

# UN-REDD PROGRAMME



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## Natural forest definitions in the context of safeguards and spatial planning for REDD+

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The UN-REDD Programme is the United Nations Collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD) in developing countries. The Programme was launched in September 2008 to assist developing countries prepare and implement national REDD+ strategies, and builds on the convening power and expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organisation. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

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## Key messages

- Natural forest can hold up to a third more carbon than nearby planted forest, and tends to be more resilient, deliver more ecosystem services and provide a better habitat for wildlife.
- The UNFCCC's Cancun safeguard (e) asks that REDD+ actions are not used for the conversion of natural forests but are instead used to incentivize the protection and conservation of biodiversity, natural forests and their ecosystem services.
- It is up to countries to decide how to show they have addressed and respected this safeguard; there is no definition of natural forest or its conversion under the UNFCCC. The definitions of natural forest and of its conversion could form part of a national clarification of safeguards.
- These national definitions will affect which areas are available for which REDD+ activities according to the safeguards. A broad natural forest definition and conversion definition would mean that a wide range of wooded ecosystems in different states of intactness will be protected by the Cancun safeguard. At the same time, it may limit the scope for plantation forestry as a REDD+ measure, for example in degraded forest areas.
- The most appropriate definition of natural forest depends on national circumstances, including existing forest cover and condition, monitoring capacity, available baseline data, policy goals, and drivers of deforestation and forest degradation.
- The UNFCCC's Warsaw Framework for REDD-plus specifies that national forest monitoring systems for REDD+ should be able to assess natural forest. The results may be relevant for safeguards information systems.
- A country's natural forest definition should therefore be appropriate for implementation of the safeguards (by including valuable forest ecosystems) and for monitoring through the NFMS (by being measurable).
- Mapping the spatial extent of different natural forest definitions, and comparing these with maps of forest biodiversity and ecosystem services can help in identifying the implications of any given definition; and a definition of natural forest is a pre-requisite to mapping the areas available for implementation of certain REDD+ policies and measures.
- Agreeing a clear natural forest definition can serve to clarify NFMS requirements, operationalize Cancun safeguard (e) and help to guide REDD+ actions towards achieving benefits for forest-dependent people, biodiversity and ecosystem services.

## List of acronyms

CDM	Clean Development Mechanism
CIFOR	Center for International Forestry Research
COP	Conference of Parties (used in this paper in the context of UNFCCC)
CPF	Collaborative Partnership on Forests
FAO	Food and Agriculture Organization of the United Nations
FRA	Global Forest Resources Assessment
FREL/FRL	Forest Reference Emission Levels/Forest Reference Levels
FSC	Forest Stewardship Council
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Tropical Timber Organization
IUFRO	International Union of Forest Research Organizations
LULUCF	Land Use, Land-Use Change and Forestry
OECD	Organisation for Economic Co-operation and Development
REDD+	Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
SBSTA	Subsidiary Body for Scientific and Technological Advice of the UNFCCC
SEEA Accounting	United Nations Statistics Division System of Environmental-Economic
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UN-REDD Programme	United Nations collaborative Programme on Reducing Emissions from Deforestation and forest Degradation in developing countries

## 1. Introduction

While the fundamental objectives of REDD+ are to reduce developing countries' greenhouse gas emissions from deforestation and forest degradation, and to enhance carbon sequestration by forests, many countries wish to ensure that REDD+ also delivers other benefits. This may involve conserving or restoring resilient forest ecosystems that provide priority goods and services in addition to climate change mitigation, and improving forest management to deliver additional social and environmental benefits.

At an international level, to help meet these additional objectives for REDD+ and to reduce any social and environmental risks, a set of seven broad safeguards was developed under the UNFCCC. These were adopted in the Cancun Agreement at UNFCCC COP16 in 2010, with REDD+ countries agreeing to promote and support the safeguards and to provide information on how they have been addressed and respected. One key issue that the safeguards cover is the risk that forest management for carbon stocks might come at the expense of natural forests and their ecosystem services, for example by replacing natural forest with plantations. The issue is addressed in safeguard (e), which states that *"[REDD+] actions are [to be] consistent with the conservation of natural forests and biological diversity, ensuring that the actions [...] are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits"* (FCCC/CP/2010/7/Add.1.para 2(e)).

Compared to planted forest, natural forests often have more resilient carbon stores, biodiversity and ecosystem services. Even natural forest that has been degraded can retain important values that need to be considered, and restoring these forest to a more natural state may have better outcomes for biodiversity and ecosystem services, including climate change mitigation than replacing with planted forest. Natural forests are considered further in section 2.

At UNFCCC COP 19 in Warsaw in 2013, Parties went on to decide that forest monitoring systems for REDD+ *should... enable the assessment of different types of forest in the country, including natural forest, as defined by the Party* (FCCC/CP/2013/10/Add.1). Hence, each REDD+ country is expected to set its own definition of natural forest, as a category within its overall forest definition.

Given the wide range of possibilities for interpreting both the concept of 'natural' and that of 'forest', natural forest definitions with very different scopes may be adopted in different countries, for example with different criteria for forest area, tree density and species composition. The definitions chosen should keep in mind:

- whether a definition supports the goals and objectives set by the country for REDD+. For example, it may be useful to consider which of the country's forests are valued for their biodiversity, ecosystem services or other benefits, and whether they are included or excluded, as this will influence the effectiveness of the safeguard (e) in protecting these values (Sasaki and Putz 2009; Pistorius 2009; Pistorius 2010).
- the implications of the definitions for the design of REDD+ policies and measures (PAMs) consistent with safeguard (e), i.e. which PAMs to include within the National Strategy / Action Plan, and how and where to implement them. In particular, the natural forest definition may constrain the areas in which plantations can be established as part of REDD+, to avoid the conversion of natural forest.

