LAND USE IN A FUTURE CLIMATE AGREEMENT

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Acronyms

ADP	Ad Hoc Working Group on the Durban Platform for Enhanced Action
AFOLU	Agriculture, Forestry, and Other Land Use
BAU	Business-as-Usual
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH_4	Methane
CO_2	Carbon Dioxide
COP	Conference of the Parties
CP2	Second Commitment Period
CTU	Clarity, Transparency, and Understanding
EU	European Union
FMRL	Forest Management Reference Level
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Greenhouse Gas
HWP	Harvested Wood Products
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation

KP	**Kyoto Protocol**
lCER	**Long-Term Certified Emission Reduction**
LULUCF	**Land Use, Land-Use Change, and Forestry**
N_2O	**Nitrous Oxide**
NAMAs	**Nationally Appropriate Mitigation Actions**
REDD+	**Reducing emissions from deforestation, Reducing emissions from forest degradation, Conservation of forest carbon stocks, Sustainable management of forests, and Enhancement of forest carbon stocks**
REL/RL	**Reference Emission Level/Reference Level**
tCER	**Temporary Certified Emission Reduction**
UNFCCC	**United Nations Framework Convention on Climate Change**

Executive Summary

This paper explores options for including land use in a future (post-2020) climate change agreement as anticipated by the UN Framework Convention on Climate Change (UNFCCC) Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP). Options are considered with an eye toward reaching agreement under the ADP, keeping in mind the level of ambition of global efforts, and the need to accelerate the reduction of global greenhouse gas (GHG) emissions.

The paper discusses the features of land use that have differentiated its treatment from that of other sectors and assesses options to address these features in a future agreement. It examines options to increase the coverage and mitigation effectiveness of land-use contributions, and explores requirements for increasing the clarity, transparency and understanding of these contributions. Finally, the paper examines options for creating incentives in the land-use sector that will increase mitigation ambition.

Special Features of Land Use

Characteristics of emissions and removals related to land use that may require special consideration of the sector in a new agreement under the ADP include:

- *The legacy effect*: past management can have an effect on carbon stocks in an ecosystem and cause stocks to vary from period to period even when the management maintains or increases stocks over time.

- *Non-permanence*: carbon stocks may be protected, or increase through human activities and be credited towards meeting mitigation targets, but these benefits may be reversed subsequently due to natural causes or human action.

- *Non-anthropogenic and indirect effects*: natural disturbances such as extreme weather, fires, or pest attacks can lead to significant fluctuations in emissions. Changes in emissions and removals may also relate to the natural carbon cycle, or to indirect effects such as CO_2 fertilization and nitrogen deposition.

- *Complexities of estimation*: despite improvements in methods, emissions and removals associated with biological systems can be difficult to estimate and national systems for doing this are not always well developed.

Addressing these special features in a future agreement will require the Parties to consider a number of questions associated with land use, which include:

How comprehensive will coverage of land use be? Previous agreements have resulted in partial coverage of land use; however, land use accounts for roughly one-quarter of global emissions, and more comprehensive coverage could unlock more mitigation potential. In addition, selective inclusion of land uses may create perverse incentives because some activities will be incentivized and some not. Lack of comprehensive land-use coverage has resulted in serious difficulties in the case of bioenergy and biofuels, because the effect of bioenergy production on GHG emissions and removals on land not included is missed. More comprehensive land coverage could be based on IPCC inventory reporting categories and this could be the simplest option. Alternatively, activity-based approaches would allow continuity with the Kyoto Protocol (KP) and could provide a way for Parties to move from partial to full coverage by allowing some activities to be voluntary only for a determined period of time. Either approach can deal with the special features of land use if adequate accounting rules are established.

Can reference levels provide an equitable means to account for national differences? Because of legacy effects, reference levels such as those applied to forest management under the KP Second Commitment Period (CP2, 2013 through 2020), could be applied collectively across all forest-related categories or activities and

could, in principle, be extended to other land-use categories or activities. However, expanding usage could increase uncertainty for countries where contributions are expressed relative to a historical level of emissions, possibly requiring an additional review step. Program and sectoral approaches could apply baselines similar to those used to create certified emission reductions for offsets in an emissions trading program or for performance-based payments under REDD+.[1]

Are natural disturbance provisions useful? The provisions adopted for forest management under the KP CP2 that allow countries under certain conditions to avoid counting emissions from natural disturbances could be translated into the new agreement. Alternatively, the new agreement could remove this provision, but countries with significant disturbance risk may reduce their level of commitment.

Important Links among Land-Use Mitigation, Food Security, Energy Options and Adaptation

The potential conflict between land-use mitigation, food supply, and energy production may be reduced if policy interventions take into account agricultural productivity, efficient food distribution, waste reduction and shifting demand patterns. Policies also need to consider how mitigation actions interact with adaptation measures to reduce the impacts of climate change on the land-use sector.

Options for Contributions

Land-use contributions could take several forms, including:

- *Policies and measures*, or actions to reduce land-use emissions, increase removals, or modify drivers of emissions. This option could be applied to programs that integrate mitigation and adaptation;

- *Quantitative national GHG targets*, which can be set in absolute or relative terms (i.e., with respect to a reference emissions level or intensity level) and be: (a) included with all other sectors in economy-wide targets or (b) expressed separately as sectoral targets either for the full land-use sector or subsets (e.g., forests, agriculture).

Parties with *economy-wide mitigation targets* could integrate their land-use sector contribution in several ways:

Option 1: Full inclusion of land use via the GHG inventory. This would be the simplest option, as no special rules would be needed to account for land use, but for the same reason it may not be acceptable for countries with, for example, significant disturbance, and could unduly benefit those with favorable legacy effects.

Option 2: Special rules for land-use emissions and removals. Two sub-options are considered.

Option 2a: Full inclusion of land use via the GHG inventory, but using reference levels and provisions for disturbances analogous to those developed under the KP for CP2.

Option 2b: Continuance of an accounting system based on activities parallel to the inventory, as in the KP. This alternative would facilitate continuity with the KP accounting and allow for a mix of voluntary and mandatory activities, or for the full inclusion of them.

Option 3: *A separate target for land use***.** Under this approach, land use or a part of it would be identified and separated from the rest of the national contribution. This option can address legacy effects and incorporate disturbance provisions, and may make variability easier to communicate politically. Compliance with the target could be demonstrated separately for the sector or, if targets are fungible, together with the national one. Separation could be useful even if the targets were fungible, because the relationship between the target and the special features of land use would be more understandable. Land-use targets may also exist independently from economy-wide targets and take the form of sectoral approaches.

1 In the climate negotiations REDD+ refers to a) Reducing emissions from deforestation; b) Reducing emissions from forest degradation; c) Conservation of forest carbon stocks; d) Sustainable management of forests; and e) Enhancement of forest carbon stocks.

ADP Decisions that May Inform Land-Use Sector Contributions

What is the nature of nationally determined contributions? A future agreement could provide full flexibility to Parties to choose the nature and scope of their contributions (which may encourage wider participation). It could also mandate requirements for certain types of contributions (which may improve consistency of coverage, treatment of special issues, and comparability across countries). Choice of contribution is likely to be linked to wider considerations of national circumstances and capacities. Intermediate options include offering some guidance on the nature and/or formulation of contributions, narrowing the variation and enhancing the comparability of contributions. There could nevertheless be wide divergence on coverage and on how the specific features of the sector are considered**.**

Information options to promote clarity, transparency, and understanding (CTU) of contributions. CTU are critical in an agreement, and flexibility in how contributions are set may make it more challenging to achieve them. The following information on CTU could be provided along with national contributions related to land use:

Where land-use contributions are expressed as policies and measures, information could include: the emissions categories in the national GHG inventory concerned; reasons that the proposed activity will reduce emissions or enhance removals; synergies and tradeoffs related to food production; and information related to adaptation and the relationship to sustainability and safeguards.

In case of economy-wide targets with full inclusion of land use via the GHG inventory (Option 1 above), the information needed will presumably be analogous to that used to provide CTU for contributions from other inventory categories. Further details may be needed for those categories deemed as key emissions sources or removals.

If land use is included in economy-wide targets and special considerations apply (Option 2 above), then the information needed to provide CTU is likely to be the same as for Option 1, plus additional information linked to the special considerations, e.g., the justification and methods to account for natural disturbances and to establish a reference level, where relevant. The supplementary 2013 IPCC guidance may provide useful indications on the information needed to provide CTU for this option, in either case 2a or 2b.

Where separate targets are formulated for land use, or part of it (Option 3 above) then CTU may require the following type of information: the coverage of each target and how economy-wide coverage is achieved without double counting or omission; how reference levels (if relevant) have been established consistent with the historical data to estimate performance; information showing the depth of ambition beyond business-as-usual; and whether the separate target is fungible with the rest of the economy-wide contribution.

Finally, *in order to avoid negative social and environmental impacts* of poorly designed or implemented contributions, the UNFCCC Conference of the Parties (COP) could either require (e.g., for internationally financed actions), or allow Parties to choose whether to provide, information on the implementation of safeguards.

Options for Incentives

Incentives refer to measures that support Parties' efforts to adopt more ambitious contributions, and can be either monetary or non-monetary. Monetary incentives can be through market mechanisms or non-market transfers. Incentives can flow from the broader negotiations on the mitigation architecture or be defined specifically for land use. Mitigation incentives can also be linked to adaptation finance. The main options arising from this analysis are:

For policies and measures, incentives to optimize contributions may include financial support for their design and implementation, market-based payments where the proposed activities produce offsets and

market demand exists, and demand-side measures.

