Crediting Forest-related Mitigation under International Carbon Market Mechanisms

A Synthesis of Environmental Integrity Risks and Options to Address Them

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Disclaimer

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Authors

Lambert Schneider (Independent researcher)
Darragh Conway (Climate Focus)
Aki Kachi (NewClimate Institute)
Barbara Hermann (Climate Focus)

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EXEUCTIVE SUMMARY

Opportunities and risks in linking forest-related mitigation to carbon markets

Preserving and enhancing forests is an essential part of global efforts to mitigate climate change. Currently, most finance for forest-related mitigation is provided through official development assistance (ODA), through grants, loans and results-based finance. However, this finance has been found to be far below what is needed to adequately protect forests. To increase finance for forest-related mitigation, some countries and stakeholders call for mobilizing further finance through so-called 'transfer-based finance', whereby payments are provided in return for transferring the rights to the emission reductions or removals to the country or entity providing the payments. This can include the crediting of the emission reductions or removals under carbon market programmes to serve demand from international compliance markets, including under Article 6 of the Paris Agreement and under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) implemented under the International Civil Aviation Organization.

Whether emission reductions or removals from forest-related mitigation should be internationally transferred and used towards achieving international mitigation targets has been debated vigorously over the past two decades. While this could bring a number of opportunities – including the potential for increased finance for forest-related mitigation, a possible reduction in the cost of achieving mitigation targets, and non-carbon benefits – it also involves a number of challenges and risks. Risks include those related to environmental integrity, (non-carbon) environmental and social risks, and a possible oversupply of offset credits. Challenges include the difficulty in securing the long-term investment needed for forest protection in the context of volatile market prices, higher administrative costs, and the lack of a crediting mechanism with international oversight that credits avoided deforestation or degradation.

This discussion paper aims to inform this debate by exploring what environmental risks could arise if offset credits from forest-related mitigation activities were to be used towards nationally determined contributions (NDCs) and CORSIA, and what options could be pursued to manage such risks. It specifically focuses on risks surrounding environmental integrity as well as environmental and social safeguards. The paper finds that some of the risks and challenges associated with crediting forest-related mitigation are common to other activities implemented under greenhouse gas (GHG) crediting programmes while some are specific to – or are heightened in the context of – forest-related mitigation. Moreover, the Paris Agreement provides a new context that is essential to consider.

Quantifying emissions reductions – the special challenges of forest-related mitigation

The quantification of emissions reductions – including addressing additionality, baselines, leakage, monitoring, uncertainty, and third-party review – is a critical aspect for ensuring environmental integrity in GHG crediting programmes. Several particular challenges arise for forest-related mitigation. First, many forest-based programmes are implemented at jurisdictional level, due to the much greater capacity of governments to achieve large-scale, long-term emission reductions. When it comes to crediting, this brings several challenges. Firstly, a key principle of GHG crediting programmes is that emissions reductions projects and programmes must be additional. This means that only those emission reductions should be credited that occur as a result of the intervention made. Additionality of jurisdictional programmes can be difficult or impossible to demonstrate through separate additionality tests due to the use of multiple policy interventions and the numerous policy objectives that may be behind each one. This raises also issues with regard to the attributability of the emission reductions. Existing standards for transfer-based finance at jurisdictional level – such as the Jurisdictional and Nested REDD+ (JNR) standard of the Verified Carbon Standard (VCS) and the Carbon Fund of the Forest Carbon Partnership Facility (FCPF) – seek to address additionality through requiring the use of conservative baselines.

Secondly, a key feature for some forms of forest-related mitigation, such as avoiding deforestation and degradation, is the difficulty in identifying and predicting economic drivers and the political conditions that influence the land sector. This affects the ability to establish baseline scenarios, as well as to estimate leakage effects. The available analysis suggests that baselines built on historical data may be more conservative, and less prone to assumptions, than establishing business-as-usual (BAU) emission

scenarios. Where deviations from historical calculations are allowed, providing clear rules and methodologies for this may help avoid over-estimating baselines. And third, obtaining data and measuring carbon stocks is often more difficult in the forest sector, which impacts the ability to develop baselines and measure emissions levels. Most existing programmes address these latter two challenges also by establishing baseline scenarios in a conservative manner, adjusting baselines to account for (changing) national circumstances, and/or discounting emission reductions based on estimated uncertainties with regard to data on carbon stocks.

With the adoption of the Paris Agreement, many countries have communicated NDCs that include targets for the land use, land-use change and forestry (LULUCF) sector. This changes the context for establishing baselines. In principle, baselines could be derived from NDC targets, but caution may be required as some NDC targets could include 'hot air'. In such instances, deriving baselines from an NDC target could lead to inflated baselines that undermine environmental integrity.

Addressing leakage locally, nationally and globally

Addressing any potential for leakage is an important consideration for ensuring environmental integrity. For forest-related mitigation, challenges in assessing, minimizing and addressing leakage are closely related to understanding drivers of deforestation, accurately predicting future trends, and assessing the impact of mitigation measures on those drivers, considering differences between sectors and different geographic regions. Approaches have been developed to address this to some extent on a local and jurisdictional scale; however, they are dependent on accurate and robust monitoring of activities outside of the scope of the credited activity. Jurisdictional approaches are better positioned to address local and national leakage. Global leakage presents an ongoing challenge for all mitigation activities linked to international trade, including forest-related mitigation. Existing programmes have not yet been able to address this risk, which is particularly relevant for globally traded commodities that are significant drivers of tropical deforestation, namely soybeans, beef, palm oil, and timber and pulp.

Ensuring the permanence of emissions reductions and removals

Another important feature of forest-related mitigation is the potential non-permanence of emission reductions or removals. GHG crediting and transfer-based programmes have developed a range of approaches to address non-permanence. A non-performance risk assessment combined with a pooled buffer, as for example implemented under the VCS, can provide a financial incentive for programmes and projects to manage and reduce non-permanence risks. Here, the accuracy of the risk assessment into the future is critical. Sufficiently long monitoring, beyond crediting periods, and effective sanctions if monitoring is stopped, are important to provide incentives to continue maintaining the carbon stocks in the long-term, and to ensure permanence. The responsibility to compensate for any non-performance could lie primarily with the owners of the activity, combined with a host country liability as required under the Clean Development Mechanism and optional under the VCS, since the owners and the host country can best influence the risk of non-permanence. These approaches would also ensure that offset credits from forest-related mitigation are fully fungible in the market. A key challenge are enforcement capabilities over both private and public actors over long time periods in case of non-compliance.

Robustly accounting for forest-related mitigation

The crediting of forest-related mitigation activities also raises a number of accounting issues. Many of the issues are not specific to forest-related activities but generally apply to the use of carbon market approaches under the Paris Agreement and CORSIA. These include the avoidance of double counting, including between the Paris Agreement and CORSIA, and how the diversity of NDC targets can be accounted for. Several issues are, however, specific to forest-related mitigation. A key issue is the lack of clarity of NDC targets with regard to the LULUCF sector, in particular how countries intend to account for the sector. Providing the necessary clarity is an important prerequisite for robust accounting for the transfer of any credits from forest-related activities.

Another particular feature of forest-related activities is that emission reductions can be subject to claims by different entities, creating legal risks as well as risks of double claiming of emissions reductions. Risks of double counting between projects and programmes can be addressed through nested accounting frameworks for REDD+, which have already been developed by several countries and jurisdictions,

such as under the VCS JNR. A further specific challenge is ensuring methodological consistency between the quantification of emission reductions under GHG crediting programmes and the quantification of emissions and removals in GHG inventories.

Avoiding negative environmental and social impacts of forest-related mitigation

Environmental and social safeguards for forest carbon and REDD+, as well as safeguards for carbon market approaches more generally (where they exist), seek to ensure that forest-related projects and programmes at least do not have negative impacts on the local environment or communities, especially the most vulnerable groups such as poor or indigenous peoples. This is important because of the intricate ways that interventions in the forest and land use sector affect people and the environment. In general, safeguards are more developed under forest-related standards than in other standards, and some even go beyond 'do-no-harm requirements', providing that programmes must result in net positive impacts. Moreover, the risks of safeguards being breached are similar under crediting and non-credited projects and programmes. At the same time, independent assessments show that the elaboration and on the ground implementation of REDD+ safeguards still need further work, in particular in terms of gender.

CONTENTS

PART I INTRODUCTION

Forests play an important role in mitigating climate change. They can remove carbon dioxide (CO_2) from the atmosphere and store it in biomass and soil. The clearance or degradation of forests can, however, also be a major source of greenhouse gas (GHG) emissions. Avoiding the loss of forest carbon stocks, as well as enhancing forest cover, is therefore an essential part of global efforts to mitigate climate change. Forests also provide other important benefits, including food, shelter, watershed services, biodiversity, recreation, and play an important role in many people's cultural and religious lives. Policies to protect or enhance forests therefore have the potential to produce a wide range of other social, economic, and environmental benefits.

In 2013, Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Warsaw Framework for REDD+ (Reducing Emissions from Deforestation and Forest Degradation, and the Role of Conservation of Forest Carbon Stocks, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks), consisting of seven decisions that cover various aspects for the implementation of REDD+ activities by countries. The decisions establish a framework for incentive-based approaches to compensate countries for proven reductions in greenhouse gas emissions from deforestation, forest degradation and enhancement of terrestrial carbon stocks (Agrawal, Nepstad, & Chhatre, 2011). The further implementation of this framework was finalized by Parties in 2015. The Paris Agreement refers to these decisions in its Article 5.

The Warsaw Framework for REDD+ was not established with the view to crediting the activities under carbon market programmes, and does not provide for procedures or standards to do so. Over the past two decades, a key point of discussion was whether and under what conditions forest-related activities should be eligible for crediting under international carbon market mechanisms. Under the Kyoto Protocol, Parties agreed that, for the first and second commitment periods, only afforestation and reforestation projects be eligible under the Clean Development Mechanism (CDM). With regard to Joint Implementation (JI), Parties agreed that all activities that are accounted for under the Kyoto Protocol by the country are eligible. Crediting of forest-related mitigation has in practice been pursued primarily in the voluntary market and several domestic carbon market programmes.

With the adoption of the Paris Agreement and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) under the International Civil Aviation Organization (ICAO), this issue is now back on the agenda. Parties to the UNFCCC have diverging views on whether, or which type of, forest-related mitigation activities should be eligible under Article 6 of the Paris Agreement, which provides a framework for countries to engage in international carbon market mechanisms and to use internationally transferred mitigation outcomes (ITMOs) towards their NDCs. Similarly, stakeholders have different views on whether offset credits from forest-related mitigation activities should be eligible under CORSIA. CORSIA requires airline operators to purchase offset credits to compensate for the increase in CO_2 emissions from international aviation above a 2019/2020 baseline. CORSIA is expected to create demand for about 3 billion credits over the period 2020 to 2035 and could become the largest single source of demand for credits. Several GHG crediting programmes that intend to apply for eligibility under CORSIA have protocols and procedures for crediting forest-related mitigation activities, including from avoiding deforestation and forest degradation.

A recurring issue in the ongoing debate is whether the environmental integrity risks associated with crediting forest-related activities are similar or different to other mitigation activities. There is also debate about how well existing frameworks, such as the Warsaw framework for REDD+, address these risks and what approaches might best be suited, as well as which types of forest-related mitigation activities or approaches best avoid or address these risks when it comes to crediting.

This discussion paper aims to inform this debate. Part II of this paper provides an overview of the different forms of international cooperation on mitigating climate change through forest-related activities (section II.1) and identifies and synthesizes the key opportunities, challenges and risks that stakeholders see with regard to using offset credits from forest-related activities under the Paris Agreement and CORSIA (section 0). While all opportunities, challenges and risks are relevant, part III of this paper specifically focuses on questions of environmental integrity in crediting forest-related

mitigation: the estimation of emission reductions or removals (section III.1); leakage (section 0); non-permanence (section 0); accounting issues, in particular in relation to determined contributions (NDCs) prepared under the Paris Agreement (section 0); and environmental and social safeguards (section 0).

The exploration of the environmental integrity risks in part III of this paper is guided by the following questions:

1. What are the environmental integrity risks that could arise if forest-related activities are credited under GHG crediting programmes?
    - What distinguishes forest-related activities from other mitigation activities that are typically credited under GHG crediting programmes? What risks are similar to other mitigation activities and what are specific to forest-related activities?
    - What specific risks arise only where forest-related activities are credited, rather than supported through other forms of climate finance (including results-based finance)?
    - How do these risks differ between different types of forest-related activities?
2. What options are there to mitigate the identified environmental integrity risks?
    - What risks can be mitigated easily, and what risks are more difficult to mitigate, taking into account the different types of forest-related activities?
    - What are the differences between how REDD+ finance frameworks and GHG crediting programmes approach these risks?

This paper does not provide a recommendation on whether forest-related mitigation activities should be eligible for crediting. Rather we aim to inform the debate by exploring and synthesizing key issues, in particular differences between forest-related and other mitigation activities; and differences between the context of supporting forest-related activities through climate finance, such as the Warsaw Framework for REDD+, and crediting these activities under GHG crediting programmes. The analysis draws on the available literature as well as on how GHG crediting programmes and jurisdictions mitigate these risks. In doing so, it is recognized that forest-related mitigation can include different type of activities, including the avoidance of deforestation and degradation, improved forest management, and afforestation and reforestation; be funded through different forms of international collaboration; and be implemented at different scales, including at the jurisdictional level or more local levels.

PART II BACKGROUND ON FORESTS AND CARBON MARKETS

II.1 Overview of different forms of forest-related mitigation cooperation

Cooperation to reduce emissions or enhance removals from forest-related mitigation takes a range of forms, with initiatives varying in terms of scale, approach and type of finance. This section illustrates the various types of cooperation, focusing on their respective financing modalities (Table 1).

Finance for governmental and international cooperation on forest-related mitigation predominantly originates from bilateral and multilateral aid donors, often in the form of finance for REDD+ (Arild Angelsen, 2017). "Classic" ODA finance, in particular for readiness activities, may be provided through means of grants, concessional loans and technical cooperation. This type of finance is provided through a range of international programms, including the United Nations Collaborative Program on REDD (UN-REDD), Norway's International Climate and Forest Initiative (NICFI) and finance provided through the Green Climate Fund's regular project cycle. This form of finance is not directly linked to the achievement of emissions reductions or removals and will not be further discussed in this paper.

An alternative way of providing ODA is through **result-based finance (RBF)**. RBF in the context of REDD+ refers to ex-post payments made on the basis of emission reductions achieved and verified (Streck et al., 2017). The right to claim emission reductions remains with the country of origin and no international transfer is made (Streck et al., 2017). This typically means that host countries can thus use the emissions reductions to achieve their NDC, though this may depend on the terms of the finance. Examples include Norway's International Climate and Forest Initiative (NICFI) – which, in addition to its grant-based finance, has pledged USD 2.7 billion in RBF to Brazil, Indonesia, Guyana, Peru and Liberia – as well as the REDD+ Early Movers (REM) Program. In addition, the Green Climate Fund (GCF) has recently approved a pilot programme for RBF, which will provide finance to countries on the basis of emissions reductions achieved in accordance with the Warsaw Framework for REDD+ (GCF, 2017).

Transfer-based finance (TBF) is similar to RBF, also providing ex-post payments made on the basis of emission reductions achieved and verified. Nonetheless, it differs from RBF in that payments are made in return for the international transfer of emissions reductions. In this way, partner countries, i.e. those buying emissions reductions, are entitled to use the transferred emission reductions to achieve their emission targets, such as those communicated in their NDCs. Existing examples of TBF for forest-related emissions reductions include the Forest Carbon Partnership (FCPF) Carbon Fund[1] and the BioCarbon Fund's Initiative for Sustainable Landscapes (ISFL)**.** The use of such emissions reductions towards NDCs could be subject to the international rules currently being developed under Article 6.2 of the Paris Agreement (Streck et al., 2017), which allows countries to engage in bilateral cooperation that results in the transfer of 'mitigation outcomes' from one country to another.[2] However, the exact relation of Article 5 on forests and Article 6 on markets, including using foreign emission reductions towards NDCs, has not yet been agreed and there is no consensus on linking REDD+ and Article 6.

