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# Understanding Land Use in the UNFCCC

## Summary for Policymakers

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## Introduction

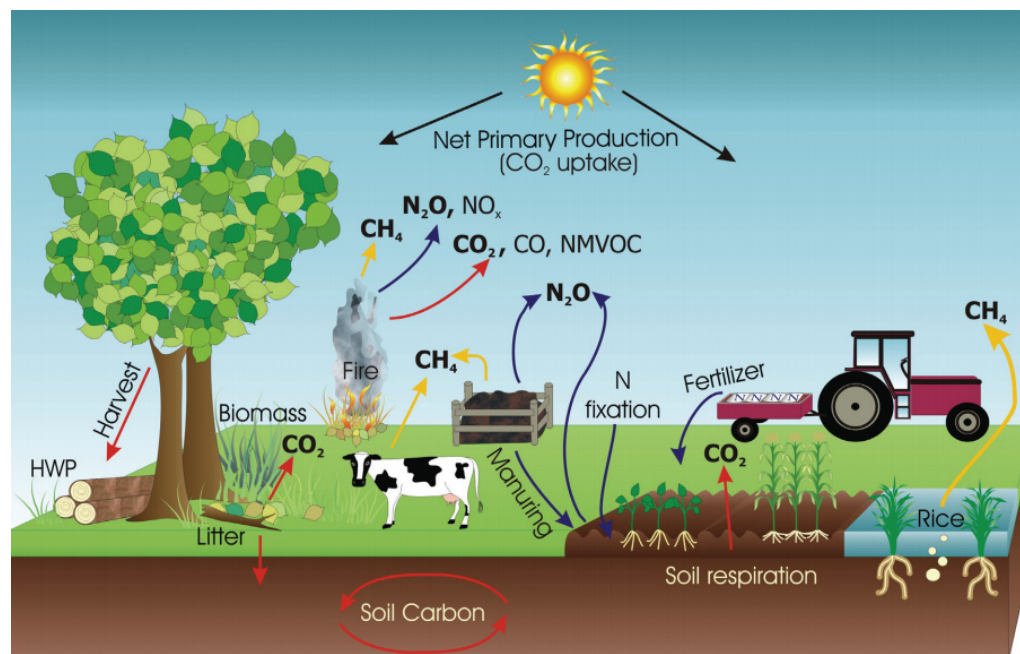
While greenhouse gas emissions from land use have the same warming effect on the atmosphere as other emissions, land use is different from other sectors in a number of ways. As a consequence, reporting and accounting of emissions from land use has developed under the United National Framework Convention for Climate Change (UNFCCC) differently to other sectors. It has come to be seen as an arcane and complex subject, impenetrable to the average person and even to skilled negotiators.

The objective of the Guide *Understanding Land Use in the UNFCCC* is to change this perception and increase the technical understanding of how human induced emissions and removals from the land sector—within climate change circles referred to as land use, land use change and forestry (LULUCF) or agriculture, forests and other land use (AFOLU)—are treated in terms of reporting and accounting under the UNFCCC. This Summary for Policymakers provides a high level summary of the Guide.

## What is “land use”?

The Intergovernmental Panel on Climate Change (IPCC) has developed six categories of land use: forest land, cropland, grassland, wetlands, settlements and other lands (e.g. bare soil, rock, ice, etc.) and, for each of the six land-use categories, the following pools: living biomass, dead organic matter, soil organic carbon and harvested wood products. In addition there are *agricultural practices* on farms, such as burning of crop residues, fertilizer application, rice cultivation, and livestock, which produce emissions, mainly of methane and nitrous oxide. Together, these comprise the various categories and activities used to estimate emissions and removals on land (Figure 1).

Figure 1: Pictorial representation of emissions and removals in the land use sector<sup>1</sup>



<sup>1</sup> 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](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_01_Ch1_Introduction.pdf)

## Why is land use different from other sectors?

Below are some ways in which land use differs from other sectors, although not all of the features are unique to land use. However, these characteristics can help to explain why Parties to the UNFCCC and its Kyoto Protocol (KP) have in some instances treated land use differently from other sectors.

- **Land use can act as a sink or a source.** Unlike other sectors, land use includes both emissions *and removals* of CO<sub>2</sub>.
- **Non-permanence.** Terrestrial carbon, particularly carbon sequestered that has entered an accounting system, can be released back into the atmosphere.
- **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.
- **It is difficult to separate natural and anthropogenic effects.** Emissions and removals in the land sector can be a consequence of management and natural factors not under the control of humans. The IPCC states that distinguishing such causal factors in the land sector is difficult<sup>2</sup>.
- **Legacy effects.** Natural disturbances or past-management decisions can affect, in particular, forests and have a long-term effect on carbon fluxes for decades to hundreds of years. They can also create cyclical results for emissions that may not be smoothed out over a period of time that matches a commitment period.