For Parties with quantitative targets, incentives derive from provisions on how to meet targets; the strength of these incentives will depend on sufficient collective ambition to meet the overall goal of the ADP. Provisions could be linked to, e.g., the adoption of pooled reduction targets, the use of land-use mitigation to produce offsets, or the establishment of criteria (e.g., minimum land-use coverage or sufficient certainty) to benefit from finance or flexibility provisions.

Market incentives can create flexibility and reduce costs associated with meeting GHG targets. Offset providers can raise finance through creating and selling emission reductions. Market incentives can also include public purchase commitments for land-use emission reductions and removals. Each of these market mechanisms will require accounting rules; the inclusion of land-use contributions could introduce some special accounting provisions for unique characteristics such as non-permanence.

*Non-market incentives***,** for example, taxes, subsidies and domestic programs using results-based payments, as well as Global Environment Facility and Green Climate Fund funds, could complement a Party´s portfolio of incentives for the land-use sector.

Conclusions

An ambitious global agreement to reduce GHGs—as called for in the ADP—implies a greater role for the mitigation of GHGs associated with land use. There are no fundamental barriers to treating land-use contributions, or incentives, on a basis comparable with other sectors if Parties wish to do so in an agreement under the ADP.

Land-use GHG mitigation has features that distinguish it from mitigation in other sectors and a different history of treatment which can inform negotiations on the next agreement. Tools and accounting systems have been developed to manage the land-use issues that require special treatment such as natural disturbances, the dynamic age-class structure of forests and non-permanence. More comprehensive treatment of land use will enhance system integrity (e.g., better capture the cross-sector spillovers in bioenergy) and a can enhance the cost-effectiveness if it increases the range of lower-cost mitigation opportunities available, relative to other sectors.

Agriculture is an important source of land-use emissions, both direct (mostly non-CO_2 emissions from livestock and rice cultivation) and from changes in carbon stocks on agricultural lands. National greenhouse gas inventories reflect this, and fully include all agricultural emissions from activities and land. The KP requires Annex I countries to count non-CO_2 agricultural activity emissions against their targets, and electively include agricultural changes in carbon stocks. An expanded role for agricultural mitigation in a future agreement would need to recognize the challenges this presents to some Parties, particularly developing countries, where such emission responsibilities could impede efforts at food security and economic development.

Because of differences across countries in terms of national circumstances and capabilities, Parties may want to consider allowing countries flexibility in the nature of land-use contributions with incentives for stronger and more comprehensive contributions over time. A reasonable goal might be to seek overall consistency with GHG inventory coverage, which does not necessarily require the relatively complex tracking of activities used under the KP, although the KP system can be used as a basis for development.

Transparency is essential to any agreement that emerges. The more flexibility Parties have on the nature of their contributions, the greater the challenge for transparency in communicating the rationale for their choices and the achievement of contribution goals over time. This report discusses a range of options for requiring information to provide more CTU of contributions.

As with any sector, mitigation of land-use emissions requires incentives. The incentives can be monetary or non-monetary, market-based or not, and tied to flexibility mechanisms or not. The incentive structure for land use can either be determined by the broader architecture for mitigation across all sectors, made specific to the land-use sector, or some combination thereof.

To summarize, this report identifies a number of issues that Parties need to consider on their way to negotiating land use in a future climate agreement by Paris in 2015. Broadly speaking, they are:

- What is the extent to which land-use emissions and removals will be included in the agreement?
- Will special accounting provisions need to be made, as they have in the past, for unique characteristics of the land-use sector such as natural disturbances and reference levels?
- How specific and how flexible will rules be for determining how Parties include land use in their contributions?
- What information must Parties provide to ensure the Clarity, Transparency, and Understanding of their contributions and will these requirements depend on the nature of the contributions?
- What incentives will be provided for land-use mitigation and will these incentives be different from those afforded to other sectors?

1. Introduction

The UN Framework Convention on Climate Change (UNFCCC)'s Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) was established to develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties.[2] The Agreement shall raise the level of ambition[3] and have a view to accelerating the reduction of global GHG emissions[4] and is intended to be effective and implemented from 2020. As assessed by the Intergovernmental Panel on Climate Change (IPCC), land uses directly contribute just under a quarter of anthropogenic greenhouse gas (GHG) emissions, mainly from deforestation and agricultural emissions from livestock, soil and nutrient management.[5] Terrestrial ecosystems sequester about a quarter[6] of total carbon dioxide (CO_2) released into the atmosphere. Therefore, an Agreement needs to incentivize reducing emissions and increasing removals from land use, if it is not to miss significant mitigation potential and achieve the ultimate objective of the UNFCCC to stabilize GHG concentrations at a level that would prevent dangerous anthropogenic interference with the climate system.[7]

An immediate question is how the treatment of land use in a future climate Agreement relates to the current treatment under the UNFCCC and the Kyoto Protocol (KP). Although sharing the underlying IPCC methodology for estimating emissions and removals, there are currently differences between the more comprehensive UNFCCC reporting requirements via national GHG inventories, and the rules concerning how land use, land-use change, and forestry (LULUCF) activities are counted towards commitments under the KP. In addition, there are limitations on the types of land-use activities that are offered incentives, for example land-use projects under the KP's Clean Development Mechanism (CDM) are limited to afforestation and reforestation. Under the UNFCCC, there is now guidance for developing countries pursuing voluntary actions to reduce emissions from deforestation or forest degradation, conserve forest carbon stocks, sustainably manage forests, or enhance forest carbon stocks (REDD+), but not for emissions mitigation from other LULUCF activities. Because of this patchwork coverage, the current set of rules under the UNFCCC and the KP probably does not capture fully and incentivize the mitigation potential of land use. Negotiations on a new Agreement allow Parties the opportunity to include land use in a more comprehensive, effective and consistent way.

Land and terrestrial ecosystems are vulnerable to climate change through changes in local conditions and increased risk of natural disturbances, which in turn creates additional challenges to sustainable development. Adaptation can help reduce this risk and reduce the impacts of climate change. Decisions by the Conference of the Parties (COP) recognize the linkages between adaptation and mitigation, particularly in agriculture and forests.

This paper's goal is to provide options for including land use in a future Agreement in a manner that incentivizes mitigation while addressing issues of concern by countries. It aims to inform discussions under the ADP related to paragraphs 2 and 6 of 1/CP17 (i.e., the post-2020 Agreement and the request[8] to identify information that Parties would provide when putting forward their contributions in a manner that facilitates the clarity, transparency and understanding of the intended contribution[9]), particularly as these issues apply to the land-use sector.

It was not the authors' mandate to address questions beyond the special considerations for land use, such as issues that pertain to the broader mitigation architecture—for example, questions about country differentiation, equity, and verification. Section 2 of the paper begins with a discussion of the features that have led to special

2 1/CP.17 (para 2-4). The phrase a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties is referred to for brevity in this paper as the Agreement.
3 Ibid. para 6.
4 Ibid. preamble.
5 Climate Change 2014: Mitigation of Climate Change. IPCC Working Group III contribution to the 5th Assessment Report of IPCC. Available at mitigation2014.org
6 IPCC AR5 report, WG1, Chapter 6 on Carbon and Other Biogeochemical Cycles, calculated from Table 6.1.
7 Article 2 of the United Nations Framework Convention on Climate Change.
8 Decision 1/CP.19, para 2c
9 Decision 1/CP.19, para 2b

treatment of land use compared with other sources of GHG emissions and how such features may be accommodated in a future Agreement, in particular in relation to carbon accounting. Section 3 discusses options for how Parties may integrate land use into national contributions. Section 4 addresses how incentives might be structured to further optimize the potential of land use to contribute to global mitigation objectives. Section 5 provides a set of conclusions.

2. Special Features of Land Use

Compared with other major sources of emissions, land use includes biological systems that are affected by complex interactions with environmental factors whose behavior is relatively difficult to predict. In addition, land use can remove CO_2 from the atmosphere and may create carbon sinks at a significant scale. Box 1 summarizes how the land-use sector is defined and the relationship to reporting under the UNFCCC.

The characteristics[10] of land use, in particular LULUCF, that have led to special provisions for treatment of the land-use sector include:

- *The legacy effect*: Carbon stocks in a managed ecosystem may vary from period to period even when the management maintains or increases stocks over time. The classic example is related to uneven-age distribution in forests where variation in emissions and removals linked to harvesting and subsequent regrowth can, for countries with large forest sectors, be significant compared with total national emissions. This can produce liabilities or windfall gains that are too large to be politically acceptable, especially where linked to sustainable practices.

10 Some of these characteristics do have analogues in other sectors—notably past investments have a legacy effect in the energy sector and weather causes fluctuations in energy use. In the former case, the additional issue for land use is that equally sustainable policies can over different time periods produce large differences in emission and removals, and in the latter case risks of emissions liabilities from LULUCF natural disturbances can for some countries be considerably larger than those associated with the effect of weather on energy use.

Box 1: Land use and reporting under the UNFCCC

In reporting under the UNFCCC and the KP, land use is conventionally divided into two categories: Land Use, Land-Use Change and Forestry (LULUCF), and Agriculture. In the IPCC 2006 Guidelines these are known collectively as Agriculture, Forestry, and Other Land Use (AFOLU). Despite this, LULUCF and Agriculture continue to be separately identified in the agreed common reporting format used for inventory reporting to the UNFCCC.

