
Deforestation- and Conversion-Free (DCF) Methodology

Introduction

In early 2022, LDC committed to eliminating deforestation and the conversion of native vegetation of high conservation value for agricultural purposes from our global supply chains by the end of 2025. Based on this commitment, LDC established industry-leading cut-off dates for deforestation and conversion: November 30, 2016, for palm, and December 31, 2020¹ for soy and other commodities.

Historical land use change data shows that deforestation and conversion driven by agricultural expansion are geographically concentrated. The first step in implementing our DCF commitment is therefore to assess deforestation and conversion risks across our global supply chains, in order to prioritize due diligence in countries and sub-national regions with higher deforestation and conversion risks for agriculture.

Developed with the support of *Proforest* and *The Nature Conservancy*, our risk-based methodology guides our due diligence process to verify deforestation- and conversion-free sourcing in our supply chains. It consists in applying more granular supply chain traceability and supplier due diligence in geographies with higher deforestation and land conversion risks, and requires crop traceability at national, sub-national or eventually farm levels, based on the deforestation and conversion risk levels associated with each crop production. This document aims to demonstrate how our methodology works and, therefore, how we verify that the volumes we source are free from deforestation and land conversion.

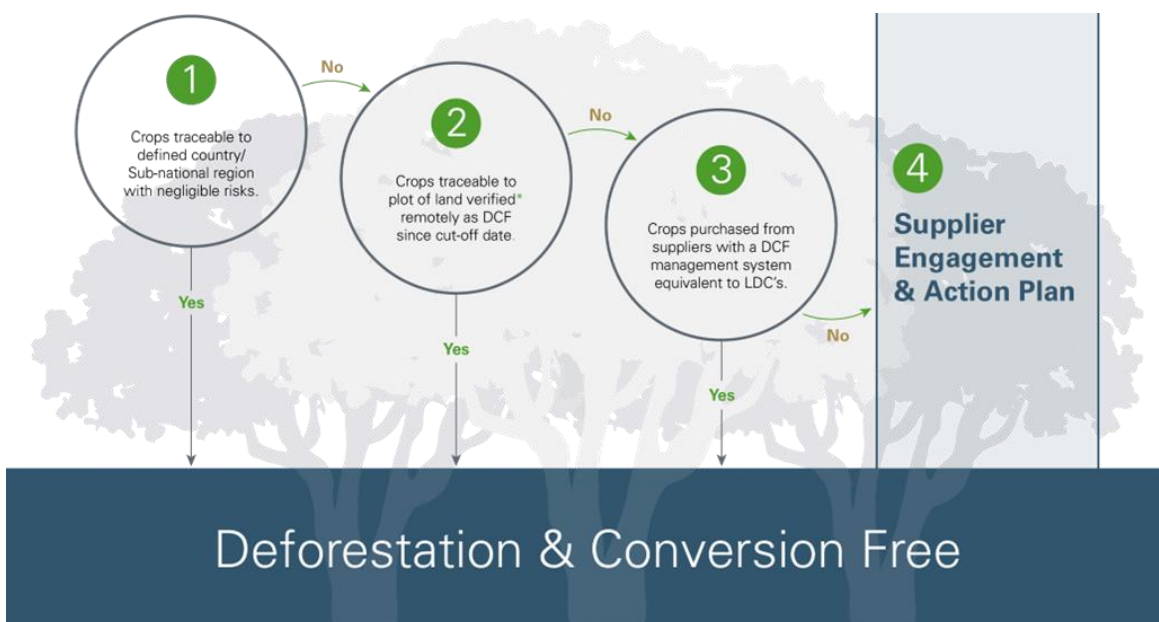
We strive to continue improving our methodology, including our risk assessments, as we gain access to better quality data and as our DCF work evolves. As such, our DCF methodology will be periodically reviewed and updated to reflect changes in our standards, new requirements from upcoming regulations or LDC's DCF sourcing expectations.

Scope

This methodology applies to commodities originated by LDC directly from farmers – considered as direct suppliers, as well as commodities originated by LDC from cooperatives, local aggregators and other third-party suppliers – considered as indirect suppliers. It does not apply to internationally traded volumes received from other crop originators as customs cleared for export.

Achieving DCF targets for internationally traded volumes still presents significant challenges, which must be addressed through accelerated sectoral initiatives.

Our steps to verify DCF volumes are as follows:



¹ We adjusted the cut-off date for deforestation and conversion from January 31, 2020, to December 31, 2020, to align with the EU Deforestation Regulation.

* This can include crops under verification and certification schemes that comply with LDC's DCF criteria.

1. Crops Traceable to Defined Country/ Sub-National Region With Negligible Risks

Our risk escalation approach to DCF verification requires us to clearly define deforestation and conversion “hotspots” within our supply chain, where more granular supply chain traceability, due diligence and engagement are required.

If a crop is traced back to a country or a sub-national region with no or *negligible deforestation and conversion risks*, we consider it as free from deforestation and conversion. However, if a crop is produced in areas that present non-negligible risks, we initiate additional traceability and due diligence.

2. Crops Traceable to Plot of Land and Verified Remotely as DCF Since Cut-off Date

If a crop is traced back to a region with non-negligible deforestation and conversion risks, it requires further traceability to the farm level.

We use satellite monitoring to conduct DCF due diligence at the farm level. If the crop is verified as produced on a plot of land already in production by our DCF cut-off date, then it is considered as DCF.