[1] It is worth noting that, although host countries receiving payments under the Carbon Fund must transfer title to emissions reductions to the Fund, most donor countries have chosen to participate in the "restricted tranche" of that fund, under which they are not permitted to use those emissions reductions for compliance purposes.

[2] Article 6.2 used the terminology of 'internationally transferred mitigation outcomes' to refer to emission reductions or removals that are sold from one country to another. For the purposes of this paper, we will use the general term emission reductions to refer to any mitigation outcomes (whether emission reductions or removals).

Table 1 Forms of results-based finance for forest-related mitigation

Form of finance		Description	Transfer of emission reductions	Creation of Unit	ODA	Level	Examples
Result-Based Finance		ODA-funded cooperation wherein ex-post payments are made on the basis of emission reductions achieved and verified, following the decisions contained in the Warsaw Framework for REDD+ or the specific requirements of the donor country or entity.	×	×	✓	National/ sub-national	REM GCF
Transfer-Based Finance	**Without carbon markets**	Payments are made in return for the international transfer of the achieved emission reductions. The achieved emission reductions are however not issued as credits under GHG crediting market programmes.	✓	×	×	National/ sub-national	FCPF Carbon Fund Potentially Article 6.2 transactions
	With carbon markets	GHG crediting programmes issue credits for the achieved emission reductions and payments are made in return for the credits. Demand for credits can arise from compliance and voluntary markets.	✓	✓	×	Mostly project based, some sub-national/ national	CDM AR California Cap-and-trade REDD+ program (not operationalized) VCS Plan Vivo

Transfer-based finance can take two forms: the emission reductions can either be transferred without issuing carbon market units, or the activities can be implemented through **carbon market programmes,** in particular GHG crediting programmes that issue credits for emission reductions against a baseline. Demand for such credits could come from compliance markets and voluntary markets (Hermwille & Arens, 2018).

In **compliance markets**, the demand is created by mitigation targets and emissions trading schemes created under national law or targets adopted under international law, such as NDCs (Hamrick & Gallant, 2017; Seeberg-Elverfeldt, 2010). So far, compliance carbon markets have mostly accepted carbon credits from systems established under international law, such as the CDM and JI. Some jurisdictions have established their own carbon market programmes through national legislation, such as the California Offset Protocols, the Australian Emissions Reduction Fund and the Joint Crediting Mechanism (JCM) established by Japan.

None of these standards have yet enabled the generation of credits from avoided deforestation and forest degradation in developing countries. The CDM only allows credits to be created for afforestation and reforestation activities. The Californian and Australian schemes use credits from a range of forest-related mitigation activities, including avoided deforestation, but are limited to credits created domestically. California also proposed a jurisdictional REDD+ programme, but this has not been operationalized. Some governments have also started to recognize carbon market units issued by private sector or non-governmental organizations, in particular in domestic markets. For instance, Colombia accepts units issued by private sector or non-governmental organizations to be used against their newly

released carbon tax, allowing entities to offset 100% of their tax liability. The VCS is among the standards that meet the requirements needed to comply with the new law (Verra, 2017).

Voluntary carbon markets have existed since the mid-1990s and, as the name suggests, credits are purchased by entities that do not use them to achieve a legal obligation or commitment, but rather for voluntary goals and personal use (Hamrick & Gallant, 2017; IFC, 2016; Seeberg-Elverfeldt, 2010). Buyers in the voluntary market use units generated by both mechanisms created under international law, such as the CDM, and carbon markets programmes operated by non-governmental or private sector organizations. The market is largely driven by private-sector entities that offset their carbon footprint for ethical and reputational reasons, for example through corporate social responsibility (CSR) targets, and/or to gain experience in carbon trading in anticipation of regulated markets (Hermwille & Arens, 2018). The lack of compliance markets accepting forest-related credits has led to the voluntary carbon markets being the main vehicle for developing forest-related mitigation activities under carbon market programmes.

Forest-related mitigation cooperation can, moreover, take place at project or jurisdictional level. **Project-based mitigation** refers to the implementation of specific projects targeting a geographically limited area within a given jurisdiction. These projects are often developed independently of national or sub-national REDD+ programmes, though they also may be "nested" within those broader programmes. In contrast, **jurisdictional mitigation** activities refer to those originating from a larger scale of national or sub-national jurisdiction (Gonzales, 2014).

All results-based REDD+ programmes and transfer-based programmes that do not involve carbon market units have taken place at the jurisdictional scale. By contrast, most offset credits issued under GHG crediting programmes originate from projects. However, there also exists one initiative to issue credits for jurisdictional programmes, through the Jurisdictional and Nested REDD+ (JNR) approach developed by Verra.

II.2 Overview of opportunities, challenges and risks

As discussed in the introduction, some countries and stakeholders advocate that emissions reductions and/or credits from forest-related mitigation be eligible to be used towards achieving NDCs and fulfilling offsetting requirements under CORSIA. Using credits from forest-related mitigation to achieve these international targets brings a number of opportunities, challenges and risks. While part III of this paper is focused on discussing one specific category of risks – namely environmental integrity risks – this chapter presents a brief overview of the various opportunities, challenges and risks highlighted by proponents and opponents of using credits from forest-related mitigation for achieving international mitigation targets.

Potential opportunities include:

- **Increased finance for REDD+.** Carbon markets offer an opportunity for REDD+ countries to access new and more diverse sources of finance, which can supplement important but typically insufficient grant and results-based finance (Streck et al., 2017). This is particularly important given the currently insufficient levels of finance available to meet the investment needs and the mitigation potential of the forest sector (Climate Focus, 2016).
- **Reducing the cost of achieving mitigation targets.** If environmental integrity can be ensured and if there is sufficient supply of credits, crediting forest-related mitigation activities could lower the global cost of achieving climate change mitigation targets. This benefit takes on more relevance in the event that significant demand for offset credits emerges in the coming years and mitigation costs in other sectors are higher, elements that remain uncertain at present. An important source of demand could be CORSIA which is estimated to create demand for 325 million tCO_2e in its voluntary phases from 2021 to 2026 and 2,050 million tCO_2e in its mandatory phases from 2027 to 2035 (EDF, 2017). Other potential sources of demand could include countries that intend to use international credits to achieve their NDCs. Some analysts have estimated that REDD+ programmes could meet a significant portion of this demand (Climate Advisers, 2018), although it remains unclear if these programmes would meet the requirements that will be adopted under CORSIA or the Paris Agreement.
- **Non-carbon benefits of forest-related mitigation programmes.** Well-designed forest-related mitigation has the potential to provide a range of benefits beyond the reduction of emissions or the enhancements of removals. These include improved biodiversity, ecosystem services, supporting adaptation, enhanced livelihoods and protection of ancestral lands. These benefits might be higher than for other credited activities. Crediting forest-related mitigation might thus enhance the non-carbon benefits resulting from international carbon markets.

Despite the potential benefits of using credits or emissions reductions from forest-related mitigation under the Paris Agreement and for CORSIA, there also exist a number of risks and challenges. These include both the risks of unintended consequences that may arise from crediting forest-related activities, as well as the practical challenges for implementing entities associated with making such crediting viable and successful.

It is worth noting that several of these risks and challenges are common to the crediting of emission reductions, regardless of the sector or activity that is credited, whereas other risks and challenges differ between sectors or activities. Similarly, some risks and challenges are common to forest-related mitigation, regardless of whether the activities are supported through climate finance or credited under carbon market programmes. In each case, however, we highlight here the aspects that are particular to the combination of forest-related mitigation and the use of crediting mechanisms, or those aspects that are magnified in this context.

- **Environmental integrity.** Whenever the generation of an emission reduction in one place is used to increase emissions elsewhere, the need to ensure environmental integrity becomes of utmost importance. If environmental integrity is not ensured, this leads to an overall increase in emissions. In the context of carbon markets, environmental integrity requires that the transfer and use of carbon market units leads to the same or lower aggregate global emissions as if the transfers did not take place. Four factors influence environmental integrity: the accounting for international transfers,

including avoidance of double counting; the quality of units generated; the ambition and scope of the mitigation target of the transferring country; and incentives or disincentives for future mitigation action, such as possible disincentives for transferring countries to define future mitigation targets less ambitiously in order to sell more carbon market units (Schneider, Füssler, La Hoz Theuer, et al., 2017). In the context of crediting forest-related mitigation a number of specific challenges exist in managing these risks, such as the possible reversal of the emission reductions or removals (also referred to as 'non-permanence').

- **(Non-carbon) environmental and social risks.** According to Global Witness and Transparency International, the countries in which REDD+ is implemented are often associated with high levels of corruption, and the land-use sector is frequently among those with the highest levels of graft (Korwin, 2016; Transparency International & FAO, 2011). One study found that 93% of countries cite weak forest sector governance and institutions in their REDD+ readiness plans to apply for REDD funding (Kissinger, Herold, & De Sy, 2012). Forests are also frequently home to indigenous and other communities whose lack of formal title makes them vulnerable to having their customary rights restricted. The challenges and risks these factors create have the potential to be magnified if these activities are credited, due to the added complications of needing to transfer rights to emissions reductions and the potential involvement of unscrupulous project developers (Loft et al., 2017).
- **Oversupply of credits.** It was noted above that the potentially significant supply of forest-related emissions reductions is among the opportunities of crediting forest-related activities; however, it can also be viewed as a risk. Where supply outweighs demand, prices can collapse, leading to limited incentives to reduce emissions in compliance markets (e.g. CORSIA or NDCs) and providing incentives for only the most low-cost carbon market projects and programmes. In this context, avoiding oversupply may require ensuring sufficient demand (e.g. raising ambition) or only allowing a limited number of credits from forest-related mitigation to be used towards NDCs or for CORSIA.
- **Effects of carbon market price volatility.** Investments in avoided deforestation and other forest-related activities typically need to take place on long time scales to be effective and sustainable, especially considering permanence issues. Where financing of these activities is linked to volatile market prices, the uncertainty this creates may limit the ability to operate effectively and to maintain the buy-in of local stakeholders.
- **Administrative costs.** Crediting forest-related activities under GHG crediting programmes could involve higher transaction costs than rewarding emission reductions through results-based finance, which, because it does not allow compensating for an increase of emissions elsewhere, requires less accuracy in terms of monitoring, reporting and verification (MRV) and does not require the issuance and tracking of tradable units. The generation of credits may require additional rigor in several aspects, including for establishing baselines, monitoring emission reductions, addressing leakage and non-permanence risks, and may require independent verification. This adds costs and requires additional capacities which are lacking in many countries (Streck et al., 2017).
- **Lack of a crediting mechanism with international oversight.** Avoiding deforestation in developing countries has so far only been credited under mechanisms operated by private sector companies or non-governmental organizations, but not under a mechanism that operates under international oversight. International oversight is often seen as providing for a greater assurance of environmental integrity. The lack of international oversight with regard to existing credits from avoided deforestation may thus be seen as a further risk to environmental integrity in using such credits.

The remainder of this paper specifically focuses on risks surrounding environmental integrity as well as environmental and social safeguards, with a view to help understanding the specific risks that arise and the means available to mitigate those risks.

PART III ASSESSMENT OF ENVIRONMENTAL INTEGRITY RISKS AND OPTIONS TO ADDRESS THEM

III.1 Estimation of emissions reductions

The estimation of emissions reductions achieved by a project or programme is at the core of approaches to both transfer-based and results-based finance. This includes a number of elements and steps that a project or programme should take to be rewarded for emission reductions or removals. Key issues include:

- **Additionality** is given if the incentives created by the policy intervention (e.g. the GHG crediting programme) are deemed to cause the activity (and its ensuing emission reductions) taking place (Gillenwater, 2012). GHG crediting programmes use a variety of approaches to ensure additionality, including that some activities are deemed automatically additional, that some activities are considered not eligible, or that step-wise procedures lead to a conclusion on additionality for a specific activity (Gillenwater, 2012; Schneider, Füssler, & Herren, 2014).
- **Baselines** – also called forest reference levels or forest reference emissions levels (RLs) in the context of REDD+[3] – provide a reference emissions level to which the actual emissions from forest-related activities can be compared throughout an established timeframe. Programmes that provide results-based payments or credit forest-related activities invariably involve the development of baselines and the measurement of results (in terms of emissions reduced or removals enhanced) against them (Streck et al., 2017).
- **Leakage** is the "unanticipated decrease or increase in GHG benefits outside of the project's accounting boundary (the boundary defined for the purposes of estimating the project's net GHG impact) as a result of project activities" (IPCC, 2000). Leakage is not unique to forest-related activities but can be significant for some type of activities. If leakage is significant, it is usually accounted for in the calculation of emission reductions under crediting programmes.
- **Measurement, reporting and verification (MRV) – or monitoring and verification under crediting programmes –** refers to the process of periodically quantifying the emission reductions or removals from an activity. The process typically involves the project or programme following predefined methods for monitoring. The methods and results are documented in a monitoring report and usually independently verified or audited.
- **Addressing uncertainty** is an important cross-cutting issue with regard to estimating emissions reductions or removals from forest-related mitigation. For forest-related mitigation, uncertainty arises mainly from two different aspects: the uncertainty surrounding the future development of the drivers for deforestation and degradation, and the uncertainty related to determining carbon stocks, which affects the quantification of baseline emissions, actual emissions, and any leakage effects.
- **Third-party review** typically includes an independent review by an accredited entity or technical experts with the view to verifying that emission reductions were determined in accordance with relevant standards.

These issues are relevant in results-based finance and transfer-based finance, including GHG crediting programmes. Other factors that impact the robustness of estimation of emission reductions include, inter alia, the definition of the boundary for determining baseline emissions and actual emissions, and the period of time over which emission reductions are estimated. These issues are not discussed here.

In the following sections, we first provide an overview of what distinguishes forest-related mitigation from other credited activities. We then discuss key issues in more detail (note that MRV issues are

[3] The terms 'reference levels' and 'baselines' both refer to the establishment of a reference point against which emission reductions are assessed. The former term is more commonly used in the context of REDD+, while most carbon market mechanisms such as the CDM and VCS refer to 'baselines'. In this paper we refer primarily to baselines, and only refer to reference levels when it is necessary for the context; however, they should be understood to refer fundamentally to the same concept.

discussed as part of uncertainty and third-party review, and that leakage is discussed in section 0 further below). Lastly, we discuss key issues arising from the context of the Paris Agreement.

III.1.1 What distinguishes forest-related mitigation from other credited activities?

The approaches and challenges for quantifying emission reductions from forest-related mitigation are in many ways similar to those of activities in other sectors, depending on the type of activity and sector. Forest-related activities do, however, have a few distinct features:

- **Use of jurisdictional approaches.** Jurisdictional approaches, while also proposed for other sectors, have to-date only fully been implemented in the case of forest-related activities, specifically REDD+. This has taken place in response to the much greater capacity of governments to adopt the policy reforms and incentive programmes required for ensuring stable, long-term emissions reductions. Nonetheless, these approaches carry with them a number of specific complexities. First, jurisdictional forest-related activities often combine several measures whereas activities credited in other sectors mostly involve a single measure or several measures whose GHG emissions impact can be clearly distinguished (e.g. 'programmes of activities'). And second, jurisdictional forest-related activities are often implemented through the adoption of relevant policies, whereas the adoption or implementation of policies is not eligible for crediting under most current GHG offsetting programmes, mainly due to concerns over how the additionality of decisions by policy-makers could be assessed (Schneider et al., 2014). On the other hand, it is worth noting that jurisdictional approaches may offer advantages associated with economies of scale, enabling governments to develop coherent approaches to MRV and baselines across the jurisdiction and dedicate resources to filling gaps in information and data in a systematic manner.
- **Uncertainty of drivers for deforestation and degradation.** A key feature of some forest-related mitigation, such as avoiding deforestation and degradation, is the high uncertainty of the economic drivers and the political conditions influence the land sector, which can change over time, are in some cases affected by international commodity markets, and are hard to predict in the future. This affects the uncertainty in establishing baseline scenarios and estimating leakage effects.
- **Uncertainty in determining carbon stocks.** Given the non-homogenous and often remote nature of forest ecosystems, data availability and accuracy can be major challenges that tend to be resolved by requiring the application of conservative assumptions, adjustment of baselines, or discounting of eligible emission reductions for crediting.