LULUCF is the part of land use where, in addition to emissions, removals by sinks can occur. The distinction between LULUCF and Agriculture in accounting is linked to special provisions which have been found necessary for LULUCF. In LULUCF the relevant GHG is mostly CO_2. Emissions reported under Agriculture comprise mainly non-CO_2 greenhouse gases emissions, notably methane (CH_4) and nitrous oxide (N_2O) associated with enteric fermentation, waste disposal, rice production, fertilizer application, and burning of savannas and agricultural residues. There are also emissions, mainly CO_2, associated with land use caused by agricultural and forestry machinery and transportation, and these are reported with other fossil fuel emissions elsewhere in national greenhouse gas inventories prepared using IPCC guidance and guidelines.

- *Non-permanence*: Carbon stocks may be protected or increase through human activities and be accounted towards meeting mitigation targets, but these benefits may be reversed subsequently due to natural causes or human action.

- *Natural disturbances*: Annual net emissions and removals in LULUCF may be influenced by extreme weather, fires, and pest attack, which are non-anthropogenic and lead to significant fluctuations of emissions recorded in the annual GHG inventory for some countries.

- *Other non-anthropogenic and indirect effects*: Changes in LULUCF emissions and removals may also relate to the natural carbon cycle, or to indirect effects such as CO_2 fertilization and nitrogen deposition.

- *Complexities of estimation*: Although there have been improvements in methods, emissions and removals associated with biological systems can be difficult to estimate (even for relatively small contributions), and national systems for doing this are not always well developed.

Under the KP, for both the first and second commitment periods, special provisions have not been needed for emissions reported under Agriculture[11] (distinct from LULUCF), nor for energy related emissions corresponding to use of agricultural machinery or transportation. These land-use related emissions are treated in the same way as emissions in other (non-land-use) inventory categories and an inventory is incomplete without them. Presumably, there is little or no reason why Parties would not want to continue this consistent treatment of those emissions in a future Agreement.

It seems likely that the special characteristics just identified will have to be taken into account when designing a future Agreement, to ensure that land use contributes to achieving the objective of the Convention without undue windfall gains or disproportionate risk, especially as for some countries land use can be a large part of the national GHG inventory. Rules applied to LULUCF under the KP illustrate how Parties have previously managed the special characteristics of land use under a regime with quantified emission limitations reductions commitments. Parties to the new Agreement may wish to consider whether these (or analogous) special rules and provisions are warranted moving forward. The rest of this section discusses this further.

2.1 The Extent of Land-Use Coverage

Under the UNFCCC, reporting is comprehensive for developed and developing countries. This is true for all sectors including LULUCF and Agriculture, and covers all sources and sinks as required by the IPCC guidance and guidelines. Similarly, there are no restrictions on nationally appropriate mitigation actions (NAMAs) in the land-use sector and, indeed, many have been proposed for a broad range of land-use activities. In the case of REDD+, relevant activities have been defined as: reducing emissions from deforestation, reducing emissions from forest degradation, conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks.[12]

Under the KP, LULUCF is divided into activities,[13] a subset of which is mandatory for developed country Parties to take into account toward meeting their commitments. That is to say, although all emissions and removals associated with LULUCF are *reported*, only a subset (the mandatory activities) need be *accounted* towards commitments under the KP. In the first commitment period (2008 – 2012), the mandatory accounting activities were afforestation, reforestation and deforestation that occurred since 1990. For the second commitment period (2008 – 2013) forest management was added to this. Agriculture is fully covered under the KP as already noted.

The main reason for the KP's distinction between mandatory and voluntary activities has been to allow for the development of reliable methodologies to estimate the emissions for voluntary activities while allowing countries the possibility to count the voluntary activities towards their commitments. For the first commitment period, the

11 Where "Agriculture" is capitalized, it refers to the IPCC reporting category that includes agricultural practices as described in Box 1; it does not include emissions and removals from croplands and grasslands that fall under LULUCF.

12 Decision 1/CP.16

13 The full list of activities is now afforestation, reforestation and deforestation (since 1990), forest management, cropland management, grazing land management, revegetation, and wetland drainage and rewetting.

KP's focus on afforestation, reforestation, and deforestation also helped reduce the risks associated with legacy effects and disturbances. Over time these arguments have become less compelling, with the introduction of rules in the second commitment period to deal with legacy effects in forest management and to address natural disturbances, and development by the IPCC of the 2013 KP Supplement[14] to address how these relate to GHG inventories. The uncertainty argument also becomes less convincing with the successive introduction of the 2003 IPCC Good Practice Guidance for LULUCF,[15] the IPCC 2006 Guidelines,[16] and most recently the 2013 IPCC Wetland Supplement,[17] which are more detailed and complete in the methodological descriptions and represent substantial improvements of GHG estimation. These IPCC methodologies are also *tiered*, meaning that they allow effort to be focused on the most important categories of emissions and removals, which reduces the risk of expending disproportionate effort in relatively insignificant areas.

There are two main arguments in favor of comprehensive coverage, as opposed to counting a subset. First, comprehensive coverage would enable mitigation potential to be maximized (because the potential associated with omitted emissions and removals would not be missed). Second, exclusions (possible unless all activities are mandatory) will tend to distort incentives and may lead to higher emissions and removals from land categories that are excluded. As will be discussed in section 2.6, the lack of comprehensive coverage has resulted in serious difficulties in the case of bioenergy and biofuels.

Options for land coverage: land-based and activity-based accounting

Land-use accounting under a future Agreement could follow the activity-based logic of the KP for LULUCF. This could allow some activities to remain voluntary, or could cover the full range of activities and be comprehensive. An activity-based approach could provide for continuity with the KP for the second commitment period, as well as a way to move, over an agreed time period, from partial coverage (with some activities voluntary) to full coverage with all activities mandatory. An activity-based approach could help identify particular management practices that may help in the estimation of emissions and removals, but tends to require complex tracking arrangements, especially when the activity on a piece of land changes.

Land use could alternatively be included on the basis of the IPCC inventory categories for LULUCF, which is what is meant by a land-based approach. This is conceptually simpler and does not require complex tracking arrangements. It would work most sensibly with comprehensive coverage.

The special rules associated with forest management reference levels and disturbances were developed under the KP for use with activity-based accounting, although they could be generalized for use with land-based accounting as explained in sections 2.2 and 2.3. If under an activity-based approach, the activities sum to the parent IPCC inventory categories, then the two approaches merge. Section 3 (contributions) identifies options for both these cases. Table 1 summarizes options for land coverage.

2.2 Use of Reference Levels

In the land-use context, national reference levels have so far been used to allow for legacy effects associated with forest management, and in connection with REDD+.

Reference levels for forest management under KP CP2

For the second commitment period of the Kyoto Protocol, forest management counts toward national commitments according to performance relative to an agreed reference level, rather than relative emissions or removals in a base year.[18] The agreed reference level may be a business-as-

14 2013 IPCC Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol, available at http://www.ipcc-nggip.iges.or.jp/home/2013KPSupplementaryGuidance_inv.html

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

16 2006 IPCC Guidelines for National GHG Inventories. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html

17 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement), Available at: http://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html

18 Under the KP credits of debits associated with forest management are allowed for or against commitments via the accounting system linked to assigned amounts. If a separate accounting system did not exist under a future agreement then, if a projected or zero reference level approach were being applied, subtraction or addition of a verified amount of GHG emissions from the inventory total would be needed to take account of the contribution of forest management to the overall national target. Such

Table 1. Options for Land Coverage in a Future Agreement

Option	Pros	Cons
Activity-based approach	Allows for continuity with KP rules. Special rules, for example, to deal with forest management reference levels and disturbances have been established on an activity basis. Allows for some activities to remain voluntary, and also supports comprehensive coverage.	Complex tracking system that may not be agreeable to all countries. If associated with partial coverage, may lead to accounting gaps, distortions and lower mitigation potential.
Land-based approach	Conceptually simple, does not require complex tracking. Works best with comprehensive coverage, likely to reduce the risk of distortions and increase mitigation potential.	Countries may wish to identify activities. Does not easily allow for continuity with the KP rules (though disturbance and reference level provisions could be generalized to apply in this case).
Combined approach	Allows both systems to be used and recognizes that activity-based and land-based systems merge as more activities are included. Could require comprehensiveness after an agreed transitional period, for example, 10 years.	Some risk of distortions and reduced mitigation during the transitional period.

usual (BAU) projection, an historical level, or zero - in which case all the emission or removal counts irrespective of historical levels or other agreed reference.

The underlying reason for the special consideration of reference levels for forest management in the KP is the unevenness of the age distribution of trees in the managed forests of many countries. This, when combined with patterns of harvest and replanting, can produce significant swings in emissions and removals, even in the presence of sustainable management which would be expected in the long run to result in maintenance of carbon stocks in the managed forest ecosystems. For countries where forestry is a relatively large part of the national economy, these swings can be a significant fraction of national total emissions, and can vary arbitrarily across otherwise similar countries at different points in time. Consequently targets that are equivalent in terms of national contribution towards Article 2 of the Convention affect countries differently over the period during which success in meeting targets is being assessed. This has proved politically unacceptable for countries with large forest sectors which are considered to be managed sustainably. A way to smooth out these fluctuations is to use BAU reference levels, which take account of the forest age class distribution and harvesting expectations. The agreement to do this for the second commitment period of the Kyoto Protocol allows Parties to use historical emissions or removals from forest management as a reference, or to use zero as well as to use projected reference levels. The use of reference levels entailed a dedicated technical assessment.[19]

subtraction/addition would be based on the difference between forest emissions or removals in the base year or period and the projected or zero reference level. It could be handled as a supplementary item included in the national inventory report.

