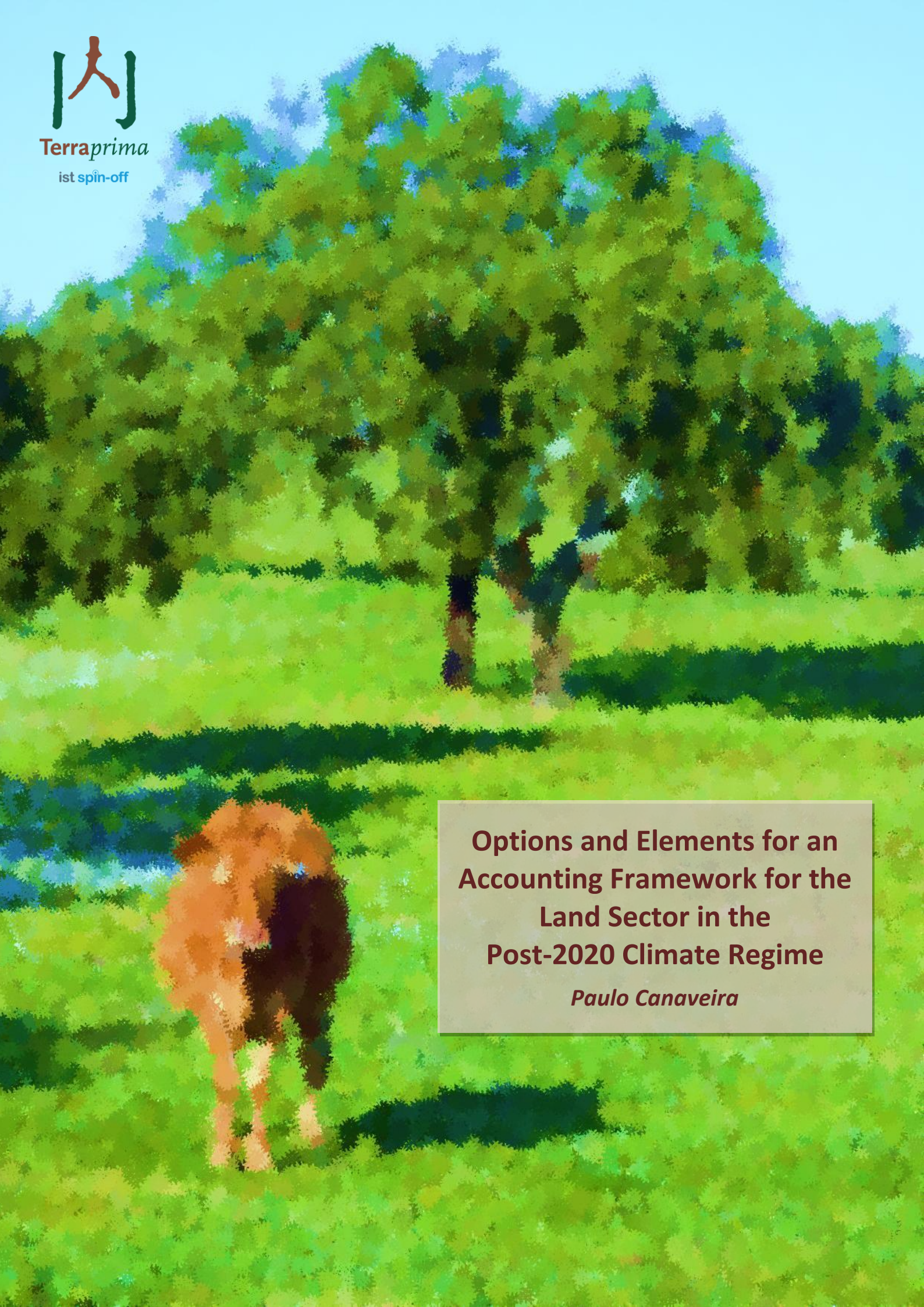

Options and Elements for an Accounting Framework for the Land Sector in the Post-2020 Climate Regime

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Disclaimer

This study was commissioned by the Federal Office for the Environment (FOEN). The content is the sole responsibility of the contractor.

To improve readability of this report, some aspects of the formal decisions taken by under the UNFCCC may have been redrafted or summarised. For full reference please refer to the original decision texts.

Acknowledgments

The author would like to thank Cristina Garcia (Spain), Tony Lemprière (Canada), Lucia Perugini (Italy) and Shira Yoffe (USA) for their comments and suggestions to earlier versions of this report. The section on historic perspective on KP LULUCF accounting rules has benefited from the input by Jim Penman (University College, London). However, the views or opinions presented in this report are solely those of the author and do not necessarily represent others that shared comments and inputs.

The ideas presented in this report have also benefited from presentations and discussions made by different colleagues from around the globe during the in the Informal Dialogues on the Land Sector, that took place in Sydney, Australia, 23-25 April 2013 and in Reykjavik, Iceland, 3-5 September 2013.

Quotation and more information

This report should be quoted as:

Canaveira, Paulo (2013). 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.

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Executive Summary

The Land Sector needs to be an important component of the mitigation efforts that the world's governments will have to embrace, if we are to be successful in curbing and ultimately stopping the emissions that cause global warming. These emissions and removals take place all over the planet, in both developed and developing countries.

The UNFCCC should not attempt to micro-manage or determine any country's choices in these difficult matters but can and should provide a framework that allows and incentivises countries to commit to reducing emissions as much as possible and as quickly as possible, while making the best possible choices for a sustainable development and avoiding the pitfalls and mistakes that others have committed in their own recent history.

Accounting systems are not objectives *per se* nor does their existence guarantee the reduction of any emissions. But they are a crucial piece of the process. As efforts of different countries have to be compared and measured, the need for common metrics and accounting rules emerges naturally. This is fundamental to create the trust atmosphere that will be required for countries to commit to reduce their emissions at the scale that is required while feeling reassured that others are equally contributing.

During the Kyoto Protocol negotiations, the land-use component was one of the most difficult to reach agreement on. Some of the reasons for that are still valid, but we have collectively moved a long way from those days and we can now look at accounting for this sector with a fresh, new perspective. The accumulated experience with KP LULUCF accounting helps us in that, but also the emergence of new "accounting systems" (such as the one that evolved for REDD+) allows us to imagine systems of accounting rules for the land sector that could be simpler than those used for the KP, easier to communicate, flexible to accommodate national circumstances and applicable to both developed and developing countries.

This report is a first attempt to systematise the current state of the art in accounting for the land sector under the convention and to find a possible set of common rules for the post-2020 global climate regime, i.e., applicable to all Parties to the UNFCCC.

It builds on the special features of the land sector (chapter 2), on the already existing reporting requirements under the UNFCCC (chapter 3), on the experience in LULUCF accounting under the Kyoto Protocol (chapter 4) and on emerging accounting systems under the convention related or applicable to the land sector (chapter 5), to propose some options and elements that could incorporate a future accounting regime, applicable to all Parties, recognising action by governments and other actors (chapter 6).

In the past, the need for different LULUCF accounting rules was justified invoking some features that supposedly didn't exist or that had a small impact in other sectors. Many of the LULUCF accounting rules were designed to address these features. While many are still relevant, it is today clear that some of those features are common to other sectors or can be addressed with proper accounting of land-use categories at national level and we can now safely move towards a higher integration of the sector into mitigation commitments. Also the development of strong and solid IPCC Guidance and a long and ongoing progress by Parties in improving their reporting capabilities places the debate in a totally different stage for the integration of the sector in the future climate agreement.

Developing common accounting rules for countries with diverse national situations was a major achievement and perhaps the biggest success in the KP/LULUCF accounting rules is its mere existence. National

circumstances played a major role in the negotiations for both the 1st and 2nd Commitment Period and we can anticipate that it is likely to remain a fundamental issue in the future.

Harmonization of rules and definitions is an important feature to allow for comparability and transparency and this should continue to be the focus and first priority in developing future accounting systems. However, over-harmonization may create many difficulties for particular Parties and flexibility to accommodate national circumstances needs to be built into the system. Deciding on the right balance between harmonisation and flexibility will likely be the one of the focus of all major discussions about future accounting rules for the land sector.

So far, the Kyoto Protocol has only had two Commitment Periods. However, it was possible to negotiate different accounting rules, an evolution from the first to the second period. These were based on accumulated accounting and reporting experience, an increase in available information about emissions and removals of the sector, and increased scientific understanding of the sector. There is certainly room for further improvements and these should to be explored.

Although accounting under the Kyoto Protocol was fundamentally an exercise to account for emissions, removals and carbon stocks, the debate was heavily influenced over concerns of the implications of the proposed rules over economic activity in agriculture and forestry, on biodiversity and nature conservation and on rural communities.

Regardless of each one's opinion on the quality of the existing LULUCF accounting rules, it should be recognised that the existence of many rules and the complex LULUCF jargon that developed with them, and the differences in estimates used in Kyoto reporting and accounting and Convention Reporting, made the sector less transparent to the non-negotiator world. This is not desirable for having policy makers, stakeholders and the public understand the implications of the proposed rules on the general accounting and on the sector itself, and thus, while not directly responsible for it, this complexity reinforces the a certain lack of trust that has surrounded the debate on the land sector's participation in the commitments that Parties propose for the future.

One of the biggest challenges for the negotiations on the land sector is, therefore, to simplify the accounting system and to improve communication in general, including making a serious effort to translate the LULUCF jargon into more understandable terms.

While there are no accounting systems under the convention (other than those resulting from the implementation of the Kyoto Protocol), many different topics being discussed under the convention share features that we would expect to see in an "accounting system" of a future climate agreement. Such cases include the Biennial Reports (BR) and Biennial Update Reports (BUR); Reducing Emissions from Deforestation and Forest Degradation (REDD+), Nationally Appropriate Mitigation Actions (NAMA) and New Market Mechanism (NMM).

From an "accounting system" perspective, Parties involved in REDD+ were successful to reach agreement: in defining the scope of eligible activities; agreeing on the metrics of progress and success (comparison to a reference level); agreeing on reporting according to common guidelines (IPCC guidelines); agreeing on the need for consistency (over time and between reference levels and reporting of actual emissions and removals); agreeing to introduce flexibility to improve over time; agreeing on the need for verification/technical assessment of both monitoring results and the established reference level.

All these aspects are relevant and important when discussing LULUCF accounting rules in general and REDD+ is probably the most developed "accounting system" designed for, and starting to be implemented by, developing country Parties. In this regard, REDD+ is a model worth exploring further.

NAMAs aim at achieving a deviation in emissions relative to "business as usual" emissions in 2020. It was also decided that NAMAs would be reported in BURs and would be subject to an International Consultation and Analysis with the aim to increase transparency of mitigation actions and their effects. All these aspects are similar to the REDD+ architecture and are relevant for an "accounting system".

The list of all proposed NAMA has been growing over time, although, due to the variable level of detail provided, it is not easy to perform one-on-one comparisons between the individual proposals or even, in some cases, fully understand the activities that are being proposed. Nevertheless, and from the information available, it is already possible to conclude that the use the land sector as a mitigation tool is generating a lot of interest amongst non-Annex 1 Parties. In fact, 62% of all non-Annex 1 Parties that submitted information have identified at least one NAMA related to the land sector.

As the system is not yet created, it is not possible to draw any lessons from NMM's application. However, the discussion suggests that the decision will eventually share some common elements with other accounting systems under the UNFCCC, such as: the use of reference levels; the need for transparent and robust reporting requirements; the need for verification process.

From the commonalities and lessons learned of the existing and emerging accounting systems a system of accounting rules is proposed. A summary of all the proposals made is presented below:

1. Holistic Focus on AFOLU
2. Keep AFOLU fungible with other sectors
3. Create the right incentive structure to promote land management changes
   - 3.1. Use reference levels in AFOLU accounting
   - 3.2. Make slow carbon changes and short commitment periods compatible
   - 3.3. Exclude from accounting natural disturbances
4. Account based on UNFCCC reporting categories
5. Aim for full carbon accounting on all lands
   - 5.1. Accept different entry point for different Parties, but define minimum levels
   - 5.2. More land over time, but "once in always in"
   - 5.3. Emissions accounted for at the right moment in time
   - 5.4. Build a system that facilitates greater coverage over time
6. Maintain consistency and accept recalculations as a "good feature" of the accounting system
7. Improve capacity and share data
8. Recognise links to adaptation
9. Build trust, increase comparability, but keep some flexibility for national circumstances
   - 9.1. Simplify language
   - 9.2. Increase transparency and comparability, but don't over standardise
   - 9.3. Initiate talks as soon as possible

1 Introduction

According to the IPCC AR5, net land use change is responsible for about 4 billion tons of CO_2 emissions per year. Agriculture adds another 6 billion tons of CO_{2eq} emissions per year (IPCC AR4), bringing the total close to 1/3 of global anthropogenic emissions. Emissions from agriculture and cropland expansion have been rising and are likely to continue to remain high, as demand for food, fibres and biofuels continues to increase.

Forests and other land uses are also responsible for the uptake of massive amounts of carbon dioxide from the atmosphere, an estimated net contribution of -9.5 billion ton of CO_2 per year (IPCC AR5). Carbon stocks in land ecosystems (in vegetation, litter and soils) exceed the total carbon present in the atmosphere by more than 2.5 times, which is a strong reminder of the risk of permitting climate change or poor management options to disrupt these ecosystems and release this carbon into the atmosphere.

Therefore, the Land Sector needs to be an important component of the mitigation efforts that the world will have to embrace if we are to be successful in curbing and ultimately stopping the emissions that cause global warming. These emissions and removals take place all over the planet, in both developed and developing countries.

Agriculture and Forests are under pressure by the needs for an ever growing human population, including for the production of food, fibres and biofuels, but also for area to develop cities, industry and transportation. The need to sustain the provision of the environmental services that these systems are responsible for (water, biodiversity) will also be an important part of this equation.

Combining a need for managing emissions with a need to provide these goods and services will not be easy and managing emissions and removals in the land sector will require making changes in the way we manage our land and what we use it for, and making choices about the products and services we promote and incentivise and those that we try to avoid.

The UNFCCC should not attempt to micro-manage or determine any country's choices in these difficult matters but can and should provide a framework that allows and incentivises countries to commit to reducing emissions as much as possible and as quickly as possible, while making the best possible choices for a sustainable development and avoiding the pitfalls and mistakes that others have committed in their own recent history.

The Durban Platform for Enhanced Action (ADP) was decided in 2012 and aims to negotiate a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties. The negotiations under the ADP and the agreement following such negotiation need to be completed no later than 2015, for it to come into effect in 2020. The ADP also recognises that the effort of controlling emissions is a global one and that all of its Parties need to contribute to the extent they can. For many countries the land sector can be one of the main sectors to target mitigation efforts on, as some of the required emission reductions in the sector can be quite cost-effective and globally significant.

Accounting systems are not objectives *per se* nor does their existence guarantee the reduction of any emissions. But they are a crucial piece of the process. As efforts of different countries have to be compared and measured, the need for common metrics and accounting rules emerges naturally. This is fundamental to create the trust atmosphere that will be required for countries to commit to reduce their emissions at the scale that is required.

1.1 KP/LULUCF Accounting Rules

Looking back at the negotiations of the Marrakesh Accords under the Kyoto Protocol, one of the sectors where it was most difficult to reach agreement was, undoubtedly, the Land-Use, Land-Use Change and Forestry (LULUCF) sector. This situation resulted from two sets of "issues": (1) the late consideration of the sector in the negotiation process; (2) the natural complexities of the sector and its differences with other sectors.

These rules were eventually captured in Decision 16/CMP.1 for the first Commitment Period (2008-2012) and in Decisions 2/CMP.6 and 2/CMP.7 for the second Commitment Period (2013-2020). The result of these negotiations was a complex set of accounting rules, applicable only to Developed Country Parties with commitments under the Kyoto Protocol that a relatively small number of negotiators and implementing authorities understand.

1.2 The Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) Process

The Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) is a subsidiary body under the UNFCCC that was established by decision 1/CP.17 to negotiate a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties. The negotiations under the ADP and an agreement following such negotiation need to be completed no later than 2015, for it to come into effect in 2020.

The ADP is to develop its work under different premises than those that were in effect when its predecessor, the Kyoto Protocol, was adopted. While the Kyoto Protocol was fundamentally targeting action by Developed Countries (listed in Annex 1), the preamble of decision 1/CP.17 emphasizes the need for action by all Parties:

> ***"Recognizing that climate change represents an urgent and potentially irreversible threat to human societies and the planet and thus requires to be urgently addressed by all Parties, and acknowledging that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions"***

Therefore, in an "ADP World" all Parties (developed and developing) are expected to contribute to the emission reductions that are required to keep climate change under manageable levels, reflecting the different contributions to climate change and the different capacities to undertake emission reductions.

The ADP is also expected to take into account the results of the decisions that took place since Copenhagen, inter alia, the issues now have more prominence (in comparison to when the Kyoto Protocol was first negotiated). These "new issues" include adaptation, REDD+, technology transfer, capacity building and financing. In conclusion, everything points to a situation where the ADP negotiations will be, both technically and politically, more complex than the KP negotiations.

1.3 The Land Sector in an ADP World

The land sector is widely recognised as one sector where there is high potential for mitigation action, both in terms of sequestration of carbon dioxide and in terms of reducing emissions of carbon dioxide, methane and nitrous oxide. The sector may also be instrumental in energy substitution (biomass and liquid biofuels) and in substituting more energy intensive materials (through Harvested Wood Products). It is also a sector that is vulnerable to climate change and it is a sector under enormous pressure for meeting the demands of food,

fibre and energy to cater to a growing global population. Finally, it is now widely recognised that deforestation and forest degradation are globally a very important source of emissions that need to be reduced if we are to be successful in dealing with climate change.

The KP/LULUCF negotiations were very much a discussion on the opportunities for developed country parties to take advantage of carbon sequestration in forests and other land-uses and on the rules that would enhance or limit that contribution.

