Kyoto Protocol commitments for Annex I countries and the voluntary nature of participation in the Clean Development Mechanism (CDM) and REDD+, which gives flexibility to non-Annex I countries.

Risks associated with the current system of coverage. The flexible elective approach of the Kyoto Protocol, and its relationship to commitments to emission reductions, can leave gaps in what is being accounted in Annex I KP Parties and have a direct effect on the level of ambition and the incentives provided, and therefore the overall outcomes. The inclusion of Forest Management as a

64 As mentioned in Section 2.2, a QELRC is a quantified emission limitation and reduction commitment under the Kyoto Protocol.

65 Decision 1/CP.16 paragraph 70 and Decision 9/CP.19.

66 There is currently no agreement under the UNFCCC on what is meant by 'subnational'.

67 Including enteric fermentation, manure management, rice cultivation, agricultural soils, prescribed burning of savannas, field burning of agricultural residues.

mandatory activity for the 2nd commitment period of the KP helps to reduce this gap but it does not close it. Emissions and removals from LULUCF are still not accounted for comprehensively, as in other sectors. This leads to situations where what is accounted for in achieving a national emission target is not the same as the real emissions and removals which the atmosphere sees. Similarly under the Copenhagen Accord some stated they will use the Kyoto Protocol LULUCF rules for their pledges and others have suggested other approaches.

More comprehensive accounting is particularly important with regard to the use of bioenergy (e.g. wood burning and biofuels), which can lower overall emissions in the energy sector, but if not captured in the accounting of LULUCF can result in emissions not accounted for in the overall inventory.⁶⁸ For example, the 27 countries of the European Union have reported increased emissions of CO₂ from the use of biomass for energy by 160% from 1990 to 2011 and at the same time reduced their overall emissions significantly⁶⁹. It is unclear if the use of this biomass has been included in the LULUCF accounting. It is possible that countries are not electing the relevant activities for accounting under the KP, although this risk may be partially mitigated in the 2nd commitment period by the mandatory FM accounting. Another example of where a gap exists is when the biomass is imported from a country that is not accounting for it. If the production of such biomass is not a net source of emissions over a normal harvesting cycle, it is a less serious issue, but if it is unsustainable e.g. the cause of a permanent decrease in carbon stocks, then there are real emissions not captured.

Finally, the current design of the CDM does not capture the full potential for using land-use emission reductions or removals in developing countries, largely due to its limitation in only recognizing afforestation and reforestation projects and the temporary nature⁷⁰ of the credits generated by these activities (see *Section 6.2* for more information). For many developing countries, reducing deforestation holds the largest mitigation potential but was not included as an eligible activity under the CDM for a variety of reasons, including concerns about market flooding and the risk of emissions displacement.

Capacity needs. For non-Annex I Parties there are institutional, capacity building, technology and financial challenges that need to be overcome to report land use more comprehensively and with better quality or lower uncertainty. This is also true for some Annex I Parties. In many cases Parties need enhanced human and financial resources, different institutional arrangements and access to technologies to develop and implement policies and measures and monitoring systems for the land use sector.

68 To avoid double counting, it was decided that emissions from bioenergy should be accounted for at the time of harvest rather than when burnt.

69 National Inventory Submissions 2013, available at: <https://unfccc.int>

70 The temporary nature of crediting (i.e. tCERs and ICERs, as discussed in *Section 6.2*) was introduced to provide a safeguard against non-permanence. If this temporary crediting approach was discontinued an alternative approach would need to be found.

3. Baselines and Reference levels

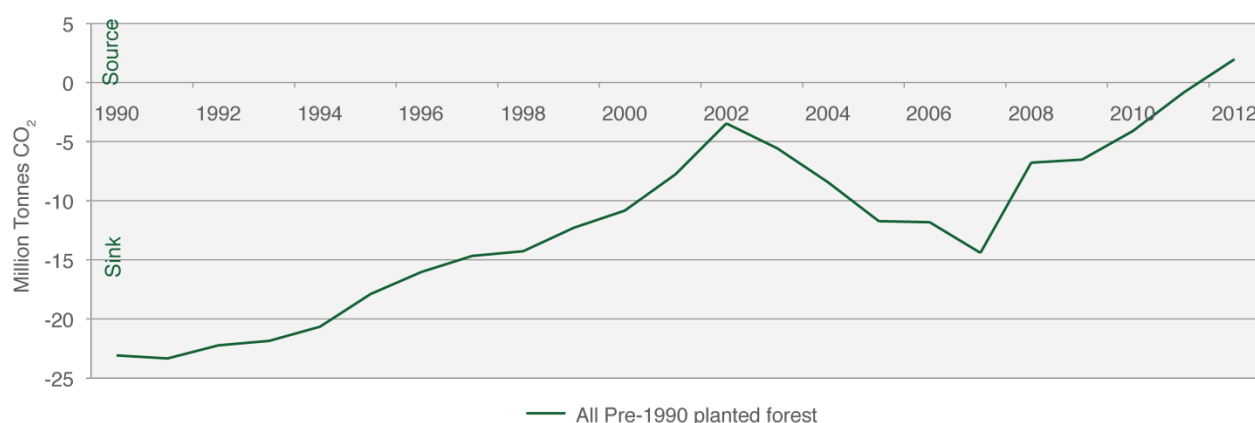
Reporting under the UNFCCC provides information on anthropogenic GHG emissions and CO₂ removals in the year in which they occur, and therefore does not require the use of a baseline or reference level. **Accounting** uses the reported data to assess whether countries have met commitments. Since the only binding commitments so far are under the KP for Annex I Parties, accounting currently only exists in the KP context and needs to compare greenhouse inventory data with assigned amount (i.e. a country's allowable emissions), adjusted for participation in the flexible mechanisms and for LULUCF. Guidance has also been provided for the development of REDD+ reference levels, and defined as “benchmarks for assessing each country's performance”⁷¹.

3.1. LULUCF baselines under the Kyoto Protocol

As described earlier, there are several reasons why the LULUCF sector has not been treated as other sectors, including uncertainties over magnitude, disturbances and the possible significant contribution arising from pre-1990 (i.e. base year for most of the countries) activities and the difficulties of dealing with long cyclic rotations of trees within commitment periods of only 5 and 8 years.

An example is New Zealand's net emissions from forest management of pre-1990 planted forests (see Figure 10), which have a cycle that is longer than the first or second (i.e. 5 and 8 year, respectively) Kyoto Protocol commitment periods. The cycle is both related to the rotation age of the most commonly used tree species and to an uneven planting frequency which means a majority of stands are established during a few years and subsequently mature and ready for harvesting during an equally short period. Expected emissions (or removals) from such cycles could possibly be dealt with in the target setting but would result in some very different quantified targets between countries that are otherwise reasonably comparable, and could be hard to explain.

Figure 10: New Zealand: Net emissions from forest management (pre-1990 planted forests)⁷²



In negotiations, positive results (decreased emissions or increased removals) are referred to as credits while negative results (increased emissions or decreased removals) are referred to as debits.

⁷¹ Decision 12/CP.17, para 7.

⁷² New Zealand National Greenhouse Gas Inventory 1990-2012, published April 2014. Assumes 28 years for land converted to forest to reach biomass steady state.

In KP terminology the accounting quantity is referred to as units to be added to or subtracted from a Party's assigned amount, where the assigned amount is the amount of tons of CO₂eq each Party is allowed to emit during the commitment period, a number which is determined (negotiated) before the beginning of the commitment period.

The solution to LULUCF issues under the KP was to exclude LULUCF from the general estimation of assigned amount, then to include LULUCF via the accounting process which could allow for the special rules. In other words, if the LULUCF sector generated a positive result (i.e. removals or decreased emissions) then there would be more room for emissions from the other sectors such the energy sector and vice versa if the LULUCF sector generated a negative result (decreased removals or increased emissions). Since the LULUCF rules were not finalized until the Marrakesh COP in 2001, Parties had an opportunity to add flexibility (i.e. the use of land sector) to meet their already agreed quantified emission limitation or reduction commitments (QELRC) for the first commitment period. This was the main reason for the push to agree on rules for the second commitment period before, or at the same time as, commitments were finalized.

3.1.1. Understanding net-net and gross-net accounting

Net-net and gross-net accounting are terms used to describe two methods for LULUCF accounting used under the Kyoto Protocol.

Net-net accounting. Several activities under Article 3.4, such as cropland and grazing land management, are accounted using the reported net emissions in each year of the accounting period minus the net emissions in 1990 (i.e. the base year for most countries). In the situation where the net emissions have decreased, a country may issue credits (i.e. removal units, or RMUs) and if net emissions have increased, it must cancel units (i.e. take on debits). In other words, these categories are treated in the same way as other sectors, such as electricity generation or transport, where emissions are compared with those in a base year, usually 1990.

Gross-net accounting. Using gross-net⁷³ accounting means accounting for the actual reported net emissions (or removals) in each year of the commitment period *without comparing it with 1990*. Accounting in this way is not possible for forest management because of the large arbitrary effects of forest age class structure already described. However accounting forest management without considering the base year would have introduced excessive credits into the accounting system so caps were introduced to prevent this. Debits were also capped and this has the effect of limiting the effect of disturbances (see *Section 3.1.2* below on “What is a cap...”).

Denmark: An example of Kyoto Protocol accounting for the first commitment period

Denmark has elected to account for forest management, cropland management and grazing land management under Article 3.4 in addition to afforestation, reforestation and deforestation since 1990 which are mandatory for all countries. The contribution from Article 3.3 afforestation, reforestation and deforestation since 1990 is equal to emissions and removals in the commitment period (gross-net accounting), while the contribution from Article 3.4 cropland and grazing land management is equal to the difference between emissions and removals in the base year and the annualized emissions and removals in the commitment period (net-net accounting). The same is not true for forest management, firstly because of a rule that says a net debit under Article 3.3 can be

⁷³ The word “gross” is used because there is no comparison of net emissions in the accounting years to net emissions in a base year or base period (or reference level); alternately, some consider “gross” to simply mean that net emissions in the accounting period is compared to the value zero.

compensated by removals from Article 3.4 forest management (up to 9 MtC per year), and secondly because under the KP for the first commitment period forest management counts towards commitments irrespective of the base year value (gross-net accounting). Because gross-net accounting for forest management can result in significant credits due to legacy effects for pre-1990 activities, a cap (see next section for details on caps) is applied which is usually met, yielding a credit from forest management equal to the cap value.

Table 12: Kyoto Protocol accounting for Denmark in the first commitment period of the Kyoto Protocol

Activity	Base year (1990) (Gg CO ₂ eq)	Net emissions / removals for 2008-2012 (Gg CO ₂ eq)	Accounted value (Gg CO ₂ eq)	Accounting rule
Article 3.3				
Afforestation and reforestation		-184	-184	Gross-net
Deforestation		440	440	Gross-net
Sum			256	
Article 3.4				
Forest management		-20.252	-917	Gross-net with cap
Offsetting 3.3 debits			-256	Using removals from FM to offset net emissions from Article 3.3
Cropland management	24.223	15.974	-8.249	Net-net
Grazing land management	888	1.444	556	Net-net
Total		-2.578	-8.866	

Notes: 1) Positive numbers are emissions, negative numbers denote removals. 2) Numbers for 2012 are from the most recent annual inventory submission (April 2014) and have not been reviewed yet.

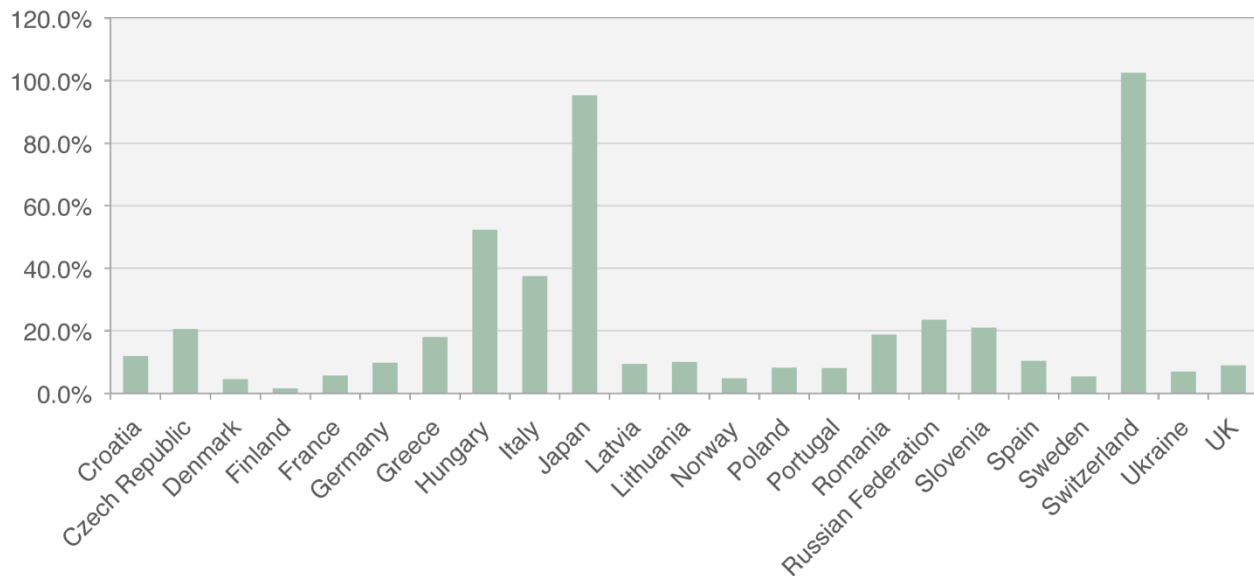
3.1.2. What is a cap and why does it exist?