19 Decision 2/CMP.6.

Reference levels under REDD+

Reference levels have been an important part of the REDD+ discussion in the UNFCCC. In the case of REDD+, reference emission levels or reference levels (REL/RLs) have been developed as *benchmarks for assessing each country's performance,*[20] that is to say they are the basis against which emission reductions are established through measurement, reporting and verification procedures. REL/RLs are flexible, in that countries must use historical data, but can adjust for national circumstances. REL/RLs will be subject to technical assessment.[21] Guidance has not been provided by the COP regarding what types of adjustments are allowed, nor in what instances; countries that adjust their REL/RLs are asked to provide details on how national circumstances were considered.[22] A country that has exploited much of its forest (a low forest, high deforestation country) might have a different BAU outlook for future emissions from deforestation and deforestation than a country that has depleted little of its existing forest to date (a high forest, low deforestation country).

Guidance by the COP for the development of REDD+ REL/RLs allows a stepwise approach, enabling developing countries to improve REL/RLs over time by incorporating better data, improved methodologies and additional pools. Subnational REL/RLs can be developed as an interim measure towards a national REL/RL. A future Agreement would have the option of using directly the REDD+ provisions already agreed and could develop REDD+ as an example of a sectoral agreement in other parts of land use, including agriculture, in which case emissions intensity could be relevant to the BAU outlook.

Options for the use of reference levels

Parties can collectively decide whether the new Agreement allows the use of reference levels, and if so, under what circumstances. Under the KP, reference levels are applied to forest management as an activity, but a future Agreement could apply the concept to the IPCC category of forest remaining forest, or to the sum of forest remaining forest and land converted to forest.[23] REDD+ applies reference levels to a range of forest activities. It has also been suggested that reference levels could be applied to LULUCF in general.[24]

Experience with the negotiations for the second commitment period under the KP suggests that use of projected reference levels requires detailed guidance on their construction, and a dedicated review process. These are needed to give sufficient confidence[25] in the environmental benefit of the contribution that is proposed, because projections tend to increase uncertainty. This implies additional resources for both countries and the UNFCCC review process. This (for countries taking commitments based on historical level of emissions) is an argument against extending the projected reference level approach beyond managed forest, for which the particular combination of uneven age class structures and the existence of policies aimed at sustainable forestry have been seen to make it necessary.

Extending the use of projected reference levels more widely within the land-use sector could confuse the relationship between different types of contributions (see Section 3.1). In particular, there would be further blurring of the lines between a quantified economy-wide contribution measured against a historic level versus an economy-wide contribution measured against a projected level.

These reservations do not apply to countries with targets relative to projections, or to sectoral agreements on the REDD+ model, because in these cases the projections process is intrinsic to the type of target or agreement in question. Mechanisms that create certified emissions reductions for offsets or emissions trading, for example under the KP CDM or Joint Implementation (JI), use

20 Decision 12/CP.17, para 7.
21 See Decisions 12/CP.17 and 13/CP.19.
22 Decision 12/CP.17.

23 Forest remaining forest, and land converted to forest are IPCC inventory categories. The former corresponds to forest that has been established for a period of time (by default 20 years, or over a period defined by the country), and the latter to forest established more recently.
24 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.
25 In addition a cap was applied to reduce uncertainties in maximum credits that could be generated. This is not expected to affect incentives in the case of BAU projected reference levels because the expected credit under BAU would be zero.

Table 2. Options for Developing the Use of Reference Levels in a Future Agreement

Option	Pros	Cons
No use of reference levels	Simplicity and consistency.	May not adequately account for important differences in national circumstances such as legacy effects and economic development history. May induce less ambitious contributions from countries for which this is a key issue.
Present coverage	Rules for REDD+ and forest management already established, no increase in uncertainty in estimates used for accounting beyond what is implied by current Decisions.	The use of RLs for forest management is currently limited to activity-based accounting (i.e. FMRLs used by Annex I countries to the KP in the 2nd commitment period) - see Option 2b identified in Section 3.
Reference levels applied to IPCC categories of forest remaining forest, or forest remaining forest plus land converted to forest	Works with IPCC categories rather than activities. Simiple generalisation of established rules probably a precondition to make widely applicable. Works with Option 2a identified in Section 3.	Additional inclusion of land converted to forest could increase uncertainty to some extent, though uncertainties could also be reduced by treating forest together, which could reduce the risk of inconsistency.
Reference levels applied to land use in general	Consistency across the land-use sector. The REDD+ model could be used for sectoral agreements covering non-forest land uses including agriculture.	For countries with targets related to historical emissions, managing the additional uncertainty from projections implies additional rules and increased burden on review process and risks cutting across different types of contributions.

baselines as a benchmarks against which to assess performance and generate credits. Under a post-2020 Agreement, depending on the choice of incentive options discussed in Section 4, this approach could extend to baselines for program and sectoral mechanisms and be modified as necessary. Table 2 summarizes options for the use of reference levels.

2.3 Treatment of Natural Disturbances

The UNFCCC states that its objective is to prevent dangerous anthropogenic (human-induced) interference with the climate system. Under the KP for the second commitment period, and subject to some conditions, emissions from *natural disturbances* in forests that are beyond the control of a Party do not count against

commitments if the Party has previously elected to exclude them from national accounting. The underlying reason for this special consideration is that for some countries where forests are a relatively large part of the land base, natural disturbances (e.g., fire, pest attack or extreme weather events) can produce a significant but random liability against their targets. This can be true even if land uses following disturbance are unchanged, with the expectation of long-term recovery of carbon stocks. The conditions on possible exclusion of natural disturbance emissions are linked to, *inter alia*, the identification of land affected, demonstration that the disturbance was beyond control of the Party, that efforts had been made to reduce the risk of disturbances, and that no land-use change occurs subsequent to the disturbance.[26] If there is land-use change then the disturbance associated emissions are accounted in full. Emissions from salvage logging are also accounted. Removals due to regrowth on disturbed areas are not accounted during the period of exclusion. Under the system adopted, the land affected is not removed from consideration and its carbon stock is taken into account in subsequent commitment periods.

Options for the use of natural disturbance provisions in a future Agreement

An Agreement could disallow the provision above, or similar ones on natural disturbances, or be flexible concerning use of disturbance provisions. If natural disturbance provisions were disallowed, those countries with significant disturbance risks might well reduce their emission reduction commitment until the overall risk of not meeting targets becomes acceptable.

Because the KP distinguishes between forest management and afforestation/reforestation there are two applications of the natural disturbance provision to cover these separate cases. Under a future Agreement, a single natural disturbance provision could be applied collectively to all IPCC forest categories. In this case, if the disturbance provision were being applied in assessing whether or not a country had met a national target based on national GHG inventory totals, then subtraction of a verified amount of disturbance-related GHG emissions from the inventory total would be needed. This is because the inventory total would continue to include the disturbance emissions, consistent with IPCC guidelines. The IPCC 2013 KP Supplement provides guidance on disturbance-related emissions in forests. A future Agreement could expand natural disturbance provisions to LULUCF categories other than forest if risk to meeting targets was significant. This would require consideration of the conditions for exclusion in these cases and the need for supplementary guidance related to inventories, which could take account of the work done for forests under the KP.

26 The conditionalities are set out in full in paragraph 34 of Decision 2/CMP.7.

2.4 Treatment of Non-Permanence

The natural disturbances discussed above are among several factors that can generate release (or reversal) of previously stored terrestrial carbon. Other sources of reversal are anthropogenic (e.g., harvesting and land clearing). The reversals problem is otherwise known as non-permanence. If national inventories, including land-use emissions and removals, are complete and continuous over time, as expected in the case of economy-wide targets, reversals do not introduce any special accounting problems other than the possibility of future adjustments for previously excluded natural disturbances.

If previously stored carbon has been credited at a point in time—either as positive carbon sequestration from, for example, tree-planting, or as credits from reduced deforestation—and used to offset an emission from another source, reversals may need to be explicitly considered in the accounting to ensure balance over time. This is the case for time-limited mechanisms that fall outside of national or sectoral accounting (like projects in the case of some market mechanisms, e.g., the CDM) where the risk of reversal needs to be addressed through separate rules and is covered in Section 4.2.1.

2.5 Harvested Wood Products

IPCC guidance and guidelines describe several ways to allocate carbon to national GHG inventories to reflect the stock changes and GHG emissions associated with the

Table 3. Summary of Options for Addressing Disturbances in a Future Agreement

Option	Pros	Cons
No disturbance provision	Simplicity.	Likelihood of less ambitious contributions from some countries.
Separate application to forest management and to afforestation and reforestation	Continuity with KP rules for countries using an activity basis; likely to lead to more ambitious contributions.	Not currently applicable to non-KP Annex I Parties (but could be adopted by other countries).
Generalisation to IPCC forest categories	Wider applicability; likely to lead to more ambitious contributions.	Adds complexity to the simple comprehensive approach based on GHG inventories.
Extension to non-forest LULUCF categories	Could lead to greater ambition where risks are significant.	As above, plus need to consider conditions for exclusion and supplementary guidance.

use of harvested wood products (HWP).[27] The simplest is to assume that wood is instantaneously oxidized[28] upon harvest; more complex methods allow for carbon storage in HWP and release of carbon over time as products come to the end of their life.[29] All IPCC methods give the same ultimate release if consistently applied by countries, but they differ in timing and the way carbon in HWP is allocated between forest product exporting and importing countries.

Options for HWPs in a future Agreement

The use by all Parties of instantaneous oxidation is simplest and introduces consistency across countries' accounting; however, this option does not accurately reflect the timing of emissions to the atmosphere and fails to provide incentives for better management of carbon stored in HWP.

Another option for an Agreement would be for countries to have free choice about which HWP method to use in specifying contributions. This would be simple, but has the disadvantage that there would be double counting or omissions unless countries all happened to account for this pool using the same method.