## Reporting on emissions and removals from land use

All Parties to the UNFCCC have committed to report on anthropogenic emissions by sources and removals by sinks, including from land use. The requirements for such reporting differ between developed (or Annex I) countries and developing (or non-Annex I) countries, but all countries must use guidelines developed by the IPCC (see table 1 below). Because of the unique features of land use, the IPCC was requested to develop a special report on good practice guidance and uncertainty management for the land use, land-use change and forestry sector. Annex I Parties to the Kyoto Protocol, in addition, must report supplementary information related to the accounting of LULUCF under the Protocol.

Table 1: IPCC guidelines for land use reporting for Annex I and non-Annex I countries

Annex I	Non-Annex I
<ul style="list-style-type: none"> <li>• 1996 Guidelines currently; 2006 Guidelines starting 2015</li> <li>• 2003 LULUCF Good Practice Guidance</li> <li>• 2013 Wetlands Supplement</li> <li>• 2013 IPCC Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (for Annex I Parties to the KP)</li> </ul>	<ul style="list-style-type: none"> <li>• 1996 Guidelines required; encouraged to use 2006 Guidelines</li> <li>• Encouraged to use 2003 LULUCF Good Practice Guidance</li> <li>• Encouraged to use 2013 Wetlands Supplement</li> </ul>

<sup>2</sup> 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](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_01_Ch1_Introduction.pdf)

## Coverage of Land Use

Currently, there are different treatments of land use across the UNFCCC and different coverage for the application of such treatments. A summary of these various land use coverages under the UNFCCC is provided in Table 2. Treatment may not be comparable as they apply to different sets of Parties and were created for different purposes and scales.

Table 2: Summary of Land Use in the UNFCCC

	UNFCCC reporting (All Parties)	Kyoto Protocol 2 <sup>nd</sup> commitment period (CP) QELRC <sup>3</sup> (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 <sup>4</sup>	To enhance mitigation action
Scale	National	National	Project	National, or subnational <sup>5</sup> as an interim step	Not specified
Scope	<p><b>Comprehensive coverage of LULUCF:</b></p> <ul style="list-style-type: none"> <li>• Forest land</li> <li>• Cropland</li> <li>• Grassland</li> <li>• Wetlands</li> <li>• Settlements</li> <li>• Other land</li> </ul> <p>Non CO<sub>2</sub> emissions from agricultural practices<sup>6</sup></p>	<p><b>Mandatory activities:</b></p> <ul style="list-style-type: none"> <li>• LULUCF</li> <li>• Afforestation</li> <li>• Reforestation</li> <li>• Deforestation</li> <li>• Forest management</li> </ul> <p>Comprehensive coverage of agricultural practices</p> <p>Voluntary (unless elected in the 1<sup>st</sup> CP):</p> <ul style="list-style-type: none"> <li>• Cropland management</li> <li>• Grazing land management</li> <li>• Revegetation</li> <li>• Wetland drainage and rewetting</li> </ul>	<p><b>Allowed activities:</b></p> <p>LULUCF</p> <ul style="list-style-type: none"> <li>• Afforestation</li> <li>• Reforestation</li> </ul> <p>Non CO<sub>2</sub> emissions from agricultural practices</p>	<p><b>Activities involved:</b></p> <ul style="list-style-type: none"> <li>• Deforestation</li> <li>• Forest degradation</li> <li>• Forest conservation</li> <li>• Sustainable management of forests</li> <li>• Enhancement of forest carbon stocks</li> </ul>	<p><b>Not specified.</b></p> <p>A wide range of activities in the land use sector have been submitted.</p>

As illustrated by Table 2, all countries are asked to report comprehensively on emissions/removals from land use. REDD+<sup>7</sup> is voluntary for developing countries interested in contributing to mitigation

3 A QELRC is a quantified emission limitation and reduction commitment (or target) under the Kyoto Protocol.

4 Decision 1/CP.16 para 70 and Decision 9/CP.19.

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

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

7 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.

through forest-related activities, and covers a range of forest-related activities. The Kyoto Protocol takes a combination of a mandatory approach for some land use activities, and an elective approach for others for Annex I Parties who have quantified commitments; and its Clean Development Mechanism (CDM) is limited to only two land use activities. Developing countries putting forward voluntary nationally appropriate mitigation actions (NAMAs) do not have constraints on coverage, and many put forward a range of land use related actions.