In the sections that follow, these issues are further explored when discussing specific aspects for ensuring environmental integrity.

III.1.2 Additionality

Additionality is a key requirement under GHG crediting programmes. The Kyoto mechanisms (CDM and JI), the Article 6.4 mechanism under the Paris Agreement, and the current Emissions Unit Eligibility Criteria under CORSIA require that additionality be ensured (ICAO, 2017). Under GHG crediting programmes, a broad variety of approaches are employed to assess additionality. Activities can be deemed automatically additional by a GHG crediting programme because they are very unlikely to be viable without further support such as revenues from credits. Similarly, many programmes do not allow certain activities to be credited because they are unlikely to be additional under typical conditions. And third, programmes use step-wise procedures to determine whether or not a specific activity qualifies as additional, considering issues such as common practice in the sector, legal requirements, financial viability of the activity in the absence of climate finance, or barriers impeding its implementation. Additionality is sometimes tested separately from establishing baselines and sometimes combined tests are used.

The principle of additionality is not enshrined under results-based finance schemes for REDD+. A key rationale for this difference is that the objectives differ between GHG crediting programmes and results-based finance programmes. Under crediting programs, ensuring additionality is critical for environmental integrity. Under results-based finance programmes, the focus is on incentivizing countries to achieve emission reductions in an effective manner. In this context, establishing a causal

link between incentives and outcomes may in some cases be deemed lower priority than under crediting programmes.

A key aspect of additionality is that the emission reductions were achieved through the credited activities or interventions. This principle of *attributability* of the emission reductions to the credited activities is common under GHG crediting programmes but can be difficult to implement in practice in some sectors. In the context of jurisdictional forest-related mitigation often many different measures are combined. Moreover, the emissions may be impacted by multiple drivers and singling out the effect of specific (policy) interventions could prove difficult, if not impossible. It is therefore not practical and feasible to clearly attribute observed emission reductions to the credited activities. Simplified and pragmatic approaches may therefore be needed. Crediting programmes could, for example, require demonstrating that the planned policies have the ability to significantly impact the emissions from the sector and that these actions have a larger impact than other factors that may impact these emissions.

A further challenge to both additionality and baselines is asymmetric information between the actors proposing activities and regulatory approving them, which can lead an incentive to provide biased information (Cames et al., 2017; Fischer, 2005; Gillenwater, 2012). While this is a challenge common to all crediting activities in all sectors, some specific challenges arise for jurisdictional approaches due to the high level of control that governments have over the factors influencing additionality and baselines.

A third important general aspect is how national policies should be taken into account in assessing additionality and establishing baselines. If mitigation policies are fully reflected in assessing additionality and establishing baselines, this could create a perverse incentive for governments not to adopt such policies. On the other hand, if mitigation policies are taken into account, this could lead to crediting of emission reductions that would occur anyways (Cames et al., 2017; Kollmuss, Schneider, & Zhezherin, 2015; Schneider et al., 2014; Spalding-Fecher, 2013). The relevance mitigation policies in the context NDC targets is discussed further in section III.1.6 below.

While additionality is a key principle under project-based crediting approaches, there has been considerable debate about additionality in the context of sectoral crediting or policy crediting. One aspect is whether the introduction, implementation, and enforcement of government policies that reduce GHG emissions should be eligible under crediting mechanisms. Under the CDM, Parties decided that such policies are not eligible and instead introduced the concept of 'programmes of activities'.[4] An important argument for allowing the crediting of policy action was that this could scale up mitigation action and may be more effective than crediting individual activities. A key concern was that additionality could be even more difficult to ensure than for activities implemented by private sector entities, since policies are often introduced to pursue multiple objectives and whether or not they are introduced could depend on many factors that may not be related to the incentives from the crediting programme (Schneider et al., 2014). This issue was also discussed in the context of whether NAMAs should be supported through climate finance or whether the emission reductions should be credited and transferred. A further important consideration is that jurisdictional programmes for forest-related activities often cover such a broad range of activities and actors that it would be extremely difficult to undertake an independent assessment of additionality.

For these reasons, jurisdictional programmes that allow crediting or the transfer of emissions reductions – most notably the FCPF Carbon Fund and the VCS JNR – have factored additionality into the establishment of baselines, requiring a conservative approach to baseline setting that aims to ensure that the emissions reductions achieved are additional. It can indeed be argued that if the baseline is selected conservatively, it is unlikely that the measures undertaken to reduce emissions below that baseline would have taken place without the incentives from climate finance or crediting. There are often limited economic incentives for governments to address ongoing deforestation and forest degradation, while the forest sector often suffers from poor governance and high levels of corruption. REDD+ often acts as a much-needed incentive to address these issues (Lee and Pistorius, 2015). In this sense, additionality may be more uncertain in countries with historically low deforestation.

[4] Decision 7/CMP.1, paragraph 20. FCCC/KP/CMP/2005/8/Add.1

III.1.3 Baselines

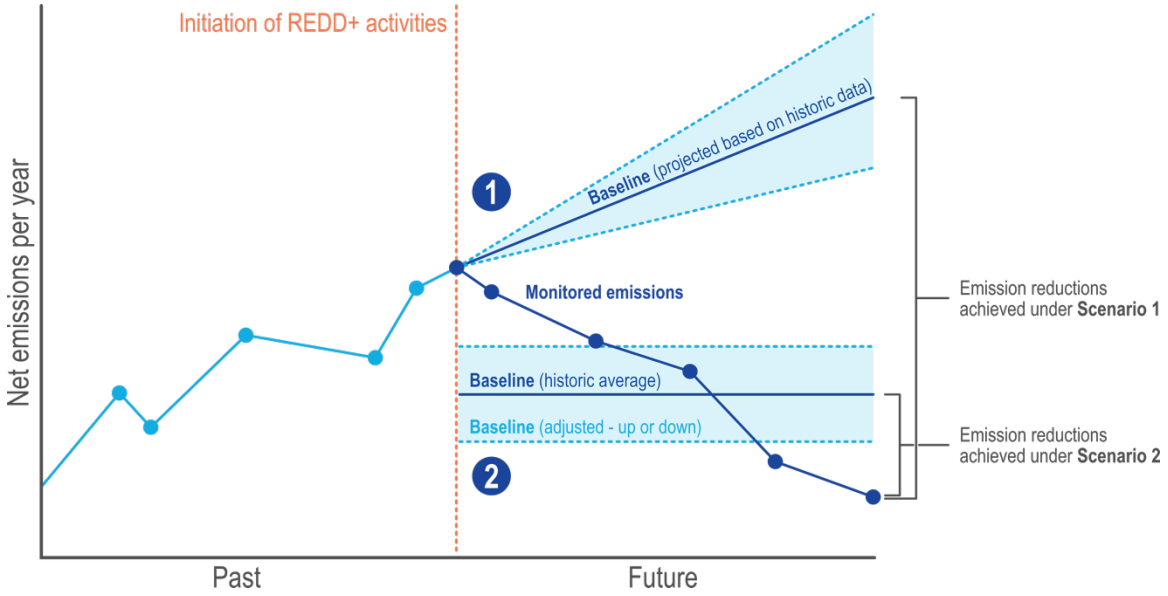
GHG crediting programmes typically use a variety of approaches to establish baselines, including business-as-usual (BAU) emissions projections, historical data, extrapolation of historical trends, best available technology, benchmarking from a peer group of activities, surveys, or monitoring of control groups (Schneider et al., 2014). The type of approach used depends on several aspects, including the type of mitigation activity, the scale at which the measure is implemented, data availability and emissions trends.

Under results-based finance and GHG crediting programmes, two main approaches have been used to establish baselines for forest-related mitigation:

- **Business-as-usual scenarios:** A business-as-usual scenario represents a forecast or projected rate of changes in carbon stock and GHG emissions for a given time period in the absence of the project or programme taking place. This involves modelling a "counterfactual" scenario based on an analysis of trends and the projection of future developments. Several existing project-based GHG crediting programmes that credit forest-related mitigation, such as the VCS and the American Carbon Registry, require establishing BAU emission scenarios according to established methodologies.
- **Historical emissions:** Historical baselines are based on the average rate of changes in carbon stock and GHG emissions over a specific time period prior to the project or programme (Chagas, Costenbader, Streck, & Roe, 2013). This can be contrasted with business-as-usual scenarios, which may integrate historical trends as part of their projections but are not based on historical averages (see Figure 1). Several GHG crediting programmes that allow forest-related activities apply purely historical baselines to these activities, primarily domestic law standards such as the New Zealand Permanent Forest Sink Initiative (PFSI) and the Japanese J-VER voluntary system. However, many other crediting programmes allow for (upwards or downwards) adjustments to be made to historical emissions to account for national circumstances, for example planned policies or trends that would lead to accelerated deforestation. Most jurisdictional REDD+ programmes also apply this approach, including most national and sub-national programmes proposed under the UNFCCC Warsaw Framework for REDD+,[5] the FCPF Carbon Fund and the Jurisdictional and Nested REDD+ (VCS JNR). By integrating future trends, this approach begins to resemble BAU scenarios, although there remains a stronger emphasis on historical averages.

[5] It should be noted that, while most countries have applied this approach, the Warsaw Framework provides countries with flexibility in determining the approach to calculating reference levels. See Decision 12/CP.17.

Figure 1 Baselines based on BAU scenarios and historical emissions



Source: Own elaboration

The methodological approach used to establish baselines has an important impact on environmental integrity. On one hand, historical baselines are not able to reflect ongoing changes in trends and drivers and are thus not always a good representation of the future emissions that would occur in the absence of the programme. On the other hand, a key advantage of historical baselines is that they are determined in an objective manner and thus avoid making subjective assumptions about future developments.

By contrast, baselines based on BAU scenarios have the potential to inflate emissions projections, for example through referring to expected developments (i.e. national circumstances) that are less than certain, especially given changing drivers of deforestation which may be hard to accurately project into the future (A Angelsen et al., 2011). How deforestation rates will develop in the future could be particularly difficult to estimate, given the many drivers and circumstances often impacting these emissions, compared to the uncertainty of baselines in some other sectors. Research indicates that baselines based on historical emissions tend to more adequately reflect actual future emissions than BAU projections (Chagas et al., 2013).

In order to ensure that baselines are established appropriately, clear criteria and methodological approaches for establishing BAU scenarios or for making adjustments to historical rates to account for national circumstances help to ensure the robustness. Where historical baselines may be adjusted for national circumstances, a set of criteria to ensure consistency and limit the potential for selective selection of data can improve the reliability of baselines (A Angelsen et al., 2011), and these should be required to be evidence-based and consider mitigation policy goals (Streck et al., 2017). The stage of implementation, funding and level of institutional development of national policies and plans should also be considered in order to ensure that adjustments are realistic (A Angelsen et al., 2011).

These types of approaches have already been implemented under some existing standards:

- Under the FCPF Carbon Fund, in order to justify adjusting historical baselines, countries must show that they have high forest cover and have historically had low deforestation, or that national circumstances have changed such that rates of deforestation/degradation during the reference period are likely to underestimate trends during the crediting period. Adjustments can be rejected where they are not documented or quantifiable.
- Under the VCS JNR, historical emissions may include modelled adjustments to account for national or subnational circumstances and are justified through showing that the chosen approach is more

likely to reflect future emissions than historical emissions. Committed national and sub-national policies can also be used to justify adjustments.[6]

By contrast, under the Warsaw Framework for REDD+, the approach to determining the reference levels is ultimately determined by the government of the country submitting it and only limited guidance is provided.

III.1.4 Uncertainty

Uncertainties in estimating emission reductions from forest-related mitigation can be significant. Important sources of uncertainty are:

- **Uncertainty in drivers of deforestation and degradation.** Deforestation and forest degradations often occur in remote areas and involve a complex set of drivers (subsistence farming, commercial agricultural activities, illegal logging, among others) the contribution of which can be hard to distinguish, quantify, and predict for the future. Uncertainties with regards to drivers can have an impact on the ability to construct a representative baseline and effectively addressing drivers. Further, uncertainties around deforestations drivers can reduce the ability to accurately estimate leakage. Finally, the uncertainty in the future development of these drives may result in issues whether the observed emission reductions are attributable to the credited (policy) interventions (see section III.1.2 above).
- **Uncertainty in determining carbon stocks.** The accurate determination of existing forest and soil carbon stocks is a fundamental basis for determining potential carbon losses due to deforestation and degradation or for determining enhancements of stocks from forest management and afforestation or reforestation. Carbon stocks need to be determined in both establishing baseline scenarios and in the periodic monitoring of actual stocks under a credited or funded activity. Given the non-homogenous nature of forest ecosystems and difficulty of accessing remote areas for forest inventories, the precise determinations of carbon stocks can be a major challenge. Emissions or removals cannot be measured *directly* (using meters or sensors) but must be estimated using complex methodologies. A major challenge in applying these methodologies is the frequent incompleteness or unreliability of data that results from the inherently complex nature of natural ecosystems and the remoteness and inaccessibility of many forest areas. Advanced remote sensing technologies have greatly reduced uncertainty and reduced the extent to which costly forest inventories must be used.

GHG crediting programmes typically address uncertainty by requiring baselines to be established in a conservative manner, meaning below the level that is estimated to most likely represent the emissions level that would occur without the incentives from the mechanisms. The larger the uncertainty, the more conservative a baseline should be. Uncertainties in baselines for forest-related activities can be addressed in similar ways (FAO, 2017). First, crediting programmes could seek to use baseline scenarios that are likely to be more conservative. Second, crediting programmes could, for example, establish procedures and protocols to estimate the uncertainty of the baseline. The uncertainty level could then be considered in the degree to which the baseline is adjusted. For instance, both the FCPF Carbon Fund and the VCS JNR require uncertainties related to the underlying data to be systematically assessed, minimized and quantified using defined methods. A related approach could be discounting of emission reduction or placing a portion of the emission reductions in a buffer, an approach applied in the FCPF Carbon Fund and the VCS (project) Standard.[7]

There remain significant gaps in measures to address uncertainties in reference levels under the Warsaw Framework for REDD+. Most forest reference emissions level/ forest reference level (FREL/FRL) submissions and REDD+ results annexes do not quantify overall uncertainties in estimations (FAO, 2017). Furthermore, diverse methodologies are applied when constructing BAU reference levels and there is no harmonized set of assumptions and international assessment of input data, methodological choices and assumptions used (Chagas et al., 2013). Whereas carbon market programmes usually

[6] Jurisdictional and Nested REDD+ (JNR) Requirements, VCS Version 3 Requirements Document, 21 June 2017, v3.4.

[7] This is the approach applied, for example, in the FCPF Carbon Fund Methodological Framework.

establish clear protocols or methodologies that specify how the level of a baselines should be derived in an objective manner and how its conservativeness is ensured, under the Warsaw Framework the methodological choices and assumptions are largely left to the discretion of countries.

III.1.5 Third-party review

Robust review processes are an essential tool for promoting environmental integrity in the estimation of emissions reductions, including the establishment of baselines, the monitoring of actual emissions and, where applicable, separate additionality requirements or the estimation of leakage effects. This review process should verify that established criteria and methodologies are followed, and that the data used is robust and meets required standards.

Such processes should be sufficiently thorough to uncover major uncertainties and enable the questioning of key assumptions and data. A minimum frequency for reviewing the validity of baselines can help ensure that baselines are current and take evolving socio-political and economic circumstances into account, as well as ensuring they are gradually made more complete as more and better data becomes available (Chagas et al., 2013).

Currently, several standards and frameworks for transfer-based finance provide for reviews, including the VCS, the VCS JNR and the FCPF Carbon Fund. The latter appoints a technical advisory panel consisting of 4-5 independent experts to conduct a full review of proposed programmes involving in-country visits, while programmes are also subject to the review and approval of the participants to the Fund (FCPF, 2016). Future verification processes can build on these processes, as well as on the review of forest management levels of developed countries under the Kyoto Protocol (Streck et al., 2017).