The third option[30] would be for all to agree to use the same method that takes account of stock changes from each

27 See Harvested wood products: Basis for future methodological development in Appendix 3a.1 in the IPCC 2003 Good Practice Guidelines, and *Harvested Wood Products* in Volume 4, Chapter 12 of the 2006 IPCC Guidelines.

28 Or equivalently, that gains and losses of carbon stored in HWP pools balance.

29 For a summary of some of the accounting options, see Iversen P., Lee D., and Rocha M., (2014) *Understanding Land Use and Forestry in the UNFCCC*

30 This is based on the agreement under the KP for HWP in the second commitment period.

country's HWP pool. The most achievable method could be for countries to calculate stock changes associated with domestic harvest and use instantaneous oxidation for exports, unless evidence could be provided on the use of exported timber. There could be additional provisions to use instantaneous oxidation for carbon in wood harvested for bioenergy or (as a consequence of concerns about wider environmental concerns) arising from deforestation. Countries could use instantaneous oxidation throughout without causing international double counting or omission.

2.6 Other Issues Associated with Land Use

As a consequence of the interactive nature of land use, the opportunities it presents for sustainable development and the risk of conflicting objectives, there are several other issues to take into account when considering contributions.

Land use and bioenergy and biofuel

Proper application of IPCC inventory methods will estimate the effect on land-use emissions from bioenergy production, including any effect from fertilizer application, fossil fuel use by machinery and transportation, and changes in carbon stocks in biomass, dead organic matter and soil carbon. To the extent that Parties' contributions cover the full spectrum of land use, the emissions associated with bioenergy crops will be covered, including indirect emissions. If coverage is partial, emissions associated with bioenergy and biofuel may not all be captured and this has been associated with the use outside the UNFCCC of secondary methods, such as estimation of indirect land use, in an attempt to cover potential accounting gaps. Partial coverage can arise from partial coverage of land use, land-use change and forestry in their contributions, or from partial coverage of countries with contributions.

Food supply, sequestration and energy production

Food, bioenergy production, and carbon sequestration imply competing demands on available land. Using more land for bioenergy production to reduce energy-related emissions draws land from other forms of production. This could contract local food supply or lead to more intensive (and possibly higher emitting) production. The risk of policy conflicts will be reduced and the likelihood of success increased by comprehensive approaches if all three components are considered in a country's mitigation contributions. Pressure on land as a resource will be reduced by taking account of production and distribution efficiency, land allocation, waste reduction, and shifting demand patterns. These factors have international and national dimensions that can best be addressed through transparency and more comprehensive coverage in a future Agreement.

Treatment of indirect and non-anthropogenic effects

Elevated CO_2 concentrations in the atmosphere, indirect nitrogen disposition, and effects of changed climate on tree growth can affect emissions and removals from land use and forestry. These are background indirect and non-anthropogenic effects. Excluding removals resulting from such effects has been called *factoring out*. However, asked by the COP to investigate whether such removals could be factored out of measurement and reporting of GHG fluxes, the IPCC indicated that the scientific community cannot currently provide a practicable methodology to measure these effects.

Because anthropogenic and non-anthropogenic effects cannot readily be separated, the IPCC for LULUCF has adopted the Managed Land Proxy, which treats as anthropogenic all land-use emissions and removals on managed land. The Managed Land Proxy is used in the 2006 Guidelines and in the supplementary guidance agreed in 2013 and it is assumed that this will continue to apply in a future Agreement. In practice, assessments of how targets are met relative to historical or projected reference levels will tend to cancel out non-anthropogenic effects, as identified in the 2013 KP Supplement. Effects of natural disturbances can be grouped with non-anthropogenic effects, although natural disturbances can be geographically identified which has enabled UNFCCC to address them through exclusion of emissions from the land affected (see Section 2.3 on natural disturbances).

Albedo and radiative forcing effects

Land use affects albedo, i.e., the proportion of solar energy reflected by the surface of the earth. Light colors are highly reflective, sending solar energy back to space, while dark colors absorb more solar radiation and have a localized warming effect. If, for example, forest expands at high latitudes on land that would otherwise be completely covered with snow, this may result in a net warming effect which counteracts the CO_2 mitigation due to increased carbon storage. The IPCC 5th Assessment Report indicates that, although local effects can be much larger, historically as a global average the albedo effect from changes in land use is about 5 percent of the radiative forcing from the increase in direct GHGs in the atmosphere,[31] which suggests that that the focus of a future Agreement, so far as mitigation is concerned, should remain on emissions reduction. However countries in designing their portfolio of contributions may wish to consider albedo, and other biophysical effects such as the interaction between ecosystems and the hydrological cycle.

Social and environmental impacts

Land use activities can have social and environmental impacts not so often seen in other sectors, for example, on biodiversity and indigenous and rural livelihoods. These impacts have been recognized, particularly in REDD+ decisions[32] where countries taking actions in the forest sector are required to provide information on how prescribed social and environmental concerns are being addressed and respected.

2.7 Mitigation and Adaptation

Some countries have expressed a preference for an Agreement that addresses both adaptation and mitigation. In particular in relation to the agricultural sector, countries have stressed the need to consider adaptation and mitigation in an integrated manner. There are potentially significant benefits to doing this, given, for example, the projected preponderance of decreasing crop yields during the present century identified by IPCC in the Working Group II 5th Assessment Report.[33]

The negotiation of a post-2020 climate Agreement presents the opportunity to create a more integrated framework that facilitates the formulation of complementary adaptation and mitigation strategies across land uses. The sector has significant potential for synergies among the objectives of mitigation, adaptation, food security, and poverty reduction. It may make sense therefore to combine policy incentives for adaptation and mitigation in land use in an integrated framework, especially as without effective adaptation, the increase in agricultural productivity associated with mitigation actions may be offset by negative impacts on productivity of climate change. In practical terms this could be done by making consideration of adaptation needs a specific part of reporting on mitigation strategies. The adaptation-mitigation relationship can also extend to the energy system; for example, interactions between ecosystems and the water cycle may affect hydropower potential at the local and regional level.

3. Options for Contributions

The ADP invites all Parties to make nationally determined contributions and to communicate such intended contributions well in advance of the 21st session of the COP.[34] This section discusses options for how these contributions could be developed for land use emissions and removals.

3.1 Nature of Contributions

Without intending to provide a definitive list of options, or a complete set of examples, land-use contributions to GHG mitigation could be expressed as:

a) *Policies and measures.* These are relevant to both mitigation and adaptation. Where they relate to mitigation, policies and measures may be quantified in GHG terms, or by using percentages or indicators, but they do not generally have targets linked directly to national total GHG emissions.[35] Given the complexity

31 Five percent is obtained by dividing the radiative forcing due to land use albedo change by sum of direct radiative forcing due to well-mixed greenhouse gases, taken from fig SPM.5 in Climate Change 2013 – the Physical Science Basis (the Working Group I contribution to the 5th Assessment Report of IPCC).
32 REDD+ safeguards were defined in Appendix I of 1/CP.16 (Cancun).
33 See fig SPM.7 in Climate Change 2014: Impacts, Adaptation, and Vulnerability (the Working Group II contribution to the 5th Assessment Report of IPCC).
34 Decision 1/CP.19, para 2(a).
35 The effect of individual policies on total national emissions can be difficult to quantify because of interactions with the rest of the economy. In general the greater the coverage of the policy, the easier it will be to quantify, and where there are groups of related policies it is better to quantify them collectively.

Box 2: Existing pledges under the Copenhagen Accord

Examples for the wide variety of national mitigation contributions can be found in the pledges countries communicated to the UNFCCC under the Copenhagen Accord. Few developed countries have provided detail on the role of agriculture, forestry, or land use in their pledges under the Accord; however, many developing countries have provided relatively detailed information on the role of land use in their pledges, which span the spectrum from economy-wide targets, intensity and sectoral targets, and to a wide set of different policies and measures. Some are quantified, either in terms of GHG emissions reduced or avoided or in terms of hectares targeted by measures. The majority, however, are not quantified. Very few countries indicated how actions would be achieved (i.e., whether through their own efforts or by international support).

of land use and differences in national circumstances and capacities, policies and measures could provide a more appropriate starting point on land use for some Parties. Land-use related policies and measures could include, for example:

- Afforestation/reforestation commitments expressed in land area to be forested or increase in forested land area
- Measures that address drivers of deforestation, promote sustainable forest management, or create incentives for carbon stock enhancement
- Measures that reduce direct emissions from agriculture (fertilizer, enteric fermentation, manure, rice cultivation)
- Demand-side measures that can indirectly lead to emission reductions (shifting consumption and dietary patterns, productivity enhancement, reduction of food loss).

b) *Quantitative GHG targets*. Mitigation targets can be expressed in absolute or relative (intensity-based) targets. Land use contributions linked to GHG emissions could be:

- Included with all other sectors in national economy-wide targets for reduction in national emissions below historical or projected emission levels
- Included in national economy-wide targets to reduce national emissions intensity
- Expressed separately as sectoral targets for the full land-use sector or for subsets, for example, forests or agriculture.

What is the nature of nationally determined contributions?

The choice of option for expressing land use contributions in the context of a future Agreement is related to the overarching type of contribution or contributions being proposed by a country.

In practice, broader considerations of national circumstances and capacities may determine the overarching contribution. For example (the list is not exhaustive and only illustrative), contributions of developed countries may be in terms of total national emissions below an historical level, those from middle-income countries expressed as intensities or relative to a business as usual projection, and those from least developed countries or small island states as policies and measures without necessarily a corresponding quantification using national GHG totals. Box 2 summarizes pledges made following the Copenhagen Accord. These pledges have no direct bearing on post-2020 contributions, but may give an indication of the type of pledges countries are willing to communicate.