- the forest assessment capacity of the country, as the national forest monitoring system (NFMS) should be able to assess natural forest as a distinct type. The role of NFMS in this context is the measurement, reporting and verification of forest-related carbon emissions, stocks and area changes over time resulting from REDD+ activities.

This paper discusses the detailed implications of a country's natural forest definition for REDD+ planning. It provides a brief history of the development of forest definitions; clarifies the need to define natural forest; discusses how the definition interacts with the definition of 'forest'; summarizes the definitions in use by key international organizations and some REDD+ countries; and concludes with a discussion on the implications of applying different definitions.

## 2. The 'natural forest' safeguard

**Cancun safeguard (e):** COP16, FCCC/CP/2010/7/Add.1.para 2(e).

"[REDD+] actions are [to be] consistent with the conservation of natural forests and biological diversity, ensuring that the actions [...] are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits"

Cancun Safeguard (e) addresses a range of forest values, and includes one of the most forceful statements in the safeguards, that REDD+ actions are not to be used for the conversion of natural forests. This reflects the perspective that conversion to planted forest is not a desirable climate change mitigation strategy, as it generates a substantial pulse of emissions and as the replacement forest may have smaller, less resilient carbon stocks. The Cancun Agreement also states that REDD+ actions should be consistent with the objective of environmental integrity and take into account the multiple functions of forests and other ecosystems.

Some studies show that natural forests can hold more than a third more carbon than adjacent forest plantations, and are more permanent and resilient (Thompson *et al.* 2009; Liao *et al.* 2010; Miles *et al.* 2010; Mackey *et al.* 2013). Overall, plantations may provide fewer ecosystem services than natural forests in the same area (Swan and McNally 2011; Lindenmayer and Laurance 2012). Plantations also typically have lower species richness than the original natural vegetation (Barlow *et al.* 2007; Brockerhoff *et al.* 2008) or support a different assemblage of species (Irwin *et al.* 2013). However, there is considerable variability amongst planted forests. Commercial, "fastwood" plantations with very few, usually exotic species that are managed mostly for pulp or biofuel production and harvested at 5-25 year intervals, generally support much less biodiversity and store less carbon than planted forests with much longer rotation cycles, more tree species and multiple management objectives, typically including timber production (Thompson *et al.* 2014). Where native-species plantations are managed as part of a landscape without encroaching on the area of natural forest, they can contribute to protection of biodiversity and ecosystem services by providing complementary forest habitat, buffering edge effects and increasing connectivity (Brockerhoff *et al.* 2008; Pawson *et al.* 2013; Thompson *et al.* 2014). Plantations as part of agroforestry, or intended for harvesting to reduce pressure on other forest land, can be a necessary part of a country's strategy for sustainable forest management. Nevertheless, conversion of natural forests to plantations degrades the multiple functions of forests, and can lead to increased emissions over time.

The safeguard also has implications for REDD+ activities seeking to influence harvesting of wood products from natural forest. It asks that actions are consistent with the conservation of natural forests and biodiversity, and should be used to incentivize the protection and conservation of natural forests and their ecosystem services and to enhance other social and environmental benefits. One implication is that REDD+ should concentrate on improving the sustainability of practice in existing production forests, rather than expanding the area to be logged. Commercially logged forests tend to store less carbon and host less biodiversity than primary forest, depending on logging approach and intensity (Barlow et al. 2007; Gibson et al. 2011; Ramage et al. 2013; Kormos and Zimmermann 2014; Martin et al. 2015). Logging roads and accompanying disturbance can increase the risk of forest degradation beyond the logged area. While logged forests can still provide essential habitat for species (Alkemade et al. 2009; Edwards et al. 2010), the long-term survival of wildlife in large, logged tracts of tropical forest is little known because those tracts are often eventually deforested (Asner et al. 2006; Shearman et al. 2012; Kormos and Zimmermann 2014).

Ensuring that REDD+ is carried out so that the existing forests that provide high value for biodiversity and ecosystem services are protected from degradation or conversion to other land uses, and complemented by reforestation in appropriate places will help to respect safeguard (e).

### 3. Forest definitions for REDD+

The relevance of the definition of 'forest' for REDD+ has been discussed since the first proposal to take action under UNFCCC on Reducing Emissions from Deforestation (e.g. Schoene *et al.* 2007; Cadman 2008; Guariguata *et al.* 2009; Sasaki and Putz 2009; Van Noordwijk and Minang 2009; Pistorius *et al.* 2010; Putz and Redford 2010; Bucki *et al.* 2012). Generally the context has been setting forest reference emission levels and forest reference levels (FREL/FRL<sup>1</sup>) and of developing National Forest Monitoring Systems (NFMS) to accurately measure changes in forest cover and carbon stocks. A range of different motivations, such as monitoring costs, jurisdiction over different areas, desired forest management approaches and existing definitions can influence how a country sets its definition of 'forest'.