What is a “cap”? A “cap” is a term used under the KP, and is the maximum amount of credits or debits that can be used by a Party to the KP in the accounting system for assessing compliance with commitments. In particular, a cap has been established on the use of forest management to meeting a country’s target.

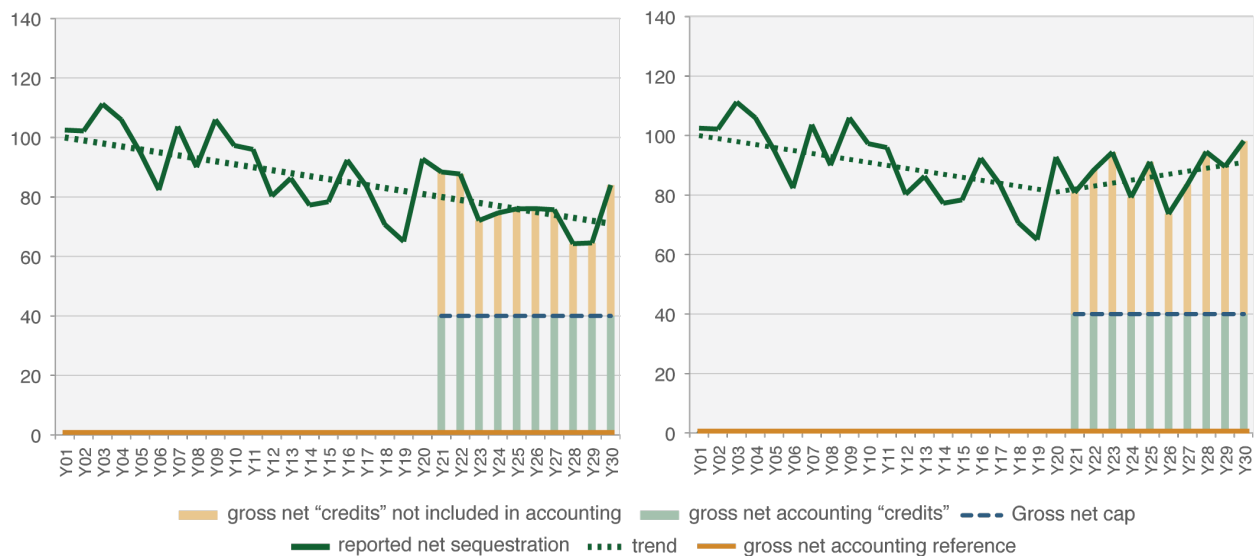
KP 1st Commitment Period: The cap plus gross-net accounting

In the first commitment period of the KP, a cap was negotiated individually for each Party⁷⁴, with the cap inscribed in an annex to Decision 16/CMP.1. For all Parties, the removals from forest management exceeded the cap established (some by a significant amount). Figure 11 on the following page shows the individual caps per Party, as a percentage of total removals from forest management for each Party accounting for forest management during the first commitment period (2008-2012).

⁷⁴ The cap was set guided by the application of a 85% discount factor applied to the removals from forest management in 1990 and a 3% cap for forest management as well as other considerations.

Figure 11: The cap as a percent of total FM removals in the 1st commitment period of the KP⁷⁵

Because most Parties have removals far beyond the cap, no incentive (or disincentive) to enhance mitigation actions in forest management existed. This is further illustrated in Figure 12, which illustrates how the cap, plus the use of gross-net accounting, would not provide incentives for a country to change practices since the cap is significantly below expected removals from forest management for most countries. In particular, the comparison of the two Figures illustrates how removals from forest management can either decrease or increase, but with a cap in place the same amount of credits would be issued.

Figure 12: Illustration of how changes in practices that result in higher net sequestration may not be captured in the amount of credits issued with a cap⁷⁶

⁷⁵ Source: UNFCCC Data Interface.

⁷⁶ Canaveira, Paulo (2014). The Land Sector in the UNFCCC Climate Negotiations - Training Course for non-A1 Negotiators, São José dos Campos, Brasil, March 2014.

However, not having a cap was also seen as a problem due to the potentially excessive contributions from forest land from pre-1990 activities and large fluxes (not directly associated with mitigation activity) that can be accounted on forest land.

During the first commitment period Annex I Parties could use removals beyond the cap up to a limit of 9 MtC/yr to offset net emissions from Article 3.3. A number of countries have done so (see example from the LULUCF accounting from Denmark in Table 12 above). This rule was removed for the second commitment period.

3.1.3. Reference levels as a new accounting approach

What is a “forest management reference level” in the context of the Kyoto Protocol?

In the second commitment period of the KP, a “reference level” approach was adopted for forest management. Called the forest management reference level (FMRL), it allowed countries to propose a quantified amount against which to compare their performance during the commitment period. The factors that countries could take into account in proposing reference levels included:

- historical removals or emissions from forest management;
- age-class structure;
- forest management activities already undertaken;
- projected forest management activities under business as usual;
- continuity with the treatment of forest management in the first commitment period; and
- the need to exclude indirect effects.

December 2009 was set as the deadline for when existing policies on the use of forest resources could be included in the forest management reference level. This was agreed to ensure that the reference level reflects expected emissions and removals from business-as-usual forest management and avoids countries including new policies such as increased harvesting in their proposed reference level. Harvest rates are generally the main driver of the forest carbon balance in the short term. The proposed FMRLs were subject to a technical assessment coordinated by the UNFCCC to increase/enhance transparency⁷⁷.

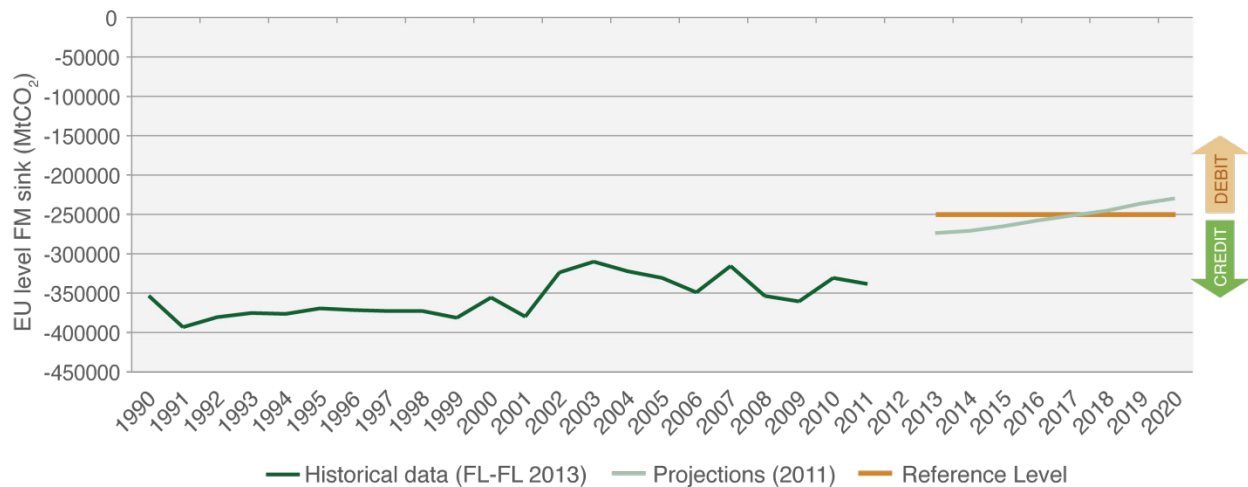
Although most KP Annex I countries have employed business as usual projections, some have not. Three parties elected in the 2nd commitment period to take a 1990 base year (net-net) approach for forest management, and one party elected a reference level of zero. These different approaches make it more difficult to compare the accounted mitigation contribution from forest management between countries. Appendix IV provides some detail on what types of FMRLs were chosen by Annex I Parties in the second commitment period and the technical assessment of them. Table 13 in Section 3.2 below summarizes key provisions and differences between FMRLs and REDD+ reference emissions levels and reference levels.

Figure 13 on the following page shows net removals for forest management for the 27 European Union (EU) countries since 1990 (data from UNFCCC reporting) and the projected net removals during the period 2013-2020. Submissions to the UNFCCC by EU countries of FMRLs state that the difference between the historic and projected removals is a combination of macroeconomic drivers predicting increased demand for timber, the age class structure of the forest, and the current high carbon stocks per hectare which is expected to increase at a slower pace in the future as older

⁷⁷ For more information visit: <http://unfccc.int/bodies/awg-kp/items/5896.php>

stands are being rejuvenated. This is expected to lead to an increase in harvesting rates in many EU member states as part of business as usual forest management⁷⁸.

Figure 13: The principle of accounting compared to a projected reference level⁷⁹



Harvest rates (driven by wood demand and age class structure) are generally the main driver of the forest carbon balance in the short term. Forest activities are influenced by economic activity including demand for timber which will have a direct effect on whether the forest owner will harvest or postpone harvest. This will again have effect on emissions and removals from forest management, where decreased harvest rate will increase carbon stocks and removals by forests and vice versa.

3.1.4. Why was this new FMRL approach taken?

Those who support the use of FMRLs suggest they provide a transparent, flexible tool to accommodate the many different national circumstances of Annex I Kyoto Parties that could not be resolved with a single base year, while providing an incentive structure that was missing in the gross-net approach. FMRLs provide countries where age class structure is problematic a way to remove the arbitrary effects of using a base year as a reference. Some also view FMRLs as a way to address the issue (as discussed in *Section 3.1*) of quantified targets that are not comparable (regarding mitigation effort) and/or difficult to explain in the negotiations (e.g. legacy effects or harvesting cycles). Depending on how the FMRL was set, it also creates new incentives to take mitigation actions in the forest sector. Finally, supporters argue that FMRLs were needed to allow the inclusion of forest management as a mandatory activity in the KP 2nd commitment period.

Those who voice concerns about the use of FRMLs suggest that unless the reference level is set at net emissions in a base year or years, it is substantially different from the way in which emissions are accounted for in all other sectors. It allows real emissions to be included below a business as usual projection and they are consequently unaccounted, i.e. avoiding the accounting of emissions that will have a real effect upon the atmosphere. Some have suggested another approach to take into account differences in national circumstances regarding forest management is the use of a base

78 The Synthesis report of the technical assessments of the forest management reference level submissions provides additional information on this from paragraph 54, available at: <http://unfccc.int/resource/docs/2011/awg16/eng/inf02.pdf>

79 Grassi G. (2013), JRC LULUCF tool (December 2013), Joint Research Centre (JRC), European Commission, available at: <ftp://mars.jrc.ec.europa.eu/Afoludata/Public/DS242>

period, rather than a single base year, which has the advantage of relying on historical information rather than projections which are inherently uncertain.

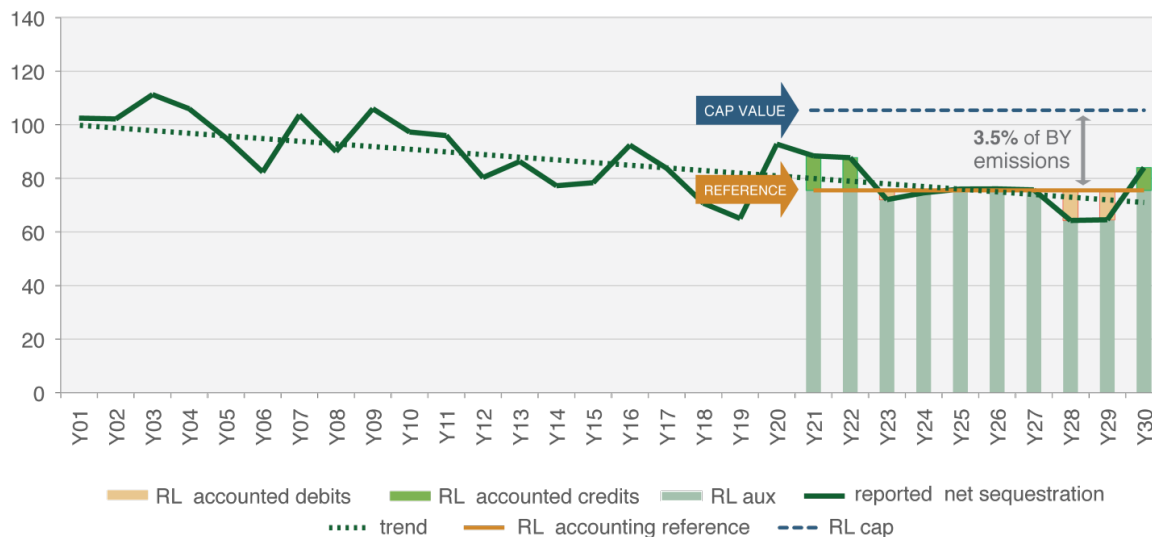
KP 2nd Commitment Period: FMRLs (plus a cap)

Countries decided for the second commitment period to cap the use of removals from forest management but, unlike the first commitment period, the cap only applies for credits while debits are uncapped. This is related to the agreement of disturbance provisions (see Section 4 for more information). The cap has been set as 3.5 % of the total emissions without LULUCF in 1990⁸⁰ (in comparison to country-negotiated caps in the first commitment period).