The ADP's Land Sector discussions will be more complex, as they will be looking at both emissions and sequestration and on the balance between the contributions to/pressures to mitigate climate change. It is unlikely that countries will commit to emission reductions from the sector without prior knowledge of how the sector's contribution to mitigation will be accounted for.

1.4 An Accounting Framework and the Land Sector

The development of an Accounting Framework is needed if we aim to compare efforts of different Parties taking into account their national circumstances and ultimately, judge the success of the aggregated efforts of all Parties in mitigating climate change. Decision 1/CP.7 refers to this as a "rules based regime under the Convention".

Given its importance to the carbon balance of the atmosphere, both in terms of sequestration, but also of emissions, an in-depth discussion on the accounting rules for the land sector is inescapable.

However, under the new climate agreement, the land sector will have to be interpreted in a much broader sense than LULUCF (currently used under the Kyoto Protocol) and could include a range of topics related to Convention reporting, agriculture emissions and "new" topics under the Convention such as REDD+, market mechanisms and, possibly, adaptation.

1.5 This report

This report aims to structure the discussion on the issues related to the development of an accounting framework for post-2020 under the ADP mandate.

It builds on the special features of the land sector (chapter 2), on the already existing reporting requirements under the UNFCCC (chapter 3), on the experience in LULUCF accounting under the Kyoto Protocol (chapter 4) and on emerging accounting systems under the convention related or applicable to the land sector (chapter 5), to propose some options and elements that could incorporate a future accounting regime, applicable to all Parties, recognising action by governments and other actors (chapter 6).

We hope this report will stimulate further discussions on this topic and facilitate an agreement on elements for an accounting framework, which will ultimately have to be negotiated by Parties in its rightful forum, the UNFCCC.

2 Features of the LULUCF Sector with Implications for Reporting and Accounting

The need for different LULUCF accounting rules is often justified invoking some features[1] that supposedly don't exist in other sectors or have a much smaller impact in other sectors. Many of the LULUCF accounting rules described in the sections below were designed to address these features. The most frequently mentioned are:

Emissions and Removals. While all the other sectors in the inventory describe only emissions of different GHG, LULUCF reporting includes also removals, i.e., this is only sector that is able to reduce GHG concentrations in the atmosphere (through photosynthesis).

Permanence. One of the concerns most echoed in LULUCF accounting discussions is the concern around permanence. The stock of carbon on terrestrial ecosystems is usually very-large compared to the reported net-removals of net-emissions of the sector. Emissions decrease the standing stock, while removals increase it. However, because removals are usually a slow process and emissions can be very high and fast in particular years/circumstances (deforestation, harvest years, extreme natural events) the concern over using removals for compliance becomes linked to the future of those "new" carbon stocks.

Natural effects. The emissions and removals in the sector are a response of living systems to human pressures, management activities and natural effects. The impact of fluctuations in temperature and precipitation patterns, droughts, floods, wind storms and fires on the net-balance of GHG can be significant and can even exceed the impacts of management practices on the same ecosystems.

Natural effects, in particular extreme events, have low predictability and variable frequency and magnitude. Another characteristic is that they are manageable only to a limited extent. In many situations "management" means only emergency reaction (e.g. evacuation of people and goods) and not management of the event *per se*[2].

It should be noted, however, that other sectors' emissions are also affected by natural causes, e.g., emissions of energy production in a hydro-dependent country may have significant inter-annual fluctuations depending on precipitation levels, particularly in years of severe drought, where the absence of hydro power needs to be compensated by increased production with other energy carriers, most commonly fossil fuels.

Legacy effects. Past-management decisions, notably policies affecting the age-class distribution of forests, such as afforestation and harvesting rates, and natural events have a deep effect on emissions and removals in subsequent years. This may also be the case for agriculture and grasslands, although the scale of this effect is likely to be much longer in forests. Accounting based on a comparison with a single base year may create large net-credits or net-debits for a Party simply because the base year net-emissions happened to be, respectively, much smaller or much bigger than those observed during the commitment period, something that can be best described as a "base year lottery". This contradicts the idea that accounting is supposed to reflect the impacts of human-induced actions. Moreover, legacy effects can mean that two countries with similar management practices may have very different accounting outcomes.

[1] The use of the word "feature" is intended to neutral, i.e., it is not to be understood as implying value judgements of "good" or "bad", but rather as differences or particular characteristics of this sector in relation to others.

[2] E.g. it is impossible to manage hurricanes or volcanoes. Other natural events, like fire or drought or flooding, are manageable only if limited in space and time. Extreme droughts, floods and wild fires are to a large extent (from an emissions and removals perspective) unmanageable.

Again, it should be noted that although this feature is true for the LULUCF sector, it is not exclusive to this sector. For example, energy emissions in most countries are influenced by the existing stock of capital invested in certain technologies and fuels (including the most pollutant ones) that reflect choices made over many years before governments made any policy changes justified by concerns about climate change. Policies to change technology, introduce renewable or to promote fuel switches will take time to have a visible impact, while these older technology and fuel choices are not decommissioned or reconverted to other less emitting fuels.

Another example, part of the AAU surplus in some Kyoto Protocol Parties can be justified and traced back to a base year economy structure that bears little resemblance to the commitment period economy. The "KP accounting performance" of these Parties would be very different if the base year was a much more recent one.

Uncertainty and recalculations. Estimating LULUCF emissions and removals is complex and requires combining different information sources to measure or estimate emissions and removals. Countries have been implementing the reporting requirements and have been improving over time, adding new or updating existing information, new pools or new gases. This has led to frequent recalculations of the time series in this sector which is often perceived as a signal of uncertainty and unreliability of Party's estimates. In fact, recalculations should be seen as a guarantee that the estimates are the best possible estimates at each point in time and that consistency in the time series is assured (more than its absolute value, consistency over time is the most important characteristic to draw conclusions on whether the sector emissions and removals are growing or decreasing).

Like with the previous features, they are not exclusive for the LULUCF sector, as other sectors are also very difficult to estimate, e.g., fugitive emissions, landfill, waste and waste water management emissions or indirect N_2O emissions from agriculture.

Relative size. LULUCF emissions and removals can be very significant in a Party's total annual GHG balance. This is particularly true for Parties with very large territories and/or Parties where the forest land is a very significant portion of their land. One annex 1 Party even reports a net-removal in their overall GHG Balance, i.e., the reported net-removals from the LULUCF more than offset the total reported emissions in other sectors from the country.

3 LULUCF Reporting under the UNFCCC

3.1 Reporting as pre-Requisite for Accounting

Reporting and accounting are often used as synonyms, but in reality the two concepts are different and should not to be confused.

Reporting refers to the process of accumulating, organising, storing, and accessing the information on activity data, emission factors and calculation formulae, which is needed for two purposes:

1. Describing the amount and trends in emissions and removals of a particular country, sector, gas, etc.
2. Assessing the quantities that are relevant for accounting

Accounting refers to the process of comparing the reported quantities with a pre-defined standard or emission target, a comparison which is made using a pre-defined set of accounting rules. E.g., in the KP, the accounting in the first commitment period for all sectors (except LULUCF) was made using an *accounting rule* which resulted in comparing the *reported emissions* during the years of the first commitment period (2008-2012) with the *reported emissions* in 1990 x the duration of the commitment period x a % reduction target. If the first quantity was smaller than or equal to the second one, the country was said to comply toward (with) its KP target.

Reporting is therefore an indispensable element of accounting and the basis for any accounting system under the UNFCCC, but does not replace the need for accounting.

Due to the specificity of the accounting rules for the land-use sector, the format of reporting for the purposes of reporting under the convention and the reporting for accounting under the KP is different and A1 Parties that are also parties to the KP had to develop two parallel reporting systems to comply with their obligations under both the UNFCCC and the KP.

The following sections address the diversity of reporting and accounting systems that exist under the UNFCCC and its Kyoto Protocol.

3.2 Reporting under the UNFCCC

3.2.1 Overview of Reporting Requirements

Reporting under the convention was established at the original text of the convention, and is most clear in the following articles:

> ***Article 4 §1. All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall: (a) Develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties;***
>
> ***Article 12 §1. In accordance with Article 4, paragraph 1, each Party shall communicate to the Conference of the Parties, through the secretariat, the following elements of information: (a) A national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties;***

All Parties to the Convention have agreed to submit to the Conference of the Parties (COP) national reports on implementation of the Convention to inform on the implementation of activities relating to mitigation. However, there are differences for developed and developing country Parties, and the contents, level of details and/or timetables for their submission are different. This was justified with the principle of "common but differentiated responsibilities", which is also mentioned in the Convention text.

Decision 1/CP.16 (Cancun Agreements) enhanced these provisions for reporting by requiring Parties to submit their national communications every four years. Additionally, developed countries should submit every two years their “Biennial Reports” and developing countries their “Biennial Update Reports”. Least Developed Country Parties (LDC) and Small Island Developing States (SIDS) have flexibility on when they should submit this information. Parties have also agreed to conduct an "International Assessment and Review" (IAR) to the information submitted by developed country Parties; and an “International Consultation and Analysis” (ICA) to the information submitted by developing country Parties.

Developed Countries are required to submit information on their “National Greenhouse Gas Inventory” on a yearly basis. They also submit “National Communications” periodically, according to dates set by the COP. The next National Communications are due by 1 January 2014 and, from then onwards, every four years. Developed countries that have ratified the Kyoto Protocol must also include supplementary information in their national communications and annual national GHG inventories to demonstrate compliance with their commitments under the Protocol. Similarly, developed country Parties shall submit their first biennial reports by 1 January 2014 and their second and subsequent biennial reports two years thereafter.

Developing Country Parties are also required to submit a “National Communication” which should include a “National Greenhouse Gas Inventory”. Up to COP 16, there were no fixed dates for the submission of national communications from these countries. The only requirement for these countries was to submit their national communications within four years of the initial disbursement of financial resources to assist them in preparing them. At COP16, it was decided that developing countries would submit their national communications every four years. It was also decided that developing countries should submit “Biennial Update Reports” containing updates of national greenhouse gas inventories, including a national inventory report and information on mitigation actions, needs and support received. At COP17, it was decided that developing countries should submit their first biennial update reports by December 2014, followed by subsequent ones every two years thereafter. The Least Developed Countries and the Small Island Developing States may submit biennial update reports at their discretion.

3.2.2 IPCC Reporting Guidance

The Intergovernmental Panel on Climate Change (IPCC) is the entity responsible for preparing guidance on how to compile an inventory for the purposes of UNFCCC reporting and KP reporting and accounting. This includes guidance on: reporting methods; emission factors; decision trees for selecting a specific method; allocation principles; and reporting tables.

The IPCC works on invitation from the UNFCCC and its guidance becomes mandatory following a formal adoption by the UNFCCC. The guidelines provide guidance on ensuring quality on all steps of the inventory compilation – from data collection to reporting. They also provide tools to focus resources on the areas where they will most benefit the overall inventory and encourage continuous improvement.

The 2006 Guidelines describe the “quality” of an inventory according to 5 criteria (often referred to as the TCCCA Principles):

1. Transparent: i.e., there is sufficient and clear documentation such that other stakeholders can understand how the inventory was compiled and have confidence that it meets the good practice requirements for national greenhouse gas emissions inventories.
2. Complete: i.e. estimates are reported for all relevant categories of sources and sinks, gases, and relevant geographic areas. Where elements are missing, their absence is clearly documented together with a justification for exclusion.
3. Consistent: i.e. estimates for different inventory years, gases and categories are made in such a way that differences in the results between years and categories reflect real differences in emissions and removals. Inventory trends reflect the real fluctuations in emissions or removals and are not the result of methodological changes.
4. Comparable: i.e. the national greenhouse gas inventory is reported in a way that allows it to be compared with national greenhouse gas inventories from other countries. This comparability is reflected in the choice of key categories, the use of the reporting guidance and tables and the use of the classification and definition of categories of emissions and removals.
5. Accurate: i.e., the national greenhouse gas inventory contains neither over- nor under-estimates so far as can be judged. This means that all endeavours to remove bias from the estimates have been made.

Annex 1 describes other key concepts related to reporting of LULUCF.

3.2.3 National Greenhouse Gas Inventories

The basis for reporting on the implementation of all commitments under the UNFCCC for all Parties is the National Communications.

National Greenhouse Gas Inventories are the basis for reporting emissions and removals under the Convention. They contain the National Inventory Report and the Common Reporting Format Tables (CRF Tables). These tables were developed and agreed to by Parties for reporting emissions and removals according to a pre-defined format addressing all sectors and greenhouse gases covered by the Convention. They were originally developed for Convention reporting and were further extended to include additional tables for the purposes of KP reporting, the former applying to all Annex 1 Parties and the later applying only to KP Annex 1 Parties. Non-Annex 1 Parties are encouraged to use them to the extent of their capacities.

The CRF Tables are composed of a series of tables, each representing a sector and the emissions and removals of those greenhouse gases that are relevant to that sector.

These tables have been preceded by work from the Inter-governmental Panel on Climate Change (IPCC), which produced guidance documents to further harmonize the way Parties report their emissions and removals. These guidance documents are benchmarks of the scientific information on the topic and are instrumental in providing support to Parties in estimating their emissions and removals, when such capacity is limited.

The guidance documents are periodically updated if requested by the Conference of the Parties or the COP/MOP, to reflect improvements in scientific knowledge and new decisions made by the COP or the COP/MOP. The most recent version of these guidance documents is the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*[3].

[3] http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html this guidance only includes information for the elaboration of information to be reported under the Convention, supplementary good practice guidance for LULUCF under the Kyoto Protocol is being developed by the IPCC responding to the request made by the COP/MOP in December 2011 and should become available end 2013.

3.2.4 Land Related Emissions and Removals in National GHG Inventories

Land management, land-use change, agriculture and forestry involve a large number of practices that have consequences on emissions and removals of greenhouse gases, in particular of carbon dioxide, methane and nitrous oxide. These emissions and removals are covered by national GHG Inventories, although the allocation of specific emissions and removals is done for different sectors in the reporting. The full impact of agriculture, grasslands, forestry and other land-use activities can only be assessed by summing up emissions and removals from different sectors and/or subcategories within sectors.

Under the 2003 IPCC Guidelines, the emissions from the mechanisation of many of the agriculture and forest management activities and those resulting from biomass and biofuels consumption are reported in the CRF Tables Sector 1 – Energy. The emissions of non-CO_2 gases associated with agriculture are reported in Sector 4 – Agriculture, while the emissions and removals associated with land-use and land-use change and forestry are reported in Sector 5 – LULUCF. The main content of the reporting tables is summarised in Table 1 and Table 2. The 2006 IPCC Guidelines have later merged the sectors "agriculture" and "LULUCF" into a single sector 4 – AFOLU, the acronym for Agriculture, Forests and Other Land Use. However, the grouping of emissions and removals for specific categories and subcategories within the sector remains fundamentally unchanged.

Table 1: Summary of Reported LULUCF Related Emissions and Removals in the CRF Tables

Sector 1 (ENERGY)		GHG	UNFCCC	KP 1st CP	KP 2nd CP
Reported Categories					
Fuel combustion → Other sectors → Agriculture/forestry/fisheries	Liquid fuels; Solid fuels Gaseous fuels; Biomass	CO_2 N_2O CH_4	X	X	X
Fuel combustion → All sectors	Liquid fuels (biofuels) Biomass	[CO_2] N_2O CH_4	X	X	X
Sector 4 (AGRICULTURE)		**GHG**	**UNFCCC**	**KP 1st CP**	**KP 2nd CP**
Reported Categories					
Enteric fermentation	[per animal species]	CH_4	X	X	X
Manure management	[per animal species]	CH_4 N_2O			
	[per management type]	N_2O			
Rice cultivation	[per management type]	CH_4			
Agricultural soils	Synthetic fertilisers; Manure application; N-fixing crops; Crop residues; Cultivation of histosoils; Pasture, range and paddock manure; Indirect emissions	CH_4 N_2O			
Prescribed burning of savannahs		CH_4 N_2O			
Field burning of agricultural residues	[per crop species]	CH_4 N_2O			

Table 2: Summary of Reported LULUCF Emissions and Removals in the CRF Tables

Sector 5 (LULUCF)	GHG Pool	GHG	UNFCCC	KP 1st CP	KP 2nd CP
Reported Categories/Activities					
UNFCCC Forest Land; Cropland; Grassland; Wetlands; Settlements; Other land **KP** Afforestation and Reforestation; Deforestation; Forest Management; Cropland Management; Grazing land Management; Revegetation; Wetland Drainage and Rewetting	Living Biomass	CO_2	X	-	-
	Above-ground Biomass		-	X *[only for mandatory and elected activities]*	X *[only for mandatory and elected activities]*
	Below-ground Biomass				
	Dead Organic Mater		X		
	Mineral Soils				
	Organic Soils				
	Harvested Wood Products		*[optional reporting]*	-	
Other Reported Emissions					
Forest land; Other	Nitrogen Fertilization	N_2O	X	X *[only for mandatory and elected activities]*	X *[only for mandatory and elected activities]*
Forest land; Wetlands; Other land	Drainage of Soils and Wetlands	N_2O CH_4			
Cropland	Land conversion to Cropland	N_2O			
Cropland; Grassland	Lime application	CO_2			
Forest Land; Cropland; Grassland; Wetlands; Settlements; Other land	Controlled Burning	CO_2 N_2O CH_4			
	Wildfires	CO_2 N_2O CH_4			

Note that although there is a clear boundary between sectors, the allocation of different emissions to specific reporting sectors or categories sometimes makes the assessment of the full impact of land-management practices difficult. E.g. fertilization is reported in sector 4 if the fertiliser is used in agriculture land, but the same activity is reported in sector 5 if applied in forest land; the non-CO2 emissions resulting from N-fixing crops and manure application in agriculture are reported in sector 4, but the increase in C stocks that result from that same activity is reported in sector 5; prescribed burning of savannahs is reported in chapter 4, while prescribed burning in all other land uses is reported in chapter 5.

Despite the situations described above, it should be stressed that, if implemented correctly, there is no double-counting or missing emissions in the full National Inventory Report and totals for a country.