Universal international agreement on definitions for concepts such as 'forest', 'natural forest' and 'forest degradation' is unlikely. The prevailing forest definition under the UNFCCC is the one used for reporting on Land Use, Land-Use Change and Forestry (LULUCF) and the Clean Development Mechanism (CDM) under the Kyoto Protocol (KP). The IPCC guidance on national greenhouse gas inventory reporting of Forest Land (IPCC 2006) is consistent with this LULUCF reporting. The definition was established in the Marrakesh Accords at COP 7 in 2001, with further specification provided in later UNFCCC decisions. It combines criteria on land cover and land use, and is adaptable to country circumstances. It is not mandatory to adopt this definition for REDD+, unless the country has already established a forest definition in order to participate in the CDM (UN-REDD Programme 2015). However, if a country decides to use a different forest definition for construction of its FREL/FRL than has been used in previous national GHG inventories, the Warsaw Framework asks that they should explain why and how the new definition was chosen (FCCC/CP/2013/10/Add.1).

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<sup>1</sup> FREL is commonly seen as covering carbon emissions from deforestation and forest degradation only, and FRL as also including sequestration of carbon by forests (UN-REDD Programme 2015).



The land-cover criteria in the “Kyoto” forest definition comprise a minimum potential crown cover and tree height, with blocks of forest covering at least a minimum land area. The minimum values for these criteria are defined by each country, within the following ranges:

- Crown cover (forests have at least 10-30%)
- Tree height (forests are at least 2-5 m tall)
- Land area (forests cover at least 0.05-1.0 ha)

Open woody ecosystems such as tree savanna are counted as forest when thresholds for tree height and crown cover are low, affecting what range of natural ecosystems is targeted through REDD+.

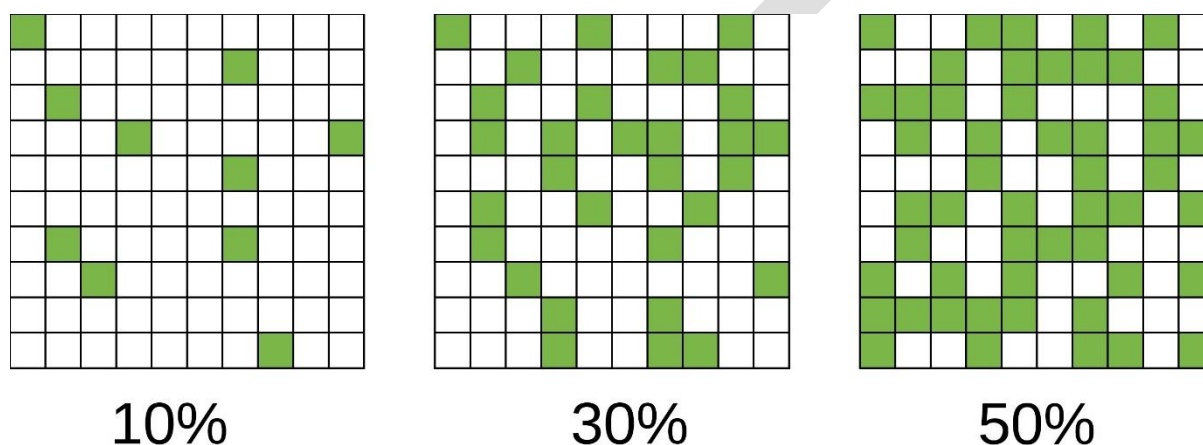


Figure 1: The effect of different crown cover thresholds – with a 10% threshold, each of these three blocks is regarded as an equal area of forest.

Second, land-use criteria are applied, both to exclude areas with that meet the land-cover criteria but come under “non-forest use” (e.g. agroforestry, trees on farmland and oil palm plantations) and to include three types of “forest” land that may not meet the above land-cover criteria: (i) young stands of natural regeneration; (ii) plantations which have yet to reach the minimum crown density and/or tree height; (iii) temporarily unstocked forest land. The “temporarily unstocked” criterion is left to national interpretation, but means that “forests” include land without trees that is expected to be forested in the future. This accommodates forest management practices such as clear-cutting and subsequent re-planting, and anticipates forest recovery from catastrophic events such as fire. The definition has sometimes been criticized for masking the extent of forest-area change, of conversion from natural forest to plantations, and of related carbon emissions (Cadman 2008; van Noordwijk and Minang 2009).

The precise land-cover thresholds used in a forest definition can strongly influence estimates of deforestation and forest degradation, assessment of the drivers of deforestation and appropriate options to tackle these, and the development of a FREL/FRL (Romijn *et al.* 2013, UN-REDD Programme 2015). The thresholds determine how much reduction in biomass through tree removal can occur before the change is considered ‘deforestation’ rather than ‘forest degradation’. With a low threshold for forest, closed-canopy forest could be degraded to open bushland without this being considered deforestation. With a high threshold, degraded areas that still provide important ecosystem services and biodiversity value may no longer be considered as natural forest that should be protected from

conversion. This difference affects which drivers the REDD+ activities of ‘reducing deforestation’ and ‘reducing degradation’ are designed to tackle and what type of changes need to be captured in the monitoring of deforestation as opposed to forest degradation. This is especially relevant for countries where initial MRV is focused on deforestation alone, often the case when a step-wise approach to implementing national MRV systems is being deployed. Whether the forest definition is narrow or broad, degradation emissions that fall short of, or happen after, deforestation would not be reported to UNFCCC. UN-REDD Programme (2015) provides guidance on setting a forest definition for the purpose of FREL/FRL, with further considerations on the impact of the effect of different thresholds, area units for monitoring and the need for consistency through time.

As described in the Introduction, the UNFCCC’s Warsaw Framework (2013) refers to the definitions of both forest and natural forest for REDD+ in the context of national forest monitoring systems (NFMS). NFMS for REDD+ should *enable the assessment of different types of forest in the country, including natural forest, as defined by the Party* (FCCC/CP/2013/10/Add.1). UNFCCC decisions allow for a great range of national forest definitions, and within these, natural forest definitions. This paper explores the implications for application of Cancun safeguard (e) and design of REDD+ actions.