Because of the adoption of FMRLs, the cap is less likely to limit credits from forest management than it did in the first commitment period when gross-net accounting was used. For those Parties using a projected business-as-usual baseline for forest management, only changes against the FMRL will count as debits or credits. This should result in smaller net differences between the reference level and the emissions and removals during the commitment period (as compared to a gross-net approach), and therefore the cap is less likely to have influence on the accounted results for most countries using this approach.

The use of FMRLs in the second commitment period is illustrated in Figure 14. Removals would be reported during the commitment period (years 21 to 30). In some years removals are above the reference level and credits would then be issued. In other years removals may be below the reference level, and debits would then be issued. The cap would only limit the accounted quantities of removals if they exceeded the cap in any year during the period, i.e. the cap is only on credits, not debits.

Figure 14: The use of a cap in the KP second commitment period⁸¹



There were various reasons for supporting the use of a cap in the second commitment period. One was due to the inherent uncertainty, or accuracy, of the proposed forest management reference levels. Some Parties (and civil society) also saw the cap as an insurance against the issuance of excessive amounts of credits in case where a reference level may have been set in a way that would provide undeserved credits to a country.

80 Decision 2/CPM.7, paragraph 13

81 Canaveira, Paulo (2014). The Land Sector in the UNFCCC Climate Negotiations - Training Course for non-A1 Negotiators, São José dos Campos, Brazil, March 2014.

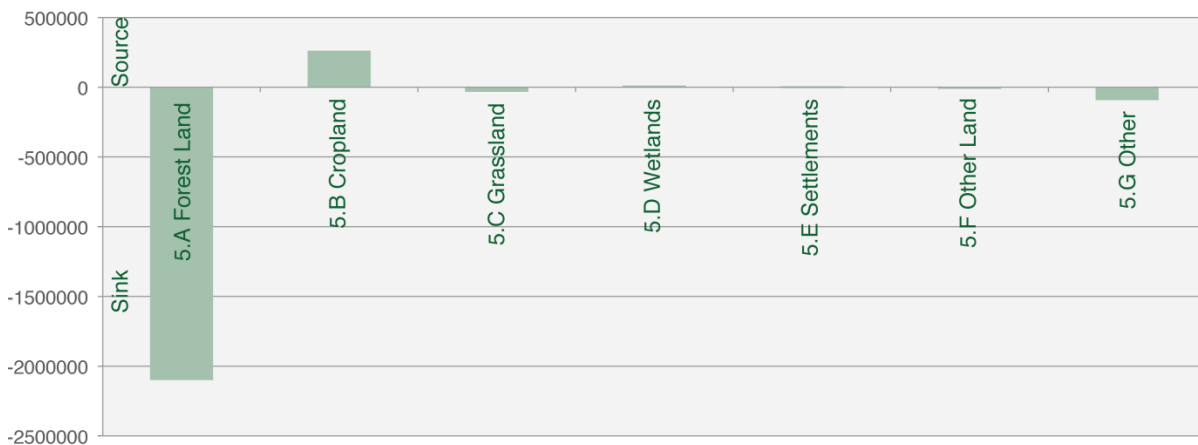
Countries that have proposed as their FMRL using either 1990 as a base year, or the value zero (i.e. gross-net accounting), have also provided a projection of expected emissions or removals for the second commitment period for forest management. This information provides some idea on the expected accounted quantity and the cap is likely to be used (i.e. limit the contribution of forest management towards their quantified target) for some of these countries.

3.1.5. Why is forest management treated differently than other land use activities?

While forest management is now (in the 2nd commitment period) accounted compared to a reference level, other Article 3.4 activities (cropland management, grazing land management, revegetation and wetlands drainage and rewetting) continue to be accounted for compared to the net emissions in 1990. This is partly due to the fact that non-forest activities do not have the legacy effects and age distribution issues similar to forests.

In addition, forest management removals in Annex I countries are much larger than other land use emissions and removals and therefore the unique qualities (as described in *Section 1.3*) can affect a country's overall GHG inventory. Reported emissions and removals quantities for other land use activities do not reach a similar magnitude as that of forest land (see Figure 15 below)⁸². For a few countries, however, these other activities do have considerable impact and in a few cases sometimes more than for forests.

Figure 15: Data for emissions and removals for each land use category reported for 2011⁸³



Note: Other includes HWP

Finally, accounting for forest management in the second commitment period of the KP is mandatory. All the other Article 3.4 activities are voluntary during the second commitment period (although countries already accounting for a particular activity during the first commitment period must continue to do so during the second commitment period).

⁸² We note that more countries report on forest land compared to other land use categories, which can bias the comparison.

⁸³ Source: UNFCCC Data Interface.

3.1.6. Technical corrections

The IPCC Guidelines list consistency as one of the indicators of inventory quality. The IPCC explains consistency as ensuring that estimates for different inventory years are made in such a way that differences in the results between years reflect real differences in emissions. An inventory's annual trends, as far as possible, should be calculated using the same method and data sources in all years, and should aim to reflect the real annual fluctuations in emissions or removals and not be subject to changes resulting from methodological differences.⁸⁴

When FMRLs for accounting for forest management during the second commitment period of the KP were agreed, Parties were therefore also requested to make technical corrections, when needed, to ensure methodological consistency between the FMRL and the reporting and accounting for forest management in the commitment period. This was to prevent a comparison between apples and oranges⁸⁵. Consistency between the FMRL and the reporting for forest management is necessary to ensure that the two values are comparable.



For example, if the area used to set the FMRL is different from the area accounted for then there is a lack of methodological consistency. The same applies for all the elements listed in the box below. The accounting results should be the result of comparing values which are generated in a consistent manner, not as a result of a change in methodology or data sets used.

Elements for FMRL construction

Parties are requested to provide information on how the FMRL has been constructed, including:

- Pools and gases included
- Approaches, methods and models used
- Area under forest management
- Historical data from greenhouse gas inventory
- Forest characteristics and related management
- Historical and assumed harvesting rates
- Harvested wood products
- Natural disturbances
- Factoring out
- Domestic policies included up to 2009

The 2013 IPCC Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol⁸⁶ provides guidance for detecting the need for technical corrections. This includes decision trees, a checklist, and guidance for how to perform technical corrections to the reference level calculation, i.e. a value of emissions and removals that should be added at the time of accounting to the original FMRL to ensure that the accounted emissions and removals do not reflect methodological inconsistencies.

⁸⁴ 2006 IPCC Guidelines, Volume1, Chapter 1.4 Inventory Quality.

⁸⁵ Picture: Apples and Oranges by Paul Cézanne, 1895 -1900.

⁸⁶ Available at: http://www.ipcc-nggip.iges.or.jp/home/2013KPSupplementaryGuidance_inv.html

Parties are likely to undertake a significant number of technical corrections not least due to the fact that the proposed FMRL's were submitted before the rules were finally agreed at CMP.7 in Durban. The need for technical corrections would be expected to arise most frequently in the cases of inclusion of harvested wood products (HWP), and natural disturbances where new accounting approaches were agreed. IPCC's 2013 KP Supplement provides methodological guidance related to the natural disturbance provisions agreed in Durban, and as well as the HWP provisions.

3.2. REDD+ Reference Emission Levels and Reference Levels

The UNFCCC has provided, in a set of decisions from COP13 to COP19, guidance for developing countries who voluntarily develop REDD+ reference levels – referred to as “forest reference emission levels and/or forest reference levels” (REL/RLS⁸⁷). Key points include that REDD+ REL/RLs should:

- Be expressed in tonnes of CO₂eq per year.
- Maintain consistency with national GHG inventories.
- Take into account historical data, but may be adjusted for national circumstances.
- Allow for a step-wise approach, i.e. countries may improve REL/RLs over time by incorporating better data, improved methodologies or additional pools.
- Allow for the use of subnational forest REL/RLs as an interim measure.

The provisions for REDD+ REL/RLs have similarities with those for forest management under the KP for Annex 1 Parties, in particular that they are flexible and nationally-determined. However, the purpose of the FMRLs and the REL/RLs are different—the former are for assessing compliance with an emission reduction commitment under the KP and the latter are for assessing performance of developing countries, including when seeking positive incentives for results-based REDD+ actions. Furthermore, differences in the provisions for setting FMRLs and REL/RLs (elaborated in Table 13 on the following page) allow for differences in capacity between Annex I Parties and developing countries. For example, under REDD+ guidance, countries may take a step-wise approach to allow for improvements.

⁸⁷ The COP has not defined a difference between REL(s) and RL(s), although some assume that a REL includes only emissions (e.g. from deforestation and/or degradation) whereas an RL includes sequestration (e.g. reforestation, enhancement of forest carbon stock, etc.).

Table 13: Differences between provisions for Forest Management Reference Levels under the Kyoto Protocol and REDD+ Reference Emissions Levels and Reference Levels

	FMRL	REL/RL
Objective	Accounting forest management under the Kyoto Protocol	To assess performance under REDD+
Units	Ton CO _{2eq} per year	Ton CO _{2eq} per year
Scale	National	National with subnational as an interim measure
Principles	<p>Information provided should be:</p> <ul style="list-style-type: none"> • Transparent, complete, consistent, comparable and accurate • Allow a technical assessment of the data, methodologies and procedures used in the construction of FMRLs • Improved models and data can be used during the accounting period but will need to be accompanied by a technical correction to be added to the accounting 	<p>Information provided should be:</p> <ul style="list-style-type: none"> • Transparent, complete⁸⁸, consistent and accurate • Allow a technical assessment of the data, methodologies and procedures used in the construction of REL/RLs <p>Countries may use a step-wise approach to allow for improvements, e.g. incorporating better data, improved methodologies, or additional pools.</p> <p>REL/RLs should be updated periodically, taking into account new knowledge, new trends and any modification of scope and methodologies</p>
GHG reporting	Consistent with general reporting principles of the Convention and IPCC guidelines.	Maintain consistency with GHG emissions and removals contained in national GHG inventories
Scope of Activities	Forest management only. Afforestation, reforestation, deforestation are accounted on a mandatory basis according to emissions and removals in the year when they occur.	<p>Can include any or all of the 5 activities below; significant activities should not be excluded; must provide reasons for omissions.</p> <ul style="list-style-type: none"> • Reducing emissions from deforestation • Reducing emissions from forest degradation • Conservation of forest carbon stocks • Sustainable management of forests • Enhancement of forest carbon stocks
Pools and Gases	Pools can only be excluded if transparent and verifiable information can be provided that the particular pool is not a source; HWP mandatory for projected FMRLs.	Information should be provided on pools and gases, and reasons for omitting any pool from the REL/RL, noting that significant pools should not be excluded.

88 Decision 12/CP.17, Annex, states that complete “means the provision of information that allows for the reconstruction of forest reference emission levels and/or forest reference levels”.