4 LULUCF Reporting and Accounting under the Kyoto Protocol

4.1 Understanding LULUCF Accounting under the KP

4.1.1 LULUCF in the Context of Emissions Accounting under the KP

Land management emissions are distributed in the National Inventory Reports in sectors 1 (that includes i.e. fuel consumption in agriculture and forestry activities), 4 (agriculture specific emissions) and 5 (land use, land use change and forestry emissions and removals), as summarised in Table 1 and Table 2.

Sectors 1 and 4 were included in the calculations of each Party's assigned amount and the emissions from these sectors during the commitment period are simply added-up to the Party total and are then compared to the respective assigned amount, i.e. there is no use of any special accounting rule.

Sector 5 (LULUCF) was treated differently for reasons that are best understood bearing in mind the way LULUCF was considered in the KP overall negotiations and the specific characteristics of the sector. These aspects are briefly described over the next two sections.

4.1.2 Brief Historic Perspective on LULUCF in the KP Negotiations

Under the Kyoto Protocol, Parties account for specific activities in their land sector rather than the all land-use categories in their territories.

When the KP targets were first negotiated the only agreed inclusion of LULUCF activities, as set out in KP Article 3.3, was for afforestation, reforestation and deforestation (ARD) since 1990. Article 3.4 had been modified during the KP negotiations so that other LULUCF activities could be included on a voluntary basis, but it had not been agreed what these should be nor how should they be accounted for.

It had been possible to agree on Art 3.3 in Kyoto because, unlike some other areas of LULUCF, the effect on overall emissions and removals was reasonably well known, because these activities are not subject to the difficulties with the arbitrary effect of forest age distribution on agreed commitments under conventional accounting, and because ARD since 1990 were not seen as carrying a risk of the residual terrestrial uptake (the 'missing sink'[4]) entering the accounting system, because they are by definition human-induced.

Agreement on the additional, voluntary, activities mentioned in Art 3.4 took until COP6bis in 2001 when it was established that these would be forest management, crop land management, grazing land management and revegetation. The latter three would be accounted relative to emissions/removals in 1990 and were uncapped, similar to other inventory categories. Forest management was accounted on a gross-net basis (i.e. not relative to 1990), but subject to a restrictive cap to prevent the allowance being too large and to factorout "non-anthropogenic" emissions and removals. The effects of forest age distribution make it impossible for all countries to agree to treat forest management like other sectors relative to 1990, and this continues to be the case.

The forest management rules for the first commitment period meant that countries electing this activity could in general gain credits with little or no additional action, adding to the impression that LULUCF is a bonus when it comes to accounting for emission reduction efforts.

[4] For a description of the "missing sink" problem see e.g. http://ngm.nationalgeographic.com/ngm/0402/feature5/online_extra.html

The discussion of the set of rules for the second commitment period was much more informed by the experience of the first commitment period, in terms of process, reporting experience and in knowledge about the sector and Parties entered into it with the determination that the LULUCF rules should be agreed before QELROs were agreed, so that allowance could be made for the trends and accounting rules. The negotiation was successful in doing that, as KP targets were decided (CMP 8) only after there was certainty on LULUCF accounting rules under the KP (CMP 7). It could be argued that this success was partial, in that most targets were actually put on the table before the rules were completely stabilised and agreed. In reality the emergence of the commitments and agreement of the LULUCF rules came in parallel. Moreover there is a trigger under KP2 requesting Parties to revisit commitments by 2014 and the early agreement on LULUCF rules will facilitate this process.

In terms of contents, there is no doubt that the negotiations for LULUCF under KP2 were much more informed and were centred around the experience of Parties applying the LULUCF reporting and accounting rules during the first commitment period and on the accumulated data (including Kyoto and Convention National Greenhouse Gas Inventory Reports and projections for LULUCF) that became available over the years.

4.1.3 KP LULUCF Accounting Principles

Decision 16/CMP.1 established a number of principles that guided the elaboration of all LULUCF accounting rules. Decision 2/CMP.7 confirmed these principles for application also in the context of the second Commitment Period.

Sound Science. The treatment of these activities should be based on sound science. The IPCC Guidelines are the main reference used to accommodate this principle.

Time series consistency. Methodologies for the estimation and reporting of these activities should be consistent over time. This is particularly important when accounting against a reference (e.g. a base year or a forest management reference level).

LULUCF accounting and overall target. The aim stated in Article 3, paragraph 1, of the Kyoto Protocol should not be changed by accounting for LULUCF activities.

Presence of carbon stocks. The mere presence of carbon stocks should be excluded from accounting. The relevant reported accounting quantities are flows to (emissions) and from (removals) the atmosphere. Carbon stocks are usually much bigger than the reported flows and the accounted quantity.

Biodiversity and sustainable use. The implementation of LULUCF activities should contribute to the conservation of biodiversity and sustainable use of natural resources.

Transfer of commitments. Accounting for LULUCF should not imply a transfer of commitments to a future commitment period.

Account for reversals. The reversal of any removal due to LULUCF activities should be accounted for at the appropriate point in time.

Factoring out. Accounting should exclude removals resulting from: (i) elevated carbon dioxide concentrations above their pre-industrial level; (ii) indirect nitrogen deposition; and (iii) the dynamic effects of age structure resulting from activities and practices before the reference year;

4.1.4 Activity Approach

While the Convention takes a land-use approach to estimating and reporting emissions and removals from the land sector (covering all managed lands), the Kyoto Protocol was designed around a different concept – the concept of "activities".

The KP and decisions 16/CMP.1 and 2/CMP.7 define mandatory activities (that all KP A1 Parties need to account for) and voluntary activities (that each Party may decide – or not – to elect for compliance) and establish a list of possible activities for election. It should be noted, however, that upon election of a voluntary activity, a Party is expected to continue to report emissions and removals on those lands for subsequent commitment periods, making such activity in effect mandatory, although only for that particular Party. The list and status of all mandatory and voluntary activities in use in each of the Commitment Periods is summarised in Table 3.

Table 3: Mandatory and Voluntary KP LULUCF Activities in the 1st and 2nd Commitment Periods

KP LULUCF Activities	KP	1st Commitment Period Status	2nd Commitment Period Status
Afforestation	Art. 3.3	Mandatory	Mandatory
Reforestation	Art. 3.3		
Deforestation	Art. 3.3		
Forest Management	Art. 3.4	Voluntary	Voluntary (Mandatory if elected in CP1)
Cropland Management	Art. 3.4		
Grazing land Management	Art. 3.4		
Revegetation	Art. 3.4		
Wetland Drainage & Rewetting	Art. 3.4	*[non-existent]*	

One of the notions behind the concept of activity is the intention to capture only the human-induced emissions and removals resulting from activities that have taken place from 1990 onwards, i.e., Parties should account for emissions and removals that result from specific activities carried out in their land sector, for which they are directly responsible for, and which would have not occurred in the absence of such activities. This is approximated via different accounting rules, which vary with activity.

The emissions and removals in other land-uses or activities cannot be used for compliance under the KP, although they may still be reported for UNFCCC purposes.

Table 4: Overview of KP LULUCF Accounted Activities by Parties in the 1st Commitment Period

KP Party	Afforestation Reforestation	Deforestation	Forest Management	Cropland Management	Grazing land Management	Revegetation
Australia	X	X				
Austria	X	X				
Belgium	X	X				
Bulgaria	X	X				
Canada	X	X		X		
Croatia	X	X	X			
Czech Rep.	X	X	X			
Denmark	X	X	X	X	X	
Estonia	X	X				
EU (15)	X	X	X	X	X	
Finland	X	X	X			
France	X	X	X			
Germany	X	X	X			
Greece	X	X	X			
Hungary	X	X	X			
Iceland	X	X				X
Ireland	X	X				
Italy	X	X	X			
Japan	X	X	X			X
Latvia	X	X	X			
Liechtenstein	X	X				
Lithuania	X	X	X			
Luxembourg	X	X				
Monaco	X	X				
Netherlands	X	X				
New Zealand	X	X				
Norway	X	X	X			
Poland	X	X	X			
Portugal	X	X	X	X	X	
Romania	X	X	X			X
Russian Fed.	X	X	X			
Slovakia	X	X				
Slovenia	X	X	X			
Spain	X	X	X	X		
Sweden	X	X	X			
Switzerland	X	X	X			
Ukraine	X	X	X			
UK	X	X	X			
No. of Parties	**38**	**38**	**24**	**5**	**3**	**3**

4.1.5 Kyoto Protocol LULUCF Reporting

One of the consequences of the activity based approach and the set of accounting rules described below is that the reporting made under the Convention does not match the reporting of all emissions and removals that are allowed to enter (or be excluded) the accounting under the Kyoto Protocol. This is because the Kyoto LULUCF activities are defined in somewhat different ways than the LULUCF categories used in Convention

GHG inventory reporting. However, the emissions and removals associated with Kyoto activities are (or should be) a sub-set of the emissions and removals included in Convention reporting.

This "feature" of the LULUCF rules meant that additional reporting requirements had to be developed and these were integrated as part of the "Supplementary Information under the Kyoto Protocol" (which includes LULUCF, but also other aspects relevant for KP accounting, such as reporting on compliance and market units owned and traded by Parties).

To respond to these new reporting requirements, all KP Annex 1 Parties had to develop and implement a specific KP LULUCF reporting system, i.e., a system parallel to the one used for Convention reporting. In addition, while filling-in these reporting tables Parties were also expected to provide the definitions of forest and the activities they elected and to use only higher tiers of reporting. These higher reporting requirements were justified by the use of this information for compliance purposes.

4.2 KP LULUCF Accounting Rules (Dictionary of KP LULUCF Jargon)

Under the Kyoto Protocol, no single accounting rule applies to all LULUCF activities. Instead, there are three basic accounting rules, than are then complemented by a second set of rules, which regulate accounting in specific situations and activities.

The sections below present a brief summary of each of those rules, although (full detail) reference should be made to Decisions 16/CMP.1 and 2/CMP.7 and to the extensive IPCC guidance on the topic. The names used for each of the rules are not necessarily reflected as such in Decisions 16/CMP.1 and 2/CMP.7, but rather reflect the jargon that is currently used in UNFCCC and KP international negotiations.

4.2.1 Basic LULUCF Accounting Rules

Gross-net 1990. All emissions and removals during the Commitment Period that occur on lands subject to the activity since 1990 are accounted, though some of this is not due to direct human activities.

This accounting rule is probably the simplest of all rules applied in the KP and reflects "what the atmosphere sees" during the commitment period on those lands (without further comparing emissions with a base year or reference level)[5].

Net-net Base Year. Only the difference between the emissions and removals that occur on lands subject to the activity in each year of the commitment period and the emissions and removals that occurred on lands subject to the activity during the base year (1990 for most Parties) are accounted for.

This accounting rule tries to capture the emissions and removals that are "additional" to those observed in the base year.

Reference Level. Only the difference between the emissions and removals that occur on lands subject to the activity in each year of the commitment period and an agreed reference level are accounted for.

This accounting rule tries to capture the emissions and removals that are "additional" to those considered in their reference level.

[5] Or, equivalently, it can be argued that for gross-net the base year emissions of the sector are not considered for accounting or that the reference level is zero.

Parties were allowed some diversity in the way they described and calculated their reference levels, with most Parties describing it as their "business as usual forest management emissions and removals", while others having defined their reference levels on the basis of "observed historic emissions and removals" (in particular years or periods).

4.2.2 Complementary LULUCF Accounting Rules

Once in, always in. This rule has two consequences: (1) once a voluntary activity is elected for a commitment period, it should remain elected in subsequent commitment periods; (2) once a unit of land enters LULUCF accounting, it should remain being accounted during that commitment period and subsequently, even if a land-use change occurs on that piece of land.

Factoring-out. In order to report only "human-induced emissions and removals", Parties are expected to not include in the accounted quantities the effects of: (i) elevated carbon dioxide concentrations above their pre-industrial level; (ii) indirect nitrogen deposition; and (iii) the dynamic effects of age structure resulting from activities and practices before the reference year.

This principle, while generally accepted by all Parties, was never directly translated into an accounting rule due to a report from IPCC that states the difficulty in developing credible methodologies for separating these effects from the remaining (observed) emissions and removals. However, some of the complementary accounting rules tried to address factoring out in indirect ways (e.g. cap; natural disturbances).

Cap (negotiated). The cap was a simple form of limiting the amount of credits and debits that a Party could generate from its existing forests (forest management). The need for a limitation was justified by a concern about the amount of possible credits entering the system and as a (crude) approximation of factoring-out.

In its first version, this limit was decided as part of the negotiations and was set in an annex, one value for each Party. This value was originally constructed based on a 3% cap of forest management (based on data by Parties and the FAO), but was later changed during the course of the negotiations for some countries. This version of the cap applied symmetrically, i.e., it would prevent Parties from gaining credits above the cap value, but would also limit the liability of Parties only to debits up to the cap value.

This rule was applied during the first and second commitment periods, but the cap value was revised for the second.

Cap (calculated). The set of rules for the second commitment period kept the notion of capping the contribution of forest management, but the cap is now expressed in the same manner for all Parties as 3.5% of base year emissions without LULUCF, rather than capping based on the total emissions and removals from forest management.

This "new" cap only limits the generation of credits by Parties, and is no longer applicable (unlike the previous version) if forest management is reporting a net-debit.

Natural Disturbances. This rule allows a Party to exclude from its accounting of "Afforestation and Reforestation" and/or "Forest Management" part of the emissions and removals occurring on lands affected by natural disturbances (fire, wind storms, pests, etc.) when those emissions are above a background level plus a margin, if needed. The "background level" is meant to represent an expected annual level of natural disturbances, while the margin would determine when the emissions are high enough in relation to that level to justify its use. This rule is voluntary, i.e., only Parties that wish to apply it need to calculate, provide information and review background levels and margins and its use is dependent upon compliance with an extensive list of other reporting requirements.

This rule was justified as an approximation to "factoring-out" of emissions and removals that are non-anthropogenic or whose severity is affected by natural factors, and aims to exclude, for accounting purposes, emissions that under certain conditions are unmanageable by Parties. This also helps Parties to limit compliance risk associated with emissions that can be very high in particular years and that are, by nature, unpredictable.

This rule did not exist for the first commitment period.

Harvested Wood Products. This rule allows a Party to include the carbon contained in products as a new carbon pool (to be added to living biomass, soil C, etc.) and to report emissions only when the products are no longer in use and decay or enter a solid waste disposal site. It intends to better reflect the timing of emissions associated with harvesting and to recognise the Carbon content embedded into products derived from wood harvesting. Previously, harvesting was considered an "instant emission", i.e., it was reported as if all carbon contained in wood was emitted immediately after harvesting took place. It also provides an incentive for the allocation of wood to long lasting products, rather than using it for energy or short lived products.

This rule did not exist for the first commitment period.

Carbon Equivalent Forest Conversion (or Flexible Land Use). This rule allows to continue to account as "Forest Management" lands that are subject to deforestation, but only if a new forest is established on lands eligible for afforestation that will deliver (in due time) an equivalent carbon stock. Under this rule, afforested lands will be accounted for as "forest management". This rule is voluntary and Parties that wish to apply it need to comply with an extensive list of other reporting requirements.

This rule was justified as describing an activity similar to normal reforestation (replanting of a plantation following harvesting – reported as forest management), the only difference being the location where the "reforestation" takes place. Without this rule, the land subject to deforestation and the new forest would be reported as "Deforestation" and "Afforestation and Reforestation", respectively.

This rule did not exist for the first commitment period.

Conversion to Plantations. This rule requires Parties to report and account the emissions and removals arising from the conversions of natural forests to planted forest.

This rule did not exist for the first commitment period.

No Net-debits. This rule determines that Parties should account for zero emissions and removals on those lands subject to afforestation and reforestation activities, if the emissions from harvesting during the commitment period are bigger than the removals accounted in those lands.

This rule was justified as to not introduce a perverse incentive limiting afforestation, by making Parties liable for full emissions associated with harvesting afforested/reforested areas although they had not received credit for the full growth (because credits only accrue during the commitment period). It should be noted that over long periods of time and sustainable management practices emissions and removals tend to compensate each other. However, over short commitment periods that is not usually the case.

This rule was applied during the first commitment period, but was revoked for the second.

Not a source. This rule allows countries to exclude pools from the accounting of any of the mandatory or selected activities, provided that it can be demonstrated that the pool is not a source of emissions, i.e., it is either in balance (emissions equal removals) or is more likely to be sequestering carbon dioxide than emitting it. By applying this rule, Parties could simplify reporting, without running the risk of issuing undeserved credits

(or "hiding" unreported emissions), i.e., omitting this pool(s) would result in a conservative estimation of the net-removals of a country.

Credit-debit Compensation. This rule applies only when article 3.3 (afforestation, reforestation and deforestation) reports net-emissions. If, in the same commitment period, forest management reports net-removals, this rule allows for one activity to "compensate" the other, i.e., doing the offset of the net-emissions from afforestation, reforestation and deforestation with the removals from forest management up to a level of nine megatons of carbon times the duration of the commitment period (this compensation is not limited by the forest management cap).

This rule was applied during the first commitment period, but was revoked for the second.