On the other hand, under the Warsaw Framework, rules for the establishment of reference levels are more flexible and existing expert assessments are facilitative in nature and non-binding, an approach which may be appropriate in the context of results-based payments, but is arguably not sufficiently stringent where credits are created.

III.1.6 The context of the Paris Agreement

The Paris Agreement provides a new context for establishing baselines. All countries have to prepare and communicate NDCs, and many countries have included in their NDCs either economy-wide targets that include the LULUCF sector, or specific targets for the LULUCF sector. The Paris Agreement furthermore requires that double counting be avoided when engaging in international transfers of mitigation outcomes under Article 6. This means that a single emission reduction should not be used more than once towards achieving NDC targets and that countries must account for international transfers of mitigation outcomes (see section 0 below).

The Paris Agreement therefore changes the context for quantifying emission reductions. Two issues are particularly important and discussed here:

1. Under which conditions would a lack of quality of issued credits (e.g. through the over-estimation of emission reductions) impact overall environmental integrity?
2. How should baselines be established in this new context?

III.1.6.1 Impact of a lack of quality of credits on the overall environmental integrity in the context of the Paris Agreement

Some countries and stakeholders have argued that the robustness of the estimation of emission reductions and the assessment of additionality under crediting mechanisms becomes obsolete if host countries have NDC targets. This is because in such instances a country may have to compensate for transferring emissions that do not represent actual emission reductions in order to still achieve its NDC target.

Two considerations are important in this new context: whether the emission reductions are covered by relevant quantifiable emissions mitigation target(s) of the NDC and whether the relevant NDC target(s) require the country to take further mitigation action, i.e. whether the targets are above or below a realistic

projection of business-as-usual (BAU) emissions (Schneider, Füssler, La Hoz Theuer, et al., 2017). If NDC targets can be achieved without undertaking any mitigation action above and beyond what is already planned or expected, they are also often referred to as containing 'hot air' – a term often used in the context of the Kyoto Protocol (La Hoz Theuer, Schneider, Broekhoff, & Kollmuss, 2017; Woerdman, 2005).

If the emission reductions from a credited activity are *not covered* by an NDC target, the quality of the credits (i.e. whether the credits represent emission reductions that are additional and not over-estimated) *directly* impacts global GHG emissions. This is because the offset credits allow their users to increase emissions beyond their mitigation obligations or goals. If the emission reductions are over-estimated due to inflated baselines, then aggregated GHG emissions are higher compared to the situation that the emission obligation or goals would be achieved without an international transfer. It is yet unclear whether emission reductions outside of the scope of NDC targets will be eligible for international transfers under Article 6.

If the emission reductions from a credited activity are *covered* by an NDC target, the context and implications may be different. In this case, the NDC target could affect the global GHG emissions impact of credit transfers *indirectly*, because the target's ambition may determine whether transferring credits issued for over-estimated emission reductions impacts the country's efforts in achieving its NDC target. If the transferring country has an *ambitious* NDC target – which requires the country to pursue further mitigation action to achieve its target – it may have to compensate for the transfer of such credits to achieve its NDC target, either by further reducing emissions or by purchasing carbon market units. The country has thus an incentive to ensure that the transferred units are backed actual emissions reductions. The same may not be true, however, for a country with an NDC target that is less stringent than its realistic business-as-usual (BAU) emissions – i.e. which does not require the country to take mitigation action beyond what is otherwise planned to achieve its target –[8] or for credits issued for emission reductions that are not covered by an NDC target. In these instances, the country might accrue more financial revenues from overestimating emission reductions and could do so without infringing its ability to achieve its NDC target.

The more ambitious an NDC target is, the more likely it is that a country would compensate for the transfer of credits that lack quality and therefore only authorize activities that are additional and determine emission reductions in a conservative manner. This is supported by evidence from Joint Implementation, where units from countries with ambitious Kyoto targets were assessed to have a significantly higher quality than from countries with targets less stringent than BAU emissions (Kollmuss et al., 2015). Whether a country compensates for a credit transfers and has incentives to ensure unit quality may also depend on *when* transfers are made. Before the target year or period, the country may not have certainty whether it will achieve its target and may thus be cautious in authorizing activities. However, once over-achievement of the target becomes certain, the country may have less incentive to ensure unit quality and may no longer compensate for the transfer of credits issued for non-additional or over-estimated emission reductions.

Independent evaluations indicate that the ambition of current NDC targets varies strongly. A number of countries are estimated to over-achieve their NDC targets significantly with current policies in place (Aldy & Pizer, 2016; CAT, 2017; Höhne, Fekete, den Elzen, Hof, & Takeshi, 2017; Meinshausen & Alexander, 2017; Rogelj et al., 2016). The ambition of NDC targets, including whether they are above or below BAU emissions appears is however difficult to assess, due to a lack of clarity of NDC targets and uncertainties of emission trajectories (La Hoz Theuer et al., 2017). Uncertainties regarding the mitigation outcome of NDC targets appear particularly high in the LULUCF sector (Fyson & Jeffery, 2018).

For forest-related activities, this analysis means that, *theoretically*, how emission reductions are estimated would not impact environmental integrity if the LULUCF sector is covered by ambitious NDC

[8] It is worth noting that most developing countries define their GHG mitigation targets with respect to a proposed BAU scenario. However, since there are no common criteria for developing these BAU scenarios, it is difficult to assess whether they reflect realistic projections. Existing analysis suggests that at least some BAU scenarios proposed by countries would be significantly over-achieved with current policies in place.

targets. In this case, additionality and the robustness of baselines would not matter. *Practically*, however, there are important caveats. Current NDC targets often lack clarity and their mitigation outcome is difficult to assess. In many instances, it is rather uncertain whether or not an NDC target is above or below BAU emissions. The available independent assessments suggest that many NDCs include targets that are less stringent than BAU emissions. Altogether this suggests that it would be risky to assume that environmental integrity is preserved – and baselines would not need to be scrutinized – if forest-related activities are included in the scope of NDC targets. Moreover, even when countries have ambitious NDC targets, they have an interest to ensure that the quality of credits is ensured in order the avoid that they 'over-sell' credits and no longer achieve their NDCs. It is therefore advisable to establish relevant standards and safeguards to ensure the quality of credits from forest-related mitigation, regardless of whether the LULUCF sector is covered by an NDC target.

III.1.6.2 Approaches for establishing baselines in the context of the Paris Agreement

The new context of the Paris Agreement has also important implications for how baselines should be established for crediting of forest-related activities. As above, two key considerations are important: whether the LULUCF sector is covered by an NDC target, and whether the target is above or below a realistic level of business-as-usual (BAU) emissions.

If the LULUCF sector is *not covered* by an NDC target, the existing 'classical' approaches pursued for establishing baselines could be used – noting the issues identified above and that different approaches are required for activities at project level or at jurisdictional level.

If the LULUCF sector is *covered* by an NDC target, the situation is again more complex. With regard to jurisdictional baselines, a reasonable approach could be deriving the baseline level from NDC targets (Broekhoff, Füssler, Klein, Schneider, & Spalding-Fecher, 2017; Füssler, Herren, Kollmuss, Lazarus, & Schneider, 2014). If there is a specific target for the LULUCF sector, the baseline could correspond to the target level. This would ensure that the country does not 'over-sell' emission reductions from this sector and that only reductions beyond the target level are credited and internationally transferred. If the country has only an economy-wide target, information on how the country intends to achieve its NDC target could inform the level of the baselines (Füssler et al., 2014).

In conclusion, deriving jurisdictional baselines from NDC targets is a sound approach as long as NDC targets are ambitious. If NDC targets are not ambitious but contain 'hot air', deriving jurisdictional baselines from NDC targets would undermine environmental integrity, as this could enable the jurisdiction to transfer credits that are not backed by actual emission reductions.

III.2 Leakage

III.2.1 What is leakage?

Protecting or enhancing carbon stocks on a local level only has value in terms of climate change mitigation if it contributes to global reductions in GHG emissions. In general, and especially when the emission reductions are used to compensate for emissions elsewhere as in carbon markets[9], it is important therefore to consider the effect that a specific intervention may have in terms GHG emissions or removals within the intervention boundary, but also outside of that boundary (K. Richards & Andersson, 2001), taking into account that such an intervention could be implemented on a project, or jurisdictional, including national level.

The IPCC defines leakage as "the unanticipated decrease or increase in GHG benefits outside of the project's accounting boundary (the boundary defined for the purposes of estimating the project's net GHG impact) as a result of project activities" (IPCC, 2000).

Leakage is not unique to forestry-related mitigation; however, it differs between sectors and different kinds of climate policy measures. Generally within the context of international climate and trade, leakage refers to a shifting of emissions from one place where there is a climate measure being implemented to another place where there is no climate measure implemented (Babiker, 2005). Examples of climate measures that can lead to leakage are a carbon tax, an emissions trading programme, or other regulatory measures that may displace emitting activity to other places without such instruments.

Leakage can also occur in a number of different ways in the context of GHG baseline and credit programmes. First, there can be a shift in production *towards* the facilitates that generate credits because, due to the carbon market revenues, these facilities can produce their products at lower costs. This has been observed for the abatement of HFC-23 from HCFC-22 production and the abatement of N_2O from adipic acid production (Schneider, Lazarus, & Kollmuss, 2010), whereas the risk seems lower for other sectors, such as aluminium, cement and steel (Erickson, Lazarus, & Chandler, 2011). Second, since crediting lowers the cost of energy (or other commodities or services), which can lead to greater use of energy (or other commodities or services) (Calvin et al., 2015; Kallbekken, 2007; Vöhringer, Kuosmanen, & Dellink, 2006). And third, emission causing activities can be shifted outside the project boundary of the credited activity. For example, if land is used for afforestation, previous land-uses, such as for agriculture, is shifted elsewhere it may induce an increase of emissions outside the project boundary.

Leakage is a particular risk when countries only include some activities within the boundary of crediting. So far under the Warsaw Framework, most countries have submitted reference levels that only include deforestation. Most countries have also omitted carbon pools other than above-ground biomass and below-ground biomass (FAO, 2017). While some omissions of activities, pools and gases may lead to a conservative quantification of emission reductions, other omissions could result in leakage, e.g. if less forest management or less afforestation action is undertaken as a result of target for avoiding deforestation.

This challenge was recognized in the REDD+ safeguards found in Appendix 1, paragraph 2(g), of the Cancun Agreement, where "actions to reduce displacement of emissions" are to be promoted and supported when undertaking REDD+ activities. The current CORSIA Emissions Unit Eligibility Criteria stipulate that "offset credits should be generated from projects that do not cause emissions to materially leak elsewhere" (ICAO, 2017). The WB FCPC, the VCS, the Gold Standard, CAR, and ACR all have approaches to address leakage on some level for their forest-related activities. In this report, we focus on this third form of leakage, since this form is more relevant for forest-related mitigation.

[9] A compensation would then not lead to an overall reduction in global greenhouse gas emissions.

III.2.2 Categories of leakage relevant for forest-related mitigation

As the drivers of deforestation are complex and dynamic, leakage – the kind that describes a shift of activity outside the project boundary – can happen in a number of different ways. Aukland et al. (2003) categorize this form of leakage into primary and secondary leakage:

- **Primary leakage** describes the entire or partial negation of GHG benefits from similar processes elsewhere – essentially resulting in the displacement rather than the avoidance of emissions. This can take place through: *Activity shifting* where activities causing the deforestation or land degradation are simply displaced to another area outside the boundary of where the REDD+ activity is being carried out. This can take the form of moving cattle or timber harvesting down the road; or *outsourcing* where another agent is contracted to supply the commodity (meat or timber) which can then result in increased deforestation or forest degradation elsewhere.
- **Secondary leakage** is similar, but the effect is indirect. In this case, the original agents do not directly shift or outsource their own activity. Secondary leakage occurs through *market effects*, where shifts in supply and demand lead to overall price increases enticing other actors to take up activities that increase emissions elsewhere i.e. leakage occurs if forests are preserved in one place, but "unchanged demand for agricultural land and forest products lead to increased forest clearing and conversion in another region" (K. R. Richards & Stokes, 2004). Another form of secondary leakage is through "super-acceptance of alternative livelihoods" where people move from lower GHG emitting occupations or habits to others that emit more (Aukland, Costa, & Brown, 2003).

Leakage can not only occur within the same sector but also from one sector to another. Inter-sectoral leakage may occur through a substitution effect. For example, with regard to building materials, preserving forest may lead to the substitution of wood with more carbon intensive building materials such as steel, aluminium, plastic, concrete that have large amounts of embedded emissions (Oliver & Fried, 2013). Emissions from deforestation can also be shifted to the agricultural sector if, instead of clearing forests, more fertilizer is applied for agricultural intensification, resulting in increased emissions from fertilizer production and application[10].

Within the forestry sector, leakage may occur at different geographic scales: locally where deforestation is displaced down the road or in the immediate vicinity, regionally, and internationally / globally to other parts of the world. The level at which the intervention takes place can have important repercussions for the risk of leakage. Project level REDD+ was rejected under the Warsaw Framework primarily because of leakage concerns. The Warsaw Framework calls for national level programmes and reference levels, or jurisdictional with progress towards national interventions and reference levels. While a larger jurisdictional approach to forest-related mitigation is better suited to address local leakage, and potentially regional leakage in the same country, international leakage remains an important unaddressed and understudied issue.

Generally, the wider the scope of the intervention, the more successful it is likely to be in addressing local leakage, however as discussed above, different drivers of deforestation are associated with different leakage risks at different geographic scales.

Project level REDD+ approaches are least capable of preventing leakage, as the intervention is likely to not have the resources or the mandate to undertake action beyond the border of the project area. The selection of possible ways to reduce leakage depends on the project and scope of the intervention, and is associated with increased costs. Some GHG crediting programmes discount credit issuance by up to 40% of estimated gross emission reductions, reflecting the difficulty of limiting leakage effects at project scales (Kissinger et al., 2012). Further research is required to investigate if such discounts are conservative or insufficient in what contexts. (Kissinger et al., 2012).

Jurisdictional or national level REDD+ approaches are better positioned to establish systems to reduce local leakage and detect shifts in activity associated with leakage, and their corresponding increased

[10] About half of the emissions from fertilizer are application on land – the other half is productions (due to N2O emissions from nitric acid production as well as energy related emissions).

emissions within their boundaries, but also may have challenges in addressing international leakage (Kissinger et al., 2012; Wunder, 2008).

III.2.3 Magnitude of possible leakage for forest-related mitigation

The available research finds that leakage effects may be significant for forest-related mitigation activities. Empirical estimates for the U.S. show that such leakage effects may range from under 10% to over 90% (Murray, McCarl, & Lee, 2003). Gan and McCarl estimate that 42-95% of reduced forestry production can be transferred elsewhere (Gan & McCarl, 2007). Such large spans of possible leakage leave a great deal of uncertainty and an important threat to environmental integrity. This may vary for different countries at different points of time depending on the driver of deforestation. Leakage risks from crediting may be lower in other sectors. For adipic acid production, leakage is estimated to have amounted to about 20% of the emission reductions (Schneider et al., 2010).

III.2.4 Drivers of deforestation and determining leakage variables

To develop policies to prevent or reduce deforestation and land degradation, it is important to assess and understand what is causing the deforestation and land degradation in the first place. These drivers are inherently linked to the risk that emissions reduced within the scope of the intervention will leak elsewhere.

Information on what is driving deforestation or land degradation in a particular area may also not always be clear (Kissinger et al., 2012), making the quantification of the risk of leakage particularly difficult. However, research identified the primary drivers of deforestation and degradation in certain contexts. These can be grouped into direct and indirect drivers. The likelihood that these drivers cause emissions to leak when forest-related mitigation measures are implemented depends on variables like the mobility of labour and capital, occupation and geographic features of adjacent lands, and the price elasticity of demand.