Table 4. Flexibility Afforded to Each Party in Choice of Contributions and Implications for Land Use

Option	Brief explanation	Implications for land use
Full flexibility	There is no guidance or incentives for countries to choose a specific form of contributions. Similar to the pledges of developing countries under the Copenhagen Accord, any contribution would be accepted.	Significant variation in the way land use is included; without strong information and reporting requirements, contributions likely to be less transparent and less comparable across countries and sources.
Guidance on nature of contributions	Negotiations could formulate guidance for countries that link contributions to, for example, the level of land-use GHG emissions and capabilities. Countries with higher emissions or capabilities could be expected to assume more stringent contributions (for example, national targets), while countries with lower capabilities could be expected to communicate, for example, policies and measures.	Land use aligned with expectations based on general considerations of national circumstances and capacities. The probable nature of the guidance suggests significant divergence may emerge on coverage and the way in which special land use issues outlined in section 2 are treated.
Guidance on formulation and nature of contributions	Guidance could also be specific to the different type and format of contributions. Where countries formulate, for example, emission reduction targets, there could be rules that guide the setting of baselines or reference levels. Such rules could seek to ensure the environmental integrity of contributions (and the UNFCCC as a whole) and comparability among contributions.	Possibility of greater clarity and consistency on coverage, and the treatment of special issues outlined in Section 2.
Mandated contributions	Parties could collectively agree on rules that mandate certain contributions, reflective of national circumstances and capabilities. As above, such rules could seek to ensure the environmental integrity of contributions, and comparability, among contributions.	Maximum consistency on coverage and the treatment of special issues.

Contributions of Parties may evolve over time and increase in coverage and level of ambition. Before moving to full land coverage with national targets, if that is their goal, Parties need to go through a process of policy design, consultation, and consensus building, monitoring and evaluation. Government ownership of the process and commitment from key actors in a country are essential prerequisites for successful planning and implementation. Consequently, land use contributions may go through different phases and progress from policies to targets. The process under the Agreement of defining contributions should facilitate increased ambition and allow for new contribution additions to existing ones. It could also allow for corrections and adjustments, where needed.

Options for the flexibility on choice of contributions. A future Agreement could leave the choice of contributions completely flexible and at the discretion of Parties. Alternately, the Agreement could formulate guidance on the type of expected contributions or—at the other end of the spectrum—be linked to binding and mandatory requirements. Such decisions are part of a broader discussion on mitigation and also linked to transparency (see Section 3.2), but could influence contributions related to the land-use sector. Table 4 lists options for how much flexibility there could be for countries in expressing their contributions, and the implications for the inclusion of land-use emissions and removals.

Options for linking land use to other sectors for Parties with emissions targets. The relationship between land use contributions and the overall national contribution would be a consideration for countries with economy-wide targets for GHG mitigation, relative to an historical level, a future projection or an intensity measure. In this instance, three options are possible, recognizing that not all countries need to apply the same option:

Option 1: Full inclusion of land use via the GHG inventory in economy-wide contributions. Under this option GHG associated with land use would be included in economy-wide targets in the same way as those from other parts of the GHG inventory. In this case, no special rules would be applied for land-use emissions and removals. Because of the absence of special rules this is conceptually the simplest option. This option could be problematic for countries with significant disturbance risk, or unduly beneficial to countries where legacy effects are favorable.

Option 2: Special rules for land use. This option considers agreement on special rules for the LULUCF part of land use. Two possibilities are identified for this option:

> In *Option 2a*, consistent with economy-wide targets, there remains full inclusion of land use including LULUCF via the GHG inventory, but before assessing whether a country had met its target, verified amounts of GHG emissions or removals would be added or subtracted from the inventory total, as described in section 2.2 (for reference levels) and 2.3 (for disturbances).
>
> *Option 2b* differs from 2a in that it assumes continuance of an accounting system parallel to the inventory for assessing how commitments have been met. In this case the LULUCF part of the commitment would be included in an economy-wide target via the accounting system on the basis of information provided in the GHG inventory in much the same way that LULUCF activities are accounted using supplementary data under the KP. Option 2b would facilitate continuance of estimates based on LULUCF activities and allow some activities to continue to be voluntary. It could also be used for full inclusion, if activities added up to the same coverage as the parent inventory categories; in this case option 2b would merge with option 2a.

Different options may work better for different Parties. Here, Option 2 could be more relevant to countries where land-use sector disturbance risks are disproportionate, or legacy effects unfavorable, or both. Option 2a could be more relevant to countries that have not been party to the KP for the second commitment period; option 2b could be more relevant to countries that were KP parties for the second commitment period.

Option 3: A separate target for land use. Under this option, land use—or part of it—would be separately identified, thereby splitting the overall national contribution into two or more parts. A separate LULUCF or forest target would imply consideration of the relationship with the

Table 5. Summary of Options for Linking Land Use to National Targets and Implications for Land Use

Option	Implications for land use
1. Full inclusion via the GHG inventory in the overall contribution	Conceptually simple, does not allow for special considerations that affect the LULUCF part of land use.
2. Special rules (similar to KP)	More complex but does allow for special considerations and continuity with current KP/LULUCF rules. Can be achieved via adjusting GHG inventory totals before assessing whether targets have been met (option 2a), or via a parallel accounting system (as is done currently under the KP) (Option 2b). Option 2b could support comprehensive coverage, and could also allow continuance of voluntary inclusion for some activities.
3. Separate target for land use	Separate land use contributions can more easily reflect land use specific features, such as forest age class (e.g., by using reference levels or simply explaining why large variations occur). Variability would be easier to understand politically; natural disturbance rules could more easily be instituted. However, separate targets for land use, if not fungible with other sectors, could undermine overall cost-effectiveness as gains from substitution of effort across sectors are prevented by lack of fungibility.

rest of the economy-wide contribution, where relevant. If achievement of the two or more targets were fungible then the combined system would be similar to one target with special rules (described as option 2). Otherwise Parties would presumably need to demonstrate how both (or multiple sectoral) targets had been met. Separate national land-use targets could also exist in the absence of economy-side targets, as with the concept of a sectoral CDM, sectoral NAMAs or REDD+ in the absence of an economy-wide contribution.

3.2 Facilitating Clarity, Transparency, and Understanding of Contributions

In the context of achieving the ultimate aim set out in Article 2 of the UNFCCC, COP decision 1/CP.19 invites Parties to communicate national contributions … *in a manner that facilitates the clarity, transparency and understanding of the intended contributions, without prejudice to the legal nature of the contributions.* An agreed common basis for CTU would facilitate assessment and comparison. Where contributions are expressed in terms of emissions and removals of GHGs, the first two requirements are underpinned by the GHG inventory guidance published by the IPCC[36] and agreed by the COP for use in reporting. It is assumed that this will continue to be the case in a future Agreement. IPCC guidance provides methodologies to estimate emissions and removals associated with all land use categories, including default methods to enable all countries[37] to produce estimates with complete coverage of land use. IPCC has also provided methods relevant to the rules agreed under the KP for the second commitment

36 The IPCC 2006 Guidelines have been agreed for developed countries, and the IPCC 1996 Guidelines plus the IPCC Good Practice Guidance of 2000 and 2003 have been agreed for use by developing countries.
37 In the context of capacity building where needed to develop or establish the necessary capabilities.

period[38] which are relevant to countries using activities to quantify LULUCF, and to special rules for dealing with disturbances and legacy effects discussed in Section 2.

CTU information needs for contribution options

Decision 1/CP.19[39] requested the ADP to identify, by the 20th session of the COP, information Parties will provide when putting forward their contributions. Building on the assumption of IPCC guidance as a common basis for GHG quantification, the information set out below could support CTU in relation to land use, depending on which options for land use contributions are selected. CTU would require specification of any special rules envisaged (e.g., to deal with natural disturbances) and identification of the approach taken to HWP and could be extended to include joint consideration of adaptation and mitigation.

Policies and measures. If land use contributions are expressed as policies and measures, information needed for CTU is likely to include the categories or sub-categories in the national GHG inventory concerned, and the reasons for believing that the proposed activity will reduce emissions or enhance removals associated with them. Reasons could include investment in mitigation technologies, better regulation, economic incentives or these in some combination. Information could also be provided on possible synergies and conflicts related to food production, information related to adaptation and the relationship to sustainability and safeguards (see below). Information may also be provided on how the impact of policies and measures is quantified, and the expected impact in GHG emissions, if quantifiable.

National emissions targets. *Option 1: full inclusion of land use via the GHG inventory***.** If land use is included in economy-wide targets via the GHG inventory without special rules (Option 1 in Table 5), the information supporting CTU on land use contributions will be analogous to that needed to provide CTU for contributions from other inventory categories.[40] The level of detail in the information provided on land-use contributions may depend on their treatment within the national total GHG inventory[41] (e.g., more detail could be provided for land-use categories identified as key, because of their contribution to the national total, or to the trend in emissions).

Option 2: special rules for land use apply. If land use is included in economy-wide targets and special considerations apply, (Option 2 in Table 4), then the information needed to provide CTU is likely to be the same as for Option 1, plus additional information linked to the special considerations and described in Section 2. Special considerations may be justified, for example, by arbitrary effects of uneven age class distribution in forests, or to reduce risks associated with natural disturbances.