Table 5: Overview of LULUCF Accounting Rules

LULUCF Accounting Rule	Accounted Emissions & Removals[6]	Applicability / Conditions
Basic LULUCF Accounting Rules		
Gross-net	$E\&R_{CP}$	• Afforestation, Reforestation and Deforestation • Forest Management (1st CP)
Net-net Base Year	$E\&R_{CP} - (E\&R_{BY} \times D_{CP})$	• Cropland Management • Grazing land Management • Revegetation • Wetland drainage and rewetting
Reference Level	$E\&R_{CP} - (RL \times D_{CP})$	• Forest Management (2nd CP)
Complementary LULUCF Accounting Rules		
Once in, always in	Account for E&R from all activities in areas that have been included in the accounting	• All areas that have been , at some point in time during any CP under a mandatory or elected activity ○ Afforestation, Reforestation and Deforestation ○ Forest Management (2nd CP) ○ Lands under elected activities in any of the CP, even where land-use changed to a non-reported activity
Factoring out	*[not in use]*	• *IPCC was not able to develop a methodology for factoring out*
No Net-debits	0	• Afforestation and Reforestation • Only on lands that are harvested where $E_{CP(AR)} > R_{CP(AR)}$ and don't change their use
Cap (negotiated)	Value on Annex to decision 16/CMP.1	• Forest Management (1st CP) • Only if $E\&R_{CP(FM)}$ over the FMRL are bigger than the cap
Cap (calculated)	$3.5\% \times TE_{BY(excl.LULUCF)}$	• Forest Management (2nd CP)

[6] Notations used in this table: $E\&R_{CP}$ Emissions and Removals in the Commitment Period; $E\&R_{BY}$ Emissions and Removals in Base Year; D_{CP} Duration of the Commitment Period; RL Reference Level; $TE_{BY(excl.LULUCF)}$ Total Emissions in the Base Year excluding LULUCF; $E\&R_{CP(FM)}$ Emissions and Removals in the Commitment Period from Forest Management; $E\&R_{CP(ARD)}$ Emissions and Removals in the Commitment Period from Afforestation, Reforestation and Deforestation; $E\&R_{NDCP(AR)}$ Emissions and Removals from Natural Disturbances in the Commitment Period from Afforestation and Reforestation; BL_{AR} Background Level for Afforestation and Reforestation; M_{AR} Margin for Afforestation and Reforestation; $E\&R_{NDCP(FM)}$ Emissions and Removals from Natural Disturbances in the Commitment Period from Forest Management; BL_{FM} Background Level for Forest Management; M_{FM} Margin for Forest Management; $E\&R_{CP(NF \rightarrow FP)}$ Emissions and Removals from the conversion of natural forests to plantations

LULUCF Accounting Rule	Accounted Emissions & Removals[6]	Applicability / Conditions
		• Only if $E\&R_{CP(FM)}$ are bigger than the cap
Not a Source	0 (for specific pools)	• Applicable to all activities • Only for pools where it can be demonstrated that the pool is not a source
Credit-debit Compensation	Deduction of the $E\&R_{CP(FM)}$ with $E\&R_{CP(ARD)}$ or $9MtC \times D_{CP}$ (whichever is smaller)	• Only if Afforestation, Reforestation and Deforestation (combined) reports a net-emission • Only if Forest Management reports net-removals
Natural Disturbances	Deduction of the $E\&R_{CP(AR)}$ with $E\&R_{NDCP(AR)} - BL_{AR}$	• Only if the Party expressed its intention to apply the provision in its initial report • Only if extensive list of information is provided • Only if $E_{ND(AR)} > BL_{AR} + 2 \times M_{AR}$
	Deduction of the $E\&R_{CP(FM)}$ with $E\&R_{NDCP(FM)} - BL_{FM}$	• Only if the Party expressed its intention to apply the provision in its initial report • Only if extensive list of information is provided • Only if $E_{ND(FM)} > BL_{FM} + 2 \times M_{FM}$
Harvested Wood Products	Inclusion of new pool	• Afforestation, Reforestation (2^{nd} CP) • Forest Management (2^{nd} CP)
Conversion to Plantations	$E\&R_{CP(NF \rightarrow FP)}$	• Part of FM reporting; E&R from conversion natural forests→plantations
Flexible Land-use	Account as FM	• Only if extensive list of information is provided • Applicable only to forest plantations (subset of forest management) • Only if Deforestation takes place on land planted since 1960 • Only if an "equivalent area" of forest is planted in land that was not forest in 1990

Table 6: Correspondence between LULUCF Accounting Rules and KP Activities

KP LULUCF Activities	1st Commitment Period		2nd Commitment Period	
	Basic Accounting Rule	Complementary Rules	Basic Accounting Rule	Complementary Rules
Afforestation	• Gross-net 1990	• No Net-debits • Credit-debit Compensation • Once in, always in • Not a source	• Gross-net 1990	• Natural Disturbances • Flexible Land-use • Once in, always in • Not a source • HWP
Reforestation				
Deforestation		• Credit-debit Compensation • Once in, always in • Not a source		• Natural Disturbances • Flexible Land-use • Once in, always in • Not a source
Forest Management		• Cap (negotiated) • Credit-debit Compensation • Once in, always in • Not a source	• Reference Level	• Cap (calculated) • Natural Disturbances • Flexible Land-use • Conversion to Plantations • Once in, always in • Not a source

KP LULUCF Activities	1st Commitment Period		2nd Commitment Period	
	Basic Accounting Rule	Complementary Rules	Basic Accounting Rule	Complementary Rules
				• HWP
Cropland Management	• Net-net Base Year	• Once in, always in • Not a source	• Net-net Base Year	• Once in, always in • Not a source
Grassland Management				
Revegetation				
Wetland Drainage & Rewetting	*[non-existent]*	*[non-existent]*		

4.2.3 Flexibility and National Circumstances in KP LULUCF Accounting

Despite the abundance and complexity of the accounting rules described in the previous section, the Kyoto Protocol Accounting Rules for LULUCF retained certain features that allowed Parties some flexibility in the way each individual Party approached LULUCF Accounting.

Election of 3.4 Activities

Although 3.3 activities (afforestation, reforestation and deforestation) are mandatory for all KP A1 Parties, 3.4 activities are voluntary. This allows each Party to select any, some or none of the available activities. However, the "once in always in" rule establishes that land should remain under accounting, once it has been accounted for the first time.

The scope on voluntary activities in the 1st commitment period included forest management, cropland management, grassland management and revegetation. In the second commitment period a new activity was added to the list (wetland drainage and rewetting), while forest management became a mandatory activity for all KP A1 Parties.

Establishment of an Hierarchy of Activities

To apply the accounting rules presented above, Parties are required to distinguish between afforestation and reforestation, deforestation, forest management, cropland management, grazing land management and revegetation activities under Articles 3.3 and 3.4, as well as to remove potential overlaps and gaps between them.

Assigning lands to a single activity at any given point in time (i.e., for each year of the commitment period) becomes therefore a pre-requisite. This is required because of the possible land-use changes which can lead to double counting of units of lands / lands subject to Articles 3.3 and/or 3.4.

Forest Definition

Decision 16/CMP.1 requires all Annex 1 Parties to specify their own definition of forest, but provides minimum standards that all Parties should observe: a minimum area of 0.05-1ha; a minimum tree height of 2-5m at maturity; a minimum tree crown cover of 10-30%. It also specifies that areas that are temporarily unstocked (due to pests, diseases, storms, fire or harvest) but are expected to recover forest cover should

also be classified as forest. Likewise, young plantations that have not yet have reached the required thresholds should also be classified as forests. Finally, decision 16/CMP.1 requires that the reported forest values are consistent with what has been reported historically to the FAO and other international organisations, or that an explanation is provided on why and how the forest definitions are different. Annex 4 illustrates how this definition can produce some slightly different results depending on the thresholds chosen by each country.

Note that even countries with a great diversity of forest ecosystems need to report based on a single set of parameters applicable to all forest types within the country. This provides a high degree of standardization amongst countries, but still allows for some room to adjust for national definitions and circumstances.

Decision 5/CMP.1 requires non-Annex 1 Parties involved in Afforestation and Reforestation CDM projects to define forests in a similar way. Decision 2/CMP.7 requires Parties to use in the second commitment period the same definition that was used in the first.

Definition of Managed Land

Both the convention reporting and KP accounting require Parties to report and account only on emissions and removals that take place on managed lands. The IPCC guidance provides only a general definition of managed, the fundamental requirement being that Parties are transparent on how they make such a distinction. The 2006 GPG IPCC state that:

> ***"Countries should describe the methods and definitions used to determine areas of managed and unmanaged lands. Managed land is land where human interventions and practices have been applied to perform production, ecological or social functions. All land definitions and classifications should be specified at the national level, described in a transparent manner, and be applied consistently over time. Emissions/removals of greenhouse gases do not need to be reported for unmanaged land. However, it is good practice for countries to quantify, and track over time, the area of unmanaged land so that consistency in area accounting is maintained as land-use change occurs"***

Definition of 3.4 Activities

The definitions of activities are also broad enough to provide room for multiple interpretations by individual Parties. Decisions 16/CMP.1 and 2/CMP.7 generally describe these activities as "systems of practices" within the broad reporting categories of forest land, cropland, etc., in relation to which the 2006 GPG IPCC states that:

> ***"Countries will use their own definitions of these categories, which may or may not refer to internationally accepted definitions, such as those by FAO, Ramsar, etc. Only broad and non-prescriptive definitions are provided for the land-use categories and of managed and unmanaged lands. Countries should describe and apply definitions consistently for the national land area over time"***

4.3 LULUCF in the KP Market Mechanisms

4.3.1 Clean Development Mechanism

The Clean Development Mechanism, is a flexible mechanism established by Article 12 of the Kyoto Protocol (and further elaborated in the guidelines defined in Decision 4/CMP.1) which allows an annex 1 Party to partly meet its emission reduction target by investing in emission reductions in a project implemented in a developing country Party, while contributing to the host Party's sustainable development objectives.

Eligibility of LULUCF in CDM Projects

According to Decisions 16/CMP.1 (1st Commitment Period) and 2/CMP.7 (2nd CP) the only LULUCF activities eligible under the clean development mechanism are projects of afforestation and reforestation (AR CDM).

Decision 2/CMP.7 further required the SBSTA to analyse possible new activities for use during the second commitment period. That process is still ongoing and there will be no new eligible LULUCF activities until a new COP/MOP decision so determines.

While CDM modalities and procedures were adopted in 2001 (Decision 3/CMP.1), the AR CDM modalities and procedures were agreed two years later in 2003 (Decision 5/CMP.1). The "simplified modalities and procedures for small-scale afforestation and reforestation project activities under the clean development mechanism" completed the legal framework for AR CDM and were agreed one year later in 2004 (Decision 6/CMP.1).

A project is generally eligible under the CDM if its activity results in an emission reduction additional to what would happen in the absence of the project. Please refer to Annex 2 for more details on requirements for LULUCF CDM Projects.

Non-permanence in AR CDM Projects

The risk that carbon stocks might be lost after the issuance and use for compliance of CER units generated through LULUCF CDM projects is usually referred to as the risk of non-permanence. This was probably the biggest perceived difference between these projects and the non-LULUCF CDM projects, which can be described as being fundamentally about reducing emissions and don't involve a "sinks" component.

This risk was addressed in the Modalities and Procedures for AR CDM by giving the units resulting from these projects a temporary status, i.e., these units could be used for compliance but would later have to be replaced by other units, considered permanent. Two approaches are available for this purpose: tCER and lCER. The main similarities and differences between the two approaches are outlined in Table 7.

Table 7: Similarities and Differences between Approaches to Address Non-Permanence in AR CDM

	tCER Approach	lCER Approach
Crediting period	Max 30 years (fixed crediting period); or Max 20+20+20 years (renewable crediting period[7])	Max 30 years (fixed crediting period); or Max 20+20+20 years (renewable crediting period)
Verification period	1st verification: determined by project participants Subsequently: every 5 years	1st verification: determined by project participants Subsequently: every 5 years
Amount of units issued	Calculated removals since the beginning of the project	Calculated removals since last verification period
Use of units	Commitment period for which they were issued	Commitment period for which they were issued
Normal expiry date of units issued	Subsequent commitment period	End of crediting period (fixed crediting period) Last crediting period (renewable crediting period)
Consequences of reversal of previously sequestered Carbon	Issuance of smaller amount of tCER (if C stocks remain above baseline) No issuance of tCER (if C stocks are equal or lower than baseline)	Replacement of lCER associated with the lost carbon
Units usable for replacement (upon expiry)	AAU, CER, ERU, RMU tCER (of the new commitment period)	AAU, CER, ERU, RMU

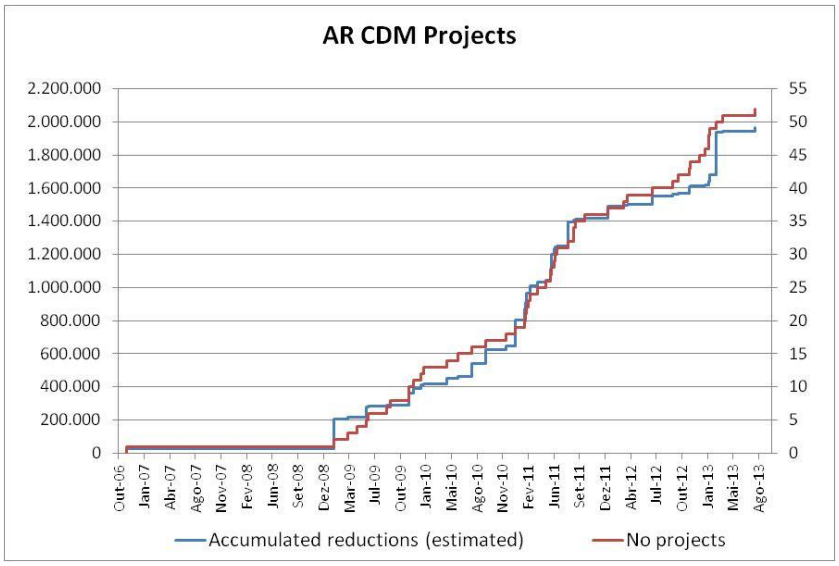
Performance of AR CDM Projects

As Figure 1 shows, it took almost two years after the legal framework was completed in 2004 for the first AR CDM project to be approved and another two years before projects started to be approved with a more regular flow.

So far[8] only 53 AR CDM projects have been approved, with an estimated reduction in emissions (i.e. emissions below baseline) of almost 2 million tons of CO_2 equivalent.

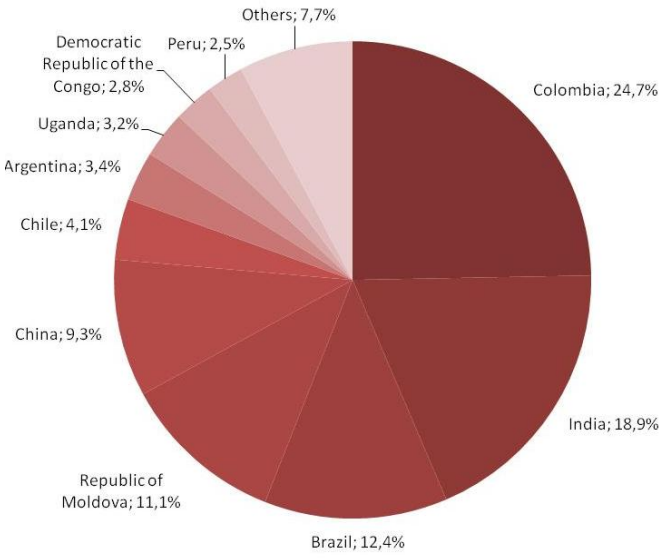
[7] The project duration under the renewable crediting period is initially established for a maximum of 20 years, but can be renewed at most 2 times, provided that the Designated Operational Entity of the Host-Party informs the CDM Executive Board that the project's baseline is still valid or has been updated.
[8] According to CDM Project Search Tool http://cdm.unfccc.int/Projects/projsearch.html, retrieved 8th December 2013

Figure 1: Evolution of Registered AR CDM Projects (number and volume)



Only 22 KP non-annex 1 Parties have approved AR CDM projects, out of which five countries account for about 76% of all emissions reductions achieved through this type of CDM projects.

Figure 2: AR CDM Share of Estimated Emission Reductions per Host-country Party



The relatively low performance of these projects can be attributed to:

Time lag between adoption of CDM rules and AR CDM rules. This time was needed to address the risk of non-permanence, but delayed the onset of activities in this sector, which might explain differences in earlier years of CDM implementation.

Time lag between adoption of AR CDM rules and first projects. This time can be explained by the amount and detail of information requirements described above and, consequentially, the time needed for project proponents and the CDM Executive Board to, respectively, propose and approve methodologies for baselines, monitoring plans and project boundaries compliant with those requirements. The additional requirements for AR CDM were difficult to comply with and only after the first methodologies were adopted did the projects start to flow.

Strict requirements. Although the activity is called *Afforestation and Reforestation* CDM, not all AR projects carried out in developing countries are eligible. The additionality criteria, including the financial additionality criteria, the methodological complexity in baseline and monitoring requirements and the social and environmental criteria imposed on these projects reduce the applicability of AR CDM projects to projects that are usually not excessively large and involve tree species or plantation objectives that are not commercial by nature and that don't raise too big environmental or social concerns. These are usually a subset, often small, of all possible afforestation and reforestation activities within a particular country.

Transaction costs. AR CDM projects usually involve extensive areas thus involving large number of stakeholders. The consultation process for these project activities requires more time than for other CDM projects. Land tenure issues in Non-annex I countries may also require time to overcome constraints due to unclear land tenure and property rights. Finally the complexity of baseline assessment and monitoring methodology also increase the transaction costs associated with these projects.

Temporary credits. The immediate consequence of creating a credit that needs to be replaced sometime in the future is that it will only be attractive to a potential buyer if its price is substantially lower than any credit without this characteristic. It has therefore been argued that a lower CO_2 price reduces the competitive advantage of this type of projects compared to other CDM project types.

Lack of market. The exclusion of the use of AR CDM credits in the biggest carbon credit market of the world (European Union's Emission Trading Scheme) has affected the demand of this kind of credits and, consequently, their prices.

4.3.2 Joint Implementation

Joint Implementation (JI), is a flexible mechanism established by Article 6 of the Kyoto Protocol (and further elaborated in the guidelines defined in Decision 9/CMP.1) which allows an annex 1 Party to partly meet its emission reduction target by investing in emission reductions in a project implemented in another annex 1 Party.

The only specific requirement for LULUCF JI projects (other than the ones applicable to all JI projects) is that projects under Article 6 aimed at enhancing anthropogenic removals by sinks shall conform to definitions, accounting rules, modalities and guidelines under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (please refer to Annex 3 for a summary list of requirements for JI projects).