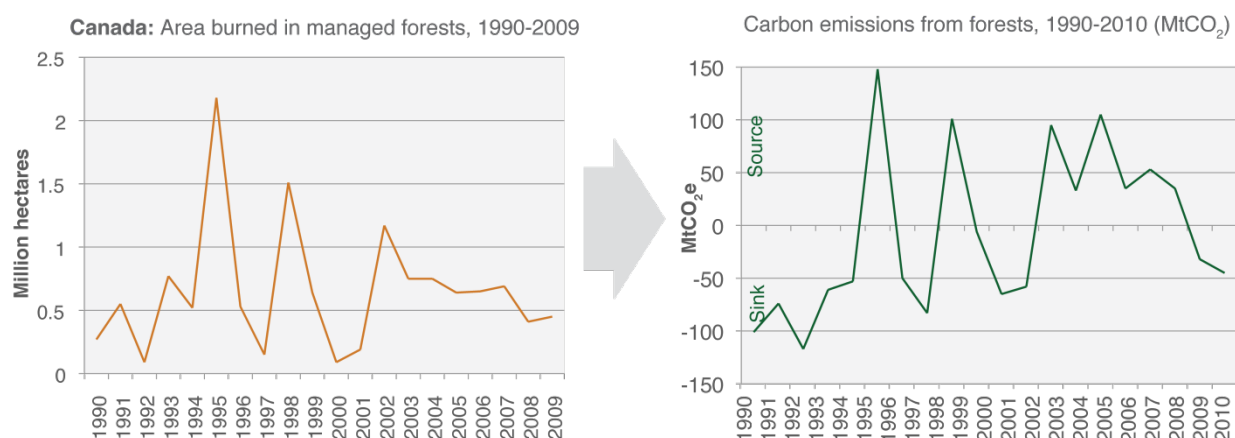
<p>Information requested for submission to the UNFCCC</p>	<p>A description of approaches, methods and models, including assumptions, used in the construction of the FMRL, including how the elements below were taken into account:</p> <ul style="list-style-type: none"> a) Removals or emissions from forest management as shown in greenhouse gas inventories and relevant historical data; b) Age-class structure; c) Forest management activities already undertaken; d) Projected forest management activities under a 'business as usual' scenario; e) Continuity with the treatment of forest management in the first commitment period; f) The need to exclude removals from accounting in accordance with decision 16/CMP.1, paragraph 1. <p>Points (c), (d) and (e) above applied where relevant.</p> <p>Forest definition used.</p> <p>Description of domestic policies adopted and implemented prior to December 2009, including how such policies are considered in the construction of the FMRL; confirmation that FMRL does not include assumptions about changes to, or new, domestic policies after December 2009.</p>	<p>The information should allow a technical assessment of the data, methodologies and procedures used in the construction of a REL/RL and be guided by the most recent guidance from the IPCC as adopted or encouraged by the COP. This includes:</p> <ul style="list-style-type: none"> • Forest definition and explanation of why and how such a definition was chosen if different from that used in the national GHG inventory or reporting to other international organizations • Data sets (including historical data) used • Approaches, methods, models (if applicable, including assumptions used) • Pools, gasses and activities included • Details of national circumstances and if REL/RL was adjusted (from historical), details on how national circumstances were considered • Information on the area included if less than the entire area of the country <p>Descriptions of relevant policies and plans, and description of changes from previously submitted information.</p>
<p>Objective of the technical assessment</p>	<ul style="list-style-type: none"> • To assess whether Parties have provided transparent, complete, consistent, comparable and accurate information on how the elements mentioned above were taken into account • To ascertain whether construction of the FMRL is consistent with information and descriptions used by the Party • To provide, as appropriate, technical recommendations to the Annex I Party • To support consideration by CMP7 of the FMRLs to be used during the second commitment period of the KP • To assess whether Parties have provided transparent, complete, consistent, comparable and accurate methodological information to facilitate review of methodological consistency 	<ul style="list-style-type: none"> • To assess the degree to which information provided by Parties is in accordance with the guidelines provided • To offer a facilitative, non-intrusive, technical exchange of information on the construction of REL/RL <p>The technical assessment may be in the context of results-based payments and a technical analysis will further assess whether there are consistency between the results and the assessed REL/RL following decision 14/CP.19 on MRV.</p>

4. Natural disturbances

Article 2 of the Convention states the objective to prevent dangerous *anthropogenic* interference with the climate system. Forests are subject to disturbances that can release carbon stocks and non-CO₂ emissions to the atmosphere. Disturbances can be either natural or human-induced and, for some Parties, can have a significant effect on their overall GHG inventory to the extent of materially affecting the commitment that a country might feasibly sign up to.

As an illustration, annual wildfire emissions in Canada fluctuated between 11 and 275Mt over the period 1990 to 2012⁸⁹ (Figure 16). Such large disturbances can cause significant liabilities for a country if expected to meet a particular quantified target.

Figure 16: The effect of fires on Canada's *forest land remaining forest land* emissions, 1990-2009⁹⁰



Detailed provisions have been agreed for Annex I Parties to remove natural disturbance impacts (i.e. emissions and subsequent removals) from the accounting for compliance with their commitments under the KP. However, there is currently no similar guidance for accounting or reporting of natural disturbances for other applications under the UNFCCC. No complementary agreements have been made with regard to how developing countries taking REDD+ actions and measuring performance against a proposed reference level address natural disturbance events, although Conference of the Parties (COP) decisions on REDD+ refer to anthropogenic emissions and removals.

4.1. Accounting for natural disturbances under the KP

Following the managed land proxy (as described in *Section 2.1.3*), emissions from natural disturbances on managed land were included in the accounting under the 1st commitment period of the KP for mandatory and elected activities. Emissions from natural disturbances on unmanaged lands were not included in the accounting so long as those lands continued to be identified by the country as unmanaged.

⁸⁹ Canada's National Inventory Report, 1990-2012, Part I (page 140).

⁹⁰ Data for wildfires from Natural Resources Canada, "Carbon emissions/removals in Canada's managed forests, 1990-2011" available at: <http://www.nrcan.gc.ca/forests/canada/sustainable-forest-management/criteria-indicators/13273>; data for emissions from Canada's National Inventory Report, 1990-2012, Part I (page 142, Table 7-7).

The same rule applies for the 2nd commitment period except that Decision 2/CMP.7 introduced a modification that, under certain conditions and if the Party has indicated in its NIR submitted in 2015 that it wishes to do so, emissions and removals that occur on land subject to natural disturbances and reported as Forest Management (FM) or Afforestation and Reforestation (A/R) may be excluded from accounting. This new provision was introduced to accommodate the national circumstances of some Parties, in particular those that are subject to natural disturbances in large areas of managed land (e.g. wild fires).

According to Decision 2/CMP.7, natural disturbances are non-anthropogenic events or non-anthropogenic circumstances. For the purposes of this decision, these events or circumstances are those that cause significant emissions in forests and are beyond the control of, and not materially influenced by, a Party. These may include wildfires, insect and disease infestations, extreme weather events and/or geological disturbances, beyond the control of, and not materially influenced by, a Party. These exclude harvesting and prescribed burning⁹¹.

Parties wishing to use the natural disturbance provision are required to say that this is the case and there are statistical and circumstantial conditions about the disturbances that can be excluded, amongst them that no land use change occurs in the land affected by the disturbance. These are set out in Decision 2/CMP.7 The 2013 KP Supplement provides good practice guidance on the implementation of the natural disturbance provision. In summary:

- Parties are allowed to use the natural disturbances provision when emissions from natural disturbances in any single year exceed a background level plus the margin where a margin is needed (see below for explanation). In these years they may exclude from the accounting of A/R and/or FM (either annually or at the end of second commitment period) the emissions from natural disturbances that exceed the background level. Any subsequent removals during the commitment period on the lands affected by natural disturbance shall also be excluded from accounting.
- Parties shall provide country-specific information in their national inventory report for 2015 on the background level of emissions associated with natural disturbances that have been included in their Forest Management Reference Level; how the background level and a margin have been estimated; and information on how to avoid the expectation of net credits or net debits during the commitment period.
- Parties shall account for emissions associated with salvage logging and shall not exclude from accounting emissions from natural disturbances on those lands that are subject to land-use change following the disturbance.
- Parties shall calculate the net emissions and removals subject to those provisions and shall provide transparent information on:
 - a. Identification of all lands subject to natural disturbance (including their geo-referenced location, year, and types of disturbances); and
 - b. How annual emissions resulting from disturbances and the subsequent removals in those areas are estimated;
- Parties shall also provide transparent information that:
 - a. Shows that no land-use change has occurred on lands for which the natural disturbance provision is applied and explains the methods and criteria for identifying any future land-use changes on those land areas during the commitment period;

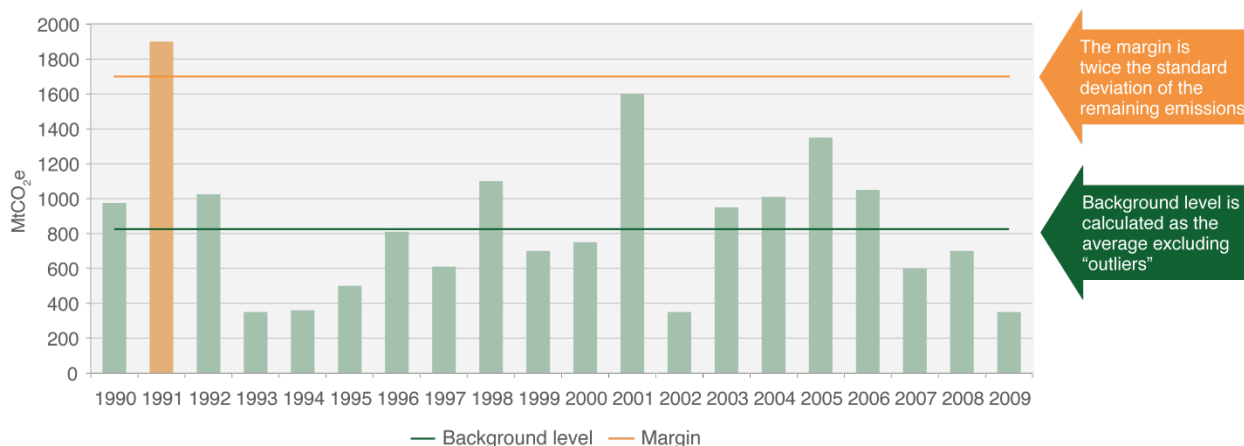
⁹¹ Decision 2/CPM.7 paragraph 1(a).

- b. Demonstrates that occurrences were beyond the control of, and not materially influenced by, the Party in the commitment period by demonstrating practicable efforts to prevent, manage or control the occurrences;
- c. Demonstrates the efforts taken to rehabilitate, where practicable, the land for which the natural disturbance provisions are applied; and
- d. Shows that salvage logging emissions were not excluded from accounting.

Background level plus the margin

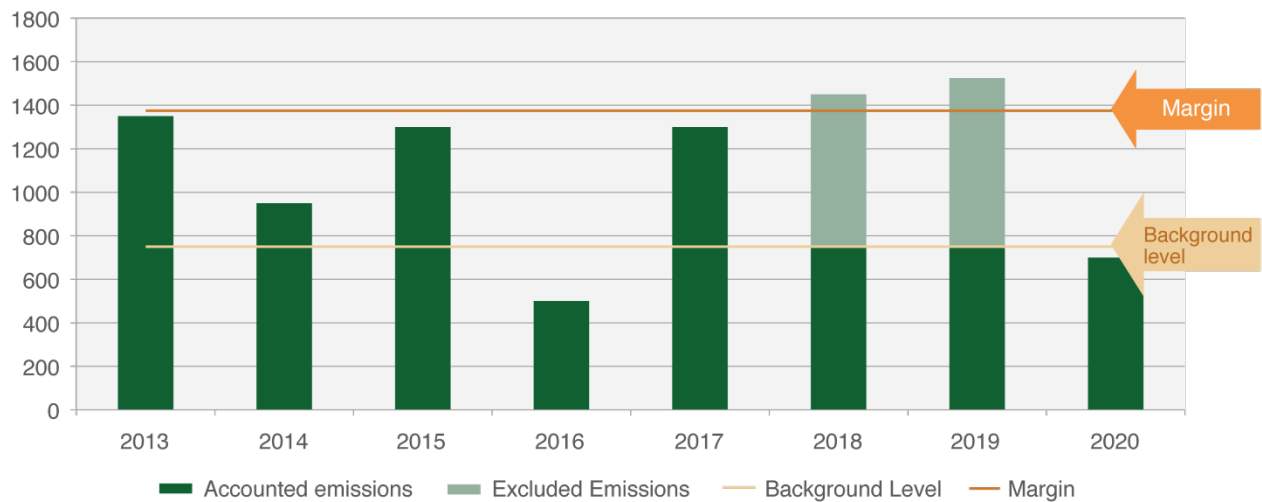
Calculating the background level and margin. The “background level” is an annualized level of expected disturbance emissions based on historical data. Figure 17 provides an illustration of how Parties may calculate the background level and margin (using the default method provided in Decision 2/CM.7). The Figure is a simulated example of a country’s total annual emissions from natural disturbances. Outliers in the time series (e.g. the orange bar) that exceed twice the standard deviation are identified and removed from the calculation. The background level is estimated as the average value of the remaining emissions (the green bars in Figure 17). The margin is twice the standard deviation of these remaining emissions. Countries may need to iterate this process until no outliers can be identified in order to calculate the background level.

Figure 17: Establishment of the background level and margin⁹²



Application of the background level plus margin. Countries may include the background level in their forest management reference level (FMRL). In a year during the commitment period for which the total emissions from natural disturbances exceeds the background level plus the margin (e.g. years 2018 and 2019 in Figure 18, following page), emissions above the background level may be excluded. Because the background level is included in the FMRL, emissions from natural disturbances up to the background level are already implicitly excluded from accounting.

⁹² Canaveira, Paulo (2014). The Land Sector in the UNFCCC Climate Negotiations - Training Course for non-A1 Negotiators, São José dos Campos, Brazil, March 2014.