#### 4. Existing definitions of natural forest

The continuum of forests with different degrees of ‘naturalness’ in a diversity of cultural landscapes has led to a long-standing debate about the definition of ‘natural forest’. There is often a stipulation that tree species should be predominantly native (indigenous). Some countries regard their all their native forests as natural forest, while others consider natural forests to be only those with minimal human influence. Secondary forests, that have regenerated after the original forest cover was removed or significantly disturbed, are only included as natural forests by the second set of countries (Penny *et al.* 2001). Lund (2014) compiled an extensive list of forest-related definitions, showing great disparity among uses of the same term in different contexts. Various terms are sometimes used synonymously with natural forest (Table 1).

*Table 1: Terms that are sometimes used synonymously with natural forest. The classifications in this table are not absolute, since the definitions of these terms also vary. Source: Dudley and Stolton (2004), Lund (2014)*

Definition by...			
Degree of disturbance	Age	Species composition	Intactness / area
<ul style="list-style-type: none"> <li>• Primary forest</li> <li>• Virgin forest</li> <li>• Authentic forest</li> <li>• Wildwood</li> <li>• Original forest</li> </ul>	<ul style="list-style-type: none"> <li>• Old-growth forest</li> <li>• Ancient forest / woodland</li> <li>• Primeval forest</li> <li>• Antique forest</li> </ul>	<ul style="list-style-type: none"> <li>• Native forest</li> <li>• Indigenous forest</li> <li>• Climax forest</li> </ul>	<ul style="list-style-type: none"> <li>• Frontier forest</li> <li>• Intact forest landscapes</li> <li>• Intact forest</li> </ul>

To be readily usable, it has been recommended that natural forest definitions: are *unambiguous* enough to serve their purpose, with parameters that are *measurable*, and they should *permit synergies for cost effective assessment and reporting*, for example by building on definitions used in existing assessments (Schoene *et al.* 2007).

Several international processes have invested considerable effort in applying these recommendations to agree workable definitions (Table 2), helping people to ensure that they are discussing the same areas of forest.

#### 4.1. International definitions of natural forest

In 2002 and 2005, a series of expert meetings on harmonizing forest-related definitions were held as a response to a request from United Nations Forum on Forests (UNFF) to facilitate national progress towards sustainable forest management, clarify reporting requests, minimize inconsistencies in information provided and reduce reporting burdens. The meetings considered several international reporting processes, and resulted in working definitions of 'natural forest', 'planted forest', and 'forest plantation'. After this effort, a number of data collecting and reporting initiatives changed their definitions, resulting in significant harmonization of concepts (FAO 2005).

Table 2 outlines the definitions of natural and planted forest published by major international organizations at the time of writing. These definitions were developed for the operational purposes of the different organisations. For REDD+, it will be important to build on existing definitions and processes in the country where possible, whilst ensuring that an adopted definition for natural forest will align with the national goals of REDD+, and the Cancun safeguards.

The different forest definitions used in the 2015 FAO Global Forest Resources Assessment (FRA) are included in Table 2, as the FRA is the most comprehensive international forest reporting process that exists. The FRA no longer uses the explicit term 'natural forest'. In the year 2000 assessment, 'natural forest' was one of the FRA classes. This was subsequently revised, with FRA 2010 and 2015 instead using the terms *naturally regenerated forest*, *mangroves* and *planted forest*. *Naturally regenerated forest* is defined as "forest predominantly composed of trees established through natural regeneration". This category has two major groups, *primary forest* and *other naturally regenerated forest* (see Table 2). Several other definitions were adjusted in response to these FRA changes, including those of the United Nations Statistics Division System of Environmental - Economic Accounting (SEEA) and the OECD.

Four broad ecological parameters are used in these international natural forest definitions: *stand establishment*, *origin of dominating species*, *degree of anthropogenic disturbance (intactness)* and *ecological functioning* (Table 3, p. 14). Stand establishment and origins of the dominating species are the most commonly used of these criteria.

Table 2: Definitions of natural and planted forest in use by international organisations