The interest in JI LULUCF Projects has been very limited, as shown by the reduced number of projects approved. In fact, out of 647 registered JI projects only 3 projects are currently registered[9] as being LULUCF related, amounting to an expected total emissions reductions of about 2.3Mton CO_{2eq}. Two projects involve "afforestation and reforestation" activities, while the remaining project is described as addressing "permanent protection of otherwise logged forests". Only 2 countries, Russia (82% of expected emissions reductions) and Romania (18%), are involved in JI LULUCF Projects.

4.4 Lessons Learned from the KP LULUCF Accounting System

High level of Harmonization between Parties and Room for National Circumstances

Developing common accounting rules for countries with such diverse national situations was a major achievement and perhaps the biggest success in the LULUCF accounting rules is its mere existence.

[9] According to JI Project Overview Tool http://ji.unfccc.int/JI_Projects/ProjectInfo.html, retrieved 26th December 2013

Amongst Annex 1 countries there are countries with management responsibilities over ecosystems as different as Boreal and Mediterranean forests; countries dominated by organic soils and requiring drainage for agriculture and countries where lack of organic matter and water stress are major limitations; countries with residual forest areas and countries mostly covered by forests; countries with economies dependent on forestry and agriculture and countries where these activities are marginal to the economy; countries with landscapes largely transformed by human activity and countries with large portions of their territories covered in natural ecosystems, much of which sometimes remains unmanaged.

It is therefore not strange that national circumstances played a major role in the negotiations for both the 1st and 2nd Commitment Period or to anticipate that it is likely to remain a fundamental issue in the future. Some of the complementary rules described above were introduced to address some of these circumstances.

Harmonization is an important feature for comparability and transparency and this should continue to be the focus and first priority in developing future accounting systems. However, flexibility to accommodate national circumstances needs to be built into the system. Deciding on the right balance between harmonisation and flexibility will likely be the focus of all major discussions about future accounting rules.

Positive Evolution of Accounting Rules over Time

So far, the Kyoto Protocol has only had two Commitment Periods. However, it was possible to negotiate different accounting rules, an evolution from the first to the second period. These were based on accumulated accounting and reporting experience, an increase in available information about emissions and removals of the sector, and increased scientific understanding of the sector. The new set of rules improves the previous set in at least three aspects:

Improved treatment of legacy effects. Parties using projected reference levels can now incorporate the legacy effects of particular age class structure of forests into the emissions and removals that are part of their proposed reference level. These particular age class structures will have a much smaller impact in the actual accounting in the 2nd CP than previously happened.

Improved interpretation of "human-induced" emissions and removals. The possibility and the accounting methodology that allows Parties to exclude emissions from natural disturbances reduces the compliance risk associated with the sector, while at the same time approximates the accounted emissions and removals to those that are a direct response to human management.

Improved accounting for harvested wood products. The effect of substituting materials of fossil origin by materials of forest origin was already partially included (through reductions in emissions of, e.g., concrete, plastic or aluminium industries) but the impact of the carbon contents of the wood products was absent from the accounting system in the 1st CP. The explicit inclusion of HWP in the accounting for AR and Forest Management improves the visibility of this effect and provides an incentive for further use of these alternatives.

There is certainly room for further improvements and these should to be explored.

Politically Sensitive Sector and Communication Difficulties

Forests and agriculture are important and sensitive sectors to almost all governments and many stakeholders, including both economic players and environmental and social NGOs.

Although accounting under the Kyoto Protocol was fundamentally an exercise to account for emissions, removals and carbon stocks, the debate was heavily influenced over concerns of the implications of the

proposed rules over economic activity in agriculture and forestry, on biodiversity and nature conservation and on rural communities.

Another concern expressed many times over the negotiations can be best summarised as the "trust issue": Were Parties trying to "play the rules" to capture (undeserved) credits from the sector, thus jeopardising the mitigation efforts of other countries and sectors? Or were they trying to develop rules that best singled out the human-induced emissions and removals, provided the correct incentive structure for the sector to develop in the future and responded well to national circumstances?

Regardless of each one's opinion on the quality of the existing LULUCF accounting rules, it should be recognised that the existence of many rules and the complex LULUCF jargon that developed with them, and the differences in estimates used in Kyoto reporting and accounting and Convention Reporting, made the sector less transparent to the non-negotiator world. This is not desirable for having policy makers, stakeholders and the public understand the implications of the proposed rules on the general accounting and on the sector itself, and thus, while not directly responsible for it, this complexity reinforces the "trust issue".

One of the biggest challenges for future negotiations on LULUCF is, therefore, to simplify the accounting system and to improve communication in general, including making a serious effort to translate the LULUCF jargon into more understandable terms.

Transparent but Challenging Implementation

The difference between the "land-based approach" used for convention reporting and the "activity based approach" used for Kyoto reporting (and all the information requirements to transparently implement the LULUCF accounting rules) has required countries to develop two parallel reporting systems to respond to both reporting systems. This fact contributes to the communication difficulties identified above. Seemingly similar categories – e.g. afforestation (KP) and land converted to forests (UNFCCC)[10] – are in fact different and as a consequence will report different values. It should be stressed that the reporting is in fact transparent, but one needs to know the reporting system with some detail to understand the differences.

Reporting and accounting for LULUCF can be challenging as it involves large amounts of information, more commonly collected for other purposes and "reused" or reprocessed for reporting, than collected specifically with this intention in mind.

In practice, this requires countries to combine very different sources of information, from national monitoring and modelling systems, to bibliographic parameters and IPCC default values, where adequate national values are missing. Definitions of different land-use categories may differ between information sources and the use of corrections of the original data and the introduction of other assumptions may be necessary to fully comply with the UNFCCC and KP reporting systems.

Updates to these information sources are usually not annual (e.g. National Forest Inventories are updated every 5-10 years in most countries; or new research allows the replacement of an IPCC default value with a nationally appropriate average value) and this adds to the challenge of producing annual estimates of emissions and removals.

New data also requires extensive recalculations of emissions and removals, often affecting more than one reporting year. Every recalculation will usually improve data quality, reduce uncertainties on the estimates,

[10] Afforestation (KP) includes all lands afforested since 1990. "Land converted to forest" (UNFCCC) includes all lands afforested over the 20 years preceeding the reporting year. The differences between the two categories may be even larger if different definitions apply in both reporting systems.

add missing pools or gases and produce emission and removal estimates that are closer to reality and should thus be generally regarded as a positive feature of the reporting system.

It should also be stressed that the IPCC Guidelines provide a good and solid basis for all this information to be combined, recalculated when needed and used in LULUCF reporting in a transparent and credible way. From a reporting perspective, using the UNFCCC reporting system as a basis for a future accounting system would reduce burden on parties in reporting and accounting LULUCF, while also adding simplicity. Also recalculations are and should remain to be an important feature of LULUCF reporting.

When using reference levels of some sort (either historical base years or projections) the consistency between the methodologies and data used for estimating those reference levels and the methodologies and data used for the annual reporting should be assured at all times to guarantee that we are accounting for changes in management and not changes in reporting methodologies.

Market Approaches in LULUCF

The current project-based system to involve LULUCF activities under the CDM is robust in delivering additionality and permanence, but has showed to have limited practical success, as illustrated by the number of projects and expected emission reductions from the sector.

The practical implementation of LULUCF CDM could probably be improved by scaling-up activities to sectoral level. A sectoral approach would better (compared with the current project approach): reduce context and transaction costs associated with project development and monitoring; reduce risk of non-permanence; minimise leakage; be better suited to other LULUCF related activities such as agriculture (potentially better involving communities and other stakeholders).

The SBSTA is also currently revisiting the method used to address non-permanence. If successful in creating an alternative to temporary credits, it may also help to boost interest in LULUCF related projects and facilitate its integration in the emission trading schemes.

However, any possible changes to CDM would have to continue to be, as before, informed by robust ways to address additionality and non-permanence.

5 Emerging "Accounting" Systems in LULUCF

While there are no accounting systems as such under the convention (other than those resulting from the implementation of the Kyoto Protocol), there are a number of recent developments in different topics being discussed under the convention that share many features that we would expect to see in an "accounting system" of a future climate agreement.

The sections below outline the main topics and features that contribute to that debate. The comments provided are not intended to be an in-depth analysis of each of those topics, but rather highlight those aspects that have already been decided upon by the Conference of the Parties and that have (or may have) relevance for the development of future accounting systems.

5.1 Follow-up and Monitoring of Pre-2020 Pledges

According to articles 4.1 and 12 of the convention, all Parties must report on "steps taken or envisaged" to implement the convention. In accordance with the principle of "common but differentiated responsibilities", the required contents of these national communications and the timetable for their submission are different for Annex I and non-Annex I Parties.

Following the pledges made by many Parties under the Copenhagen Accord and the Cancun Agreements (Decision 1/CP.16) it has been further determined that A1 Parties should submit Biennial Reports, and that non-A1 Parties should submit Biennial Update Reports.

5.1.1 Biennial Reports

The Cancun agreements (Decision 1/CP.16) stipulated that, in addition to the existing reporting requirements, Developed Country Parties should provide biennial reports. It was later decided (Decision 2/CP.17) that this reporting would begin in January 2014 and that reporting would be repeated every two years. "Reporting Guidelines" were also adopted for the preparation of biennial reports and these included sections on:

- Information on GHG emissions and trends from 1990 to the latest reported year.
- Quantified economy-wide emission reduction target, including a description of the approach to count emissions and removals from LULUCF.
- Information on progress in achievement of targets, including:
    - Mitigation actions and their effects, organised by sectors and gases. LULUCF is singled out as one of the sectors.
    - Estimates of emission reductions and removals with and without LULUCF and emissions and removals from LULUCF using the accounting approach selected by the Party.
- Information on projections
- Information of the provision of financial, technological and capacity-building for developing countries

Decision 19/CP.18 further elaborated on these guidelines by adopting the common tabular format for the biennial reports.

At Cancun, a process for International Assessment and Review (IAR) of emissions and removals related to quantified economy-wide emission reduction targets was also decided, with a view to promoting comparability and building confidence. The process will involve two steps: a technical review; and a multilateral assessment. Although less stringent than the compliance system under the Kyoto Protocol, this

system provides the same basic functions: it brings transparency and credibility to claims of emission reductions made by Parties.

5.1.2 Biennial Update Reports

The Cancun agreements (Decision 1/CP.16) also stipulated enhanced reporting requirements for Developing Country Parties (with additional flexibility to be given to the least developed country Parties and small island developing States) which included "Biennial Update Reports containing updates of national greenhouse gas inventories, including a national inventory report and information on mitigation actions, needs and support received".

Mitigation actions should be measured, reported and verified domestically, although a nuance is introduced in relation to the origin of financing of such mitigation actions. Internationally financed mitigation actions are also to be subject to international measurement, reporting and verification.

Finally a decision was also taken to conduct International Consultation and Analysis of biennial update reports through analysis by technical experts in consultation with the Party concerned and through a facilitative sharing of views.

It was later decided (Decision 2/CP.17) that this reporting would begin in December 2014[11] and that reporting would be repeated every two years. "Reporting Guidelines" were also adopted for the preparation of biennial update reports and these included sections on:

- Information on national circumstances and institutional arrangements.
- National Greenhouse Gas Inventory. Non-A1 Parties are encouraged to use the 1996 IPCC Good Practice Guidance on LULUCF.
- Information on mitigation actions and their effects. For each NAMA Parties should provide information: on the nature of the action; on reduction goals and progress indicators; on assumptions and methodologies used; on progress of implementation and estimated emission reductions; on their domestic arrangements for MRV.
- Finance, technology and capacity-building needs and support received.

As for A1 biennial reports, at Cancun, a process for International Consultation and Analysis (ICA) of biennial update reports was also decided, with the aim to increase transparency of mitigation actions and their effects. The process will involve two steps: a technical analysis; and a facilitative sharing of views. Although less stringent than the compliance system under the Kyoto Protocol, this system provides the same basic functions: it brings transparency and credibility to claims of emission reductions made by Parties.

5.2 Reducing Emissions from Deforestation and Forest Degradation (REDD+)

REDD+ is the acronym used for "reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries".

Summary of REDD+ Decisions and Negotiation Process

REDD+ was formally introduced in the UNFCCC negotiations in 2005[12], following a submission from Papua New Guinea and Costa Rica requesting this topic to be added to the agenda. The Bali Action Plan in 2007

[11] The least developed country (LDCs) Parties and small island developing States (SIDS) may submit biennial update reports at their discretion.

(Decision 1/CP.13) recognised it as one of the mitigation options to be discussed for possible inclusion on a future global agreement on climate change. The objective was to enhance national and international action on mitigation to climate change by considering "policy approaches and positive incentives" to assist developing countries in undertaking additional REDD+ action. A separate decision taken at the same COP (Decision 2/CP.13) invited Parties to initiate demonstration activities and further clarified the objectives of REDD+.

After consideration by Parties, agreement was reached in 2009 on methodological guidance for activities related to REDD+ (Decision 4/CP.15). With relevance for accounting, this decision requested developing country Parties "to take the following guidance into account":

1. Use the most recent IPCC guidance as a basis for estimating emissions and removals, forest carbon stocks and forest area changes
2. To establish robust and transparent national forest monitoring systems that:
    a. Use a combination of remote sensing and ground-based inventories for estimating emissions and removals, forest carbon stocks and forest area changes
    b. Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties
    c. Are available and suitable for review as agreed by the COP

The Cancun Agreements (Decision 1/CP.16) in 2010 further identified five activities eligible under REDD+:

1. Reducing emissions from deforestation;
2. Reducing emissions from forest degradation;
3. Conservation of forest carbon stocks;
4. Sustainable management of forests;
5. Enhancement of forest carbon stocks;

It further determines that these activities are to be implemented in 3 phases: (1) development of national strategies or action plans, policies and measures, and capacity-building; (2) implementation of national policies and measures and national strategies or action plans and results-based demonstration activities; (3) results-based actions that should be fully measured, reported and verified.

The same decision also elaborated on the information requirements of REDD+, which can be summarised as follows:

1. A national strategy or action plan (addressing, i.a., drivers of deforestation and forest degradation, land tenure, forest governance, gender and safeguards)
2. A national (or subnational) forest reference emission level or forest reference level.
3. A robust and transparent national (or subnational) forest monitoring system. Decision 11/CP.19 would later clarify that the national monitoring system should:
    a. Build upon existing systems
    b. Enable the assessment of different forest types, including natural forest
    c. Be flexible and allow for improvement
4. A system to provide information related to safeguards

Finally, the appendix I to Decision 1/CP.16 elaborated on the understanding of which safeguards should be promoted and supported. These included:

[12] http://unfccc.int/resource/docs/2005/cop11/eng/misc01.pdf

1. Complementarities and consistency between REDD+ actions and national forest programmes and relevant international conventions and agreements
2. Transparency and existence of national forest governance structures
3. The respect for the knowledge and rights of indigenous peoples and local communities
4. Conditions for full and effective participation of all relevant stakeholders
5. Consistency with the conservation of natural forests and biological diversity
6. Actions addressing the risk of reversals and reducing the displacement of emissions

The technical discussion and in 2011 agreement was reached (Decision 12/CP.17) on guidance for systems to provide information on how safeguards are addressed and respected. Decision 12/CP.19 would later add that information on safeguards would need to be provided from the beginning of REDD+ activities and should be updated with the periodicity of National Communication onwards.

Decision 12/CP.17 also adopted modalities for forest reference emission levels and forest reference levels. In relation to the latter the COP:

1. Agrees that reference levels[13] are a benchmark for assessing each country's performance in REDD+ activities (Decision 4/CP.15 had previously recognised that reference levels should be established transparently and taking into account historic data, adjusted for national circumstances)
2. Decides that reference levels shall be established maintaining consistency with the country's greenhouse gas inventories
3. Invites Parties to submit information on the development of their reference levels, including how national circumstances were taken into account in the process
4. Agreed that a step-wise approach to reference levels could be useful, by incorporating over time better data, improved methodologies and additional pools
5. Agreed that reference levels should be periodically updated, taking into account new knowledge, new trends and any modification of scope and methodologies
6. Invited developing country Parties to submit their proposals for reference level, on a voluntary basis and when deemed appropriate; and acknowledged that a subnational reference level may be elaborated as an interim measure
7. Agreed to establish a process to enable the technical assessment of the proposed reference levels. Decision 13/CP.19 concluded that process and further elaborated that the assessment would focus on:
    a. The extent to which reference levels maintain consistency with national GHG inventories
    b. How historical data were taken into account
    c. The extent to which the information is transparent, complete, consistent and accurate. The information should cover methodologies, data sets, approaches, methods, models, assumptions used and area covered
    d. The policies and plans that were considered
    e. Description of differences to previously submitted reference levels
    f. Coverage of pools and gases
    g. Forest definition
    h. Assumptions about future domestic policies and their use in the reference level

Decision 14/CP.19 aligned the REDD+ modalities for measuring, reporting and verifying with those of biennial update reports (BUR) by stating the emissions and removals should be reported in BUR and, as such, would become part of the International Consultation and Analysis process of the BURs.

[13] For simplicity "reference levels" is used with the same meaning as "forest reference emission levels and forest reference levels"

It should be noted that all the reporting and "accounting" requirements described above are nuanced in all the decisions quoted with references to developing country needs for capacity building, technology transfer and financial support. In particular, Decisions 9/CP.19 and 10/CP.19 address these issues in more detail.

Lessons learned from REDD+

From an "accounting system" perspective, Parties involved in REDD+ were successful to reach agreement: in defining the scope of eligible activities; agreeing on the metrics of progress and success (comparison to a reference level); agreeing on reporting according to common guidelines (IPCC guidelines); agreeing on the need for consistency (over time and between reference levels and reporting of actual emissions and removals); agreeing to introduce flexibility to improve over time; agreeing on the need for verification/technical assessment of both monitoring results and the established reference level.

All these aspects are relevant and important when discussing LULUCF accounting rules in general and REDD+ is probably the most developed "accounting" system designed for, and starting to be implemented by, developing country Parties. In this regard, REDD+ is a model worth exploring further.