Figure 18: Application of the natural disturbance provision⁹³

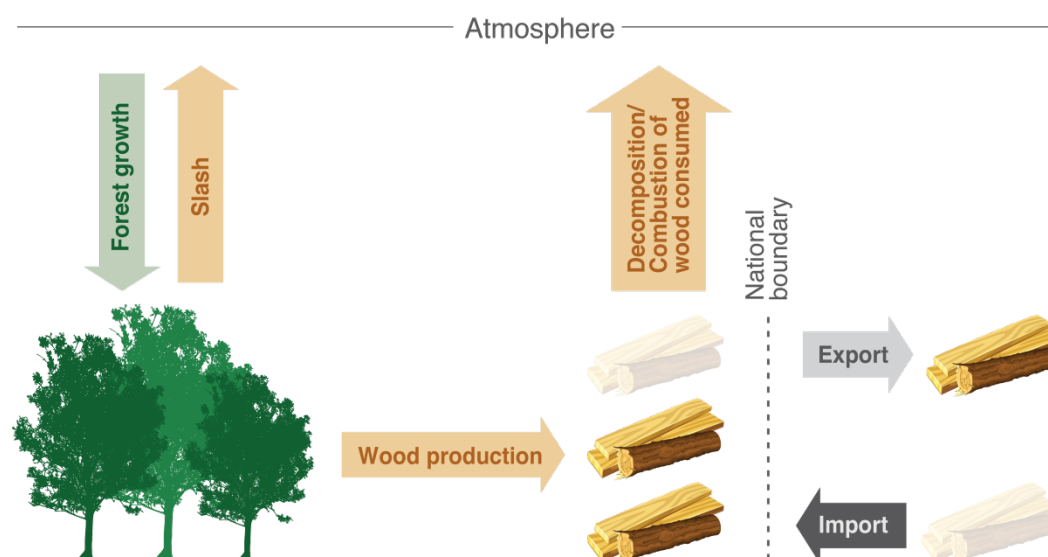
According to the IPCC, it is *good practice* that the background level and the margin be developed together so as to ensure that the exclusion of natural disturbances does not lead to the expectation of net credits or net debits. The establishment of the background level and margin can be done through the default method as described above, or an alternative method may be proposed by the Party, who then has the burden to prove that the proposed method does not generate net-debits or net-credits in a systematic way. Only when Parties submit their National Inventory Reports (NIR) in 2015 it will be possible to know if any alternative methods have been suggested and accepted in the review process.

⁹³ *Ibid.*

5. Harvested Wood Products

Harvested wood products are products entirely or partly made of wood. According to the *2006 IPCC Guidelines*, harvested wood products (HWP) includes all wood material (including bark) that leaves harvest sites⁹⁴. Different wood products have the ability to store carbon for shorter or longer periods of time. The production of a HWP and its storage life therefore has an effect on the total emissions and removals of greenhouse gases.

Figure 19: Carbon flow to and from the harvested wood product pool



In practice, countries only consider emissions and removals arising from stocks of semi-finished products such as solid wood and paper when estimating the HWP contribution. Mill residues and fuelwood are excluded as they have a short storage time and assumed to be oxidized in the year of harvest (instantaneous oxidation).

The sections below focus on reporting of HWPs under the Convention (through national GHG inventories) and KP-LULUCF rules for HWPs. As with natural disturbances, there is currently no guidance or mention of how developing countries pursuing result-based REDD+ actions may handle emissions and removals from HWPs.

5.1. Reporting of HWPs under the UNFCCC

IPCC Default Approach or Instant Oxidation

The *IPCC 1996 Guidelines* recommended using the default assumption that all carbon removed in wood and other biomass from forests as oxidized in the year of removal. This approach is sometimes referred to as the IPCC default approach or simply as instantaneous oxidation. The basic idea is that new wood products are merely replacing existing wood products which are then discarded and oxidized, and HWP therefore has no net effect on the total emissions and removals. When the total pool of harvested wood product is assumed not to increase this means the annual

⁹⁴ 2006 IPCC Guidelines, Chapter 12, Section 12.1 (Introduction), page 12.5.

carbon inflow and outflow from the HWP reservoir are equal. The guidelines acknowledge that it is not strictly accurate in the case of some forest products, but is considered a legitimate, conservative assumption for initial calculations.

Methods for calculating HWPs

Emissions and removals of GHGs from HWPs can be calculated as the difference between inflow and outflow as shown in Figure 19 above. But wood products are also exported and imported, which opens up the question of which country should report on the wood products – the country where the wood products have been produced or the country where the wood products are being consumed?

Both the *GPG-LULUCF* and the *2006 IPCC Guidelines* describe different possible technical approaches for reporting HWP (see Table 14) but maintain an option for reporting zero HWP contribution in cases where countries consider the contribution to be insignificant.

Table 14: IPCC approaches for estimating HWP

Approach	Explanation
Stock Change Approach	Include emissions from all wood consumed in the country (including imports)
Production Approach	Include emissions from all wood produced in the country (including exports)
Atmospheric-flow Approach	Similar to the stock change approach but different calculations
Simple Decay	Similar to the production approach but different calculations

Since some countries are major importers of wood and others are major exporters of wood the chosen approach can make a significant difference to the reported emissions and removals. As a result it is not straightforward to compare the HWP contribution from different countries that use different approaches. In addition, some countries have also used a version of the Stock Change Approach that only includes the HWP consumed from domestic production. This approach is sometimes referred to as the Stock Change Approach Domestic or simply the SCAD Approach. The UNFCCC Parties never reached agreement on which of the options all countries should use to report, and therefore reporting for HWPs under the Convention remains voluntary.

While there are different arguments for using different approaches, the problem remains that if countries use different approaches then there are most likely HWPs which are being reported twice (e.g. if both the exporting and the importing country are including the emissions in their reporting), or not reported at all (e.g. if neither the exporting nor the importing country is including the emissions). See Annex V for further detail and examples on how to report on HWP emissions.

5.2. Accounting of HWPs under the Kyoto Protocol

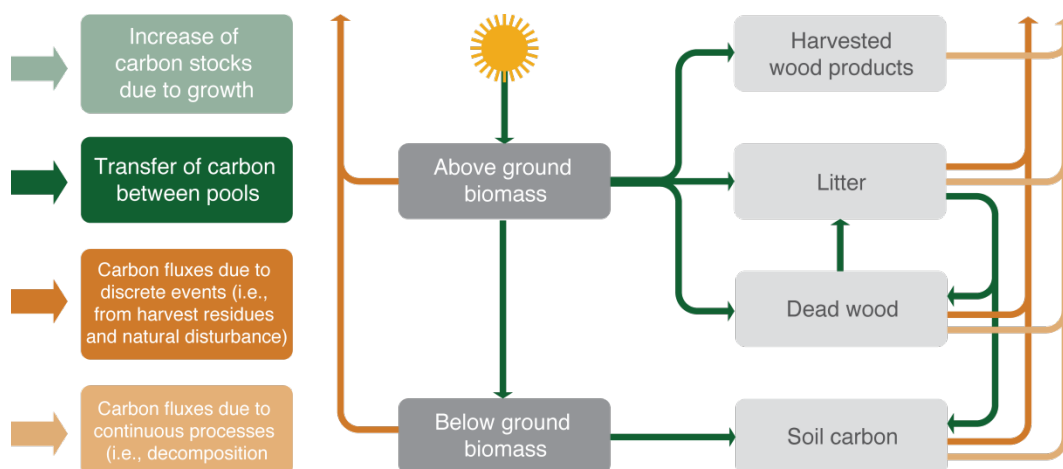
Rationale for including HWPs in the accounting

HWPs are an integrated part of the carbon flow to and from forests (see Figure 20, following page). If this pool is not included in the accounting then there would be a stronger incentive to keep carbon in forests instead of producing HWPs. As the consumption of HWPs is significant this could in theory create an incentive to import HWPs. When HWPs are imported from countries that do not account for their forests, including developing countries, these emissions are not captured. Furthermore,

HWPs can be a driver of deforestation. However, it is difficult to know whether this would happen in practice, and it is in fact not different from other sectors where, for example, emissions from manufactured goods are also only considered in the country of production and not in the country of consumption.

On the other hand, comprehensive accounting, including HWPs, can create an incentive to enhance the productivity of forests and produce more HWPs, including more of the long lived wood products compared to products with shorter life spans.

Figure 20: Carbon flow into the system and between the different pools including the role of HWPs⁹⁵



Accounting of HWP under the Kyoto Protocol

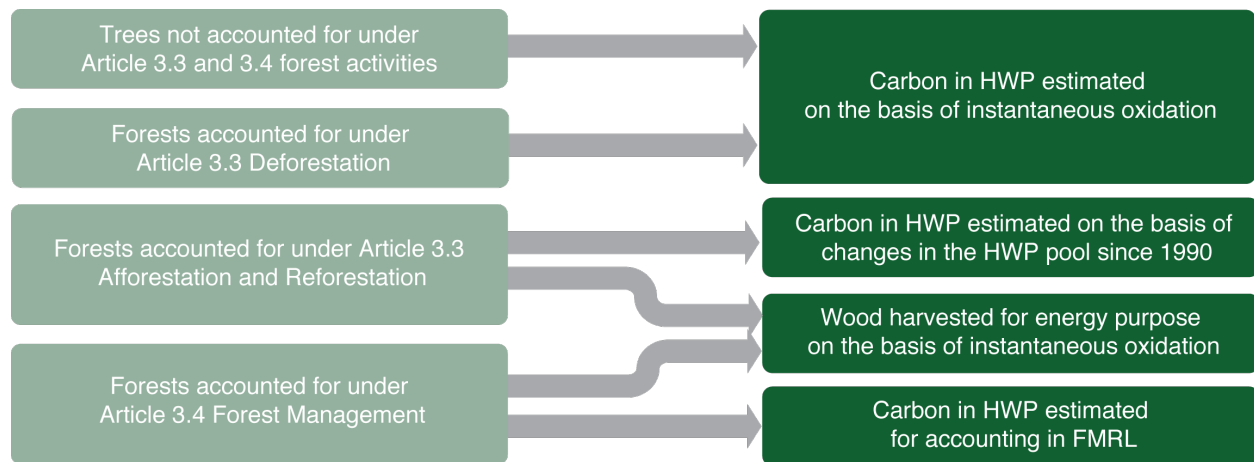
HWPs were not included in the reporting or accounting for the first commitment period of the Kyoto Protocol. Accounting for HWPs in the 2nd commitment period, however, is complicated by the different rules applied for forest activities during the 1st and 2nd commitment period (CP). HWPs for the 1st CP of the Kyoto Protocol (2008-2012) were treated using instantaneous oxidation. For the 2nd CP (2013-2020) Parties adopted an approach similar to the production approach described above. In practice, for most countries (including all those with projected forest management reference levels), HWPs will be included as a sixth carbon pool linked to the accounting for forests including afforestation and reforestation under Article 3.3 and forests management under Article 3.4. (See also Figure 21, following page). The specific rules are summarized as follows:

- For forest management where the Forest Management Reference Level (FMRL) is constructed based on a projection, HWP will be included in the FMRL (this includes 34 Parties), while for other approaches (1990 or zero as FMRL) it is up to the Party depending on whether information is available. If HWP is included then it will also be included in the FMRL.
- For afforestation and reforestation HWP will be included as a sixth pool accounted with net emissions and removals during the commitment period.
- Afforestation/reforestation and forest management will include exported HWP, while imported HWP will not be included.
- HWP from deforestation will be accounted as instantaneous oxidation.

⁹⁵ Adapted from *IPCC 2006 Guidelines* (Volume IV, chapter 2, figure 2.1).

- HWP from other areas such grassland or cropland, if elected, will be accounted as instantaneous oxidation.
- Regardless of the feedstock all wood harvested for the purpose of energy will be accounted as instantaneous oxidation.
- HWP in solid waste disposal sites will be accounted as instantaneous oxidation.
- Emissions from HWP produced before the second commitment period will be included under forest management, except where a Party already accounted for forest management during the first commitment period in which case the HWP from the first period will not be included. This is because it was already covered by instantaneous oxidation during the first commitment period.
- However, for forest management, if the FMRL is based on a projection then emissions from HWP from before the commitment period can be excluded as long as there is consistency between the FMRL and the accounting during the commitment period.

Figure 21: Different sources of domestic wood products and how they are included in accounting under the Kyoto Protocol



The mandatory inclusion of HWPs for projected FMRLs will produce more conservative accounting because if a country e.g. has overestimated the projected harvest for the commitment period and this projected harvest doesn't materialize this will mean less emissions and possible issuance of credits. A reduced harvest will, on the other hand, mean less HWP compared to the projection and the HWP pool will therefore have the opposite effect and provide not only a more comprehensive, but also a more conservative accounting.

6. CDM and JI accounting for land use and forestry

Under the flexible mechanism of the KP, Parties are able to implement LULUCF project activities to help fulfill their commitments. The **Clean Development Mechanism (CDM)**⁹⁶ allows for the implementation of afforestation and reforestation (A/R), in non-Annex I countries that will generate Certified Emission Reductions (CERs) that can be bought by Annex I Parties. In **Joint Implementation (JI)**⁹⁷ an Annex I Party may purchase Emission Reduction Units (ERUs) from projects that sequester carbon in another Annex I country (following the definitions, accounting rules, modalities and guidelines under Article 3.3 and 3.4).