Organization	Natural forest definition	Planted forest or plantation definition
CPF working definitions (FAO 2005)	<p><b>Natural forest:</b> forest stands composed predominantly of native tree species established naturally. This can include assisted natural regeneration, excluding stands that are visibly offspring/descendants of planted trees.</p>	<p><b>Planted forest:</b> Forest stand in which trees have predominantly been established by planting, deliberate seeding or coppicing, where the coppicing is of previously planted trees.</p> <p>Explanatory note: includes all stands established by planting or seeding of both native and non-native species.</p>
<p>FAO (FRA 2015)</p> <p>(Also offers definitions for mangroves, with a subcategory of planted mangroves)</p>	<p><b>Naturally regenerated forest:</b> Forest predominantly composed of trees established through natural regeneration.</p> <p>Explanatory notes</p> <ol style="list-style-type: none"> <li>1. In this context, predominantly means that the trees established through natural regeneration are expected to constitute more than 50% of the growing stock at maturity.</li> <li>2. Includes coppice from trees established through natural regeneration.</li> <li>3. Includes naturally regenerated trees of introduced species.</li> </ol> <p><b>Primary forest:</b> Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.</p> <p><i>Explanatory note</i></p> <p>1. Some key characteristics of primary forests are:</p> <ul style="list-style-type: none"> <li>- they show natural forest dynamics, such as natural tree species composition, occurrence of dead wood, natural age structure and natural regeneration processes;</li> <li>- the area is large enough to maintain its natural characteristics;</li> <li>- there has been no known significant human intervention or the last significant human intervention was long enough ago to have allowed the natural species composition and processes to have become re-established.</li> </ul> <p><b>Other naturally regenerated forest:</b> Naturally regenerated forest where there are clearly visible indications of human activities.</p> <p><i>Explanatory notes</i></p> <ol style="list-style-type: none"> <li>1. Includes selectively logged-over areas, areas regenerating following agricultural land use, areas recovering from human-induced fires, etc.</li> </ol>	<p><b>Planted forest:</b> Forest predominantly composed of trees established through planting and/or deliberate seeding.</p> <p>Explanatory notes</p> <ol style="list-style-type: none"> <li>1. In this context, predominantly means that the planted/seeded trees are expected to constitute more than 50% of the growing stock at maturity.</li> <li>2. Includes coppice from trees that were originally planted or seeded.</li> <li>3. <u>Excludes</u> self-sown trees of introduced species</li> </ol> <p><b>Planted forest of introduced species (sub-category):</b> Planted forest, where the planted/seeded trees are predominantly of introduced species.</p> <p>Explanatory note</p> <ol style="list-style-type: none"> <li>1. In this context, predominantly means that the planted/seeded trees of introduced species are expected to constitute more than 50% of the growing stock at maturity.</li> </ol>

	<p>2. Includes forests where it is not possible to distinguish whether planted or naturally regenerated.</p> <p>3. Includes forests with a mix of naturally regenerated trees and planted/seeded trees, and where the naturally regenerated trees are expected to constitute more than 50% of the growing stock at stand maturity.</p> <p><b>Other naturally regenerated forest of introduced species (<i>subcategory</i>):</b> Other naturally regenerated forest where the trees are predominantly of introduced species.</p> <p><i>Explanatory note</i></p> <p>1. In this context, predominantly means that the trees of introduced species are expected to constitute more than 50% of the growing stock at maturity.</p>	
FSC (2002)	<p><b>Natural forest:</b> Forest areas where many of the principal characteristics and key elements of native ecosystems such as complexity, structure and diversity are present, as defined by FSC approved national and regional standards of forest management.</p>	<p><b>Plantation:</b> Forest areas lacking most of the principal characteristics and key elements of native ecosystems, which result from the human activities of planting, sowing or intensive silvicultural treatments.</p>
IPCC (2006) (following FAO FRA 2000)	<p><b>Natural forest:</b> A forest composed of indigenous trees and not classified as a forest plantation.</p> <p><i>IPCC (2014) further states that:</i></p> <p>“It is good practice that Parties, according to their national circumstances: (a) provide their definition of natural forest and planted forest (which include forest plantation as defined in the 2006 IPCC Guidelines);</p> <p>(b) define when a conversion from natural forest to planted forest occurs; and (c) apply these definitions consistently throughout the CPs.”</p>	<p><b>Forest plantation:</b> Forest stands established by planting or/and seeding in the process of afforestation or reforestation. They are either of introduced species (all planted stands), or intensively managed stands of indigenous species, which meet <i>all</i> the following criteria: one or two species at planting, even age class, and regular spacing.</p>
IUFRO (2000)	<p><b>Natural forest:</b> A forest consisting of trees native to the specific area or region, not yet greatly modified in composition and structure except through physical interference.</p> <p><i>Notes:</i> A natural forest can develop as a result of initial human influence, e.g. natural forest on abandoned farmland, an area of indigenous forest not managed for a long time, etc.</p>	<p><b>Planted forest:</b> Forest in which trees have been established through planting or human seeding. Plantations are a subset of planted forests.</p>
REDD+ SES (2012) (builds on FAO FRA 2010) <i>and</i>	<p><b>Natural forest:</b> forest predominantly composed of trees established through natural regeneration. This can include primary forests (naturally regenerated forests where there are no clear indications of human induced activities and the ecological process is not</p>	-

UN-REDD Social and Environmental Principles and Criteria (UN-REDD Programme, 2012)	significantly disturbed) and other naturally regenerated forests (where there are clear indications of human induced activities).  (Uses the term “natural forest” synonymously with “naturally regenerated forest” as defined in FAO FRA 2010 – matches REDD+ SES definition above)	
World Bank (2002)	<b>Natural forests</b> are forest lands and associated waterways where the ecosystem's biological communities are formed largely by native plant and animal species and where human activity has not essentially modified the area's primary ecological functions.	-

Table 3: Parameters used by international organisations in their natural forest definitions

	FRA 2015	IPCC	CPF	REDD+ SES	WB OPs	IUFRO	FSC
<b>Stand establishment:</b> Naturally regenerated (not though afforestation or reforestation)	x	x	x	x			
<b>Origin of dominating species:</b> Predominantly native species	x	x	x		x	x	
<b>Degree of anthropogenic disturbance (intactness):</b> No indication of human activity, vs. clear indication of human activity	x				x	x	
<b>Ecosystem functioning:</b> Characteristics of native ecosystems present, such as complexity, structure and diversity	x				x		x