For example, countries not wanting to account for emissions from natural disturbances should specify that this is the case, and whether the proposal is to use the method as agreed for the second commitment period of the KP, or some other method that does not lead to the expectation of credits or debits, plus the level of disturbance emissions that occurred historically, and what level was anticipated in future, and the exclusion criteria. Countries using a reference level should specify how it was calculated and what the relationship is to emissions and removals in the inventory used to estimate the base year or emissions intensity. CTU would require specification of which type of reference is being used, the associated historical data and, in the case of a BAU reference level, information to justify the value proposed.[42]

Under Option 2b, countries could continue to specify their post-2020 contributions on an activity basis, possibly with partial inclusion. The information needed to provide CTU on proposed contributions would need to say whether the coverage of land-use emissions and removals was

38 *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol* (*KP Supplement*), IPCC 2013.
39 Decision 1/CP.19, para 2(c).

40 See the following report for a discussion of information requirements in general: *Ex-ante clarification, transparency and understanding of intended nationally determined mitigation contributions* WRI Working Paper by Kelly Levin, David Rich, Jared Finnegan and Yamide Dagnet, March 2014.
41 Including the treatment of HWP – see section 2.5
42 For example the information requirements in support of forest management reference levels were set out in Appendix II to Decision 2/CMP.6

comprehensive (i.e., the same as that of the IPCC land-use inventory categories), or partial because only some activities are being counted. If it were partial, CTU would presumably require identification of which activities are included, reasons for believing that mitigation beyond BAU would occur in the included activities, and consideration of emissions displacement associated with the exclusions.

The supplementary guidance produced by IPCC in 2013 for use under the KP for the second commitment period[43] provides a useful indication of what is needed to provide CTU for option 2a and option 2b.

Option 3: separate targets for land use. Where separate targets are formulated for land use, or part of it, in the context of economy-wide targets (Option 3 in Table 4) then CTU will require information on the coverage of each target and how economy-wide coverage is achieved, without double counting or omission. If contributions are expressed separately as sectoral targets relative to a reference level with national coverage for the land-use sector or some part of it, then information may be needed on how a reference level scenario has been established consistent with the historical data to estimate performance. COP decisions from the REDD+ negotiations may help indicate information requirements associated with commitments of this type. Information could be required to show that the main sources of land-use emissions and removals were included, for example, forests and organic soils. Additional information may be needed to show the depth of ambition below BAU. If more than one contribution of this type is proposed, or contributions of this type co-exist with contributions expressed as economy-wide commitments, then CTU would be increased by information on consistency between them was considered. This may help avoid conflicts and perverse incentives, for example, between food production and mitigation.

Safeguard requirements. There are concerns among some Parties and observer organizations that a poorly designed international and badly implemented national land-use contributions may have detrimental impacts on the social and biological environment. To address these concerns, safeguards can ensure emission reductions or removals are generated in a manner that does no harm, or meets certain social and/or environmental criteria. For those activities carried out with international support and/or incentives, the COP could require information on the implementation of safeguards that optimize synergies and minimize negative impacts on ecosystems and livelihoods. Parties may choose to provide this information voluntarily for those activities implemented and/or incentivized with their own resources.

Can greater transparency regarding contributions temper the need for a centrally agreed set of rules? There may be substantial challenges to getting all Parties to agree to upon a set of specific rules applicable for all land-use contributions prior to COP 21 in Paris. While CTU is absolutely essential to any agreement, greater transparency could help achieve agreement in this situation. The key to this may be to ensure that the level of understanding in terms of anthropogenic GHG emissions is increased, not diminished, under a new Agreement. For example in the case of disturbance emissions, a Party might not wish to follow the approach developed under the KP for the second commitment period, but CTU provisions in a new Agreement could require information on the issues identified in the relevant LULUCF Decision[44] and for which the IPCC has subsequently provided supplementary guidance.

4. Options for Incentives

In the context of this report, incentives refer to measures that support Parties adopt more ambitious contributions. Incentives could be either monetary or non-monetary. They can apply to the broader negotiations on the mitigation architecture for a future Agreement or be defined specifically for land use.

How reducing emissions and increasing removals from land use may be incentivized is closely linked to how land use is incorporated into a future Agreement. For example, if land use is fully integrated in a Party's quantified target, that Party is likely to manage its land-use emissions as part of an overall mitigation strategy. More countries may participate if there is flexibility around absolute vs. relative targets (e.g., for agriculture) along with how comprehensively a Party is allowed to include land use. Furthermore, if land-use sector credits can be used to help a Party meet

43 *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol* (*KP Supplement*), IPCC 2013.

44 See Decision 2/CMP.7, especially paragraphs 33 and 34.

a quantified contribution, countries with high mitigation costs will be incentivized to purchase such credits and countries with low mitigation costs will be incentivized to create them.

To be effective, incentives will need to respond to the different circumstances, needs, and capacities of Parties, such as differences in land management histories, ecosystem conditions (e.g., age class structures and harvesting cycles), economic development, and capacity. Long-term incentives are particularly important in the land-use sector as short-term incentives could increase the risk of reversals once the incentive expires. National policies could promote long-term incentives, mixing private and public sources to avoid depending on any one of them exclusively over time. Long-term structural incentives could include establishing longer commitment periods over which the contributions can be made. Incentives may also change over time as a country's circumstances and capacities change. Rules could be developed that encourage Parties to assume more ambitious mitigation contributions over time. Finally, incentivizing adaptation in conjunction with mitigation is important for long-term sustainable land-use strategies.

4.1 Incentivizing Ambitious Contributions

Several types of incentives may be considered by Parties to increase the level of contributions. These include incentives associated with how targets can be met or how Parties' transition from implementing policies and measures to adopting targets along with market and non-market financial incentives. Countries may move from less ambitious to more ambitious contributions thereby expanding the scope and coverage of their activities over time. Financial and non-financial incentives may play a role in this.

Options for incentives – Parties proposing policies and measures

Financial support can help with designing and implementing policies and measures, such as land restoration, afforestation, emission reductions from livestock or programs that aim to change deforestation practices to more sustainable land uses. Such measures can also be bundled under a NAMA (e.g., the livestock sector of a country or a large forestation program) or a programmatic activity (e.g., program of activities linked to a payment-for-ecosystem services scheme). Such activities could also produce offsets and thus qualify for results-based payments, including market-based payments if the proper market framework and demand are in place (see 4.2.1.).

Where drivers of deforestation are linked to markets, contributions that reduce emissions from land use can be supported by demand-side measures. For example, market commitments not to purchase commodities produced on recently deforested land can send a strong market signal through supply chains. Where drivers cannot be addressed by these types of demand-side measures, other incentives may be needed. Such policies and measures could help achieve national targets or contributions, or they may fall under a Party's NAMAs. Depending on a Party's circumstances and capacities, support may be required to help develop and implement these domestic policies and measures.

Options for incentives – Parties with quantitative GHG targets

As discussed in previous sections, the special considerations that apply to land use would justify rules that allow flexibility and reduce risk for Parties (e.g., see natural disturbances, reference levels for forest management, etc.). Rules that allow the step-wise inclusion of activities, data, and additional information, as in the case of REDD+, create incentives to move gradually toward more ambitious targets. Flexibility is an important incentive as it allows taking into account the special features of the land-use sectors, and the ability to meet targets more cost-effectively.

Flexibility in compliance management. The EU-pooled emission reduction target (the so-called EU bubble) under the Kyoto Protocol provides an example for risk sharing through a joint mitigation effort. Similarly, land-use contributions could be formulated by groups of countries. If land-use targets are separate from other sectors, pooling

them across countries with diverse age class structures and subject to different natural disturbance events may help moderate the overall impact of these issues in any given accounting period.

If a Party has included land use in its economy-wide target, special rules for the accounting of land use that increase incentives for the inclusion of land use and full land coverage may apply (see Section 2). If land-use emissions and removals are formulated as separate targets, such targets could benefit from a longer compliance period than other sectors, given the temporal fluctuations in emissions and removals as discussed above. If targets are not met, offset provisions may facilitate compliance management. Emission reductions from other sectors (and countries) could be used to compensate for the compliance shortfall in the land-use sector (the same may also apply vice versa). The application of land use as an offset may also be linked to more ambitious or tighter caps in other sectors.

Allowing the use of offsets can encourage increased ambition while also inducing cost-effective mitigation (in Parties with targets) and incentivizing policies and measures (in Parties without targets). Emission reductions could be generated by policies or sectoral agreements (e.g., REDD+ or sectoral NAMAs), projects, or programs (e.g., the CDM and JI if they continue).

Options for incentives applicable to all – creating participation criteria

Parties could be required to meet certain criteria to benefit from flexibility or finance. Such criteria could incentivize increased ambition in the land-use sector. For example, a Party that includes comprehensive accounting of the land-use sector or has a quantified economy-wide target (versus policies and measures) could be allowed to participate in emissions trading in the land-use sector to meet its overall contribution.

Criteria could also ensure the environmental integrity of incentive frameworks; for example, Parties could be required to demonstrate the ability to account for emissions and track emission credits or allowances before being able to participate in trading—either as part of a cap, or under a NAMA or sectoral agreement. The higher the demonstrated capacities, the more flexibility and participation in mechanisms could be granted.

4.2 Financial Incentives for Mitigation

This section discusses how different market and non-market mechanisms can be used to directly incentivize emission reductions and removals from land use.

4.2.1 Market Mechanisms

Market mechanisms combine financial incentives with flexibility. Non-market financial incentives may work more directly in stimulating particular mitigation actions.