Some treatments of land use are partial. The key benefit to Parties of such coverage is flexibility. However, more comprehensive accounting can be important when considering interactions with other sectors—for example, in the case 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.

## What is the difference between land and activity-based approaches?

The land based approach to estimate emissions proceeds from the classification of all the managed territory of a country into IPCC land categories (forest land, cropland, grassland, wetlands, settlements, other lands). Emissions and removals are calculated on the basis of this classification. Since the IPCC land categories cover all the land, the land-based approach is associated with comprehensive coverage. To date, however, Parties have not agreed on rules to use a land-based approach for accounting purposes.

The activity-based approach to estimate emissions identifies specific activities on the land that influence GHG fluxes. This approach focuses on the anthropogenic 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 elected or included on a mandatory basis.

In practice, as the activity-based 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 the same level of coverage.

## LULUCF accounting 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 (base year) activities and the difficulties of dealing with long cyclic patterns of emissions within shorter commitment periods (e.g. 5 to 8 years under the Kyoto Protocol). The solution under the Kyoto Protocol to such issues was to exclude LULUCF from the general estimation of assigned amounts, and to allow countries to use performance within the LULUCF sector to help offset emissions from other sectors, with a suite of special rules including those for how a reference level was set.

Reference levels are not necessary to *report* GHG emissions and removals. Each year developed countries simply report through national inventories anthropogenic GHG emissions and CO<sub>2</sub> removals in the year in which they occur. Assessing whether a country has met a quantified commitment (as is the case under the KP), however, requires a reference against which to *account*

for whether the target was met. In Marrakesh (COP-7, 2001), KP Parties introduced particular accounting rules for land use:

- **Gross-net accounting**, the actual reported net emissions (or removals) in each year of the commitment period *without comparing it with 1990*, for forest-related activities.
- **Net-net accounting**, 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), for all other land use activities.

Because managed forests can have large and arbitrary legacy effects, using either a gross-net or a single base year (e.g. 1990) can have different impacts on Parties' accounting, making the values incomparable in terms of overall level of mitigation effort. For this reason, in 2011, KP Parties chose to allow a reference level to be set for Forest Management in the second commitment period while, at the same time, making it a mandatory (versus elective) accounting activity.

- **Forest Management Reference levels (FMRLs)** are proposed by Parties and can be a business as usual baseline or can employ either of the approaches above; justification must be provided and in the case of FMRLs proposed in 2011, were subject to review coordinated by the UNFCCC Secretariat to increase transparency.

Table 3: Accounting rules for LULUCF under the Kyoto Protocol

KP LULUCF Activities	1 <sup>st</sup> Commitment Period	2 <sup>nd</sup> Commitment Period
Afforestation (3.3)	Gross-net (with a cap for forest management)	Gross-net
Reforestation (3.3)		
Deforestation (3.3)		
Forest Management (3.4)		Reference level (with a cap)
Cropland Management (3.4)	Net-net (i.e. comparison to 1990 base year)	Net-net (i.e. comparison to 1990 base year)
Grazing land Management (3.4)		
Revegetation (3.4)		
Wetland Drainage & Rewetting (3.4)	Not specified	

## Special provisions for land use under the CDM and JI

The CDM<sup>8</sup> allows for the implementation of afforestation and reforestation (AR) project activities or program of activities in non-Annex I countries that generate Certified Emission Reductions (CER) that can be bought by Annex I Parties. In joint implementation (JI)<sup>9</sup>, an Annex I Party may purchase Emission Reduction Units (ERUs) from projects that remove and/or store carbon in another Annex I country (following the definitions, accounting rules, modalities and guidelines under Article 3.3 and 3.4).

Because carbon stocks are subject to natural disturbances that can release the stored carbon to the atmosphere (for which a country has received credit), under the CDM the concept of *temporary credits* has been created. If an Annex I Party has used temporary credits to meet its commitments in a commitment period, it must replace it after it has terminated—this, among other factors, has

<sup>8</sup> For more information on the CDM see: <http://cdm.unfccc.int>

<sup>9</sup> For more information on JI see: <http://ji.unfccc.int/index.html>



limited the demand for such credits and is identified as one of the reasons for the low number of registered projects. In the case of JI, ERUs generated are considered permanent because 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.