6.1. Allowable activities under CDM and JI

The CDM has been limited to afforestation and reforestation. In order to implement such project under the CDM, a non-Annex I Party must have selected and reported to the CDM Executive Board the following:

- A single minimum tree crown cover value between 10 and 30 percent;
- A single minimum land area value between 0.05 and 1 hectare; and
- A single minimum tree height value between 2 and 5 meters.

JI can include any LULUCF activity under Articles 3.3 and 3.4 (i.e. afforestation, reforestation, forest management, cropland management, grazing land management, revegetation and wetland drainage & rewetting).⁹⁸

At the time of writing there are only 53 registered A/R CDM project activities and 3 registered JI LULUCF project activities⁹⁹. SBSTA is considering possible additional LULUCF activities under the CDM, with a view to forwarding a draft decision on such matter for consideration and adoption at CMP 10 (December 2014), although there has been minimal progress on this agenda item to date.

6.2. Non-permanence and crediting

Carbon stocks are subject to natural disturbances such as fire and wind or anthropogenic disturbances such as harvesting that can release (totally or partially) the stored carbon to the atmosphere. Under the UNFCCC this has been called the risk of non-permanence. To address this risk in A/R CDM project activities, *temporary credits* have been created:

- **Temporary CER or tCER** is a CER issued for an A/R CDM project activity that expires at the end of the commitment period following the one during which it was issued. For example, if a tCER is issued in 2007 it will expire in 31 of December 2012; if a tCER is issued in 2010, it will expire in 31 of December of 2020. At the end of the commitment period all tCERs valid for that

⁹⁶ For more information on the CDM see: <http://cdm.unfccc.int/>

⁹⁷ For more information on JI see: <http://ji.unfccc.int/index.html>

⁹⁸ Projects that reduce deforestation are not included as ERUs in theory should only be issued for projects that are a net sink.

⁹⁹ UNFCCC database, consulted in March 23rd, 2014. The JI project database is available at:

http://ji.unfccc.int/JI_Projects/ProjectInfo.html and the CDM database at: <http://cdm.unfccc.int/Projects/projsearch.html>

period are automatically terminated. Every five years new tCERs can be issued after the carbon stocks have been verified. In effect this means tCERs are issued periodically for the same stored carbon – if the carbon is lost, no new tCERs are issued. Once the project crediting period expires no new tCERs can be issued and all existing tCERs are terminated.

- **Long-term CER or ICER** is a CER issued for an A/R CDM project activity that expires at the end of the crediting period of the project activity for which it was issued. For example, if a project with a 20 year crediting period¹⁰⁰ was registered in 2008 and an ICER is issued in 2012 the ICER will expire in 2028. New ICERs can be issued every five years as the forest grows. If the total carbon stock in a forest is found to be less than the number of ICERs issued then ICERs are cancelled. At the end of the project's crediting period all ICERs are automatically terminated.

If an Annex I Party has used tCERs or ICERs to meet its commitments in a commitment period, it must replace the tCER or ICER after it has terminated.

In the case of JI, ERUs issued to JI LULUCF projects come from converting a Removal Unit (RMU) into an ERU— i.e. credits are only issued to a JI LULUCF project if there is net sequestration across the country as a whole that results in an issuance of RMUs. ERUs are considered permanent because JI LULUCF projects fall under the national accounting, so if there is a subsequent loss then this emission will be captured in the national accounting under Article 3.3 or 3.4.

The temporary nature of the CERs from A/R CDM project activities has been identified as one of the reasons for the low number of registered projects. SBSTA is considering alternative approaches to addressing the risk of non-permanence under the CDM¹⁰¹, with a view to forwarding a draft decision on such matter for consideration and adoption at CMP 10 (December 2014). However, there has been minimal progress on this to date.

¹⁰⁰ The crediting period begins at the start of the A/R CDM project activity and can be either: A maximum of 20 years which may be renewed at most twice provided that, for each renewal, a DOE determines and informs the Executive Board that the original project baseline is still valid or has been updated taking account of new data where applicable; or A maximum of 30 years.

¹⁰¹ For an independent analysis of alternative approaches consult: "Alternative Approaches to Addressing the Risk of Non-Permanence in Afforestation and Reforestation Projects under the Clean Development Mechanism" by the Nicholas Institute of Duke University. Available at: <http://nicholasinstitute.duke.edu/climate/policydesign/alternative-approaches-to-addressing-the-risk-of-non-permanence#.UyuvTCjofRc>

7. Social and environmental safeguards

This section is focused on UNFCCC provisions that relate to protecting or promoting (i.e. safeguarding) social and/or non-GHG related environmental concerns when taking actions to mitigate climate change in the land use and forestry sector.

7.1. Social and environmental provisions in the UNFCCC

The Convention in several places mentions protection of social and environmental concerns when taking mitigation actions. These apply broadly, i.e. to all sectors including land use and forestry. They include (bold font used to identify relevant text):

- Preamble: “Affirming that responses to climate change should be **coordinated with social and economic development** in an integrated manner with a view to **avoiding adverse impacts** on the latter, taking into account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty”.
- Article 2, Objectives: “The ultimate objective... stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to **allow ecosystems to adapt naturally** to climate change, to **ensure that food production is not threatened** and to **enable economic development to proceed in a sustainable manner.**”
- Article 4, Commitments: “All parties... Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and **employ appropriate methods, for example impact assessments**, formulated and determined nationally, **with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment**, of projects or measures undertaken by them to mitigate or adapt to climate change”

The application of provisions included in the preamble and Article 4 is generally understood to be nationally determined, i.e. countries decide how to coordinate social and environmental concerns with, and when to apply impact assessments to, mitigation actions taken in support of the UNFCCC. There are currently no specific requirements for reporting on such measures taken. By contrast, Article 2 is a collective objective that suggests global mitigation efforts should broadly protect ecosystem functioning that impacts food production and sustainable economic development.

7.2. Social and environmental requirements in the Kyoto Protocol

To date, the KP does not require Annex I Parties to meet or provide information on specific social or non-GHG related environmental (e.g. biodiversity, natural forests) ‘safeguards’ when undertaking mitigation actions. One exception is Parties who engage in Joint Implementation through the KP. The Project Design Document Form¹⁰² published by the Joint Implementation Supervisory Committee (JISC) for LULUCF JI projects requires project proponents to document an analysis of environmental impacts, including transboundary impacts, in accordance with procedures of the host country and, if impacts are considered significant by project participants or the host country, to

¹⁰² Available at: <http://ji.unfccc.int/UserManagement/FileStorage/9PIQ8RP4L02KJQESYE0OE59PATEVH3>

undertake an environmental impact assessment and to document and provide its conclusions and all references used. Social impacts are not included in the Project Design Document Form and no explicit social safeguards are mentioned in JI requirements. Stakeholder comments on the LULUCF project must also be provided. In addition, any leakage effects must be estimated, monitored and its treatment documented. Finally, because Annex I countries are required to account for the net emissions or sequestration from land use, if a reversal occurs in a JI forestry project it will be captured in the national accounting and the liability would fall on the host country.

The **Clean Development Mechanism** (CDM) includes both general social and environmental provisions, and some that are specific to afforestation/reforestation (A/R) projects:

- *Contribution to sustainable development:* All CDM projects must receive a Letter of Approval from the host country Designated National Authority (DNA) that confirms the project contributes to the country's sustainable development. The application of this requirement is left up to the country. In practice, countries have approached the determination of whether a CDM project contributes to sustainable development in different ways—both with regard to process and substance—resulting in differences in application¹⁰³.
- *Special requirements for A/R projects:* The KP (Decision 5/CMP.1) requires A/R projects to document environmental impacts, including on biodiversity and natural ecosystems, and impacts outside the project boundary area. The Project Design Document (PDD) for A/R CDM reflects this environmental requirement and also requires analysis of significant socio-economic impacts, including outside the project boundary. If any environmental or socio-economic impact is considered significant by the project participants or the host Party, an impact assessment is required and a description of planned monitoring and remedial measures to address such impacts.

7.3. Safeguards and REDD+

The concept of applying social and environmental safeguards to mitigation actions under the UNFCCC is most prominent in REDD+ discussions and decisions. In Cancun (COP 16, 2010), Parties agreed that a set of such safeguards should be promoted and supported when undertaking REDD+ activities¹⁰⁴ (see Box below). In Durban, the following year, the Conference of the Parties (COP) agreed that developing countries Parties should provide a summary of information on how the safeguards are being addressed and respected throughout the implementation of REDD+ activities, and to provide such a summary periodically in their national communications or other channels agreed by the COP¹⁰⁵. Another decision¹⁰⁶ states that countries seeking to obtain and receive results-based payments should provide the most recent summary of information on how all of the safeguards have been addressed and respected before they can receive results-based payments.

103 For more information on the range of approaches taken by DNAs see "Mapping of Criteria set by DNAs to Assess Sustainable Development Benefits of CDM Projects", paper prepared by Ritika Tewari (The Energy and Resources Institute, i.e. TERI) for the CDM Policy Dialogue.

104 Decision 1/CP.16, Appendix I, para 2.

105 Decision 12/CP.17, paras 3 and 4.

106 Decision 9/CP.19 para 4.

REDD+ Safeguards: The list of safeguards applicable to the implementation of REDD+ activities, included in Cancun Decision 1/CP.16 (Appendix I), is paraphrased below.

- Consistency with the objectives of national forest programs
- Consistency with relevant international conventions and agreements
- Transparent and effective national forest governance structures
- Respect for the knowledge and rights of indigenous peoples and members of local communities
- Full and effective participation of relevant stakeholders
- Consistency with the conservation of natural forests and biological diversity
- Enhancing social and environmental benefits
- Addressing the risks of reversals
- Reducing displacement of emissions

At the time of writing, there is no further guidance from the COP on the applicability or interpretation of the Cancun safeguards for REDD+. Many developing countries are starting to create safeguard information systems to comply with the requirement to submit information on how Cancun safeguards have been addressed and respected, and in order to receive finance. In addition, many funding organizations (e.g. the Forest Carbon Partnership Facility's Carbon Fund) have elaborated social and environmental requirements consistent with the Cancun REDD+ safeguards as a pre-condition for receiving results-based REDD+ finance.

The application of REDD+ Safeguards: Cambodia

At present, most developing countries are working to decide how to address and respect the UNFCCC REDD+ safeguards. In Cambodia a preliminary review of safeguards has been produced to serve as information source for making a decision for designing a national approach to safeguards. This review contains the following information:

- An analysis of UNFCCC guidance for safeguards as provided through COP decisions from COP16 to COP19;
- An analysis of other safeguards initiatives at global level such as UN-REDD Social and Environmental Principles and Criteria (SEPC), World Bank Strategic Environmental and Social Assessment (SESA), and the REDD+ Social and Environmental Standards (REDD+ SES, managed by the Climate, Community and Biodiversity Alliance (CCBA) & Care International) and how they address the UNFCCC safeguards;
- A review of relevant Policies, Laws and Regulations (PLRs) in Cambodia in order to identify gaps between these existing PLRs and the globally proposed safeguard measures;
- An analysis of lessons learned from the application of safeguards in voluntary REDD+ pilot projects in Cambodia;
- An analysis of experiences with devising a national safeguard approach in neighboring countries and;
- A list of preliminary recommendations for the Cambodian Government's consideration regarding how to promote and support the Cancun and other global REDD+ safeguards in practice. (The review document is still under validation).

A Safeguards Technical Team has been established with governmental and non-governmental representatives including community forestry networks to make recommendations for a national safeguard approach including on how to provide information on safeguards following the UNFCCC guidance provided.

8. The future of land use in the UNFCCC

The Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) is currently working towards agreement on “development of a protocol, another legal instrument or an agreed outcome with legal force”¹⁰⁷ by 2015 (COP 21, Paris) applicable to all Parties that would come into effect and be implemented from 2020.

As part of the agreement for the modalities and procedures for LULUCF accounting in the 2nd commitment period of the KP, Parties agreed *to explore more comprehensive accounting of anthropogenic emissions by sources and removals by sinks from LULUCF, including through a more inclusive activity-based approach or a land-based approach*¹⁰⁸, and to report to CMP 9 on the outcomes of the work programme¹⁰⁹. To date discussions have not produced any significant outcome on this issue. In recent discussions (SBSTA 39), it was agreed that any outcome of such a work programme will not be applicable in the second commitment period; i.e. would only be valid after 2020¹¹⁰.

How land use and forestry might be integrated into the future agreement remains an open question. Negotiations leading towards a new agreement could allow Parties an opportunity to consider whether a new or revised set of rules, requirements, and/or guidance related to land use is needed. In addition, to consider whether, and if so how best, to integrate such rules for various applications (e.g. mitigation commitments, financial mechanisms, etc.) provided for under the Convention.