5.3 Nationally Appropriate Mitigation Actions (NAMA)

Summary of NAMA Decisions and Negotiation Process

NAMA is acronym used for "Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner". NAMAs were formally introduced in the UNFCCC negotiations through the Bali Action Plan in 2007 (Decision 1/CP.13). The objective was to enhance national action by non-Annex 1 Parties in mitigating climate change.

In 2009, the Copenhagen Accord (Decision 2/CP.15) determined (§5) that mitigation actions by non-Annex 1 Parties were to be subject to domestic measurement, reporting and verification[14], and the results of this process should be reported in their National Communications. However, where NAMAs receive support, they should be subject to international measurement, reporting and verification, in accordance with guidelines adopted by the COP.

The Cancun Agreements in 2010 (Decision 1/CP.16) further determined (§48) that the NAMAs aimed at achieving a deviation in emissions relative to a "business as usual" emissions in 2020. It also decided (§63) to conduct International Consultation and Analysis of Biennial Update Reports with the aim to increase transparency of mitigation actions and their effects.

The need to bring more clarity to the NAMAs that non-Annex 1 Parties were proposing resulted in a series of workshops where Parties were invited to provide more detail about their proposed NAMAs. In particular, Decision 2/CP.17 invited non-Annex 1 Parties (§34) to provide more information on underlying assumptions and methodologies, sectors and gases covered, global warming potentials used, support needs and estimated mitigation outcomes.

In Annex III to Decision 2/CP.17 (on reporting Guidelines for Biennial Update Reports) requested non-Annex 1 Parties to include, i.e., information on their NAMAs and their effects (§11-13). For each mitigation action (or group of actions) Parties should provide information on:

[14] Decision 1/CP.16 (§62) further decided that the national process for measurement, reporting and verification of NAMAs would be done in accordance with general guidelines to be developed under the Convention

- Name and description of the NAMA
- Methodologies and assumptions used
- Objectives of the action and steps to achieve it
- Progress of implementation, results achieved and estimated emission reductions
- Description of domestic measurement, reporting and verification arrangements

The information contained in the Biennial Update Reports (including NAMAs) will be subject to a process of International Consultation and Analysis (ICA). Annex IV to Decision 2/CP.17 elaborated on Modalities and Guidelines for this process. The consultation and analysis process will involve 2 steps: (1) a "technical analysis" based on the information contained in the Biennial Update Reports; and (2) a "facilitative sharing of views" around the report from step 1. The first step shall be carried out by a team of technical experts who report back to the Subsidiary Body for Implementation of the UNFCCC.

NAMAs and LULUCF

There are no specific references to LULUCF, but the sector is implicitly included in the spectrum of possible activities to be carried out by non-Annex 1 Parties.

The list of all proposed NAMA has been growing over time, although, due to the variable level of detail provided, it is not easy to perform one-on-one comparisons between the individual proposals or even, in some cases, fully understand the activities that are being proposed. An attempt to standardise the information submitted by Developing Country Parties is contained in the NAMA Registry that has been recently created, but so far only 48 NAMAs have been registered using this tool[15].
From the information available (see Figure 3 and Table 8 for a summary) it is already possible to conclude that the use LULUCF as a mitigation tool is generating a lot of interest amongst non-Annex 1 Parties. In fact, 62% of all non-Annex 1 Parties that submitted information (60 Parties Submissions and 1 Group submission) have identified at least one NAMA related to LULUCF. This number is very likely an underestimation: e.g. some of the Parties listed have not identified LULUCF related NAMA but are very engaged in REDD+; although not all African countries listed agriculture NAMAs, the Group of African States has made a submission on behalf of the group containing a list of NAMAs in the Agriculture and LULUCF/agriculture sectors.

[15] According to the NAMA Registry http://www4.unfccc.int/sites/nama/SitePages/Home.aspx. Retrieved 20th December 2013.

Figure 3: Explicit references to LULUCF and related topics in the NAMAs proposed by non-Annex 1 Parties

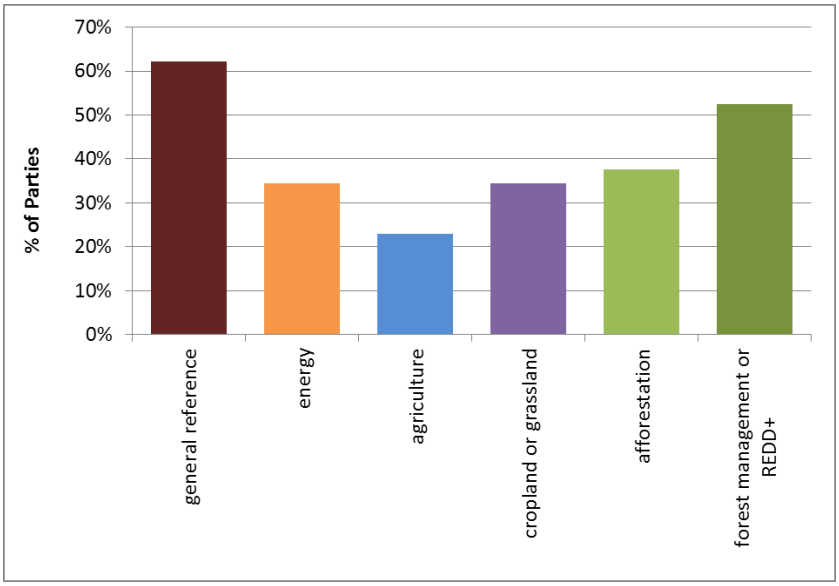


Table 8: Explicit references to LULUCF and related topics in the NAMAs proposed by non-Annex 1 Parties

Non-Annex 1 Party[16]	General LULUCF Reference	Energy biomass biofuels	Agriculture fertiliser use; manure management; N fixing crops; livestock	LULUCF cropland grassland	LULUCF afforestation reforestation	LULUCF REDD+ forest management conservation
Afghanistan						
Algeria						
Antigua and Barbuda						
Argentina	X	X				X
Armenia	X				X	X
Benin	X				X	X
Bhutan	X					
Botswana		X				
Brazil	X	X	X	X	X	X
Burkina Faso	X				X	X
Cambodia	X					X
Cameroon	X				X	X
Central African Republic	X	X		X	X	X
Chad	X	X	X	X	X	X
Chile	X	X	X		X	X
China	X				X	
Colombia	X	X			X	X
Congo	X			X	X	X
Costa Rica	X					X
Côte d'Ivoire	X	X		X		X
Cook Islands						
Dominica	X	X				

[16] All non-Annex 1 Parties that made submission of NAMA have been listed. "X" means that an explicit reference to emissions and/or removals from that sector was made by the Party. The information contained in this table is based on documents FCCC/AWGLCA/2011/INF.1, FCCC/AWGLCA/2012/MISC.2, FCCC/AWGLCA/2012/MISC.2/Add.1, FCCC/SBI/2013/INF.12/Rev.2 and the NAMA Registry. For details on individual NAMA please refer to the original Party submissions and/or to the NAMA Registry.

Non-Annex 1 Party[16]	General LULUCF Reference	Energy biomass biofuels	Agriculture fertiliser use; manure management; N fixing crops; livestock	LULUCF cropland grassland	LULUCF afforestation reforestation	LULUCF REDD+ forest management conservation
Egypt	X				X	
Ethiopia	X	X	X	X	X	X
Eritrea	X			X		X
FYR Macedonia	X	X	X	X	X	X
Gabon	X				X	X
Gambia	X		X	X	X	X
Georgia						
Ghana	X	X	X	X	X	X
Guinea	X	X	X	X		X
India						
Indonesia	X			X		X
Israel						
Jordan	X		X	X	X	X
Kyrgyzstan						
Korea						
Madagascar	X	X	X	X	X	X
Malawi	X	X	X	X		X
Maldives						
Mali						X
Marshall Islands						
Mauritius						
Mauritania	X	X			X	
Mexico						
Moldova						
Mongolia	X		X		X	X
Morocco	X			X	X	X
Papua New Guinea	X			X		X
Peru	X					X
San Marino						
Serbia		X				
Sierra Leone	X	X		X		X
Singapore						
South Africa						
Swaziland	X		X	X		
Tajikistan						
Togo		X				
Tunisia	X	X		X	X	X
Uruguay		X				
Group of African States	X		X	X		

Considerations on the NAMAs Process

It is too soon to draw lessons from the application of the NAMAs, as the concept and its application are still evolving. However two practical considerations can be made, which are relevant for the development of a future Accounting Framework:

1. There is a lot of interest in exploring LULUCF as a mitigation option, REDD+ and AR NAMAS are leading the list (mentioned by half of the countries), but interest in cropland and grassland management and bioenergy is also high in the agenda (mentioned by one third of the countries).

2. Although not yet fully elaborated, an "accounting" system is starting to emerge from the decisions on this topic, namely the need for common reporting formats, for transparency in methodologies monitoring and baselines and for verification by external entities (international or national, depending on type of financing for each NAMA)

5.4 New Market-based Mechanism and Framework for Various Approaches

Summary of NMM and FVA Decisions and Negotiation Process

NMM is acronym used for "New Market Based Mechanism". The notion of a NMM developed as consequence of the introduction in the Bali Action Plan in 2007 (Decision 1/CP.13) of an agenda item whose objective was to explore "various approaches, including opportunities for using markets, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different national circumstances of developed and developing countries".

The first formal reference to a NMM was made 2010 in the Cancun Agreements (Decision 1/CP.16), where Parties decided to consider the establishment of "one or more market-based mechanisms". The framework for that consideration was to be guided by the following (§80):

1. Voluntary participation of Parties, while fair and equitable access for all Parties should be promoted;
2. Actions should complement other means of support for NAMAs;
3. Mitigation should be stimulated across broad segments of the economy;
4. Environmental integrity should be safeguarded;
5. A net-decrease and/or an avoidance of global emissions should be ensured;
6. The mechanisms would assist developed country Parties to meet part of their mitigation targets, but such mechanisms would need to be supplemental to domestic mitigation efforts;
7. Good governance and robust market functioning and regulation should be ensured.

An additional requirement called the NMMs to undertake to maintain and build upon existing mechanisms, including those established under the Kyoto Protocol.

The decision to create a NMM came in 2011 in Decision 2/CP.17 (§83), but its modalities and procedures were postponed to the next session. In Doha in 2012 it was not possible to reach agreement on modalities and procedures for a NMM, but Decision 1/CP.18 (§50) called for a work-programme to develop them by COP 19. Amongst the possible elements for consideration in the work-programme (§51) the following were identified with particular relevance for accounting:

1. Operation under the guidance and authority of the COP;
2. Standards for real, permanent, additional, and verified mitigation outcomes and to avoid double counting of efforts;
3. Requirements for the accurate measurement, reporting and verification of emission reductions, emission removals and/or avoided emissions;
4. Means to stimulate action across broad segments of the economy (sector and/or project-specific basis);
5. Criteria for the establishment, approval, and periodic adjustment of ambitious reference levels (crediting thresholds and/or trading caps);
6. Periodic issuance of units based on mitigation below a crediting threshold or based on a trading cap;
7. Criteria for the accurate and consistent recording and tracking of units.

FVA is acronym for Framework for Various Approaches. FVA is even less elaborated than the previous mechanism and it builds on a rather flexible notion "that Parties, individually or jointly, may develop and

implement various approaches, including opportunities for using markets and non-markets, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries" (§41 of Decision 1/CP.18). An elaboration of what that could really mean in practice is yet to be elaborated by Parties. However Parties are asked to elaborate on the framework so that "all such approaches must meet standards that deliver real, permanent, additional and verified mitigation outcomes, avoid double counting of effort and achieve a net decrease and/or avoidance of greenhouse gas emissions" (§42 of Decision 1/CP.18).

NMM, FVA and the Land Sector

There are no specific references to the Land Sector (or any other sector), but references to "emission removals" suggest that the sector is implicitly included in the spectrum of possible activities to be carried out by non-Annex 1 Parties under this new instrument.

Considerations on the NMM and FVA Processes

As the system is not yet created, it is not possible to draw any lessons from NMM or FVA's application. However, the discussion suggests that the decision will eventually cover common elements with other accounting systems under the UNFCCC, such as: the use of reference levels; the need for transparent and robust reporting requirements; the need for verification process.

6 Approach to a post-2020 Accounting Framework in the AFOLU Sector

Article 2 of the UNFCCC can be simplified to stating that the objective of the UNFCCC is to reduce emissions as much as possible and as quickly as possible.

> ***"The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."***

The accounting framework for AFOLU should therefore serve as a tool to estimate and demonstrate the contribution of the AFOLU sector to that ultimate objective. It should be constructed in a way that highlights the consequences of management decisions of Parties on emissions and removals, rather than attempting to prescribe what Parties should be doing.

Such a system could provide an important incentive structure for Parties to adopt the best decisions that consider the implications on emissions and removals, if the AFOLU accounting system is connected to the realization of a target or to a financing structure.

The elements presented below were drafted having that objective in mind and intend to present one possible way to achieve those goals. Other alternatives may also be possible, so this section aims at starting that debate, more than prescribing or forecasting what the future system will look like.

6.1 Holistic Focus on AFOLU

Under the KP accounting system, LULUCF and Agriculture are treated as separate sectors. When considering the management decisions taken daily by various entities (farmers, other private and public entities) this separation strikes as highly artificial. A future accounting system should attempt to treat them consistently. There are several reasons to do this:

1. The emissions and removals on cropland and grazing land are in reality a combination of emissions from "agriculture practices" (fertilization, animals grazing, manure application to soils) and emissions and removals occurring on "cropland" or "grassland". Considering them under the same accounting framework would allow for more consistent treatment of the sector and to identify and properly account for trade-offs in management options that affect components currently reported in different sectors.
2. The AFOLU concept is much closer to the farming sector, as both farmers and agriculture authorities understand it. Mitigation actions for the AFOLU sector (rather than separate actions for the agriculture and LULUCF sectors) are easier to develop and to communicate to farmers, if they are developed and implemented covering AFOLU.
3. It will be worth exploring further approaches attempting to reduce emissions at larger scales, such as regions or landscapes as mitigation options, as there are linkages and trade-offs between different activities carried out in the same landscape or region (e.g. addressing agricultural drivers of deforestation). Working under the AFOLU concept would simplify the development of approaches to work at those higher geographical scales, compared to a more fragmented approach separating LULUCF and Agriculture.
4. The CRF reporting tables based on the 2006 IPCC Guidelines are constructed under the AFOLU concept. As A1 Parties have committed to use these guidelines from 2015 onwards, accounting on a different basis would require the development of a separate reporting system.

6.2 Keep AFOLU fully fungible with other sectors

Many of the LULUCF accounting complications under the KP resulted from the late consideration of the sector in the negotiations. If addressed from the beginning of the negotiations, the land-use sector emissions and removals will not create a limitation to high ambition in global mitigation efforts, but rather add a viable mitigation option to the portfolio of possible policies and measures that a country might wish to implement. There are several political and technical arguments in favour of this approach:

A ton is a ton. For the atmosphere there is no difference between a ton emitted by a bus, a power plant or a burning tree. Also the amount of carbon in one sequestered ton is the same as the carbon contained in one emitted ton. Provided that the accounting rules produce a result that mimics the mitigation efforts of a country, there is no reason to keep it isolated.

Cost efficiency. If a country is subject to an emission reductions target of some sort, it makes economic sense that this country has the maximum possible freedom to allocate its effort to the sectors were it is more cost-effective to reduce emissions, be that in the energy sector, the residential or transport sector, or the forest or agriculture sector. Mitigation is not about punishing countries for their emissions, but about reducing emissions as much as possible, as quick as possible and as cheap as possible. In addition, countries will most likely invest in many different actions and sectors rather than committing their full compliance strategy to a single sector.

Share of emissions and mitigation potential. The share of emissions from animal production, agriculture and forests in the global emissions is too big (about 1/3) for the sector to be treated as a "special" sector. Any remaining concerns over the participation of the sector should be frontally addressed in the negotiations, rather than trying to avoid the discussion and separate the sector from the other emission sources. The mitigation potential in many countries (particularly in some developing countries) is strongly dependent on action in this sector. The interest in REDD+ and LULUCF and agriculture related NAMAs is a testimony to this importance and it would be unwise to characterise those actions as being of lower importance or relevance for the global mitigation effort (compared, e.g., to reducing emissions in the transport or waste sectors).

Biomass and biofuels. The accounting premise of biomass and biofuel burning emissions being equal to zero is only valid if the emissions from (growing and) harvesting the raw materials used in their production are accounted for in the LULUCF sector. Not accounting for LULUCF (or accounting under a completely different structure) would result in a serious problem of underestimation of emissions or in the need to change the biomass and biofuels burning accounting rules in the energy sector.

IPCC Guidance fully elaborated and Party's capacities are much improved now. The 2006 IPCC guidance allows for the reporting of the AFOLU sector with a high degree of confidence. This guidance is now much more detailed and comprehensive than the guidance that was available when the KP was first signed and negotiated. KP A1 Parties have taken on huge efforts to improve their monitoring and reporting capacities to respond to KP requirements and, mostly driven by REDD+ reporting requirements, non-A1 countries are quickly and remarkably improving their reporting capacities. Huge efforts in field and satellite research across the globe have already made reporting estimates much more accurate and complete than what was possible only a decade ago. This effort is ongoing and will continue into the future, resulting in easier, more accurate, more complete, less uncertain and cheaper estimates over the next years and decades. Most of the concerns that arose when the KP was first negotiated (over reporting capacity and quality) are no longer valid.

Permanence. The main argument for non-fungibility is related to the risk of non-permanence of carbon stocks. This concern would be eliminated if the land remains permanently under accounting, as a possible reversal in carbon stocks would be accounted for in the future (see section 6.5.2 below).

6.3 Create the right incentive structure to promote land management changes

Emissions and removals will vary due to many factors, including natural factors, age-class and past management legacy effects and management changes introduced more recently. Accounting systems designed to account and promote management changes in the land sector should focus on the later.

6.3.1 Use reference levels in AFOLU accounting

Although emissions and removals in the AFOLU sector depend on management decisions during a commitment period, they are also dependent on the structure of the sector at each point in time.