Incentives could be created through demand for emission reductions from land-use contributions or linking land-use contributions to carbon markets. The efficacy of emission trading markets depends on key characteristics and design parameters, such as sufficient demand, availability of supply, market rules, environmental integrity, and transaction costs. The relative lack of demand for land-use credits is a key lesson from emission-trading markets to date (i.e., any mechanism under the UNFCCC that allows land-use credits to be used to meet compliance requirements). The vast majority of emissions trading occur in domestic markets, and if domestic emissions-trading systems do not also allow land-use credits demand will not materialize and the incentives will not exist. This occurred for the Kyoto Protocol's flexible mechanisms (CDM, JI, and emissions trading), which have not achieved their mitigation potential for land use. Long-term and consistent demand is particularly important for the land-use sector, as emission reductions or removals can take time to accumulate, and weak or short-term demand may result in reversals if incentives disappear.

Options to enable market mechanisms for the land-use sector

The COP will have the choice of whether or not to allow Parties to meet their stated contributions with market mechanisms in general and also to limit or restrict the sourcing of offsets (e.g., from countries with or without economy-wide and/or land-use contributions). Specific rules for the inclusion of the land-use sector in such mechanisms may also be agreed to if deemed necessary. Trading can also occur without the use of offsets, as is currently the case for REDD+ (e.g., some governments are buying emission reductions, but not counting them against targets).

Without prejudice to which of these options Parties ultimately agree upon, there are unique characteristics of land use that may require special provisions when enabling market mechanisms, such as considerations for the extent of coverage, the use of reference levels and provisions for safeguards as discussed in Section 2. Below are some additional provisions that may be needed, which are unique to markets or the use of offsets.

Treatment of natural disturbances and non-permanence. The specific risk of reversal in land-use mitigation has to be addressed through separate rules in the case where a project or program developed as a market-based offset is not captured through national accounting. Natural disturbances are examples of reversals that would have to be considered, in particular for sectoral or project-based mechanisms. Reversals can also be human-induced.

Options to deal with non-permanence include: 1) a temporary crediting system similar to the CDM (where credits expire after a certain time) and 2) allowing permanent credits insured through the use of a buffer pool or an alternative financial mechanism (e.g., insurance mechanism) established for the purpose. Options also exist for dealing with natural disturbances, including the current approach outlined in Section 2.3.

The CDM establishes a precedent for managing non-permanence for afforestation/reforestation projects. The central idea is to issue temporary credits, which must be confirmed throughout and replaced once the project crediting period ends. The contingent liability that comes with these arrangements, and their lack of full fungibility with credits from other sectors, led to a highly discounted value of afforestation/reforestation CDM credits and a modest take-up of LULUCF CDM activities, although weak demand because of market-access issues is also a contributing reason.

Fungible, permanent credits may be created through the use of buffer pools and/or seller liability. For example, California's emission trading scheme addresses unintentional non-permanence risk via a Reserve Buffer Pool and intentional reversal by making the landowner liable to replace lost credits. Carbon capture and storage under the CDM and the voluntary market also make use of buffer pools. Table 6 summarizes the options.

Leakage management. Although not uniquely associated with it, activity shifting, often called leakage, is a particular risk in the land-use sector. Options to account for leakage largely revolve around the question of scale:

- National level accounting can address domestic leakage (if accounting is sufficiently comprehensive); however, such programs require high levels of capacity and strong governance to be implemented effectively.

- Smaller-scale programs can prioritize areas of high emissions and be easier to implement—particularly by the private sector—but have higher risks that leakage is not captured in accounting frameworks.

- A middle ground, recognized in REDD+ decisions, is to recognize and allow for a subnational scale as an interim step,[45] which provides greater flexibility in defining mitigation strategies and addresses capacity and other constraints where national implementation is challenging.

De-linking from offsets. Payments for land-use emission reductions can be de-linked from their use as an offset against emissions targets. For example these payments or purchase commitments could be agreed to separately under conditions that they not be used as an offset. This is the current situation with REDD+, where several developed countries are purchasing REDD+ emission reductions or signing purchase agreements but not considering them as offsets. Such transactions could be accompanied by simplified reporting requirements, but would still require mechanisms to avoid the risk of double counting. This would, however, create a dual market for land use and other credits, which reduces overall market liquidity, adds complexity, and could reduce demand.

45 Decisions on REDD+ suggest that REL/RLs and MRV would occur at a national scale, or subnational scale as an interim measure. There is no specified duration for the interim period. Decision 1/CP.16 notes that full implementation of results-based activities requires national monitoring systems.

Table 6. Summary of Options to Address Non-Permanence Risk Associated with Projects

Option	Pros	Cons
Temporary crediting with re-crediting and replacement (as with temporary certified emission reductions (tCERs) under the CDM)	System established; allows short-term utilization of emission-reduction compliance as bridging strategy for long-term emission reductions to materialize.	Reputation for complexity. Discounted value of emission reductions. Does not create an incentive to maintain a forest beyond the project crediting period. Has contributed to weak demand.
Temporary crediting with ongoing confirmation and replacement at the end of the project (as with long-term certified emission reductions (lCERs) under the CDM)	System established.	The confirmation requirement places a long term liability on the credits. This leads to discounted value of emission reductions. Does not create an incentive to maintain a forest beyond a project crediting period. Has contributed to weak demand.
Buffers (international or national)	No need for temporary units. Fungibility.	Reduction of emission reductions that can be monetized. Need to negotiate buffer arrangements. Need for an entity to manage the buffer. An undercapitalized buffer risks system failure.
Use of insurance mechanisms	No need for temporary units. Fungibility. Private sector can assess risk and prices appropriately.	May result in large discounts, or devaluation, of emission reductions. Insurance market currently under-developed.
Seller liability	No need for temporary units. Fungibility.	May not be attractive to sellers. Enforcement difficulties in countries with weak legal systems and if relying on small parties to cover liabilities.

4.2.2 Non-Market Finance

Non-market finance can cover a wide range of incentives, and may be particularly useful to help address some of the barriers to land-use mitigation. Depending on how it is characterized, non-market finance could include results-based payments as discussed above. Non-market approaches may also include domestic policies or regulations such as taxes, subsidies or domestic programs that use results-based payments to achieve a desired outcome.

Non-market-based approaches would ideally complement market-based ones, and may be more appropriate than the latter where, for example, emission reductions are not quantifiable with certainty; where there is a risk of carbon credits flooding the market because they are very cheap to generate and diverse emission reductions are sought; where perverse incentives exist; and where investment decisions are made for reasons other than GHG abatement. Non-market approaches may also be seen as an alternative for countries that do not wish to participate in market mechanisms.

Non-market approaches could form part of a Party's domestic approach to meeting a national target and are currently possible as a NAMA that could be linked to a national contribution. Finance can also be tied to broader integrated land-use planning to tackle drivers more broadly, or be linked to adaptation finance. Non-market finance for developing countries can be deployed through the GEF, the GCF or other entities.

5. Conclusions

An ambitious global Agreement to reduce GHGs—as called for in the ADP—implies a greater role for the mitigation of GHGs associated with land use. There are no fundamental barriers to treating land-use contributions, or incentives, on a basis comparable with other sectors if Parties wish to do so in an Agreement under the ADP.

Land-use GHG mitigation has features that distinguish it from mitigation in other sectors and a different history of treatment which can inform negotiations on the next Agreement. Tools and accounting systems have been developed to manage the land-use issues that require special treatment such as natural disturbances, the dynamic age-class structure of forests and non-permanence. More comprehensive treatment of land use will enhance system integrity (e.g., better capture the cross-sector spillovers in bioenergy) and fungibility can enhance the cost-effectiveness if it increases the range of lower-cost mitigation opportunities available, relative to other sectors.

Agriculture is an important source of land-use emissions, both direct (mostly non-CO_2 emissions from livestock and rice cultivation) and from changes in carbon stocks on agricultural lands. National greenhouse gas inventories reflect this, and fully include all agricultural emissions from activities and land. The KP requires Annex I countries to count non-CO_2 agricultural activity emissions against their targets, and electively include agricultural changes in carbon stocks. An expanded role for agricultural mitigation in a future Agreement would need to recognize the challenges this presents to some Parties, particularly developing countries, where such emission responsibilities could impede efforts at food security and economic development.

Because of differences across countries in terms of national circumstances and capabilities, Parties may want to consider allowing countries flexibility in the nature of land-use contributions with incentives for stronger and more comprehensive contributions over time. A reasonable goal might be to seek overall consistency with GHG inventory

coverage, which does not necessarily require the relatively complex tracking of activities used under the KP, although the KP system can be used as a basis for development.

Transparency is essential to any Agreement that emerges. The more flexibility Parties have on the nature of their contributions, the greater the challenge for transparency in communicating the rationale for their choices and the achievement of contribution goals over time. This report discusses a range of options for requiring information to provide more CTU of contributions.

As with any sector, mitigation of land-use emissions requires incentives. The incentives can be monetary or non-monetary, market-based or not, and tied to flexibility mechanisms or not. The incentive structure for land use can either be determined by the broader architecture for mitigation across all sectors, made specific to the land-use sector, or some combination thereof.

To summarize, this report identifies a number of issues that Parties need to consider on their way to negotiating land use in a future climate Agreement by Paris in 2015. Broadly speaking, they are:

- What is the extent to which land-use emissions and removals will be included in the agreement?
- Will special accounting provisions need to be made, as they have in the past, for unique characteristics of the land-use sector such as natural disturbances and reference levels?
- How specific and how flexible will rules be for determining how Parties include land use in their contributions?
- What information must Parties provide to ensure the Clarity, Transparency, and Understanding of their contributions and will these requirements depend on the nature of the contributions?
- What incentives will be provided for land-use mitigation and will these incentives be different from those afforded to other sectors?

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