Direct drivers include agricultural expansion, both commercial and subsistence such as for planting crops or grazing livestock; expansion of infrastructure (urban expansion or regional transport infrastructure); mining and wood extraction (for timber, fuelwood, etc.); logging, uncontrolled fires; livestock grazing in forests; and fuel wood collection (Kissinger et al., 2012). Indirect drivers include international markets and commodity prices; population growth; domestic markets; national land use and urban planning policies; governance capacities and local, including household, behaviour patterns (Geist & Lambin, 2002).

These drivers vary regionally and may also change over time – historical patterns may not be repeated in the future (Kissinger et al., 2012). Each driver may cause leakage on different geographic scales; however, some drivers will inherently be more of a local or international dimension.

Globally, agriculture and especially commercial agriculture are the largest drivers of deforestation (Kissinger et al., 2012; Ziegler et al., 2012). Although small-scale subsistence agriculture is an important driver in Africa and some other countries, it will likely become relatively less prominent as populations become increasingly urbanized (Boucher et al., 2011). Subsistence agriculture inherently has a more local dimension and is more likely to lead to local than to international leakage through market effects since it does not affect international markets for the products involved (Aukland et al., 2003).

Drivers of deforestation in developing countries are thought to be similar in Africa and Asia, while the drivers of degradation are more similar in Latin America and Asia (Hosonuma et al., 2012). Soy and livestock grazing were the primary drivers in South America in 2011 (Boucher et al., 2011), whereas timber, paper and palm oil were more significant in Southeast Asia (Boucher et al., 2011; Kissinger et al., 2012). In both these regions, commercial agriculture is a particular problem. In central Africa too, there has been a recent increase of palm oil driven deforestation (Kelley, 2016). Overall, commodities that are traded globally are much more prone to international leakage (Boucher et al., 2011).

III.2.5 Minimizing, monitoring, and accounting for local and regional leakage

In order to ensure a positive environmental impact, it is important that actions be taken to prevent or reduce leakage to the greatest extent possible. Regardless, monitoring is important to estimate and to account for any unavoidable leakage, e.g. through leakage sharing agreements. How one addresses different types of leakage is closely related to the driver of deforestation or degradation in that context and the kind of intervention implemented.

III.2.5.1 Minimizing leakage

Leakage can in some respects be minimized through the kind of intervention taken. An example of an intervention that minimizes leakage would be to increase the efficiency of forest resource extraction or by intensifying agriculture on non-forest land to reduce pressure for deforestation. Indirect measures include the provision of alternative livelihoods that are less likely to lead to deforestation and land degradation, such as honey production, eco-tourism or income for forest regeneration. The success of such measures is however highly dependent on active participation of and acceptance by local populations. Therefore, in order to be effective in preventing leakage, such measures must be coupled with intense stakeholder consultations, a sense of local ownership and effective governance, as well as longer term secure land tenure.

Local leakage due to a narrow boundary for crediting could be addressed by requiring the inclusion of significant activities, pools and gases in order for activities to be eligible for crediting. This would go further than the current Warsaw Framework, which calls for countries to only justify their emissions, and it would limit crediting to activities that include relevant activities, pools and gases. A level of "significance" could be defined, to minimize the risk that emission reductions or removals may be overestimated (Streck et al., 2017).

III.2.5.2 Monitoring leakage

Monitoring local and regional leakage involves a number of different approaches. For primary leakage monitoring, historical deforestation figures are important. If these are not available, monitoring to understand any shifts in activity is very challenging (Wunder, 2008).

Leakage belt monitoring refers to a process of measurement and quantification of shifts of activity in areas where a shift of the deforestation or land degradation activity is thought to likely occur and comparing increases or losses of carbon stocks to the established baseline. Such an approach is recommended or taken by the VCS, the ACR, the FCPC, and the Australian Carbon Farming Initiative. In some cases, such belts cover areas around projects five to seven times the size of project areas larger than 100,000 ha and 20 to 40 times the size of smaller ones (<100,000 ha). It is unclear to which extent such leakage belts are sufficient. New satellite monitoring techniques may improve monitoring, although with multiple drivers of deforestation and land degradation, causation may be somewhat unclear.

Agent tracking may also help to account for leakage, as it can estimate leakage by comparing current behaviour to historical behaviour of conversion after an intervention. This is generally done through surveys and statistics.

III.2.5.3 Estimating and accounting for leakage

Leakage deductions are sometimes used to account for displacement of emissions outside a boundary. Based on the characteristics of the activity, an assumed probable leakage factor or risk is estimated ex-ante, and sometimes followed up with ex-post monitoring. Ex-post monitoring is, however, associated with extra costs, and is therefore unevenly implemented between programmes. Moreover, because rules vary, ex-post monitoring is sometimes even unevenly implemented between project developers within the same programme. It is therefore unclear if the leakage discount factors are overly conservative or lax. The use and application of deductions as a way to address local leakage varies, but is applied or suggested by a number of standards including the VCS, CAR, and ACR.

Leakage sharing agreements may also be used if two programmes have the potential to leak into each other's defined scope. The two programmes could either each be individually responsible for any increased leakage, or payments could be shared based on an estimated shared risk of leakage between programmes. Here, it is important that the systems to monitor leakage are robust, otherwise leakage is not properly accounted for. However, uncertainties and difficulties in monitoring of carbon stocks and other data can undermine the effectiveness of this approach.

III.2.6 The challenge of global leakage

Global leakage, which is closely associated with trade flows and globalization, is particularly challenging to monitor and the hardest to address – it is likely impossible to mitigate global leakage entirely (Lambin & Meyfroidt, 2011). Efforts to address deforestation and degradation caused by globally traded commodities, such as cattle, palm oil and wood products, are highly prone to global leakage (Boucher et al., 2011). The trans-boundary nature of international leakage makes it hard to quantify, but may be rampant and seriously undermine the effectiveness of efforts to reduce deforestation or degradation (Henders & Ostwald, 2012). A recent report by the Office of the Auditor General of Norway reviewing the Norway's International Climate and Forest Initiative found that "poor implementation of REDD+ on a national level and in key tropical forests means that although logging stops in one place, it can be replaced by logging somewhere else" (Riksrevisjonen, 2018).

Examining different forest carbon leakage quantification methods and their suitability for assessing leakage, Henders and Ostwald found that there is generally a lack of accounting for international leakage among the 34 quantification models assessed, including the VCS, CAR and ACR (Henders & Ostwald, 2012). Only two methods address international leakage, and both are based on complex modelling exercises, neither is implemented in forest crediting programmes.

Theoretically, international leakage could to some extent be better monitored and assessed by combining information from national and international sources, however, in practice leakage is highly dependent on the driver and conditions and circumstances of the countries in question. Displacement will most likely shift to countries that are similarly suitable for that activity (e.g. a certain crop or a substitutable crop), that provide access to international markets, and are often those that are in an earlier stage of forest transition: so-called "high forest low deforestation countries". These countries often have weaker institutions, have less granular GHG inventories, and less capacity to monitor and take measures to address increased pressure on forests. Leakage through market effects may not even be possible to tie to a single intervention. Leakage could however be reduced by expanding REDD+ participation internationally (Kissinger et al., 2012), for which there is an unprecedented global effort. Current participation in REDD+ monitoring and inventory robustness is however still highly uneven, and comprehensive information and data is lacking on a global scale. This is related not only to the relative lack of granularity of carbon stocks and GHG emissions and removals from forests in GHG inventories on a global scale, but also to the fact that such international leakage may simply be caused by the change of commodity prices (Boucher et al., 2011). Lambin and Meyfroidt find that "if REDD+ policies are to be effective, they must be accompanied by trade regulation and efforts at global land-use management beyond the borders of individual countries" (Meyfroidt, Rudel, & Lambin, 2010). Such congruent complementary measures are necessary whatever the source of finance for the forest-related mitigation is. However, the implementation of such policies or the lack thereof is an especially important consideration for transfer-based finance, including through carbon market programmes.

III.3 Non-permanence

III.3.1 Defining non-permanence

A key risk of forest-related mitigation activities is the possible reversal of emission reductions or removals, as carbon stocks that are preserved or enhanced could be lost through natural or anthropogenic disturbances at a later point in time. Because drivers of deforestation are dynamic and change through time, a strategy to reduce deforestation today may not be effective in the long term. The reversal of emission reductions or removals is often referred to as 'non-permanence' (IPCC, 2014). Risks of non-permanence also exist for some other activities, such as the geological storage of carbon dioxide or the avoidance of emissions from coal mine fires, though the likelihood of non-permanence may differ considerably between activities.

The Kyoto Protocol requires addressing non-permanence under the CDM for afforestation and reforestation projects as well as for projects that capture and store carbon dioxide in geological reservoirs. Other project types that pose risks for non-permanence are not eligible under the CDM. The current CORSIA Emissions Unit Eligibility criteria require that 'carbon offset credits must represent emissions reductions, avoidance, or carbon sequestration that are permanent' and that 'if there is risk of reductions or removals being reversed, then either (a) such credits are not eligible or (b) mitigation measures are in place to monitor, mitigate, and compensate any material incidence of non-permanence' (ICAO, 2017).

III.3.2 The context of the Paris Agreement

The context of the Paris Agreement is also relevant for addressing non-permanence. Similar to the considerations for the estimation of emission reductions in section III.1.6 above, the ambition and scope of NDCs play a role.

If the emission reductions or removals from a credited activity are *not covered* by an NDC target, a reversal would *directly* impact global GHG emissions. This is because the host country would not observe the reversal when reporting its progress towards achieving its NDC under Article 13.7(b) of the Paris Agreement, and would thus not have to compensate for the reversal in order to achieve its NDC. If the emission reductions or removals are *covered* by an NDC target, the ambition of the NDC target of the transferring country comes into play. If the transferring country has an *ambitious* NDC target – which requires the country to pursue further mitigation action to achieve its target – it may have to compensate for a reversal in order to achieve its NDC. This holds as long as the forest-based mitigation activities are fully reflected in GHG inventories (or other parameters) used to track progress towards the NDC target and as long as the LULUCF sector is accounted for in ways that ensure that any reversals are reported and accounted for. By contrast, this would not hold for a country with an NDC target that is less stringent than its realistic BAU emissions.

Whether the host country would compensate for any non-permanence from forest-related projects or programmes thus depends on whether its NDC covers the LULUCF sector; how the LULUCF sector is accounted for; and how ambitious the NDC target is. Even if the country would have to compensate for any non-permanence, it may have an interest in a proper accounting for non-permanence by the entities participating in the credited activity, in order to manage non-permanence risks and to avoid the risk that it is 'over-selling' credits and may no longer achieve its NDC. For these reasons, it is advisable that non-permanence be addressed independently of the ambition, scope, and LULUCF accounting approaches of the NDC.

III.3.3 Options to mitigate the risk of non-permanence

GHG crediting programmes, including international and non-governmental programmes, and transfer-based finance programmes commonly require addressing the risk of non-permanence. Table 2 provides an overview of the approaches applied to address the risk of non-permanence. These include three main measures:

- **Reducing the risk of non-permanence:** The risk of a reversal can vary considerably between different activities. Some GHG crediting programmes require conducting a non-permanence risk assessment and exclude activities with a higher non-permanence risk. The requirement to conduct a non-permanence risk assessment can also provide incentives to reduce non-permanence risks, such as through measures that reduce the likelihood or impact of forest fires.
- **Monitoring and verification of permanence:** The identification of any reversal is a prerequisite for compensating for reversals. All GHG crediting programmes require monitoring and verifying permanence, though the duration of monitoring as well as the consequences for not monitoring vary.
- **Compensation for any non-permanence:** In the event of a reversal, different approaches could be pursued to compensate for the reversal, such that the atmosphere permanently 'sees' an emission reduction or removal. This requires that already issued credits which are subject to a reversal are replaced. The obligation to replace credits could lie with the project or programme implementing the forest-related mitigation activity, an activity-specific or a pooled buffer (i.e. an account where credits are set aside for the purpose of compensating for a reversal), an insurance company, the host country, or the country or entity using the credit.

Table 2 summarizes and compares these measures for three programmes: the CDM, the VCS, and the FCPF Carbon Fund. Although only afforestation and reforestation (AR) projects, as well as the capture and geological storage of carbon dioxide (CCS), are eligible under the CDM, we consider this mechanism here because it constitutes the only multilaterally agreed framework to address non-permanence. We include the approaches for CCS projects because they broaden the approaches used for AR projects and address some of their shortcomings. They are therefore seen by some stakeholders as a possible blue print for approaches in the forest sector, including for measures for reducing deforestation or degradation, though the likelihood and causes of a reversal are different. The VCS established two similar approaches to address non-permanence of forest-related activities: one for activities implemented at project-level and one for jurisdictional and nested activities (JNR). The methodological framework of the FCPF includes general criteria and principles for addressing non-permanence (FCPF, 2016).

Table 2 Overview of approaches to address the risk of non-permanence

	CDM AR	CDM CCS	VCS	FCPF
Measures to reduce the risk of non-permanence				
Non-permanence risk assessment	No	Yes	Yes	Yes
Exclusion of activities with a high non-permanence risk	No	Yes	Yes	No rules
Monitoring and verification				
Obligation to monitor beyond the end of the crediting period	No	Yes	No	Implicitly
Update of baseline possible in the event of catastrophic non-permanence	No	No	Yes	No
Amount of compensation required to address possible non-permanence				
If reversals are observed during the crediting period	Reversals observed	Reversals observed	Reversals observed	Reversals observed
If no monitoring report is submitted	All issued credits	All issued credits	All issued credits	No rules
After the end of the crediting period	All issued credits	Reversals observed	Fraction of credits	Mechanisms or faction of credits
Responsibility for the compensation for non-permanence				
Activity owners	No	Yes	Yes	Yes
Activity-specific buffer	No	Yes	No	Yes
Pooled buffer	No	No	Yes	No
Insurance	No	No	Optional	Optional
Buyer country	Yes	Yes	Optional	No
Host country	No	Yes	Optional	No

The comparison shows that the measures to address the risk of non-permanence vary considerably among the programmes. A first important aspect is whether the risk of non-permanence of an activity is assessed and whether activities with a high risk are eligible or excluded from the programme. For AR CDM projects, a non-performance risk assessment is not required. Projects could actually plan from the outset to release the carbon at a later stage. A non-performance risk assessment is not required due to the safeguard that *all* credits from AR projects must be replaced by permanent Kyoto units at the end of the (last) crediting period, regardless of whether a reversal occurred. This is different for CCS CDM projects as well as for activities implemented under the VCS. For CCS projects, a risk and safety assessment is required in order to identify relevant risks and remedial measures, and to provide assurance of the integrity of the storage site. Geological storage sites shall only be used if there is no 'significant risk' of a reversal. Under the VCS, a non-permanence risk assessment is required in order to determine the number of credits to be deposited in a pooled buffer that is used to compensate for reversals. Projects with a high non-performance risk are excluded. The methodological framework for the FCPF also requires assessing the non-permanence risk but does not include any provisions for excluding activities that have a high non-performance risk.

All programmes require monitoring and verifying permanence, though the duration for how long monitoring is required, as well as the consequences for not monitoring vary. For CDM AR projects, monitoring continues, in principle, until the end of the last crediting period when all issued credits must be replaced by permanent Kyoto units. For CDM CCS projects, monitoring and verification continues at least 20 years beyond the end of the last crediting period. It should only be terminated once no seepage has been observed 'at any time in the past 10 years' and if 'all available evidence from observations and modelling indicates that the stored carbon dioxide will be completely isolated from the atmosphere in the long term'. Under the VCS, monitoring is only required until the end of the crediting period. Under the methodological framework for the FCPF Carbon Fund, the programme should put in place a

mechanism to address non-permanence after the end of the term of the emission reduction purchase agreement (ERPA). This means implicitly that monitoring should be continued, but it is unclear for how long.

Another important aspect concerns the consequences if no monitoring report is submitted. As long as monitoring reports are regularly submitted, all programmes require that any monitored reversal is compensated for, though the methodological framework for the FCPF Carbon Fund is not clear on whether any reversal beyond the amounts put in a reserve would need to be compensated for. If no monitoring report is submitted, the consequences also differ considerably between the programmes. For both AR and CCS CDM projects, *all* issued credits must be replaced by other Kyoto units. Similarly, where projects fail to submit a verification report within five years under the VCS, a fraction of credits put in a buffer are put on hold. If after 15 years no verification report is submitted, all credits issued to the project or programme must be replaced through the buffer. This is a rather conservative approach, as non-permanence would be even addressed if all emission reductions or removals were reversed. The methodological framework for the FCPF Carbon Fund does not specify the consequences if no monitoring report is submitted.