Comparing commitment period emissions with emissions in a base year (like the KP does for all non-LULUCF sectors in relation to 1990) results in a poor accounting method for LULUCF that can result in a "forest lottery". As all countries had a different forest structure in 1990 (or any other year) from the one characterising any commitment period, it follows that large amounts of accounting credits or debits will be generated largely by chance, rather than by introducing really good or really poor forest policies. Also, countries with similar forest management practices may have very different accounting results, due to differences in age structure and other forest characteristics. A similar argument can be developed, although probably on a smaller scale, in relation to cropland, grassland and other land uses.

As forests tend to grow slower as age increases, countries with older forests will have smaller annual sequestration rates than countries with very young forests. The age class structure of the forests in each country is largely related to:

1. Past management decisions. These decisions influence the balance between production and protection forests; whether harvesting or deforestation were stimulated or strongly discouraged; if policies promoted afforestation or agriculture
2. Record of natural disturbances. Forests recovering from a natural disturbance in the near past may have higher rate of sequestration than a mature forest where these disturbances did not occur.

An alternative to using a single a base year (or period) is to develop a projection of the emissions and removals that are likely to happen during an accounting period, knowing what the forest structure looks like at the onset of that period. Accounting against this reference level will remove from accounting any changes in carbon stocks that were expected given the forest structure of that Party, i.e., only differences to business as usual would be credited. The same approach could be followed for other land-uses also, notably in cropland and grassland or animal related emissions.

If designed under this premise (use of a projected reference level), the accounting system would provide an incentive for Parties to change forestry, agriculture and land-use policies to do better than they normally would and to serve as a warning system against policies with unintended consequences on emission increases.

Accounting real emissions (during an accounting period) against a projected reference level makes the estimated accounting quantities less uncertain, as the uncertainty on the difference (or trend) is smaller than the uncertainty on each of the estimates (reference level and annual emissions)[17].

[17] Provided that methodological consistency between reporting methodologies and the methodologies for estimating reference levels is ensured.

Finally, the projected reference level as an "accounting method" is also similar and more compatible with accounting rules elsewhere in the UNFCCC and KP systems that make extensive use of the notion of projected emissions as a reference for calculating additionality.

6.3.2 Make slow carbon changes and [short] accounting periods compatible

While some emissions can be quite large on a particular year in the LULUCF sector (e.g. deforestation, harvesting, forest fires, and land-use conversions), most emissions or removals are usually, on an annual basis, rather modest. This, combined with the use of a projected reference level, is challenging when the intention is to promote AFOLU management changes and the accounting periods are shorter than the time it takes for the changes in management to be fully reflected in reporting and accounted for (or get the credit they "deserve").

This challenge could be surpassed with a more extensive use of the default IPCC 20 year transition period for land-use changes, i.e., by allowing that the impact of management changes introduced during a commitment period be accounted for a period of 20 years. This could be achieved through the rules for developing reference levels where the impact of recently introduced management changes could be excluded from the projections for future accounting periods (up to a maximum of 20 years, after which the new practice would be considered business as usual).

Recognising benefits over 20 years would remove a perverse incentive to promote action only at the beginning of each accounting period and pave the way for activities with slower but recognisable climate benefits to be promoted (e.g., measures to combat soil erosion and desertification or to promote soil carbon sequestration). From an emissions increase perspective, the 20 year period would also contribute to avoid practices that, e.g., promote further degradation of soils.

6.3.3 Exclude from accounting impacts from natural disturbances

The projection of emissions and removals has its limitations, namely in producing estimates for the impact of emissions associated with natural events of high inter-annual variability. Rather than attempting to forecast the actual level of emissions from natural disturbances in an accounting period and include it in the reference level, the model used for the 2nd CP of the KP could be used.

Under that approach a background level of natural disturbances in forests is embedded into the reference level and an accounting provision allows for emissions – where these are high – to be excluded from accounting. A number of information requirements guarantees that the system is not abused.

This model could be expanded to other land uses (especially cropland and grassland) and built into the new accounting framework. Alternatives for identifying and excluding emissions and removals from slower processes (like desertification or climate change itself) could also be considered, although that will probably be very difficult to do in practice.

6.4 Account based on UNFCCC reporting categories

Both the 2003 IPCC GPG for LULUCF and the 2006 IPCC Guidelines include reporting tables based on land uses (forest land, cropland, wetland, etc.), rather than activities (forest management, wetland drainage and rewetting). Using the land basis for accounting would largely simplify reporting for accounting purposes, as the information source would be the UNFCCC national inventories.

It should be noted that this approach is not incompatible with the implementation by Parties of activities targeting only specific sub-sectors or emission sources (in some cases and depending on how activities are defined the scope of reporting of activities may overlap fully with that of land uses). If the reference level is constructed as the expected level of emissions and removals without additional management changes, then those new activities would be responsible for any accounted emissions or removals under the respective land use.

6.5 Aim for full carbon accounting on all lands

In an ideal world, all variations in carbon pools and net emissions and removals of greenhouse gases from all land uses would be reported and used in an accounting framework. However, it must also be recognised that the reporting of land-use emissions and removals is complex and requires large amounts of data which are currently not available for all Parties.

In an "ADP World", where all Parties are somehow involved, setting the bar at full carbon accounting is probably over ambitious and is more likely to play as a factor for exclusion of countries from making contributions within the sector, rather than as an incentive to promote mitigation action.

It should be noted that even for Annex 1 countries, which have been reporting regularly for longer periods of time, the challenges for full carbon accounting have not yet been fully surpassed.

While the above is true for full carbon accounting, it is also true that most countries are able to report quite accurately on some lands, carbon pools and/or GHG gases. E.g. reporting on living biomass in forests is, for most countries, quite accurate and complete, while the reporting on wetlands or settlements is still, for many countries, much more incomplete and has higher uncertainty.

6.5.1 Accept different entry points for different Parties, but define minimum levels

Full carbon accounting from the land use sector (all lands, all pools, and all gases) should be stated as a long term objective for the accounting system. However, there is a risk for very slow progress towards that objective, if Parties are completely free to decide when and how to enter the accounting system. Alternatively, a decision to establish "minimum entry points" could be taken. A possible set of such entry points, building on the principle "once in always in", would require e.g. that parties would account for:

- All lands and agriculture emissions[18] used for demonstrating compliance with pre-2020 Pledge
- Other Key Categories within the AFOLU sector[19]
- Lands under AR CDM in the 1st and 2nd Commitment Period
- Lands and agriculture emissions used for demonstrating results in Internationally Supported NAMAs or REDD+ in pre-2020 context
- All pools and gases of the above categories

The list could, naturally, be added with any categories a Party may voluntarily wish to account for.

[18] In the sense of the current chapter 4 (agriculture) emissions: animal emissions, fertilization, manure management, etc.
[19] Key categories vary with the relevance of emissions and removals of particular land uses in each Party and may include forest land, cropland, grassland, wetlands or land-use changes only (lands converted to…) and therefore would not have to be the same for all Parties. Methodologies for identifying Key categories are available in the IPCC Guidance and could be used to determine mandatory categories for each Party.

6.5.2 More land over time, but "once in always in"

The counterpart for introducing the flexibility to start with a minimum entry point and gradually moving into full carbon accounting should be the requirement to maintain the reporting and accounting over subsequent periods of all lands, pools and gases after they have already been accounted by that Party in the past.

This requirement should be applied for all lands already part of existing accounting systems pre-2020 and for all Parties where LULUCF related activities were part of the pre-2020 Pledges.

That would guarantee the permanence of the carbon stocks or, where that would not be the case, the reduction of carbon benefits to be generated over future accounting periods.

The "once in always in" rule would also contribute to avoid that Parties would choose only whatever activities would be beneficial (from an accounting perspective) over a particular accounting period and changing those lists of activities over subsequent accounting periods, but rather focus on actions that would provide a climate benefit over more sustained time periods than a single accounting period.

6.5.3 Emissions accounted for at the right moment in time

Full carbon accounting should also mean that emissions are accounted for when they occur. The "instant oxidation" proxy (emissions at the time of harvesting) should be replaced by proper accounting of the harvested wood products pool, which will make the timing of emissions dependent of the type and lifetime of the products that are produced from the harvesting of forests.

6.5.4 Build a system that facilitates greater coverage over time

Moving towards full carbon accounting can be facilitated by allowing a phased coverage of more activities in a land-use category or additional land use categories over time or by including extra pools or gases in the reporting of already accounted land uses.

Rather than setting *ex-ante* the full list of land-uses that will be accounted for[20], Parties should have the possibility to include new activities, pools and gases as they develop the capacity to do so, even within an accounting period. However, each change should represent a movement towards full carbon accounting, i.e., Parties should be able to add but not to remove land-uses, pools or gases (see 6.5.2). Deadlines for moving towards higher coverage could also be considered and decided upon.

It should be noted that increasing coverage over time could be possible without compromising targets provided that accounting is made against a projected reference level. As it reflects changes in management that are not contained in the reference level, the consistency of the accounting system is maintained after such additions (see 6.6).

6.6 Maintain consistency, accept recalculations as a "good feature" of the accounting system

Recalculations are a common feature in greenhouse gas inventories and take place in all sectors, pools and gases. However, many have rightly pointed out that recalculations are more frequent in the LULUCF sector

[20] In KP accounting, Parties would elect those voluntary activities they wish to account for in the beginning of the accounting period and that choice could not be changed. Only in the subsequent commitment period would Parties be able to elect new activities, but they won't be allowed to stop accounting for previously elected activities.

and/or that the difference between the original and the recalculated estimates is larger in the LULUCF sector than in other sectors.

Recalculations are also a reporting good practice. If better data, better methodologies and better emission factors become available, then they should be used in greenhouse gas inventories as soon as possible. Reporting should reflect – at each point in time – the best possible estimate of the real emissions and removals a particular country can do.

From an accounting perspective, the idea of using numbers that fluctuate over time may, at first sight, seem challenging. However, the impact of recalculations on accounting is more likely to be positive than negative:

- If recalculations represent an improvement in the overall quality of the estimates that are reported, then the accounting is improving every time a recalculation is made. Recalculations are a good opportunity for Parties to bring into reporting new data sources, improved methodologies, increase the comprehensiveness of reporting (e.g. adding pools or gases that were missing in previous inventory submissions). Technology and science are evolving fast in LULUCF reporting and opportunities to report more accurately and cheaply will emerge in the near future.
- Recalculations are often made by Parties as a direct response to suggestions or problems identified by the expert review teams during UNFCCC inventory reviews. Use of tools to make reporting across countries more comparable, consistent and overall more credible can be promoted.
- From an accounting perspective, often the trend in emissions has more "value" than the absolute level of emissions in each reporting year. Recalculations will not have an impact on whatever value judgement one may which to make about a particular Party's emissions trend, provided that recalculations are made consistently for all reporting years (time series consistency is one of the most important principles for reporting).
- The new methodologies, data etc. will have an impact on both the reference level value and the reported values of emissions and removals. As the relevant quantity for accounting is the difference between these numbers (rather than each of the numbers in itself), the impact of recalculations, if projected reference levels are used for accounting purposes, will be far more limited than might be expected.

The accounting rules for AFOLU should therefore encourage recalculations and require that these are made:

1. Consistent with IPCC guidance.
2. On a voluntary basis by a Party, whenever developments within a country allow for higher quality estimates to be made.
3. On a mandatory basis by request of the expert review team (or equivalent body), whenever problems are identified in the methodologies and data used by Parties.
4. Over the full time series.
5. On the reference level and the actual reporting during the accounting period.

6.7 Improve capacity and share data

Access to data and methodologies and the capacity to use them can become a limiting factor in delivering mitigation in this sector. Although impressive progress has already been made in improving the reporting capacities of many Parties, there are still countries and AFOLU categories where further capacity is needed.

Instruments like the UN-REDD Programme[21] to support national level readiness and data sharing platforms like the IPCC's Emission Factor Database[22] or GlobAllomeTree[23] are instrumental in bringing countries up-to-

[21] http://www.un-redd.org/AboutUN-REDDProgramme/tabid/102613/Default.aspx

speed with reporting requirements for implementing reporting and accounting procedures. These instruments should be continued and expanded to cover the full scope of AFOLU activities and land-uses and the full scope of climatic and geographic zones.

Current IPCC guidance already allows all Parties to report on almost all pools and gases of the Land Sector, at least at Tier 1 level. For accounting, tiers 2 and 3 would be desirable and significant steps need to be taken by many Parties in that direction. The future accounting system could differentiate the requirements for minimum tiers, demanding higher tier for, e.g., access to markets, while accepting lower tiers (applied in a conservative manner) to report on progress in emissions reductions.

6.8 Recognise links to adaptation

While accounting is fundamentally about mitigation of climate change, adaptation is also very important in the land sector and will need to be addressed by Parties together with mitigation. The link can be made by each Party, taking into account its national circumstances, in several ways:

Promote synergies. Many options for improving adaptation of crops and forests to climate also contribute to reducing emissions or increasing sequestration. These *win-win* changes in management practices should be identified and receive priority when sustainable forest management or climate-smart agriculture are being planned and implemented.

Avoid maladaptation. On the contrary, some mitigation options may contradict the adaptation efforts or make adaptation more costly and difficult. These options should in principle not be pursued.

Incorporate climate impacts in reference levels. Modelling of climate impacts is improving and becoming more reliable. While today it may be extremely challenging to include the impacts of future climate change into the construction of a projected reference level, it is theoretically possible to conceive this in the future. If that could be achieved, the progress in both mitigation and adaptation could be tracked over time.

6.9 Build trust, increase comparability, but keep some flexibility for national circumstances

6.9.1 Simplify language

Communication is of paramount importance in building trust. The complicated language used in the past should, to the extent possible, be replaced by other terms closer to common language or terms used elsewhere in the UNFCCC negotiations.

All delegations and stakeholders should be able to comprehend what the proposals for accounting rules are attempting to do and why.

6.9.2 Increase transparency and comparability, but don't over standardise

There is a strong and compelling case to be made for full standardization amongst different Parties: if all Parties report and account based on exactly the same definitions, methodologies, data requirements, reporting templates and accounting rules, then the results are fully comparable, highly transparent, are easily

[22] http://www.ipcc-nggip.iges.or.jp/EFDB/main.php
[23] http://www.globallometree.org/

understood by all stakeholders and therefore, will contribute to build trust and – hopefully – a trustworthy environment will help Parties to propose more ambitious emission reductions targets.

However, fully standardised approaches may actually prove to be difficult or even impossible to implement in all possible national contexts (and in an "ADP world" this diversity will only increase). Considering the wide range of climate zones, soils types and ecosystems, developing a system that suits all situations is not easy. Information sources also differ from country to country and the system should aim to make the best use of available information, rather than requiring information that does not exist or that will take years to develop.

The opposite case – no standardisation or national systems – has its own appeal for individual Parties. If one can choose one's own definitions, information sources, methodologies, etc. it can be argued that the results better represent local circumstances. However, and in this case, the number of possible alternatives to report and account for these emissions and removals is likely to be so large that no meaningful comparison between Parties could be made from its results. This has the potential to lead to a severe lack of trust amongst Parties and between Parties and other stakeholders (e.g. NGOs).

Clearly a balance will have to be struck between an "ideal" fully standardised system (but possibly impossible to negotiate and implement) and an "ideal" fully national system (with very limited comparability and that will be very difficult to accept under an international regime). The tension between these two extremes (how much standardisation is enough?) already consumed most of the negotiation time under the KP and this will likely be the case again.

Clear Definitions

The IPCC reporting guidelines already provide for some level of standardisation that can also be used for accounting purposes.

Where the need to go deeper on definitions is felt by Parties, one can learn from the KP experience and its forest definition where a good compromise was reached. The agreed forest definition allowed for a high level of standardization, while leaving enough flexibility for all parties to adopt slightly different versions of the same basic definition that better suited their national circumstances.

This type of approach, i.e., agreed clear definitions that retain some room for national circumstances, could be expanded where needed.

Reporting tables and reporting methodologies

Parties should agree on the reporting tables and IPCC guidelines and good practice guidance to be used for accounting on AFOLU. Following recent decisions by the COP, the 2006 Guidelines are to be used by A1 Parties as of 2015. For non-A1 Parties the use of the 2003 IPCC LULUCF GPG is encouraged. The reporting tables from the 2 versions are different (Agriculture + LULUCF vs AFOLU), but the information requirements in both versions are not significantly different. On the other hand, the 2006 guidelines provide, in some cases, simpler ways of estimating emissions and removals, and have considerably expanded the scope and variety of default values for use where national values are not developed yet.

It should therefore be possible to agree on the use of the 2006 IPCC guidelines and agreed reporting tables (IPCC or UNFCCC) as a basis for accounting on AFOLU for all Parties, although as explained in section 6.5 that wouldn't mean that all elements of those tables would have to be filled in from the beginning and for all Parties.

Reference levels

If accounting is made against a projected reference level, the credibility of the reference level becomes the difference between a sound accounting system and a weak accounting system. This concern over credibility remains valid regardless of whether we discuss reference levels for forest land, or more broadly on AFOLU.

Developing projected reference levels at AFOLU level can be challenging. In practice this would probably require the calculation of different reference levels for each land-use, which are then added to form the projected AFOLU reference level. Note that the reporting system under the convention – in particular the recent Biennial Reports – already requires Parties to develop projections of emissions and removals for all sectors. The AFOLU reference level could build on those exercises.

The full standardisation of reference levels would probably require that all Parties use the same models, methodologies, etc. to develop their reference levels. For the reasons mentioned before, that is very unlikely to be possible. The opposite, i.e., Parties develop whatever reference levels suits them is also very unlikely to be acceptable.

As an absolute minimum, Parties will have to agree on a narrative for the reference level, i.e., what the value proposed as a reference level is supposed to represent: in section 6.3.1 the proposed narrative is that the reference level should represent the "emissions and removals that are likely to happen during an accounting period, knowing what the forest structure looks like at the onset of that period".