## 4.2. National definitions of natural forest

At UNFCCC COP 17 in Durban 2011, a requirement was introduced for Annex I countries<sup>2</sup> participating in the second commitment period of the Kyoto Protocol to report and account for all emissions arising from the conversion of natural forests to planted forests under LULUCF (FCCC/KP/CMP/2011/10/Add.1). A definition of natural forest was thereby made relevant for LULUCF reporting for the first time. IPCC (2014) responded to this new requirement in its 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (KP Supplement), saying that: “*It is good practice that Parties, according to their national circumstances: (a) provide their definition of natural forest and planted forest (which include forest plantations as defined in the 2006 IPCC Guidelines); (b) define when a conversion from natural forest to planted forest occurs; and (c) apply these definitions consistently throughout the Commitment Periods.*”

Whilst developing countries have not had to report on LULUCF emissions to UNFCCC, they have usually complied with the FAO’s request for information on the extent of different forest types for inclusion in the FRA, and this distinguishes *naturally regenerated forest* (see Table 2). In the 2010 FRA country reports, three REDD+ countries (Philippines, Chile and Ethiopia) gave an explicit national definition for *naturally regenerated forest*. Most countries used existing national classifications of forest types and inferred which types comprised ‘naturally regenerated forests’. For example, Kenya included two types: ‘indigenous forest’ (tree canopy cover above 40%, including mangroves and bamboo forest) and ‘open woodland’ (primarily native tree canopy cover of 10-40%). According to FRA, *naturally regenerated forest* includes *primary forest* and *other naturally regenerated forest*. A common approach was to include all forest categories except primary forest and plantations as ‘*other naturally regenerated forest*’. Some countries excluded forests with specific recorded uses or with timber concessions. There is thus much variation among countries in what is included here.

Criteria that countries use to define *primary forest* in their FRA reporting include ecological structure and function, area/coverage, use/conservation and human intervention. Around half of the countries reporting to the FRA in 2010 provided figures for primary forest, either by summing the area of specific types from national forest classifications, or estimating the proportion of forest that is undisturbed. For example, Cambodia’s definition comprises areas with forest cover higher than 90% and no visible access roads, whilst Kenya assumed that 20% of its forest had no human interference.

Of the 64 UN-REDD Programme partner countries, a small number noted national definitions of *natural forest* in their reports to the 2015 FRA, including Colombia and Mongolia (Box 1). These use characteristics such as structure, function, coverage, density, and species composition. In addition, some countries refer to natural forests whilst describing other national forest categories, e.g semi-natural or indigenous forests, without offering an explicit definition.

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<sup>2</sup> Annex I Parties include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States and several Central and Eastern European States.

Box 1: Example definitions of natural forest from Global Forest Resources Assessment country reports (FAO 2015)

**Colombia**

Natural forest cover (Cobertura Bosque natural): Land mainly covered by trees that may contain shrubs, palms, bamboos, grasses and lianas. Dominated by tree cover with a minimum 30% canopy density, a minimum canopy height (*in situ*) of 5 metres at the time of recording and a minimum area of 1 hectare. Excludes commercial forest plantations (conifers or broadleaf), palm crops and trees planted for agricultural purposes. It also excludes areas of trees in urban parks and gardens. (Source: IDEAM, 2011).

**Mongolia**

Natural Forest: All forest stands with a Relative Stock Density above 0.3 are registered as natural forests.

## 5. Implications for REDD+ of different natural forest definitions

When countries wish to define ‘natural forest’ with REDD+ in mind, it is useful to consider existing relevant definitions and data sources, used across relevant national institutions, with particular attention to plans for the NFMS. Countries will be making these decisions in the light of their national circumstances: their drivers of deforestation and forest degradation and the actions needed to address them; the feasibility of different monitoring approaches; their forest types, and national objectives for protecting them from conversion and degradation (or allowing forests to regenerate). Altogether, this will inform how the definitions of forest and natural forest can work within the national REDD+ strategy.

To apply safeguard (e), it is also necessary to interpret ‘conversion’ from natural forest (section 6.2). It is commonly understood that the stricture on conversion of natural forest was included in the safeguards with the intention of preventing conversion to planted forest as a REDD+ action (Rey *et al.* 2013), but the text could be clearer. Ideally, a national interpretation of safeguards would define natural forest and conversion in a way that allows any tree planting required to achieve the national REDD+ goals whilst remaining consistent with safeguard (e).

We propose that a definition of natural forest that serves key objectives for REDD+ will meet the following criteria:

- Suitable for monitoring: parameters and/or proxies used in the definition will need to: be suitable for use in NFMS (e.g. national capacity to measure it exists), contribute to developing a FRL/FREL.
- Protects valued forest: the definition can be designed to ensure that through safeguard (e), conservation of all forests considered valuable for biodiversity and ecosystem services is incentivized, and that they are protected from conversion by REDD+ actions.
- Enables restoration: where criteria for natural forest include natural regeneration, countries may wish to phrase this to allow planting that encourages regeneration, e.g. planting of perch trees.

At one extreme, a country might choose to restrict the definition of ‘natural forest’ to undisturbed, primary forest. This may be appropriate in countries where environmental values are largely concentrated in such forest. In other countries, such a definition could mean that large areas of forest valuable for its biodiversity and ecosystem services (including climate change mitigation) could fall



outside the protection offered by safeguard (e) against conversion by REDD+ actions. The safeguard's requirement to be consistent with the conservation of biodiversity would still apply, but unless there is good information about the biodiversity present in degraded, open or secondary forest, there is some risk that forest of conservation importance could be converted to plantations under REDD+.

A natural forest definition that is very inclusive, however, could in some cases be counterproductive. Some countries aim to establish woodlots or plantations in order to relieve pressure on natural forest in the short and medium term. Here, a natural forest definition could be designed to protect forests that are important for biodiversity and ecosystem services, whilst still leaving some land available for conversion to woodlots or plantations. Alternatively, regenerating natural forests could be managed sustainably to supply wood at a lower density over a larger area.