As stated in the introduction, the Guide does not seek to make recommendations on how land use might be integrated into a future agreement. However, the information presented in this Guide covers many of the elements related to land use that may be considered by Parties, who are likely to take into consideration experiences from many years of reporting emissions and removals under the UNFCCC (both for Annex I and non-Annex I countries) and the accounting rules of the KP (both 1st and 2nd commitment periods).

107 1/CP.17, paragraphs 2-4.

108 To date, there is no consensus in the UNFCCC negotiation of what a land-based approach would mean in the context of accounting.

109 Decision 2/CMP.7, paragraph 5

110 See SBSTA 39 report, available at: <http://unfccc.int/resource/docs/2013/sbsta/eng/05.pdf>

Annex I: Kyoto Protocol decisions on land use

Below is a list of key Kyoto Protocol decisions related to measurement, reporting and accounting of emissions and removals from land use.

Table 15: Key Kyoto Protocol decisions on land use measurement, reporting and accounting

Decision No.	Title	Relevance
14/CP.11 ¹¹¹	Tables of the common reporting format for land use, land-use change and forestry	Adopts CRF tables for the purpose of submission of annual inventory information on LULUCF by Annex I Parties to the Convention.
15/CMP.1 ¹¹²	Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol	Provides guidelines on supplementary information that each Party included in Annex I shall provide, including information related to activities under Article 3, paragraph 3, and any elected activities under Article 3, paragraph 4 (e.g. geographical location, information that demonstrates that these unaccounted pools were not a net source of emissions, factoring out, etc.).
16/CMP.1 ¹¹³	Land use, land-use change and forestry	Adopts definitions, modalities, rules and guidelines relating to land use, land-use change and forestry activities under Articles 3, 6 and 12 of the Kyoto Protocol for application in the first commitment period.
17/CMP.1 ¹¹⁴	Good practice guidance for land use, land-use change and forestry activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Decides that for the first commitment period, Annex I Parties to the Kyoto Protocol shall apply the Good Practice Guidance for Land use, Land-use Change and Forestry, as developed by the IPCC, in a manner consistent with decision 16/CMP.1.
24/CP.19 ¹¹⁵	Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention	<p>Adopts the revised “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories” contained in annex I, the revised common reporting format tables contained in annex II and the global warming potential values contained in annex III.</p> <p>Encourages Annex I Parties to use the “IPCC 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands” in preparing their annual National Inventory Reports due in 2015 and beyond.</p> <p>An outline and general structure of the national inventory report is also presented (including for Chapter 6 LULUCF)</p>

111 Available at: <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>

112 Available at: <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>

113 Available at: <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=3>

114 Available at: <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=10>

115 Available at: <http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=2>

2/CMP.6 ¹¹⁶	The Cancun Agreements: Land use, land-use change and forestry	<p>Affirms that the principles contained in paragraph 1 of decision 16/CMP.1 continue to govern the treatment of land use, land-use change and forestry activities.</p> <p>Agrees that the definitions of forest, afforestation, reforestation, deforestation, revegetation, forest management, cropland management and grazing land management shall be the same as in the first commitment period under the Kyoto Protocol</p> <p>Decides that each submission of a forest management reference level shall be subject to a technical assessment by a review team, according to the "Guidelines for the submission and review of information on forest management reference levels/baselines" present in the Decision.</p>
2/CMP.7 ¹¹⁷	Land use, land-use change and forestry	Adopts the definitions, modalities, rules and guidelines relating to land use, land-use change and forestry activities under the Kyoto Protocol for application in the second commitment period.
2/CMP.8 ¹¹⁸	Implications of the implementation of decisions 2/CMP.7 to 5/CMP.7 on the previous decisions on methodological issues related to the Kyoto Protocol, including those relating to Articles 5, 7 and 8 of the Kyoto Protocol	Decides that for the purposes of reporting land use, land-use change and forestry activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol for the second commitment period, each Party included in Annex I shall include the information specified in annex II to the decision in its annual greenhouse gas inventory in accordance with Article 5, paragraph 2, of the Kyoto Protocol, which shall be submitted starting with the annual inventory for the first year of the second commitment period.
6/CMP.9 ¹¹⁹	Guidance for reporting information on activities under Article 3, paragraphs 3 and 4 of the Kyoto Protocol	<p>Adopts the common reporting format tables for the purpose of submission of information on anthropogenic greenhouse gas emissions by sources and removals by sinks from LULUCF activities under Article 3, paragraphs 3 and 4, pursuant to Article 5, paragraph 2, of the Kyoto Protocol in the second commitment period.</p> <p>Requests Annex I Parties to apply, as appropriate, the "IPCC 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol" in a manner consistent with decision 2/CMP.7 and consistent with annex I to decision 24/CP.19.</p> <p>Decides that the 2013 Supplement to the "2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands" shall apply for providing information on wetland drainage and rewetting elected activity under Article 3, paragraph 4, of the Kyoto Protocol.</p>

116 Available at: <http://unfccc.int/resource/docs/2010/cmp6/eng/12a01.pdf#page=5>

117 Available at: <http://unfccc.int/resource/docs/2011/cmp7/eng/10a01.pdf#page=11>

118 Available at: <http://unfccc.int/resource/docs/2012/cmp8/eng/13a01.pdf#page=14>

119 Available at: http://unfccc.int/national_reports/accounting_reporting_and_review_under_the_kyoto_protocol/items/7969.php

Annex II: UNFCCC decisions on REDD+

Below is a list of key decisions related to REDD+. ¹²⁰

Table 16: Key UNFCCC REDD+ decisions

Decision No.	Title	Relevance
1/CP.13 and 2/CP.13 (Bali)	Policy approaches and positive incentives on issues related to REDD+ ^{**}	Together, decisions 1/CP.13 and 2/CP.13 established a two track approach: one on policy matters under the Convention as part of the Bali Action Plan, and one on technical and methodological issues under the SBSTA, with methodological advice generated by SBSTA to be incorporated into subsequent COP decisions.
4/CP.15 (Copenhagen)	Methodological guidance including use of the most recent IPCC Guidelines and Guidance (as adopted or encouraged by the COP)	Technical decision on how to estimate emissions and removals of greenhouse gasses from the forest sector, including use of the most recently approved guidance from the IPCC and to establish robust and transparent national forest monitoring systems. The decision also mentions that forest reference emission levels and forest reference Levels (REL/RLs) should take into account historic data, but can adjust for national circumstances
1/CP.16 (Cancun)	Policy approaches and positive incentives on issues related to REDD+ ^{**}	The Cancun Agreements is a key decision in defining REDD+ and establishing an implementation framework for REDD+. It introduced the concept of the three-phased approach ending with full results-based implementation, which requires national forest monitoring systems as well as the seven safeguards.
2/CP.17	Policy approaches and positive incentives on issues related to REDD+ ^{**}	Clarifies that the seven safeguards will apply regardless of the source of financing, and that appropriate market-based approaches to support results-based actions, as well as non-market-based approaches could be developed. Requests further work on the financing of results-based actions.
12/CP.17 (Durban)	Guidance on systems for providing information on how safeguards are addressed and respected and modalities relating to forest reference emission levels and forest reference levels	Provides technical guidance on: 1) safeguards information systems (SIS) and 2) forest reference emission levels and forest reference levels (REL/RL).
1/CP.18 (Doha)	Policy approaches and positive incentives on issues related to REDD+ ^{**}	A process-oriented decision that established a work program on market-based approaches and a process on coordination of support for all REDD+ activities; and a request to SBSTA to work on how non-market-based approaches could be developed, and on methodological issues related to non-carbon benefits.
9/CP.19 (Warsaw)	Work programme on results-based finance to progress the full implementation of the activities	Highlights the need to scale up financing and clarifies elements REDD+ countries should have in place to receive results-based finance. Establishes an

¹²⁰ For a more detailed summary of REDD+ decisions: "The Road from Bali to Warsaw: Collection of COP Decisions on REDD+" by Thy Heang and Peter Iversen (Cambodia, 2014). Found at: <http://www.cambodia-redd.org/category/document-centre/redd-materials/cop-decisions>. The Annex was a summary of this document.

	referred to in decision 1/CP.16, paragraph 70	information hub on the UNFCCC web platform to promote transparency on results-based actions and corresponding payments, as well as REL/RLs and safeguards information system. Requests the Standing Committee on Finance to focus on issues related to finance for forests, including the implementation of the REDD+ activities.
10/CP.19 (Warsaw)	Coordination of support for the implementation of activities in relation to mitigation actions in the forest sector by developing countries, including institutional arrangements	Invites countries to designate a focal point to the UNFCCC for REDD+. Several needs and functions in regards to coordination of support are identified, and parties are encouraged to meet on an annual basis, starting with SBSTA-41 (together with COP20 in Lima, 2014).
11/CP.19 (Warsaw)	Modalities for national forest monitoring systems	Repeats parts of 4/CP.15 related to monitoring including the use of IPCC guidance; subnational monitoring and reporting as an interim measure; and the need for national forest monitoring systems to provide data and information that are transparent, consistent over time, and suitable for measuring, reporting and verifying (MRV). Acknowledges that national forest monitoring systems could be useful for providing information on the safeguards.
12/CP.19 (Warsaw)	The timing and the frequency of presentations of the summary of information on how all the safeguards referred to in decision 1/CP.16, appendix I, are being addressed and respected.	Repeats parts of the Durban decision on guidance for safeguard information systems; states that countries should provide a summary of information on how safeguards are being addressed and respected in their national communications, and possibly via the UNFCCC web platform; and that the frequency should be consistent with the submission of National Communications.
13/CP.19 (Warsaw)	Guidelines and procedures for the technical assessment of submissions from Parties on proposed forest reference emission levels and/or forest reference levels	States that each submission on proposed REL/RLs will have a technical assessment conducted by two LULUCF experts. Clarifies the purpose and scope of the assessment.
14/CP.19 (Warsaw)	Modalities for measuring, reporting and verifying	Clarifies information a country should provide, the technical analysis that would occur, and how the country and experts will interact during the process of "MRV" for results from REDD+ actions.
15/CP.19 (Warsaw)	Addressing the drivers of deforestation and forest degradation	Reaffirms the complexities and importance of addressing the drivers of deforestation and forest degradation; encourages countries, international organizations and the private sector to continue working on this and to share information via the UNFCCC web platform.

**Note: REDD+ refers to "reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries".

Annex III: KP-LULUCF rules not covered in the Guide

The following information is adapted from *Options and Elements for an Accounting Framework for the Land Sector in the Post-2020 Climate Regime*.¹²¹

Once in, always in: This rule has two consequences: (1) once a voluntary activity is elected for a commitment period, it should remain elected in subsequent commitment periods; (2) once a unit of land enters LULUCF accounting, it should remain being accounted during that commitment period and subsequently, even if no any activity is further implemented on that piece of land.

Carbon Equivalent Forest Conversion: This rule allows to continue to account as “Forest Management” lands that are subject to deforestation, but only if a new forest is established on lands eligible for afforestation that will deliver (in due time) an equivalent carbon stock. Under this rule, afforested lands will be accounted for as “forest management”. This rule is voluntary and Parties that wish to apply it need to comply with an extensive list of other reporting requirements. This rule was justified as describing an activity similar to normal reforestation (replanting of a plantation following harvesting – reported as forest management), the only difference being the location where the “reforestation” takes place. Without this rule, the land subject to deforestation and the new forest would be reported as “Deforestation” and “Afforestation and Reforestation”, respectively. The net carbon stock change accounted across the entire cycle would be zero in both cases: either counting both under forest management or counting the cleared land under deforestation and the planted land under reforestation. This rule did not exist for the 1st commitment period.

Conversion to Plantations: This rule requires Parties to report and account the emissions and removals arising from the conversions of natural forests to planted forest. This rule did not exist for the 1st commitment period.

No Net-debits: This rule determines that Parties should account for zero emissions on those lands subject to afforestation and reforestation activities, if during the commitment period the emissions from harvesting are bigger than the removals accounted in those lands. This rule was justified as to not introduce a perverse incentive limiting afforestation, by making Parties liable for full emissions associated with harvesting afforested/reforested areas although they had not received credit for the full growth (because credits only accrue during the commitment period). It should be noted that over long periods of time and sustainable management practices emissions and removals tend to compensate each other. However, over short commitment periods that is not usually the case. This rule was applied during the 1st commitment period, but was revoked for the 2nd.

Not a source: This rule allows countries to exclude pools from the accounting of any of the mandatory or selected activities, provided that it can be demonstrated that the pool is not a net source of emissions, i.e., it is either in balance (emissions equal removals) or is more likely to be sequestering carbon dioxide than emitting it.

¹²¹ Canaveira, Paulo (2014). Options and Elements for an Accounting Framework for the Land Sector in the Post-2020 Climate Regime. Terraprima Report to the Swiss Federal Office for the Environment, February 2014.

Annex IV: KP FMRLs in the second commitment period

What types of FMRLs were chosen by Annex I Parties in the second commitment period?