After the end of the crediting period, the requirements also differ. For AR CDM projects, *all* issued credits must be replaced by other Kyoto units. This is a very conservative approach, as non-permanence would be even addressed if all removals from all projects would be reversed after the end of regular monitoring. This takes into account that AR projects with a high risk of non-permanence – or even planned non-permanence – are eligible under the CDM. For CCS projects, monitoring continues for at least 20 years of the end of the crediting period (or a longer period if any seepage is observed), and any reversals observed during that period have to replaced. Once no seepage is observed for 20 years the site is deemed to be safe and monitoring is discontinued. The Californian programme – though not assessed in detail here – requires forestry projects to maintain their carbon stock for 100 years (California Air Resources Board, 2014). Under the VCS, a different approach is taken; monitoring is no longer required, and a *fraction* of the issued credits remains in a pooled buffer. The fraction is determined based on a non-performance risk rating for the activity, which considers both natural and anthropogenic risks for a reversal. It is thus implicitly assumed that, on average, the credited activities perform after the end of monitoring as predicted in the non-permanence risk assessment. The FCPF requires the programme to put in place a robust reversal management mechanism or another specified approach that addresses the risk of reversals beyond the term of the ERPA. If the mechanism is not put in place, the credits from the program in the buffer will be cancelled. Similar to the VCS, it would in the case be assumed that the activity performs as predicted after the end of crediting. Further research is needed to determine the validity of this assumption, as the credited entities do no longer have financial incentives to ensure the permanence of the emission reductions.

Lastly, another important difference between the programmes relates to the responsibility for compensating for any non-permanence. The multilateral framework of the CDM strongly relies on liabilities for countries. For AR projects, the *buyer* country bears the responsibility for compensating for any non-permanence. For CCS projects, the responsibility to compensate for any reversals lies first with the project owners, including a project-specific buffer account. Only if the project owners do not fulfil their obligation to replace units, a country liability comes into effect. At the project outset, it is decided whether the country liability lies with the *host* or the *buyer* country.

The VCS framework primarily relies on compensation through a *pooled* buffer in which a fraction of the issued credits is deposited. The amount of credits to be put in the buffer is based on a non-performance risk rating. For jurisdictional approaches, this can be complemented by insurances or country liability which lower the risk rating and then require a smaller fraction of credits to be deposited in the buffer. The methodological framework for the FCPF Carbon Fund applies a programme-specific buffer or, alternatively, allows programmes to establish their own buffer arrangements or to use an insurance.

Overall, the multilaterally agreed rules for addressing non-permanence under the CDM establish more stringent requirements for addressing non-permanence compared to the VCS and the FCPF, mainly because they also require that countries take on liability for non-permanence and because they employ

more conservative approaches to address non-permanence risks after the end of crediting. A liability for *buyer* countries, however, implies that the credits are not directly fungible with permanent credits from other sectors. For this reason, major buyers, such as the EU ETS, did not recognize credits from CDM AR projects. Moreover, the buyer has limited possibilities to influence the non-permanence risks. Approaches that put the liability on those entities that can influence the risk may provide better incentives to manage and reduce risks of non-permanence. However, once a credit has been purchased, transferred, and used for compliance, the enforceability of such a liability to address any reversal far into the future becomes an important challenge, especially with private actors that may go out of business or with new governments.

The effectiveness of the buffer approach depends on the size of the buffer which is based on the accuracy of the non-performance risk rating and the diversification of risks within the pool. The non-performance risk rating is undertaken based on the conditions present and the information available at the time of the risk analysis. Over longer time periods, circumstances and risks can change considerably. The VCS requires updates of the risk analysis, but only during the crediting period. It is thus uncertain whether non-permanence is effectively addressed beyond the crediting period, in particular if programmes do not sanction any non-permanence after the end of crediting. It is also unclear to what extent risks analyses include future climate change considerations. *Pooled* buffers, as implemented under the VCS, provide for better safeguards than *programme-specific* buffers, as foreseen under the FCPF Carbon Fund, because pooled buffers can compensate for reversals even in the event that the reversal exceeds the credits put into a buffer by a specific programme. A further advantage of pooled buffers is that they are more easily enforceable, as the pooled buffer is typically under the control of the GHG crediting programme (or any other form of transfer-based finance programme), whereas enforceability can be an issue with private sector entities (e.g. in the case of bankruptcy) or possibly with changes in future governments.

To provide appropriate incentives for projects or programmes to reduce the risk of non-permanence, and to provide assurance that non-permanence risks are addressed beyond the end of crediting periods, several options could be combined to mitigate non-permanence risks:

- A **non-performance risk assessment** that results in a quantitative risk rating, combined with a requirement to deposit a fraction of the issued credits in a **pooled buffer**, provides financial incentives for REDD+ activities to manage and reduce non-permanence risks, as activities with lower non-permanence risks receive more credits. A pooled buffer mitigates the risk that reversals from a specific project or programme exceed the buffer or that the responsible entities do not have the financial resources to buy further credits to compensate for the reversal. The conservativeness of pooled buffers could be improved by addressing risks from future climate changes, such as the likelihood of future increased droughts or flooding caused by climate change.
- **Monitoring for sufficiently long time periods**, beyond crediting periods. This provides incentives to continue maintaining the carbon stocks in the long-term, and to ensure non-permanence over time. If monitoring is stopped before the regular end of monitoring, effective sanctions should apply, such as a requirement to replace all issued offset credits. This provides incentives to continue monitoring, even in the event of a reversal.
- The ultimate **responsibility to compensate for any non-performance** could primarily lie with the project or programme implementing the forest-based mitigation activity, combined with a **host country liability**. The project and programme, and the host country, can best influence the risk of non-permanence and should therefore bear the responsibility. Host country liability may also facilitate political support for continued management of the carbon stocks. Liability with projects and programmes, and host countries, also ensures that offset credits from REDD+ activities are fully fungible in the market. A key challenge are enforcement capabilities over both private and public actors over long time periods in case of non-compliance with liability rules.

III.4 Accounting issues and relation to NDCs

III.4.1 What accounting issues are relevant when crediting forest-related mitigation?

International action to address climate change is founded upon the notion of cooperation and shared responsibility. Fundamental to this cooperation is the ability to measure and account for the contribution of each party to global emissions and to the shared effort to mitigate them. In any system under which countries have climate change mitigation targets – such as the Paris Agreement – or which regulated private-sector entities have obligations to reduce emissions – such as under CORSIA or national emissions trading systems – accounting rules and review processes are required to assess whether those pledges or obligations have been met.

Accounting for mitigation targets typically involves several elements. Defining mitigation targets clearly is a key prerequisite for accounting, including that they are expressed in quantifiable indicators; that the scope of the mitigation targets is clearly defined, including the geographical coverage, the sources, activities, pools and GHGs included, and the time frames covered; and that the target level is clearly specified, usually in relation to historical reference year or projected BAU emissions (Schneider, Füssler, Kohli, et al., 2017). A key issue for forest-related mitigation is that the LULUCF sector is often accounted for in specific ways.

Accounting for mitigation targets also requires establishing systems and procedures to track progress towards the targets. This includes defining the methodologies and data sources to quantify the progress, such as relevant guidelines by the Intergovernmental Panel on Climate Change (IPCC); making institutional arrangements to collect relevant data, calculate the progress achieved, and report on the outcome; and establishing accounting rules to compare the reported progress with the mitigation targets.

Where emissions reductions and removals are transferred between countries or other entities, robust accounting rules are required to avoid double counting of emission reductions. This raises additional complexities and risks, which require clear, coherent and robust accounting rules to be in place to ensure the environmental integrity of the system. In the context of crediting forest-related mitigation activities, accounting rules may have to address several possible uses of credits, including towards achievement NDC targets, towards fulfilling offsetting requirements under CORSIA, and towards achieving voluntary goals. All or some of the information and steps may be subject to an international reporting and review, and an international mechanism to facilitate compliance.

Given the impact of accounting rules on the ability to meet emissions targets, it is perhaps not surprising that, though highly technical, their development is also a decidedly political process whereby Parties pursue rules that reflect their national interests. Being among the most complex, the development of accounting rules for land use have tended to be among the most highly politicized, and critics have argued that this has led to the adoption of rules that compromise the environmental integrity of mitigation commitments, in particular under the Kyoto Protocol (Dooley & Gupta, 2017).

III.4.2 Treatment of the LULUCF sector in NDCs

A key issue for accounting for forest-related mitigation is the treatment of the LULUCF sector in NDCs. Two issues are particularly important in this context: whether the LULUCF sector is included in NDCs and how it is accounted for.

An evaluation of NDCs indicates that, as of late 2017, 116 out of 165 countries had proposed a quantified emission mitigation target that includes land use, including several REDD+ countries. Of these, 91 plan to adopt an economy-wide or multi-sector target that includes land use, while 20 plan to adopt only a specific emissions target on land use, and five plan to adopt both.[11]

There remain large uncertainties regarding how countries will account for their land-use sector emissions under their NDCs. Several countries indicate specific approaches, including the net-net approach, the reference level approach, or a combination of these (Climate Focus, 2016). While most

[11] See http://forestdeclaration.org/goal/goal-7/

countries confirm they intend to account for their emissions using IPCC guidelines, there are discrepancies as to whether the 1996 or 2006 Guidelines will be used, and only a handful of countries indicate their intention to use the 2003 IPCC Good Practice Guidance for the land sector. In total, the ambiguity in how countries incorporate LULUCF into their NDC is estimated to lead to an uncertainty of more than 2 $GtCO_2$ in 2030 (Fyson & Jeffery, 2018).

The lack of clarity in NDCs with regard to the accounting for LULUCF and the diversity of approaches indicate that a good deal of work remains to be done to clarify the scope of and assumptions underlying the broad inclusion of land use within emissions targets in NDCs. Indeed, negotiators have highlighted the challenges in finding common accounting rules that suit all and ongoing efforts of countries to define rules that suit national circumstances (Dooley & Gupta, 2017). Providing the necessary clarity on targets for the LULUCF sector, including how the sector is accounted for, is an important prerequisite for robust accounting for the transfer of any carbon market credits from forest-related mitigation.

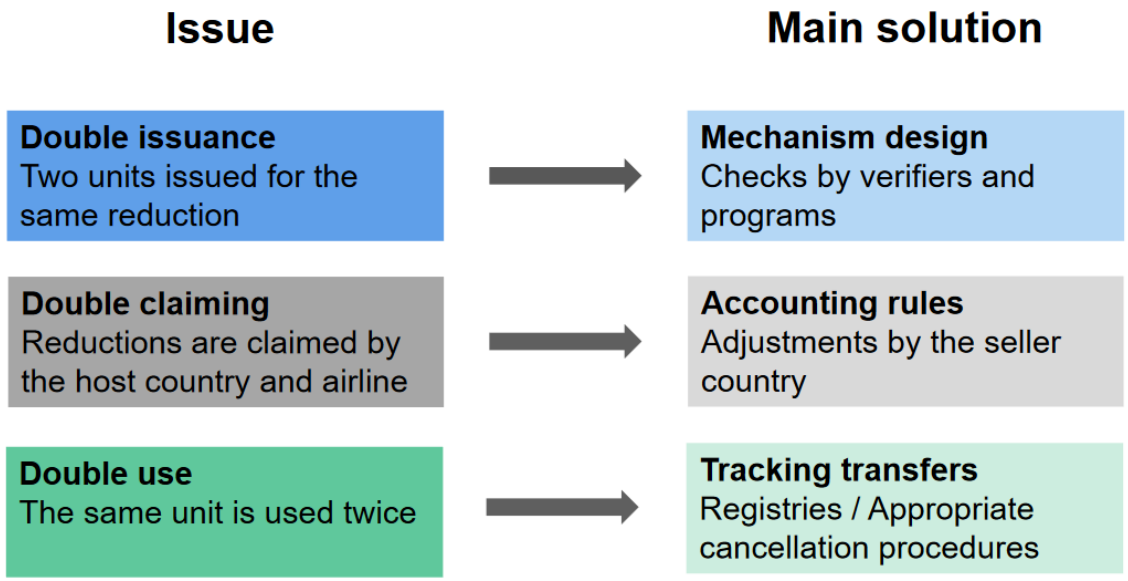
III.4.3 Avoiding double counting

A fundamental principle of accounting – both in carbon markets and in greenhouse gas accounting more broadly – is avoiding double counting of emission reductions. Double counting occurs if a single emission reduction is used more than once towards achieving mitigation targets. Three different forms of double counting are commonly distinguished (Schneider, Kollmuss, & Lazarus, 2015):

1. **Double issuance**: This occurs if more than one unit is issued for the same emission or emission reduction.
2. **Double use:** This occurs when the same issued unit is used twice, for example, if a unit is duplicated in registries.
3. **Double claiming:** This occurs if the same emissions reduction is claimed by two different entities towards achieving a mitigation target: once by the country in which the emission reduction or removal occurs, and once by the country or entity using the carbon market unit.

Avoiding double counting requires a suite of measures to be addressed. Figure 2 provides an overview of the main systems put in place to avoid the three different forms of double counting.

Figure 2 Main strategies to address different types of double counting



Both the Paris Agreement and the Emissions Unit Eligibility Criteria under CORSIA require that double counting be avoided. The CORSIA Emissions Unit Eligibility Criteria explicitly require avoiding all three forms of double counting (ICAO, 2017). Double use and double issuance are issues that can mainly

be addressed through the design of mechanisms issuing units and the registries where those units issued, transferred, and cancelled or retired.

The Paris Agreement envisages that double claiming of internationally transferred mitigation outcomes under Article 6.2 be avoided through the application of 'corresponding adjustments'. It is yet unclear how and when corresponding adjustments will be applied and what triggers the application of adjustment. They could, for example, be applied to reported progress towards targets, such as total GHG emissions, or to emissions budgets. Both approaches could effectively ensure that transferred emission reductions cannot be counted by the transferring country towards achieving its NDC. The application of adjustments could be triggered through the issuance, the first transfer, the first acquisition or the use of units. A further unresolved issue is how credits under the Article 6.4 mechanism could be accounted for. A simple and pragmatic approach could be to apply the accounting rules developed under Article 6.2 when credits issued under the Article 6.4 mechanism are internationally transferred. It is also unclear whether ITMOs will constitute units or accounting terms reported for the purpose of applying adjustments. If ITMOs are considered units, then any credits issued under the Article 6.4 mechanism could be deemed as ITMOs. If ITMOs are accounting terms, then credits issued under the Article 6.4 mechanism would be accounted for as ITMOs if they are internationally transferred and used towards NDCs (or possibly used for other purposes, depending on how ITMOs will be defined). In both cases, appropriate tracking systems are needed to ensure that transparent information on the issuance, transfer and use of units is available in order to avoid double counting (see section III.4.9 further below).

As provisions under the Paris Agreement have not yet been implemented, most GHG crediting programmes and the FCPF have not yet established provisions to avoid double claiming with NDC targets; however, most programmes have policies in place to avoid double issuance and double use.

The approaches to address double counting for forest-related mitigation are in principle the same as for other sectors. There are a number of general challenges with avoiding double counting as well as a few specific challenges for forest-related mitigation. The sections that follow explore important accounting issues and highlight the contexts or issues that may be particularly important for crediting forest-related mitigation.

III.4.4 Ensuring clear and unencumbered national claims

In order to issue a credit, it is typically required that the entity in question has the legal right to claim that its actions led to the generation of that emissions reduction or removal. This right should be "unencumbered", that is, should not be at risk of reasonable claims by other entities that they contributed to the generation of the same emissions reduction. Proof that the entity selling emissions reductions possesses this right is typically required under carbon market standards,[12] as well as under other transfer-based finance mechanisms such as the FCPF Carbon Fund (FCPC, 2016).