Mapping the spatial extent of possible different natural forest definitions under consideration, and comparing these with maps of forest biodiversity and ecosystem services can help in identifying the implications of any given definition. A definition and map of natural forest is a pre-requisite to mapping the areas available for implementation of certain REDD+ policies and measures. Figure 2 shows two possible maps of natural forest for Tanzania, both defined using crown cover > 10%: map (a) based on the REDD+ strategy forest definition, shows areas with tree height > 5m whilst Map (b) based on the CDM forest definition, shows only areas with tree height > 2m. There is also a difference between the definitions in minimum area unit, but this is not visible on the maps.

Whilst the natural forest definition is key to understanding safeguard (e), other elements of the safeguards, on respect for the rights of indigenous communities, full and effective participation of relevant stakeholders and the conservation of biological diversity are all valid both within and outside of natural forests. Land of national or local importance for biodiversity conservation should not be chosen for conversion to plantations under REDD+, and indigenous people and local communities should consent to and be involved as appropriate in any such action. For example, thicket vegetation and grasslands are often important for wildlife species unlikely to thrive within plantations; and any effort to establish plantations on land being used for pasture or crops will require careful negotiation. Planted forest can be a useful resource for local communities, and can also form a buffer at the transition between agricultural and natural forest land, for example where deforestation has already occurred on hilly areas marginal for agriculture.

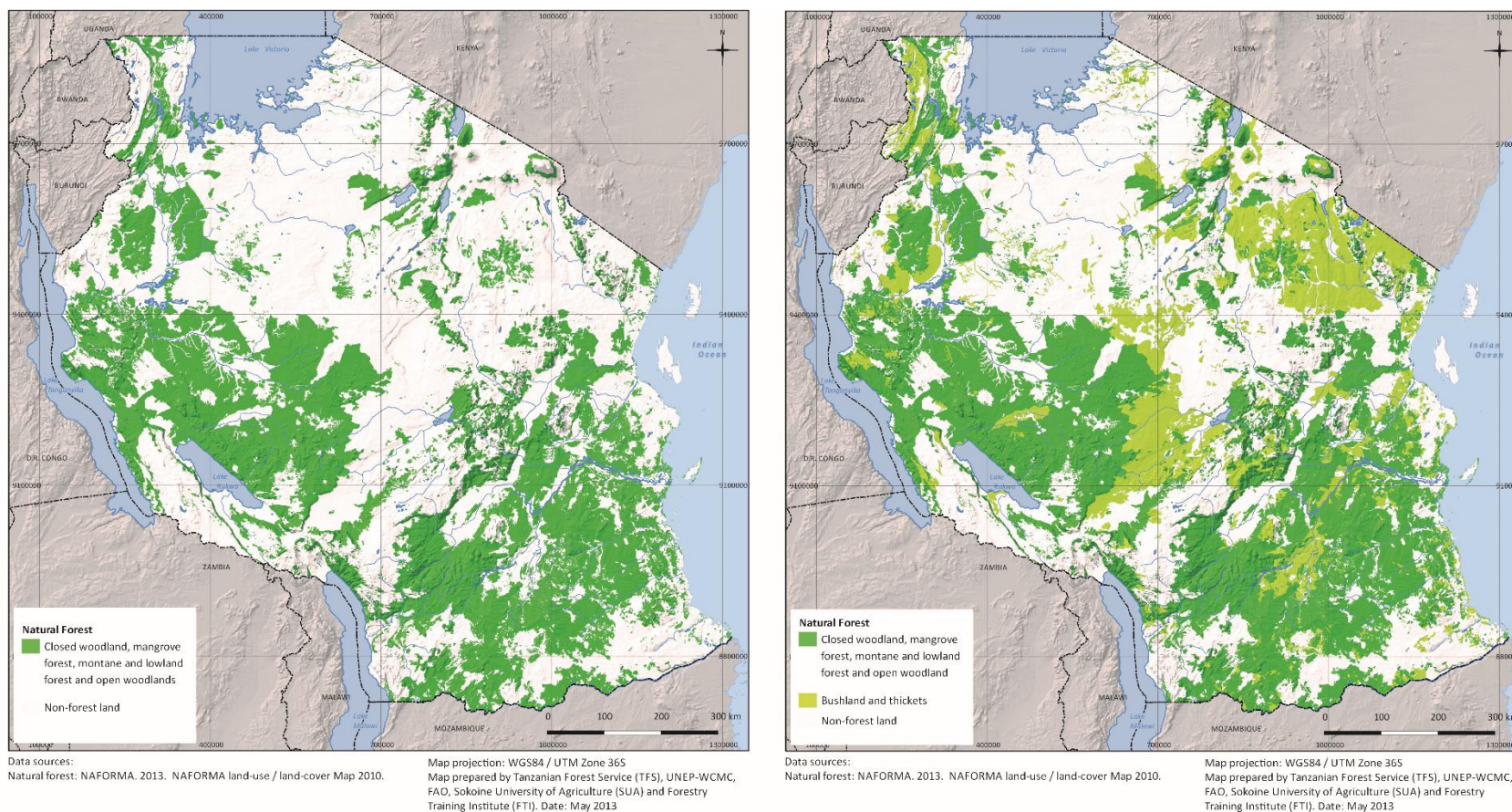


Figure 2: 'Natural forest' in Kenya, mapped using (a) a 5m and (b) a 2m tree height threshold (Runsten et al. 2013).