Parties proposed three different approaches for setting reference levels:

- FMRL based on net emissions in 1990 (3 Parties);
- FMRL equal to zero (1 Party) and;
- FMRL based on a projection (34 Parties).

This latter group can again be divided up into a group of 17 Parties using country specific projections, 14 Parties using a common model-based approach, two Parties using a linear extrapolation of historic data and one Party using the historic average emissions from forest land remaining forest land.

Japan is the only country that uses zero as the value for the reference level; in addition it applies what is called the “narrow approach”. The KP definition of forest management allows countries to select specific activities which have been applied since 1990 and then only account for the areas where these activities takes place, rather than the total area of managed forests (which most countries use). This means Japan has a much larger area under forest land remaining forest land under the Convention (24,943 Kha) than the area accounted for under forest management (14,817 Kha) and also the reported net removals accounted for under the Kyoto Protocol (-52,606 Gg CO₂) is less than that reported under the Convention (-77,735 Gg CO₂) (all values from 2011 inventory submissions).

Technical assessment of FMRLs

The use of transparent, complete, consistent, comparable and accurate information to allow for a technical assessment of the submission of FMRLs is required. After FMRLs were submitted in 2011, a review process was implemented and the team of reviewers and Parties that had submitted FMRLs had considerable exchanges of questions and answers during the review process – partly due to the fact that this is the first time such an exercise has taken place. The review process led to a number of changes in Parties’ proposals. The submissions and the technical assessment reports as well as the synthesis report on the technical reviews can all be found on the UNFCCC website¹²².

While the technical assessment and the information provided were part of the process to agree on the use of FMRLs as a new accounting approach, this information is also relevant for the actual accounting during the commitment period to allow Parties to demonstrate methodological consistency between the reference level and reporting for forest management, including in the area accounted for, in the treatment of HWP, and in the accounting of any emissions from natural disturbances. In case an inconsistency is detected then Parties will make technical corrections, using IPCC methods for ensuring time series consistency and report on how these technical corrections were made. This information shall be reported as part of the annual GHG inventories and will be reviewed as part of the annual GHG inventory review process.

¹²² Available at: <http://unfccc.int/bodies/awg-kp/items/5896.php>

Figure 22 below shows how Annex I FMRLs were inscribed in the Appendix of Decision 2/CMP.7, expressed in tons of CO₂eq for (a) an assumption of instantaneous oxidation of HWP and (b) applying first order decay functions for HWP. Since the HWP rules were not finalized until Durban, technical adjustments may be needed to achieve consistency (see Section 5.2 and Annex V for more information on how HWPs are calculated under the Kyoto Protocol).

Figure 22: Appendix from Decision 2/CMP.7 in which Annex I FMRLs are inscribed

Appendix

Party ^a	Reference level (Mt CO ₂ eq/year) ^b	Applying first-order decay function for HWP
Australia		4.700
Austria	-2.121	-6.516
Belarus	-30.020	
Belgium	-2.407	-2.499
Bulgaria	-8.168	-7.950
Canada	-70.600	-114.300
Croatia	-6.289	
Cyprus ^d	-0.164	-0.157
Czech Republic	-2.697	-4.686
Denmark	0.334	0.409
Estonia	-1.742	-2.741
European Union (27) ^c	-253.298	-306.853
Finland	-19.300	-20.466
France	-63.109	-67.410
Germany	-2.067	-22.418
Greece	-1.830	-1.396
Hungary	-0.892	-1.000
Iceland	-0.154	
Ireland	-0.008	-0.142
Italy	-21.182	-22.166
Japan	0.00	
Latvia	-14.255	-16.302
Lithuania	-4.139	-4.552
Luxembourg	-0.418	-0.418
Malta ^c	-0.049	-0.049
Monaco ^d	-	
Netherlands	-1.464	-1.425
New Zealand	11.150	
Norway	-11.400	
Poland	-22.750	-27.133
Portugal	-6.480	-6.830
Romania	-15.444	-28.393
Russian Federation	-116.300	
Slovakia	0.358	-1.084
Slovenia	-3.033	-3.171
Spain	-20.810	-23.100
Sweden	-36.057	-41.336
Switzerland	0.220	
Ukraine ^e	-48.700	
United Kingdom of Great Britain and Northern Ireland	-3.442	-8.268

^a Technical corrections will be made to include, if necessary, the treatment of natural disturbances and harvested wood products, or any other relevant provisions included in this annex.

^b Assuming instantaneous oxidation.

^c The European Union total includes Cyprus and Malta. Cyprus and Malta are member States of the European Union but are not Parties to the Convention that are also Parties to the Kyoto Protocol with a commitment inscribed in Annex B to the Kyoto Protocol.

^d Monaco did not propose a forest management reference level due to its lack of forest land.

^e Ukraine's revised forest management reference level is a preliminary or interim estimate.

Note: Parties have made different assumptions in the construction of the reference levels proposed in the appendix above. These assumptions are found in Parties' submissions. See: <<http://unfccc.int/4907.php>>.

Annex V: Additional information about HWP

This Annex provides further information about the calculation of HWPs for reporting in National Inventory Reports (NIRs) to the UNFCCC.

To estimate emissions and removals from HWP it is necessary to estimate the carbon stored in wood product production (inflow) and the carbon release when existing wood products are being replaced and discharged (outflow). Since the existing wood products in use are a result of many years of wood product production, the IPCC recommends including both inflow and outflow since 1900 in order to make estimates for recent years.

This very long time period is to avoid underestimating the size of the HWP pool and the emissions. The contribution from wood products from before 1900 is believed to be insignificant. Since probably no country has production data back to 1900 what countries do in practice is to reconstruct data by using production data as far back as possible e.g. by using reported forest products data held by the FAO.

To estimate the outflow of carbon released, the IPCC recommends using a first-order decay function with appropriate half-life for the product category in question. This means a constant rate of decay from the pool. A half-life is the number of years it takes to lose one-half of the material currently in the pool. Countries should use at least the two product categories shown in the table 17 below since there is a big difference in half-life of these products.

Table 17: Default half-lives and decay rates for agreed for the 2nd commitment period of the Kyoto Protocol

	Half-life (years)	Decay rate (k)
Paper	2	0.347
Wood panels	25	0.028
Sawn wood	35	0.020

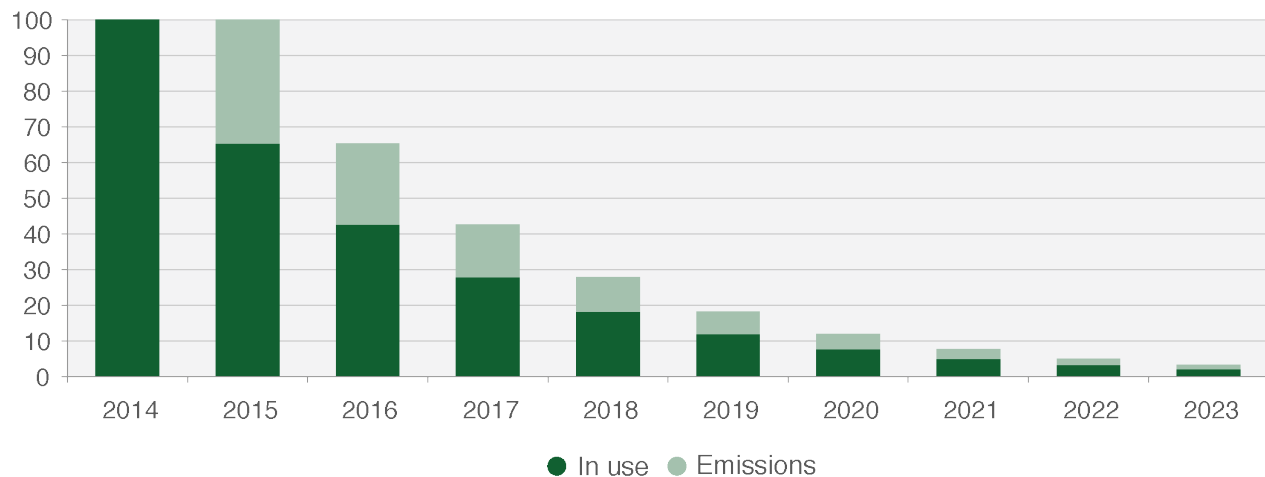
The decay rate can be calculated as: $K = \ln(2)/\text{half-life}$

More half-lives can be found in *GPG-LULUCF*¹²³. As with other GHG reporting categories, countries can use different tiers for estimating emissions and removals from HWP such as country specific data for half-lives (tier 2) or country specific models for decay functions (tier 3).

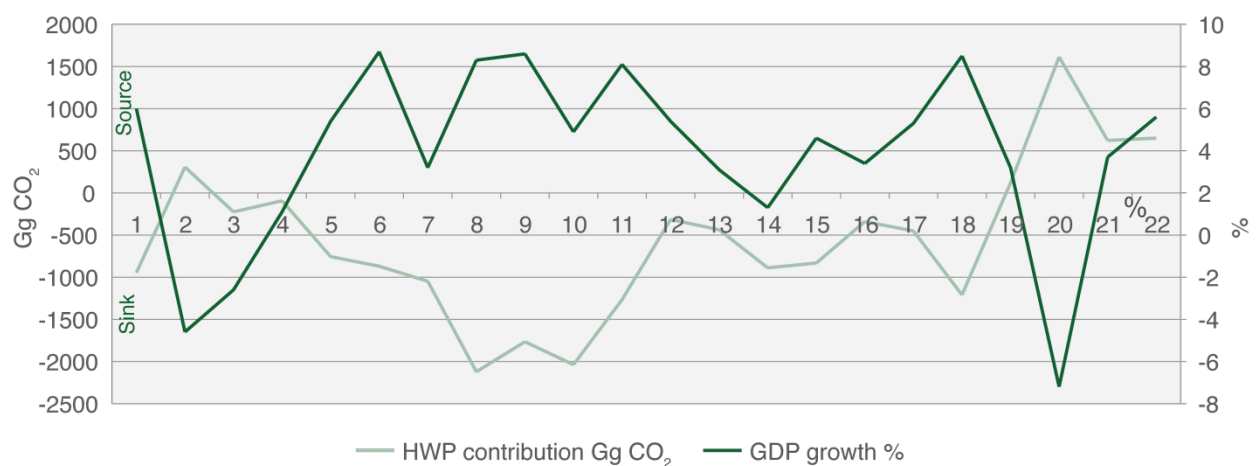
Figure 23 on the following page illustrates how 100 tons of carbon in paper is being reduced year by year using the decay rate of 0.347 which is equal to a two-year half-life.

123 Available at: <http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf.html>

Figure 23: Decay of 100 tons of carbon in paper using a 2-year half-life = 0.347 decay rate



The diagram only includes the production in 2014. In reality a country will have a fresh inflow of new HWP every year, an outflow originating in all products produced in previous years and still in use, and the total amount of HWP in use will be much larger than the annual inflow. This means the annual outflow from the existing HWP pool is more dependent on emissions from the HWP already in use than the latest annual inflow. The annual inflow is dependent on the annual production which varies annually. As a result the HWP pool is more likely to become a source of CO₂ in years with low production and a sink in years with higher production. This is illustrated in Figure 24 showing the annual growth of the Finnish economy (GDP) and the net contribution from HWP. This is opposite most other emissions which will have a tendency to increase when the economy is increasing.

Figure 24: The contribution from HWP in Finland vs. annual economic growth rate (GDP)¹²⁴

¹²⁴ Source: Statistics Finland and the National Inventory Report (2013).

Annex VI: Acronyms and abbreviations

2006 IPCC Guidelines	2006 IPCC Guidelines for GHG Inventories, Chapter 4 AFOLU
AAUs	Assigned Amount Units
ADP	Ad Hoc Working Group on the Durban Platform for Enhanced Action
AFOLU	Agriculture, Forestry and Other Land Use
A/R	Afforestation/Reforestation
BR	Biennial Report
BUR	Biennial Update Report
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
COP	Conference of the Parties
CRF	Common Reporting Format
DNA	Designated National Authority
ERU	Emission Reduction Unit
EU	European Union
FM	Forest Management
FMRL	Forest Management Reference Level
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GPG-LULUCF	Good Practice Guidance for Land Use, Land-Use Change and Forestry
HWP	Harvested Wood Products
ICER	Long-term Certified Emission Reduction
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
KP	Kyoto Protocol
KP Supplement	2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol
LULUCF	Land Use, Land Use Change and Forestry
MRV	Measurement, Reporting and Verification
NC	National Communication
NIR	National Inventory Report
PDD	Project Design Document

PLR	Policies, Laws and Regulations
QELRC	Quantified emission limitation and reduction commitments
REDD+	Reducing emissions from deforestation and forest degradation, plus the role of conservation, sustainable management and enhancement of forest carbon stocks
REL/RL	Reference Emission Level/Reference Level
SBSTA	Subsidiary Body on Scientific and Technical Advice
tCER	Temporary Certified Emission Reduction
UNFCCC	United Nations Framework Convention on Climate Change