The ability to prove that an entity has the full rights to claim its actions have led to the generation of an emissions reduction is relatively straightforward in most energy or industrial sector projects where a single entity owns the plant or facility in which the project takes place. Projects and programmes in the land-use sector, however, generate significant additional complexities. The land upon which the activities takes place may be subject to multiple and often overlapping rights to ownership, use, harvesting and management. In addition, there is often conflict between statutory law and customary law, in particular with regard to the rights of indigenous peoples and other local communities. These factors often create an uncertain and risky ground for assessing the impact of the mitigation intervention on stakeholders, including in terms of a right to the carbon credits generated (or to a certain share) (Streck & Unger, 2016). Another form of different claims could arise if products from the land, in particular biomass, are used by others and the resulting emission reductions are also claimed by others.

At the national level, authorization of projects or programmes would be proof that the national government does not make claim to the emissions reductions in question. Nonetheless, governments and

[12] See, e.g. VCS Standard: VCS Version 3, 3.11: Ownership and Other Programs; Decision 5/CMP.1 Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol.

private project developers alike should prove the ability to claim title to emissions reductions where these are to be sold.

The most suitable format to clearly determine carbon credit related claims (and avoid any conflicts) are contracts, or chains of contracts. Such contracts need to clarify the (environmental) service, the terms of contribution and compensation, as well as the right to request carbon credit issuance and to effectuate transfers of carbon credits to third parties. The latter is particularly relevant in situations, in which the entity contributing a service and thus holding the right to benefit from the emission reductions in question is not equipped, willing or able to take on the responsibility to monetise this right. Through a contract or a sub-contract with a duly authorised representative, the right holder can transfer the rights to sell carbon benefits of the activity to an intermediary. This construction is very common in small-scale projects which involve land of multiple small land owners, farmers or households (Streck & Unger, 2016).

In larger, national or sub-national programmes it will often not be feasible to enter into contracts with every entity that is involved in the generation of emissions reductions, as this may include hundreds of thousands (or even millions) of people who have rights to and are involved in the use and management of forests in a given jurisdiction. The main existing experience in managing the issue of rights to emissions reductions at this scale comes from the FCPF Carbon Fund, where title may be shown through "reference to existing legal and regulatory frameworks, sub-arrangements with potential land and resource tenure rights-holders (including those holding legal and customary rights, as identified by the assessments conducted under Criterion 28), and benefit-sharing arrangements under the Benefit-Sharing Plan."

The approach pursued by the FCPF Carbon Fund has proven relatively workable in practice. However, countries have struggled with interpreting the requirements, leading to the FCPF issuing guidance in 2018 (FCPC, 2018). Ultimately, proving title to emissions reductions generated at a national or sub-national scale will always provide challenges, and requirements should aim to balance the protection of the rights of land owners and communities who may be impacted by the sale of emissions reductions with the need to provide sufficient flexibility in order to make programmes workable. The experience of the FCPF also shows the need to provide clear guidance to countries and to work with them in designing arrangements that will meet the requirements.

III.4.5 Authorization of transfers

For countries to be able to make adjustments, they need to have clear and complete records of all emissions reductions that leave the country. Moreover, in light of possible implications for national accounting, countries should have the right to determine whether such emissions reductions be generated and sold in the first place. The foregoing implies that the international transfer of emissions reductions eligible for use in compliance markets should be subject to the prior authorization of host countries. This is particularly important in forest-related mitigation, where implementation can take place at multiple levels (e.g. national, sub-national and project levels), often through 'nested' frameworks.

Government authorization is foreseen under both Article 6 of the Paris Agreement and in the context of programmes such as the FCPF Carbon Fund. National programmes and many sub-national programmes are already managed by national governments and usually must be signed off by the relevant minister, meaning that this presents less of an issue here, although internal coordination is needed to ensure that different ministries with responsibility for forests and land use are aware of programmes. The details of transactions should be clearly recorded in relevant agreements, such as emissions reduction purchase agreements.

In the case of projects developed by private entities, prior written authorization should be provided by governments that explicitly allows those entities to generate and sell credits and commits the government to make corresponding adjustments to account for these. Ideally such authorization should take a standardized form such as the Letters of Approval provided under the CDM.

III.4.6 Overlapping activities and nested frameworks

In some countries, different forest-related mitigation activities are implemented in parallel. In these instances, there could be some overlap between different types of activities and different levels of implementation. While no country has yet received results-based payments for REDD+ emissions reductions measured and verified under the Warsaw Framework for REDD+,[13] initial experience with the submission and review of reference levels has highlighted some accounting issues arising. For example, technical assessment reports have highlighted potential double counting in countries which include multiple REDD+ activities in their submission – especially deforestation and forest degradation (FAO, 2017). Moreover, overlapping claims can occur where emissions reductions are claimed by a project and by the jurisdiction in which the project takes place.

In response to these challenges, a number of countries have developed or are developing nested accounting systems for REDD+, including Colombia and the State of Acre in Brazil. At the heart of a nesting system is an approval system that requires any activity occurring within a given jurisdiction that will generate credits for emissions reductions separately from that jurisdiction's accounting to obtain approval from the jurisdiction. The jurisdiction guarantees via its approval that the activity's emissions reductions (i.e., emissions that are sold, claimed or otherwise used internationally) will not be claimed by that jurisdiction itself as its "own efforts."

The approval and data management processes associated with nested systems can also be designed to help coordinate and ensure overlap between projects in the jurisdiction. They can also help ensure that baselines and reference levels are coherent and use the same underlying data and assumptions. A nested accounting system and related data management system therefore have the potential to address several of the potential issues discussed above, including the need for authorization of the generation of emissions reductions and the need for consistency in accounting methods across projects, programmes and national inventories.

Experience with such systems can be found outside the REDD+ context of JI under the Kyoto Protocol and the EU ETS, for which the European Union established a system of rules for nesting JI projects (from which credits could be sold internationally) occurring within sectors covered by the EU ETS. Here, rules were established for regulating JI project activities in EU Member States, to the effect that the issuance of credits under JI in any sector covered by the EU ETS must be mirrored by the cancellation of EU ETS allowances (Climate Focus, 2015).

III.4.7 Methodological consistency between GHG inventories and the quantification of forest-related mitigation activities

To ensure robust accounting of any transfer of credits from forest-related mitigation, it is important that consistent methodological approaches be applied. In practice, there exist important discrepancies in approaches to accounting for land use under NDCs and to prepare GHG inventories and those for quantifying emission reductions under the Warsaw Framework for REDD+, GHG crediting programmes or transfer-based finance programmes such as the FCPF Carbon Fund.

If emission reductions from forest-related mitigation do not show-up in GHG inventories (e.g. because GHG inventory methodologies do not apply the necessary granularity), then the host country may not be able to use the reductions to achieve its NDC target. If the reductions are internationally transferred, and accounted for, this could even imply that the country would have to 'compensate' for such transfers by reducing emissions further.

Under the Warsaw Framework for REDD+, countries have substantial flexibility with respect to which activities and carbon pools to account for and how to define them, and the accounting periods used. Moreover, REDD+ activities are defined differently than land-use categories in GHG inventories. While UNFCCC decisions do require countries to ensure consistency with national GHG inventories to the

[13] In September 2017 The Green Climate Fund published a call for proposals for results-based finance programmes based on the Warsaw Framework for REDD+. See: https://www.greenclimate.fund/documents/20182/820027/GCF_B.18_06_-_Request_for_proposals_for_the_pilot_programme_for_REDD-plus_results-based_payments.pdf/0691c547-110a-4bee-886b-084664326fe1.

extent possible, this is often challenging, and discrepancies can exist in terms of scope and scale, methodology and definitions (FAO, 2017). For this to be correctly done, the accounting systems for generating emissions reductions must be compatible with those for measuring national emissions and accounting for the country's NDC.

III.4.8 Overall mitigation in global emissions and own benefit

The Article 6.4 mechanism "shall aim to deliver an overall mitigation in global emissions". No agreed definition exists for this term and it is yet unclear how it will be implemented, in particular whether it will be voluntary goal or a mandatory requirement (Marcu, Vangenechten, Martin-Harvey, & Gonzalez Holguera, 2017). If the concept is implemented such that a fraction of the emission reductions achieved through the mechanism should not be used by any Party towards its NDC, this could raise the question whether non-governmental GHG crediting programmes or other transfer-based programmes that involve forest-related mitigation should implement a similar principle. Implementing this principle could require that accounting ensures that the country hosting the activity fully accounts for the transfer (e.g. by applying a corresponding adjustment for the full transfer), whereas the country or entities using the emission reductions would only use a portion of them.

A parallel issue under discussion in the negotiations is an 'own benefit' for the host country meaning that there is a sharing of the emission reductions between the country where they occur and the country or entity using them towards NDCs or CORSIA (UNFCCC, 2018). This could, for example, be implemented by issuing only a portion of the credited emission reductions as credits. It requires that the relevant sector is covered by the NDC targets.

III.4.9 Infrastructure for tracking transfers

A prerequisite for robust accounting of transfers of credits is that the necessary infrastructure is in place to track transfers. This is commonly achieved through electronic registries and transaction logs. Registries are electronic systems for recording and tracking the issuance, transfer, cancellation and retiring of units (allowances or credits). Units are held in individual accounts and can be transferred between accounts. Registries enable tracking of unit transfers between large numbers of parties and between multiple systems. In some instances, registries may not be based on units, but could record transferred emission reductions in other forms of databases. Transaction logs play a complementary function by performing checks on transactions that take place between or within registries.

A number of different types of registries exist, including national registries under the Kyoto Protocol, registries of project mechanisms such as the CDM, voluntary market registries and registries for transfer-based and results-based finance programmes. Registries may be managed nationally or externally – for instance, the FCPF Carbon Fund requires that countries either create their own national emission reduction transaction registry, or instead to use a centralized emission reduction transaction registry managed by a third party on its behalf.

Registries and transaction logs are essential tools for managing international transfers of emissions reductions. These need not be dedicated registries for forest-related mitigation – national registries can in principle manage all emissions transactions involving the country – but registries should be able to manage the specific requirements for forest-related mitigation, such as measures to address non-permanence. Registries should be firmly embedded in national and international legal frameworks and be subject to sufficient checks and oversight. They also need to facilitate that different levels of accounting (national, sub-national, project) can be managed where necessary (Dinguirard et al., 2016).

Countries can also consider the adoption of data management systems for REDD+ projects and programmes that record data regarding the projects and programmes through which emissions reductions were generated (e.g., baseline information according to which a carbon unit was issued, geographical information relating to a project boundary, information on title to emissions reductions) (Dinguirard et al., 2016). While this is not necessary to address double counting per se, it can help to address several other issues highlighted in this paper, such as issues surrounding consistency of data and methodologies and title to emissions reductions. Carbon market mechanisms usually provide such information in publicly accessible databases on projects.

III.4.10 Accounting for the diversity of NDC targets

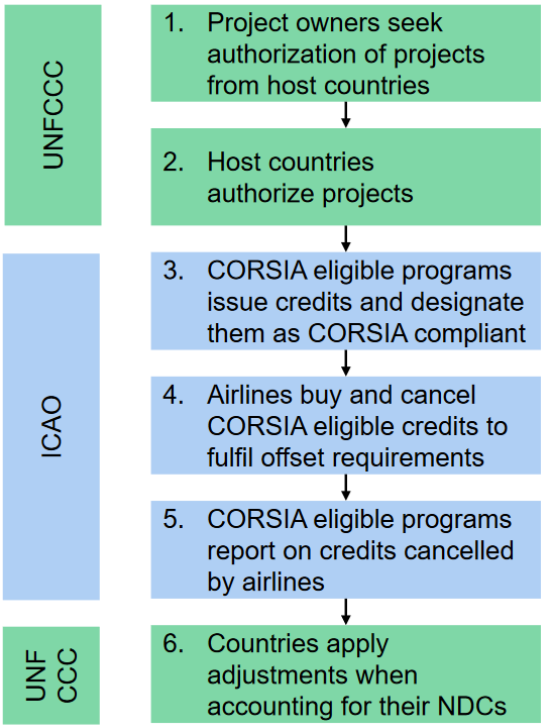
The diversity of first NDCs poses several practical challenges for accounting for international transfers. These are mostly challenges that are not specific to forest-related mitigation, but some are particularly relevant for the LULUCF sector. Three key issues include:

- **Single year targets:** Current NDC targets cover different time frames – mostly single year targets for 2025 or 2030. Specific LULUCF targets also generally relate to single years. If transferred mitigation outcomes occur in a different time period than the year or period in which they are used to achieve a mitigation target, cumulative global GHG emissions could increase (Hood, Briner, & Rocha, 2014; Kreibich & Obergassel, 2016; Lazarus, Kollmuss, & Schneider, 2014; Prag, Hood, & Barata, 2013; Rich, Bhatia, Finnegan, Levin, & Mitra, 2014; Schneider, Füssler, Kohli, et al., 2017). This could, for example, occur if a country uses international transfers from a cumulative mitigation effort over the period 2021 to 2030 to achieve a single-year target in 2030.
- **Non-GHG metrics and different GWP values:** NDC targets are currently expressed in a variety of metrics. For example, some LULUCF targets are not expressed as GHG emissions but refer to land areas (in ha) or to rates of deforestation. Countries also draw upon different values for global warming potentials (Graichen, Cames, & Schneider, 2016). The use of different metrics between countries exacerbates robust accounting, in particular with regard to the non-GHG metrics in the LULUCF sector. A key question is how double counting should be avoided in such instances.
- **Conditional NDC targets:** Lastly, many NDCs include targets that are 'conditional' on support from other countries, sometimes in combination with less ambitious 'unconditional' targets. Some countries proposed that such support could include the use of international market mechanisms. If, however, the same reductions are used to achieve both the conditional NDC of the transferring country as well as the NDC of the supporting country, this constitutes double claiming. This would lead to a weakening of overall ambition, compared to the situation that support is provided through forms of climate finance in which the supporting country does not use the emission reductions to achieve its own NDC. If double claiming should be avoided also with regard to *conditional* targets, international market mechanisms could still be used, but only if the acquiring country does not use emission reductions that are also counted towards achievement of the transferring country's NDC.

III.4.11 Use of credits from forest-related mitigation under CORSIA

Several stakeholders propose that credits from forest-related mitigation be eligible under CORSIA. In this context, avoiding double claiming between NDC targets under the Paris Agreement and the mitigation obligations by airlines under CORSIA requires coordination between two separate frameworks: the UNFCCC and ICAO. CORSIA requires that GHG offsetting programmes ensure that double counting be avoided, but to do so, it is necessary that countries apply corresponding adjustments. Figure 3 provides an illustration of how the necessary action could be sequenced and coordinated between the UNFCCC, GHG crediting programmes and ICAO.

Figure 3 Possible arrangements to avoid double claiming between the UNFCCC and ICAO



III.4.12 Use of credits from forest-related mitigation in voluntary markets

The use of credits from forest-related mitigation generated under voluntary carbon market standards, such as the VCS or Plan Vivo, also creates particular double counting issues. At present, the voluntary carbon market operates in somewhat of a parallel universe from NDCs. This is particularly relevant in the case of forest-related mitigation, since to date virtually all credits from forest-related mitigation have been issued under voluntary market standards.

The voluntary market standards are considering two main approaches to deal with the new context of NDC targets. One approach is that adjustments by the host countries will be necessary in order to use credits for claims of offsetting GHG emissions or compliance uses such as CORSIA. Another approach is that the nature of the claims is changed and that the buyers of the credits rather help countries to achieve their NDC targets (ICROA, 2017). To implement such an approach, the VCS recently announced that it intends to introduce a new type of unit – a domestic climate contribution unit – for which double claiming with NDC targets does not need to be avoided.[14]

[14] http://verra.org/wp-content/uploads/2018/05/VCS-v4-Consultation-Domestic-Climate-Contribution.pdf

III.5 Environmental and social safeguards

III.5.1 What are safeguards?