However, Parties can add to this minimum narrative other elements to improve transparency and allow for future reviews and recalculations, such as:

1. Transparently describe coverage of reference level using AFOLU categories, as described in the 2006 IPCC Guidelines:
    a. Which AFOLU categories were considered and included in the reference level
    b. Which carbon pools were considered and included in the reference level for each relevant AFOLU category
    c. Which gases were considered and included in the reference level for each relevant AFOLU category (CO_2; CH_4; N_2O; CO; NMVOCs)
2. Transparently describe the main drivers for emissions and removals relevant for each AFOLU category included in the reference level, e.g.:
    a. Historical and assumed areas and area changes per AFOLU category
    b. Historical and assumed populations of each animal species
    c. Historical and assumed soil correction applications and intensities (fertilisers, manure, liming)
    d. Age class structure for forest land
    e. Historical and assumed harvesting rates
    f. Background level of natural disturbances
3. Transparently describe the main past and existing policies affecting the drivers of emissions and removals and how these have affected the reference level
4. Transparently describe the methodologies used for the calculation of the reference level demonstrating that these
    a. Are consistent and coherent with the latest submitted inventory report
    b. Can be subject to recalculations in a transparent manner, if recalculations are made in the historical time series

Review procedures

The credibility and acceptability of an accounting system based on a reference level depends first and foremost on the credibility of the reference level itself.

The review procedure used for the forest management reference level under the KP can be used as a model, although some aspects should be revisited to improve the overall quality perception over the reference levels proposed by each Party. A review procedure on a reference level should be able to:

1. Assert that, under the assumptions and category coverage used by the Party, the reference level reflects the best estimate at that point in time
2. Assert that the reference level is consistent with the methodologies and data used by the Party in AFOLU reporting and, where needed, that it will be possible to recalculate it in the future in a transparent way
3. Assert that the assumptions used by the Party are in line with historical trends or that significant differences have been properly and transparently explained

Strong review procedures are also needed during the accounting period to provide for the quality assurance "stamp" of each Party's estimates of emissions and removals. Expert review teams should have the capacity to draw recommendations for future improvements and identify areas where the information suffers from severe problems of technical or scientific nature.

It would also be worth exploring the value of keeping the notion of "adjustments" that allows KP inventory reviewers to adjust in a conservative manner the values reported by Parties, where these were believed to have more serious problems. Along with increased trust that the values used for accounting are credible, this power of the review teams also works as an incentive for Parties to improve their emission inventories.

6.9.3 Initiate talks as soon as possible

Developing a Common Accounting Framework for AFOLU will require time and some in-depth technical discussions to support the common understanding of the accounting rules that will eventually emerge and be agreed by Parties.

That process should be carried out under the right legal framework (AWG ADP). Parties would benefit from an "agenda slot" to discuss these issues as soon as possible.

Annex 1 – Some Key GHG Inventory Concepts

Inventories rely on a number of key concepts, which are important to ensure that inventories across countries and through time have the characteristics highlighted in section 3.2.2. The most relevant inventory concepts mentioned in the IPCC Guidance include:

Good Practice: In order to promote the development of high quality inventories a collection of methodological principles, actions and procedures is defined, collectively referred to as good practice. Inventories consistent with good practice are those which contain neither over- nor under-estimates "so far as can be judged", and in which uncertainties are reduced as far as practicable.

Emission estimate. The most common and simple methodological approach is to combine information on the extent to which a certain human activity takes place[24] (called activity data or AD) with coefficients which quantify the emissions or removals per unit activity. These are called emission factors (EF). The basic equation is therefore: Emissions = AD × EF.

Anthropogenic emissions and removals means that emissions and removals included in inventories are a result of human activities. The distinction between natural and anthropogenic emissions and removals normally follows straightforwardly from the data used to quantify human activity.

Managed Land Proxy. Emissions and removals on managed land are taken as a proxy for anthropogenic emissions and removals. Inter-annual variations in natural background emissions and removals, though can be significant, are assumed to average out over time.

Tiers: A tier represents a level of methodological complexity. Usually 3 tiers are provided. Tier 1 is the basic method, Tier 2 intermediate and Tier 3 the most demanding in terms of complexity and data requirements. Tier 1 is the simplest and IPCC provides most of the information for its calculation, so that Parties are able to provide emission estimates with little input data. Tiers 2 and 3 are sometimes referred to as higher tier methods and are considered to be more accurate. In practice, most countries report on the basis of a combination of different tiers for each part of the their inventories (lower tiers for categories for which there is no national information combined with higher tiers for the most important data and emission factors).

Default data: Tier 1 methods rely on default data for most variables, and therefore should be feasible for all countries. Default data readily available national or international statistics and/or default emission factors and additional parameters.

Key Categories: The categories that have a significant influence on a country's total inventory of greenhouse gases in terms of the absolute level, the trend or uncertainty of emissions and removals. Key Categories should be the priority for countries during inventory resource allocation for data collection, compilation, quality assurance/quality control and reporting.

Decision Trees: Decision trees help the inventory compiler navigate through the guidance and select the appropriate tier for each circumstance based on the assessment of key categories. In general, it is good practice to use higher tier methods for key categories, unless the resources required to do so are prohibitive.

Uncertainty assessment: Characterises the range and likelihood of possible values for the national inventory as a whole and for its components. Awareness of the uncertainty of parameters and results provides inventory compilers with insight when evaluating suitable data for the inventory during the data collection and compilation phases. Uncertainty assessment also helps identify the categories that contribute most to the overall uncertainty, which helps the inventory compiler prioritise future inventory improvements.

Continuous improvement and rigor is encouraged through activities of quality assurance and quality control (QA/QC) and verification.

[24] E.g. how much land was deforested; how many cows of a certain type exist; etc.

Annex 2 – Summary of Requirements for LULUCF CDM Projects

A CDM project is initiated by a Project Design Document (PDD) is approved by the Executive Board of the CDM that should contain:

1. Technical description of the project and justification of the project boundaries;
2. Proposal for a Baseline (using an existing approved methodology; or proposing and justifying a new methodology);
3. Statement of operational lifetime of the project and crediting period selected;
4. Description of how the emissions are reduced below those that would have occurred in the absence of the project;
5. Documentation and analysis of environmental impacts, and, where relevant, references to Environmental Impact Assessments carried out in accordance with procedures of the host Party;
6. Information on Annex-1 funding for the project
7. Stakeholder consultation process and summary of results;
8. Proposal for a Monitoring Plan (using an existing approved methodology; or proposing and justifying a new methodology; in both cases including identification of data needs, data collection methodologies, quality assurance and quality control);
9. Calculations used for estimating emissions in the baseline and its associated leakage[25], for estimating emissions within project boundaries and leakage, and an estimation of emission reductions of the CDM project activity.

After project implementation and throughout the life of the project, projects are subject to Verification and Certification of its results. Verification will independently review the monitored reductions that have occurred as a result of the project during the verification period. Certification will provide the written assurance that the project achieved the reductions in emissions as verified. The units that are issued as result of a CDM project (after being proposed by Host-Party and Project proponent, approved by the CDM EB, correctly implemented, verified and certified), are called CER (Certified Emission Reductions). These units can later be used for compliance under the Kyoto Protocol by Annex-1 Parties.

Decision 5/CMP.1 included additional requirements for AR CDM projects. These included:

1. Host Party information on its applicable forest definition;
2. Additional information requirements to the PDD, including:
    a. Analysis of the socio-economic and environmental impacts, including impacts on biodiversity and natural ecosystems. Where these are deemed “significant” an Environmental Impact Assessment or Social Impact Assessment is required including a description of monitoring and remedial measures to address them;
    b. Demonstration that the GHG Balance of proposed AR activity is additional to changes in carbon stocks that would have occurred in the absence of the proposed activity;
    c. Demonstration that a coincidence of peaks in carbon stocks (resulting from planned management activities, harvesting cycles) and verifications is avoided;
    d. The specification of the approach to address non-permanence and crediting period that was selected (see next section for more information);
3. An extension of information requirements for determining baselines, monitoring plans and leakage estimations to include also methods, activity data and calculation formulas for estimating removal by sinks;
4. Information describing changes in circumstances within the project boundary that affect the legal title to the land and the rights of access to the carbon pools.

[25] defined as: the net change of anthropogenic emissions by sources of greenhouse gases which occurs outside the CDM project activity boundary, and that is measurable and attributable to the CDM project activity

Annex 3 – Summary of Requirements for LULUCF JI Projects

A project is generally eligible under JI if it:

1. Has been approved by the Parties involved
2. Results in a reduction of anthropogenic emissions by sources or an enhancement of anthropogenic removals by sinks that is additional to any that would otherwise occur
3. Has an appropriate baseline and monitoring plan

Additionally, JI LULUCF projects shall conform to definitions, accounting rules, modalities and guidelines under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

In very general terms, Emission Reduction Units (ERU) shall be issued when monitored and verified emissions and removals are smaller than the baseline emissions and removals.

In relation to baselines Decision 9/CMP.1 requires that the baseline shall:

1. Be defined as the scenario that reasonably represents the anthropogenic emissions or removals that would occur in the absence of the project;
2. Cover emissions and removals from all gases, sectors and source categories within the project boundary;
3. Be established: on a project-specific basis and/or using a multi-project emission factor; in a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors; taking into account relevant national and/or sectoral policies and circumstances; in such a way that emission reduction units (ERUs) cannot be earned for decreases in activity levels outside the project activity or due to force majeure; taking account of uncertainties and using conservative assumptions.

In relation to the monitoring plan, the same decision requires that:

1. All relevant data necessary for estimating or measuring emissions and/or removals of greenhouse gases occurring within the project boundary during the crediting period be collected and archived;
2. All relevant data necessary for determining the baseline be collected and archived;
3. All potential sources of emissions and/or reduced removals of greenhouse gases outside the project boundary that are significant and reasonably attributable to the project during the crediting period be identified, collected and archived. The project boundary shall encompass all anthropogenic emissions by sources and/or removals by sinks of greenhouse gases under the control of the project participants that are significant and reasonably attributable to the Article 6 project activity;
4. Information on environmental impacts, in accordance with procedures as required by the host Party, is collected and archived, where applicable;
5. A quality assurance and control procedures for the monitoring process are in place;
6. Procedures for the periodic calculation of the reductions of emissions and/or enhancements of removals by the project, and for leakage[26] effects, if any, are in place;
7. All steps involved in the calculations referred to above are documented.

[26] Leakage is defined as the net change of anthropogenic emissions by sources and/or removals by sinks of greenhouse gases which occurs outside the project boundary, and that is measurable and attributable to the Article 6 project

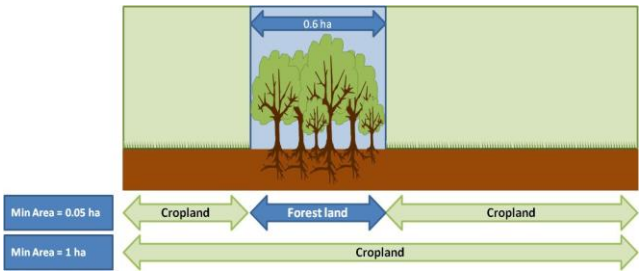
Annex 4 – Implications of the KP Forest Definition

Decision 16/CMP.1 requires all Annex 1 Parties to specify their own definition of forest, but provides minimum standards that all Parties should observe: a minimum area of 0.05-1ha; a minimum tree height of 2-5m at maturity; a minimum tree crown cover of 10-30%. It also specifies that areas that are temporarily unstocked (due to pests, diseases, storms, fire or harvest) but are expected to recover forest cover should also be classified as forest. Likewise, young plantations that have not yet have reached the required thresholds should also be classified as forests. Finally, decision 16/CMP.1 requires that the reported forest values are consistent with what has been reported historically to the FAO and other international organisations, or that an explanation is provided on why and how the forest definitions are different.

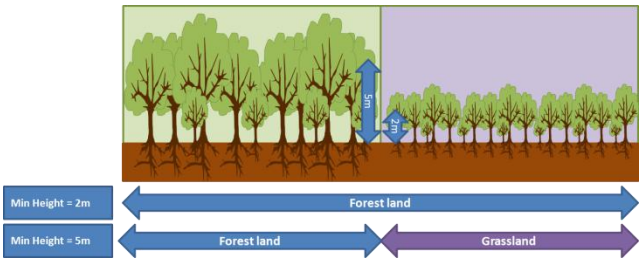
Depending on the specific definition chosen by each country, the total forest areas will vary, as shown in Figure 4.

Figure 4: Implications of the KP Forest Definition

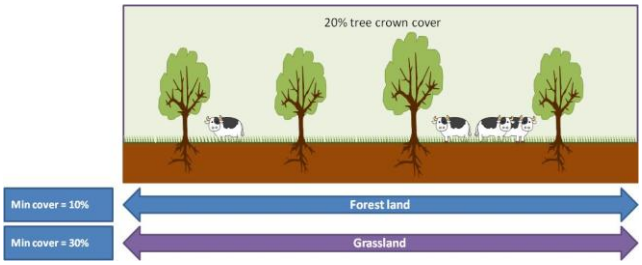
Minimum area 0.05 ha to 1 ha



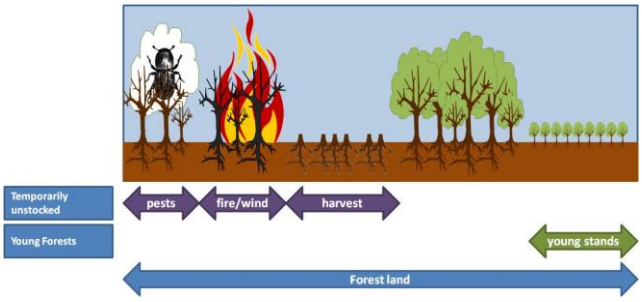
Minimum tree height at maturity 2 m to 5 m



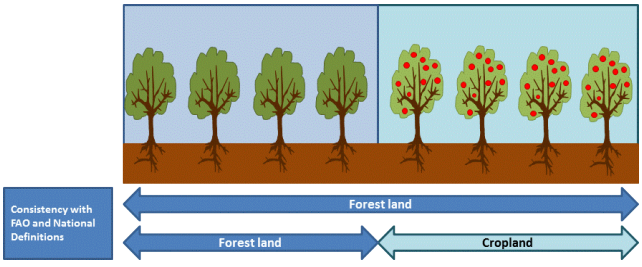
Minimum tree crown cover 10% to 30%



Inclusion of areas below thresholds

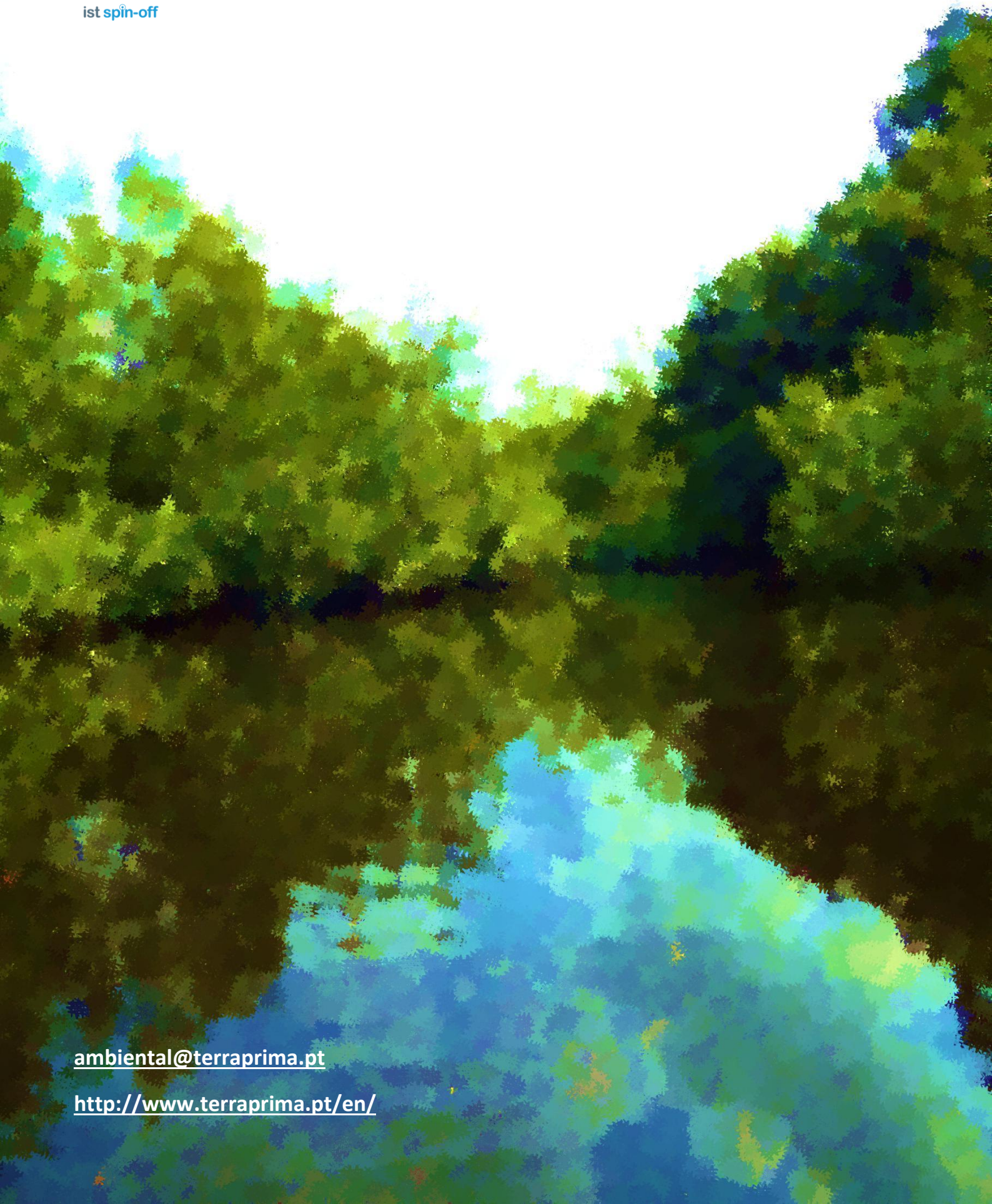


Consistency with FAO and national definitions



Terraprima

ist spin-off



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