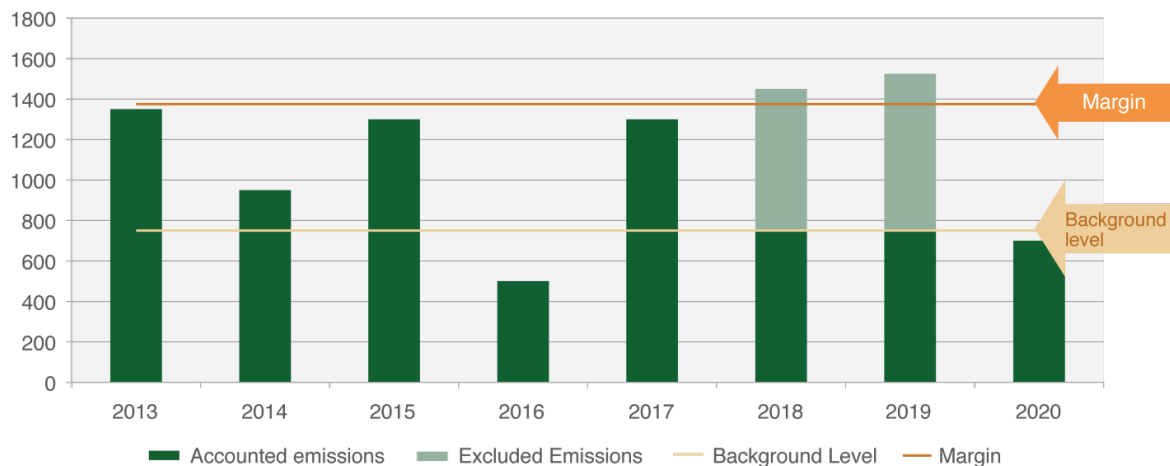
## How does the UNFCCC manage natural disturbances in the land sector?

Article 2 of the Convention states the objective is to prevent dangerous *anthropogenic* interference with the climate system. Forests, in particular, are subject to disturbances that can release carbon stocks and non-CO<sub>2</sub> 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.

For reporting to the Convention, Parties apply IPCC Guidance which adopted the concept of *managed lands*—i.e. land designated by countries as areas where human interventions and practices are applied—and estimate all emissions and removals from such lands as a proxy for man-made emissions and removals. GHG emissions or removals from unmanaged lands are assumed to be non-anthropogenic.

For the 2<sup>nd</sup> commitment period of the KP, Parties agreed that, under certain conditions and if the Party has indicated in its 2015 National Inventory Report that it wishes to do so, emissions and removals occurring on land subject to natural disturbances and reported as Forest Management, Afforestation or Reforestation may be excluded from accounting. In order to exclude emissions from natural disturbances, emissions must *exceed a background level plus a margin*<sup>10</sup> (see Figure 2 below).

Figure 2: Application of the KP natural disturbance provision



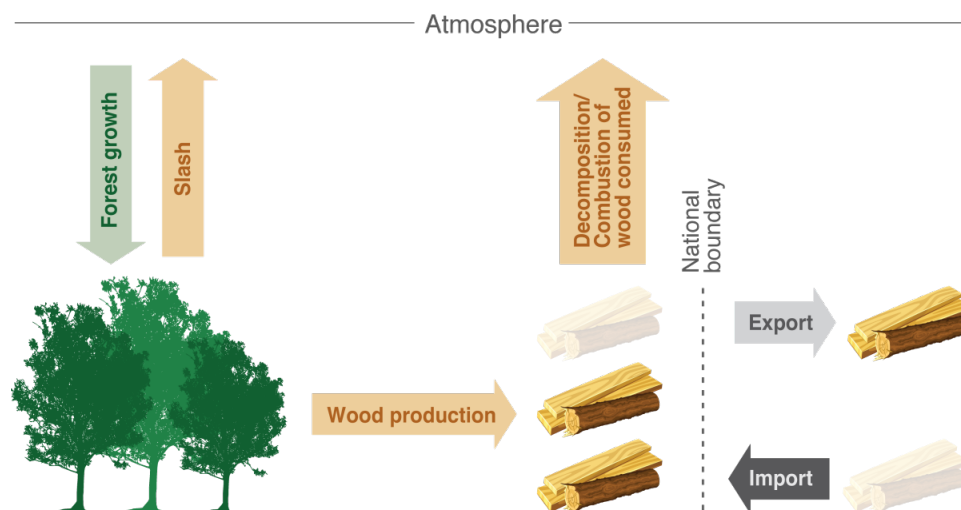
## The treatment of harvested wood products (HWP)

Harvested wood products are products entirely or partly made of wood. The rationale for considering harvested wood products in both reporting and accounting is because different wood products store carbon for shorter or longer periods of time - for example furniture will store carbon longer than

<sup>10</sup> The background level is the annual level of expected disturbance emissions based on historical data, and the margin is twice the standard deviation of annual emissions.

paper. The production of a HWP and its storage life therefore has an effect on the total emissions and removals of greenhouse gases.