## 6. Interactions between definitions

### 6.1. Forest and natural forest

Since natural forest is a subset of total forest land, the national definition for natural forest will often take the national definition of forest as a starting point, either explicitly or implicitly. For example, if the national definition of natural forest is “forest that is not planted, and composed of indigenous species”, then it is by referring back to the land-cover and land-use criteria of the forest definition that we can identify which ecosystem types are included, and how much secondary or degraded forest is counted as natural.

Whether the definition of forest also includes temporarily unstocked land is relevant<sup>3</sup>, partly because including ‘unstocked’ forest broadens the scope of lands to be monitored by NFMS and protected by the safeguards, and partly because it affects what is considered as conversion.

### 6.2. Conversion and natural forest

Whilst it seems counterintuitive that REDD+ policies and measures would degrade natural forests, some possibilities could include encouraging an increase in intensity of fuelwood collection in specific areas, expanding agriculture into degraded areas, or replacement of indigenous with commercial tree species. By ruling out ‘conversion’ of natural forest, safeguard (e) should reduce these risks.

Conversion of natural forest itself is undefined under the UNFCCC. An obvious interpretation is change to the forest such that it no longer meets the natural forest definition, which would include changes in land-use or in land-cover. The IPCC (2006) greenhouse gas inventory guidance is consistent with this, referencing ‘conversion of native forest into a new forest type’ and ‘conversion of natural forests to plantation forest’ when discussing ‘Forest Land Remaining Forest Land’. However, countries do have to clarify the safeguards themselves, and there is a small risk that if MRV systems focus in the first instance on conversion between forest and non-forest only, this land-use change definition is adopted without considering the implications.

If conversion were consequently to be defined as only a change in land-use, management that changed the density or composition of the forest would not be considered conversion so long as other land uses did not emerge. In addition, if “natural forests” include temporarily unstocked land, even clear felling would not be considered conversion as long as the forest was allowed to regenerate afterwards. To avoid any doubt, a country might choose to use a natural forest definition that excludes unstocked land, and to define conversion as a change in forest state so that it no longer meets the natural forest definition.

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<sup>3</sup> as noted in section 3, the current Kyoto/CDM definition of forest includes temporarily unstocked land

Table 4: Interaction of example definitions of “natural forest” and “conversion of natural forest”

Which forests are protected from “conversion” under REDD+?		Conversion definition includes...	
		Change from natural forest criteria (e.g. degradation past those thresholds)	Change in land-use from forest (e.g. to agriculture)
Natural forest definition includes...	Restricted to closed forest (e.g. land-cover criteria >70% cover, > 5 m height) with limited disturbance	Closed forest well protected	Degradation of all forest types possible
	Also includes open forest (e.g. land-cover criteria >10% canopy cover, > 2m height)	Open (and regenerating) forest not protected	Open and regenerating forest not protected
		Degradation of closed forest possible	Degradation of all forest types possible
	Also allows temporarily unstocked forest	Open and some regenerating forest well protected	Open, closed and some regenerating forest protected from land-use change
		Degradation of all forest types possible	Forest meeting natural forest criteria protected from land-use change

If these conditions are met, a natural forest definition that focuses on closed forest could then also help to prevent degradation of high-biomass forests (Bucki *et al.* 2012) – but that choice would not protect open or regenerating forest areas from conversion as a REDD+ action. The safeguard would still require that REDD+ actions were consistent with the conservation of biological diversity.

It could also be useful to specify in the forest and natural forest definitions whether the criteria used (e.g. origin of species, mode of regeneration, level of management intervention) apply to the entire forest or to a minimum percentage of the trees, land area or biomass present. A more refined definition could help to classify the many forests that could be perceived as natural but have some disturbance, including any forests categorized as “semi-natural” under existing definitions.

## 7. Conclusions

The UNFCCC’s Cancun safeguard (e) states that REDD+ actions should not convert “natural forest” but are instead to incentivize the protection and conservation of biodiversity, natural forests and their ecosystem services. The “Warsaw Framework for REDD Plus” determined that national forest monitoring systems for REDD+ should be able to assess “natural forest”. Both of these decisions require definitions of “natural forest”, and the Warsaw decision clarified that countries will set their own definitions. To ensure consistency with past or ongoing forest monitoring or management initiatives, countries may prefer to base the natural forest definition on existing national definitions, while ensuring that it serves the national goals for REDD+, and is consistent with the Cancun safeguards.

‘Natural forest’ is a subset of ‘forest’, and the two definitions interact. The implications of this interaction should be considered. The most appropriate definition of natural forest depends on

national circumstances, including existing forest cover and condition, monitoring capacity, available baseline data, policy goals, and drivers of deforestation and forest degradation. There are possible trade-offs to consider in setting a definition, especially with regard to the provision on conversion and how this is defined. A country with much unmanaged intact forest may prefer a definition of natural forest focused on intact forests to incentivize their protection, and to permit degraded land to be managed sustainably for production. Depending on the definition, this may preferentially protect high-biomass ecosystems. Conversely, countries with little or no intact forest may wish to include forests that have already been logged or otherwise degraded, but that could provide valuable ecosystem services or wildlife habitat now or in the future.

To ensure long-term success and credibility, REDD+ actions need to be designed in a way that supports national sustainable development goals, as well as ensuring that the multiple functions of forests and ecosystem resilience are maintained for the future. Agreeing a clear natural forest definition can serve to clarify NFMS requirements, operationalize Cancun safeguard (e) and help to guide REDD+ actions towards achieving benefits for forest-dependent people, biodiversity and ecosystem services.

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