Forest carbon and REDD+ safeguards refer to principles, rules and procedures put in place to achieve social and environmental goals (Roe, Streck, Pritchard, & Costenbader, 2013). They seek to ensure that REDD+ projects and programmes at least do not lead to negative impacts on the local environment[15] (e.g. through replacing natural forests with plantations) or communities (e.g. through displacement or impacting forest rights and livelihoods). In some cases, safeguards also seek to ensure that projects and programmes have a net positive impact on environmental and social well-being. Brown, Seymour, and Peskett state that safeguard considerations are important because new financial flows are likely to fuel conflict and create new opportunities for corruption (Brown, Seymour, & Peskett, 2008).

Environmental and social safeguards have long been applied by development organizations as conditions for financing projects, and have become a fundamental part of the implementation of REDD+ at national and jurisdictional scales.

III.5.2 The relevance of safeguards in REDD+ and in carbon market approaches

Safeguards are relevant in any emissions mitigation project or programme that has the possibility of a negative impact the local environment or the rights of local people. Despite this, most compliance focussed GHG crediting programmes have only placed limited emphasis on safeguards, and human rights and environmental and social impacts – in particular weak provisions for local stakeholder consultation and the lack of grievance mechanisms – have frequently been a controversial issue in project implementation.

In contrast, in REDD+ frameworks and programmes safeguards play a far more prominent role. This is partially due to the special importance of safeguards in the forest and land-use sector given the important role that forests play in ecosystems, biodiversity, and the livelihoods and food security of local populations. It is also due to the high importance that donors and Parties to the UNFCCC have placed on safeguards. The attention paid to safeguards has also been an important aspect facilitating progress on REDD+ in climate negotiations.

Environmental and social safeguards – which for present purposes exclude measures to ensure the integrity of GHG mitigation – are arguably equally important whether REDD+ finance is grant-based, results based or transfer-based (including market approaches). This marks an important contrast with other issues examined in this paper (e.g. additionality, baselines, leakage and permanence), where it has been argued that environmental integrity – as it relates to GHG emissions mitigation – takes on special importance when emission reductions are used toward mitigation commitments or obligations.

III.5.3 The role of the Cancun safeguards

Appendix 1 of the Cancun Agreements decision[16] provides UNFCCC level guidance for safeguards for REDD+ related activities. These enjoy broad consensus and are often used as a starting point to guide other initiatives. Indeed, several of the most common safeguard design standards (UN-REDD, FCPF and the REDD+ Social and Environmental Standards) enable countries to convert the Cancun Safeguards into a national framework by means of guidelines and steps for operationalizing their safeguards. REDD+ countries also tend to favour developing country-appropriate approaches to safeguards that meet the Cancun principles but reflect national needs and circumstances (Roe et al., 2013).

[15] For the most part, environmental safeguards for REDD+ are concerned with impacts on the local environment, such as the conservation of natural forests and the protection of biodiversity. The Cancun safeguards also incorporate global GHG emissions, specifically through requiring measures to address permanence. Since permanence is addressed as a separate issue in this paper, this section focuses only on safeguards aimed at protecting the local environment.

[16] 1/CP.16 The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention. (See Annex 1)

III.5.4 Safeguards in existing forest-related finance

Most REDD+ standards and frameworks have dedicated and explicit safeguards, which build on international frameworks such as the Cancun safeguards (Table 3). Moreover, many development organizations apply their own safeguards in disbursing financing to recipient countries, which will also cover REDD+ finance. Overall, essentially all ODA and results-based finance for REDD+ involves the application of at least one set of safeguards. The extent to which they are actually implemented on the ground however varies.

In contrast, GHG crediting programmes tend to be more narrowly focused on GHG emissions accounting, and in many cases do not have dedicated safeguards, either generally or for forest-related mitigation. Nonetheless, in the voluntary carbon market – where most credits from forest-related mitigation are transacted – the use of credits toward corporate commitments or for sale to the public has led to a premium being placed on credits from projects that result in multiple benefits. As such, the majority (59%) of forest and land-use credits transacted under the principle voluntary GHG crediting programme – the Verified Carbon Standard – are also certified under a parallel standard that is dedicated to ensuring that projects have positive co-benefits, known as the Climate, Community & Biodiversity (CCB) Standard (Hamrick & Gallant, 2017).

It is worth noting that the current version of the CORSIA Eligible Emissions Unit Criteria calls for projects to "show how they comply with social and environmental safeguards" (ICAO, 2017), though they do not give further detail on what kinds of safeguards should be provided or whether their implementation should be monitored. Projects developed under GHG crediting programmes without safeguards may need to undergo an additional certification in order to be valid for use in that scheme.

The following sections explore the scope and approach of different safeguards approaches, beginning with describing the central role played by the Cancun Safeguards and going on to discuss the differences in the scope and extent of protection and the processes for implementation of the standards.

Table 3 Overview of environmental and social safeguards

	Warsaw Framework on REDD+ / Cancun Safeguards[17]	GHG crediting and transfer-based finance programmes[18]					
			VCS[20]				
		CDM[19]	JNR[23]	Other AFOLU[24, 25]	Joint VCS / CCB[26]	Gold Standard[21]	FCPF Carbon Fund[22]
Social criteria							
Free Prior and Informed Consent (FPIC)	-	-	-	-	X	X	X
Labour Standards	-	-	-	-	X	X	X
Indigenous peoples rights	(2c, 2d)	-	(X)[27]	-	X	X	X
Gender Equality and Women's Rights	-	-	-	-	X	X	X
Corruption	(2a and 2b)	-	-	-	X	X	(X)[28]
Land acquisition and resettlement	-	-	-	-	(X)	X	X
Environmental criteria							
Pollution prevention	(2e)	-	-	-	-	X	X
Biodiversity	(2e)		(X)[29]	-	X	X	X
Cultural heritage	(2d)	-	-	-	X	X	X
Procedural criteria							
Compliance with laws and regulations	2a	-	(X)[30]	X	X	X	X
Stakeholder Participation	2d	X	X	-	X	X	X
Grievance Mechanism	-	-	-	-	(X)[31]	X	X

III.5.4.1 Scope and extent of protection

There is a relatively broad degree of consensus among the different REDD+ standards and frameworks regarding the overarching principles for safeguarding social welfare and the environment, with the

[17] See: https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf

[18] References in parentheses denote reference to the general issue, but not the specific language

[19] See: http://cdm.unfccc.int/EB/rules/modproced.html

[20] See: http://verra.org/wp-content/uploads/2018/03/VCS_Standard_v3.7.pdf

[21] See: https://www.goldstandard.org/project-developers/standard-documents

[22] Refers to the World Bank's Env Soc Framework. See https://www.forestcarbonpartnership.org/sites/fcp/files/Documents/PDF/Nov2011/FCPF%20Readiness%20Fund%20Common%20Approach%20_Final_%2010-Aug-2011_Revised.pdf and http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf

[23] See: http://verra.org/wp-content/uploads/2018/03/JNR_Requirements_v3.4.pdf

[24] See: http://verra.org/wp-content/uploads/2018/03/AFOLU_Requirements_v3.6.pdf

[25] Calls on "Project proponents shall identify potential negative environmental and socio-economic impacts and shall take steps to mitigate them" and voluntary application of other standards such as CCBS

[26] See: http://verra.org/wp-content/uploads/2017/12/CCB-Standards-v3.1_ENG.pdf

[27] No reference to indigenous people's rights, but indigenous people are referred to as relevant stakeholder

[28] Fiduciary policy includes comprehensive guidelines for corruption. Differences between sovereign and non-sovereign recipients.

[29] No specific policy, but refers to UNFCCC decisions

[30] Refers to UNFCCC guidelines

[31] Only at project level, none at programme level

Cancun Safeguards serving as a broad reference point. Several frameworks do go beyond these and adopt additional safeguards, for example on land acquisition, cultural heritage and gender equality (Table 3). The standards however vary in terms of the rigour of application of those principles in practice, as well as their definitions and co-benefit considerations of standards. Gender for example, is only considered in some safeguards.

Some voluntary GHG crediting programmes place an increased emphasis on social and environmental and apply a higher standard than results-based finance frameworks. Specifically, most seek to go beyond 'do no harm' requirements and require overall positive environmental and social outcomes.

Some transfer-based initiatives, such as the FCPF, apply a relatively comprehensive range of safeguards which are quite specific and well defined, despite only applying a 'do no harm' standard. This is also the case for many bilateral results-based finance programmes (Roe et al., 2013). In contrast, the Warsaw Framework for REDD+ applies the Cancun Safeguards directly, without further interpretation, and countries have significant flexibility to interpret them in line with national circumstances. It is worth noting, however, that countries applying for REDD+ finance through the Green Climate Fund will also need to comply with the GCF Environment and Social Policy.[32]

The FCPF provides for a minimum requirement of 'do no harm,' and does not mandate co-benefits, such as enhanced livelihoods and biodiversity. The FCPF does however require the application of the World Bank's recently revised environment and social framework.[33] In contrast, some GHG crediting programmes in the voluntary market (e.g., CCB Standards) and those international standards that guide the design of policies, programmes and projects (e.g., UN-REDD, REDD+ SES) are more aspirational in their principles and criteria, highlighting the importance of not only protecting but also improving social and environmental conditions (Roe et al., 2013).

International frameworks and programmes are inconsistent in their provisions for grievance mechanisms in cases where well intentioned efforts may encounter problems. The Gold Standard and the FCPF have the most explicit grievance provisions, others only indirectly reference the opportunity for complaints, or have no provisions for grievances whatsoever.

III.5.4.2 Processes for safeguards implementation

A key distinction in the stringency of safeguards is whether they are voluntary or compulsory and the extent to which even compulsory safeguards are implemented on the ground. In frameworks such as the FCPF Carbon Fund and bilateral RBF frameworks, payments are based on legally-binding agreements under which compliance with safeguards is required.

Under the Warsaw Framework and the Cancun and Durban decisions, REDD+ countries are required to meet the Cancun safeguards, which are non-binding in character but enjoy broad acceptance. Countries are also required to have in place 'safeguards information systems' that provide "transparent and consistent information that is accessible by all relevant stakeholders and updated on a regular basis". Parties are required to submit this information periodically to the UNFCCC, in line with their national communications (every few years).[34] While some guidance has been provided on the reporting of safeguards, this is relatively broad and flexible,[35] certainly much more so than bilateral RBF programmes or transfer-based finance through the FCPF Carbon Fund. Nonetheless, it is relevant to note again here that countries receiving results-based finance through the GCF will be required to comply with that organization's processes for safeguards implementation and reporting.

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[32] See: https://www.greenclimate.fund/documents/20182/574763/GCF_policy_-_Environmental_and_Social_Policy.pdf/aa092a12-2775-4813-a009-6e6564bad87c.

[33] See: http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf

[34] UNFCCC Decision 12/CP.19: The timing and the frequency of presentations of the summary of information on how all the safeguards referred to in decision 1/CP.16, appendix I, are being addressed and respected.

[35] Decision 17/CP.21: Further guidance on ensuring transparency, consistency, comprehensiveness and effectiveness when informing on how all the safeguards referred to in decision 1/CP.16, appendix I, are being addressed and respected.

III.5.4.3 Experience with safeguard implementation so far

It is an ongoing debate whether REDD+ interventions should exclusively focus on addressing climate change and concentrate on "doing no harm", or whether REDD+ interventions should specifically aim to reduce poverty and have positive sustainable development co-benefits as clear co-objectives. While REDD+ provides opportunities to reduce poverty, and promote other sustainable development co-benefits, it could also prove to be a risky intervention especially for the most vulnerable. This leads to some extent to a trade-off: in theory, compliance with stringent checks and processes to ensure safeguards are implemented, but can be cumbersome for host countries, in particular when they need to comply with multiple different frameworks (Clarke, Mikkolainen, & Camargo, 2016). This trade-off can also be found in other carbon market approaches, but given the forest and land sector's important role for people's livelihoods', their food security, their cultural and religious heritage as well as for ecosystems more generally, forest mitigation efforts must make a particular effort to take local needs, concerns, and potential benefits into consideration. Safeguards for forest-related mitigation are important whether they are combined with markets or not.

In practice, experience with environmental and social safeguards has been mixed. Gender in particular is not considered by all REDD+ approach safeguards, which may lead to unintended negative outcomes for women. A recent study on the gender impact of 16 subnational REDD+ initiatives in six countries suggests that on average, REDD+ had a negative impact on perceived wellbeing in general, but disproportionately for women (Larson et al., 2018). The second evaluation of the FCPF found that the programme did not achieved systematic gender mainstreaming in the Facility's operations (Clarke et al., 2016).

In its investigation into Norway's International Climate and Forest Initiative, the Office of the Auditor General of Norway recently found "inadequate follow-up of social and environmental safeguards as regards indigenous peoples' rights, poverty alleviation and preservation of natural forests" (Riksrevisjonen, 2018).

Although REDD+ safeguards still need further work, especially with regard to their on-the-ground implementation, their elaboration goes beyond other compliance focused market-based interventions and has a more elaborate discussion of risks and benefits.

III.6 Conclusions

Forests play an important role in mitigating climate change, and stopping deforestation and degradation will be critical to reaching the goals of the Paris Agreement. The Warsaw Framework for REDD+ forms the multilateral framework for incentive-based approaches for countries to reduce emissions from deforestation and forest degradation, and to enhance terrestrial carbon stocks. The framework is further referred to in Article 5 of the Paris Agreement. While it represents progress, the battle against deforestation has not yet been won and requires a great deal of further effort, including increased finance. Expectations of potential financial flows mobilized through carbon markets, including demand for offsets from international aviation, have led some countries and stakeholders to call for (expanded) eligibility for forest-based mitigation in compliance-based carbon markets.

There continues to be significant debate on the respective opportunities, challenges and risks associated with using credits from forest-related mitigation activities under the Paris Agreement and CORSIA. This paper has focused on one specific category of risks that are heightened when a link to markets is made, namely those related to environmental integrity. Environmental integrity is critical for GHG crediting mechanisms, as using offset credit allows emissions to increase elsewhere, which means that offsetting offers no overall benefit to the atmosphere. The analysis highlights that, while many risks and challenges are common to carbon markets in general, several are specific to forest-related activities or are heightened in this context. Key risks and challenges identified include the jurisdictional nature of many forest-based interventions and associated additionality challenges; the uncertainty of forest carbon stocks and flows; challenges in identifying drivers of deforestation and predicting future trends; addressing leakage due to national and global drivers of deforestation; and ensuring the permanence of emissions reductions.

Neither the Paris Agreement's Article 5, nor the Warsaw framework were developed as a market-based approach and do not provide for procedures or standards to become one. There is further no explicit link between the Paris Agreement's Article 5 and Article 6, which addresses international transfers of emission reductions. They do however apply many similar principles. The existing transfer-based finance programmes for forest-related mitigation, such as the VCS and the FCPF Carbon Fund, have been developed much more in accordance with the requirements that are common under compliance carbon markets, and have developed various approaches that aim to address the risks specific to forests highlighted above. These include improved and more granular assessments of forest carbon stocks and flows, conservative assumptions, risk minimization, discounting, buffers, and liability provisions. None of these programmes currently addresses global leakage, though this risk could be reduced if multilateral efforts to address deforestation are successful.

In any debate on the role of carbon markets in forest-related mitigation, it is also crucial to consider the context of the Paris Agreement and NDCs. Clarity is needed on how the LULUCF sector is accounted for in NDCs, how transferred emission reductions and removals should be accounted for in the context of the diversity of NDCs, and how additionality and baselines should be assessed in the light of NDCs. To provide for environmental integrity, it is thus also important that Parties to the UNFCCC provide a robust accounting framework, that countries clarify and quantify their NDCs, and that GHG crediting programmes consider the context of the Paris Agreement and NDCs in quantifying emission reductions and avoiding double counting of mitigation efforts.

Whether forest-related mitigation activities are credited or not, there is a global consensus that deforestation is a global challenge that calls for a global response including the vastly increased mobilisation of resources and effort. Determining whether and to what extent markets should be further mobilised to help provide the resources needed is a crucial question and is sure to become more prominent as discussions on the scope of CORSIA and Article 6 advance further. The importance and the complexity of this debate demand the prioritization of further robust, objective analysis and rational, evidence-based debate that puts the ultimate objective of the Paris Agreement at its centre.

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