Figure 3: Carbon flow to and from the harvested wood product pool



Emissions and removals of GHGs from HWPs can be calculated as the difference between inflow and outflow as shown in Figure 3 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? 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.

Both the *Good Practice Guidance for Land Use, Land-use Change and Forestry*<sup>11</sup> and the *2006 IPCC Guidelines for National GHG Inventories, Volume 4, Agriculture Forestry and Other Land Use*<sup>12</sup> describe different possible technical approaches for reporting HWP—including the assumption that carbon from biomass removed from forests is immediately released; estimating emissions from wood products *consumed* in the country; or estimating emissions from products *produced* in the country—but do not recommend any particular approach. As a result it is not straightforward to compare the HWP contribution from different countries. Under the Kyoto Protocol 1<sup>st</sup> commitment period, HWPs were treated using instantaneous oxidation. For the 2<sup>nd</sup> commitment period (2013–2020) Parties adopted an approach similar to the production approach, and made accounting of them mandatory for projected FMRLs.

## Guidance for REDD+

Since 2007 a number of decisions have been made to provide guidance to, in particular, developing countries wishing to reduce emissions from deforestation and forest degradation, conserve forest carbon stocks, sustainably manage forests and enhance forest carbon stocks (REDD+). Such guidance, in some areas, has less detail than that provided for Annex I Kyoto Protocol Parties. In other areas, such as social and environmental safeguards and policies and measures, more guidance is provided. A summary table is provided below that compares the types of decisions that have been made under the UNFCCC, illustrating the divergence in focus.

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

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

Table 4: Comparison of guidance provided for UNFCCC reporting, KP accounting and REDD+

	UNFCCC reporting (all Parties)	Kyoto Protocol (Annex I Parties to KP)	REDD+ (developing countries)
Purpose	Reporting	Compliance	Enhance mitigation action; possibly receive results-based finance
Reference levels	None required	Allowed for forest management; Party proposed	Party proposed based on historic emissions with adjustments; allows for a stepwise approach
Natural disturbances	Use of managed land proxy	Provision to factor out of accounting	No provisions <sup>13</sup>
HWPs	Multiple approaches provided in IPCC guidelines	Required in the 2 <sup>nd</sup> CP using a production approach	No provisions
Policies and measures	Little to no guidance provided	Does not mandate how a country meets a target	For example, requests countries to develop national strategies and action plans; and address drivers of deforestation and forest degradation, and land tenure, forest governance, and gender issues. <sup>14</sup>
Social and environmental safeguards	Little to no guidance provided	No requirements	Must address a list of social and environmental safeguards and report to the UNFCCC, particularly if seeking results-based payments

## Social and environmental safeguards

The Convention has not focused on safeguards per se although 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 include issues such as: avoiding or minimizing adverse impacts on the economy, people and the environment, ensuring food production is not threatened, enabling sustainable economic development, and allowing ecosystems to adapt naturally. Similarly, the Kyoto Protocol does not require Annex I Parties to meet or provide information on specific social or non-GHG related environmental ‘safeguards’ when undertaking mitigation actions. There are a few social and environmental requirements for participation in Joint Implementation and the CDM, but not as stringent as those for REDD+.

In REDD+ discussions and decisions the concept of applying social and environmental safeguards to mitigation actions under the UNFCCC has been very prominent. In Cancun (COP-16, 2010), Parties agreed that a set of safeguards should be promoted and supported when undertaking REDD+ activities (see Box below). In Durban, the following year, the COP agreed that developing country 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 COP and in

<sup>13</sup> although COP decisions on REDD+ refer to anthropogenic emissions and removals

<sup>14</sup> Decision 16/CP.1 (paras 72-73)

Warsaw (COP 19, 2013), that the frequency of submission should be consistent with provisions for national communications and as a condition to receive results-based payments.

**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

## 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”<sup>15</sup> by 2015 (COP-21, Paris) applicable to all Parties that would come into effect and be implemented from 2020.

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.

The Guide does not seek to make recommendations on how land use might be integrated into a future agreement. However, the information presented in the 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 1<sup>st</sup> and 2<sup>nd</sup> commitment periods).

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<sup>15</sup> 1/CP.17, paragraphs 2-4.