If satellite imagery indicates that the crop was grown on land cleared after our DCF cut-off date, we engage with the supplier to confirm whether land clearing has occurred and the purpose of such clearing. In some cases, this validation might require field-level verification conducted by LDC or a designated third-party. If a crop is confirmed to have been produced on land intentionally cleared after our cut-off date, it is not considered DCF. We then engage with the supplier in question to discuss possible compensation and remediation actions.

3. Crops Purchased From Suppliers With a DCF Management System Equivalent to LDC’s

In some cases, due to commercial sensitivity and data protection concerns, suppliers prefer not to disclose their supply chain details to LDC for the purpose of conducting DCF due diligence.

As an alternative, suppliers have the option to prove their DCF compliance by demonstrating that they have a DCF management system that aligns with our DCF definition and cut-off date. Where this is the case, their supply to LDC is considered to be DCF.

4. Supplier Engagement and Action Plan

Supplier engagement and collaboration are essential to meeting our DCF commitment. As part of our DCF risk-approach due diligence, we ask suppliers to provide the necessary level of supply chain traceability. If non-compliance is identified and validated, we require suppliers to take compensation or remediation actions.

Recognizing that maintaining strong relationships with suppliers is key to driving positive change, our approach is not to boycott suppliers located in high-risk regions, nor to immediately cut off those found to be operating outside the bounds of our DCF requirements. Instead, in line with the *OECD-FAO Business Handbook on Deforestation and Due Diligence in Agricultural Supply Chains*, we choose to collaborate and engage with suppliers, supporting them to improve and adopt practices that align with our DCF goals, including:

- Committing to preserve all remaining forest and native vegetation areas on the farm.
- For any clearing conducted by the supplier after the cut-off date, committing to:
 - 1) Restore or reforest the cleared area on the farming property; or
 - 2) Develop or participate in a compensation project to restore or protect forest and native vegetation areas equivalent to the non-compliant clearing, ideally in similar terrestrial regions.

Currently, there is no industry-wide standard for what constitutes adequate compensation. We will continue refining our requirements, guided by the principles of additionality, long-lasting impact, local action and fairness.

If suppliers are proven to lack the capacity or willingness to implement such corrective actions, or if they do not comply with the corrective actions that have been agreed with LDC, they may be suspended from LDC’s supply chains. However, we remain committed to engaging with them and supporting their re-entry at a later stage, if they implement a time-bound action plan that addresses the confirmed non-compliant land clearing and provide regular updates and evidence on implementation progress.

LDC's Deforestation and Conversion Risk Assessment

LDC's Remote Sensing team collaborates with external service providers to conduct assessments that aim to identify countries and regions with no or negligible deforestation and conversion risks.

Wherever data availability allows, we strive to take a crop-specific approach to assess deforestation and conversion risks, especially for crops with higher risk exposure, such as soy, palm and coffee, as specified by [recognized studies](#). This method allows us to develop a more specific understanding of the risks and hotspots linked to each crop. If no crop-specific data is available, we apply proxy data to our best knowledge. The data sources used in our global risk assessment exercise are listed in [Annex 1](#).

Country-Level Risk Assessment and Categorization: Identifying Priority Countries

For each crop, we rank countries based on the highest absolute deforestation and conversion areas linked to that crop between 2017 – 2021², using best available public and/or service provider data. The countries responsible for up to 90% of the global deforestation and conversion for that crop, are considered "priority" countries. Other countries are considered negligible risk for that crop.

Sub-National-Level Risk Assessment and Categorization: Identifying Priority Regions

Within each "priority" country, we rank regions according to the highest absolute deforestation and conversion areas linked to the relevant crop between 2017 – 2021, using best available public and/or service provider data.

Sub-national regions that account for up to 90% of the country's deforestation and conversion for that crop are identified as "Priority" regions of the country for that specific crop. Other regions are considered as negligible risk of this country for the crop.

Risk Assessment Results

Using our DCF risk assessment methodology, our Remote Sensing and [Satelligence](#) teams leveraged public and proprietary data to produce the lists of "Priority Countries" and "Priority Sub-National Regions", where further DCF due diligence is required. Please refer to [Annex 2](#) for the risk assessment results for each crop.

More Granular DCF Assessments

Generally, we apply the methodology described herein to all agricultural supply chains, however there are exceptions based on the availability of sectoral tools or more granular knowledge of our supply chains:

Palm

For palm oil, we use the [NDPE IRF](#) (No Deforestation, Peat, Exploitation – Implementation Reporting Framework), a sector-wide tool that measures companies' progress toward their deforestation-free targets. This replaces our own DCF methodology, aligning with our [COP 27 Agri Trader Palm Roadmap](#) commitment.

Sugar

For sugar origination, we apply deforestation and conversion risk assessments at sugar mill level, rather than at the sub-national region level. We have updated our global database of sugarcane mills with geocoordinates, allowing us to assess deforestation and conversion at mill level within a 100-km radius around each sugar mill.

Rice

Similarly, we apply deforestation and conversion risk assessments at rice mill level, rather than at the sub-national region level. It allows us to assess deforestation and conversion within a 50-km radius around each rice mill that we source from, bringing more granular risk profiles to identify possible hotspots in our supply chain.

² The 5-year period of 2017 to 2021 was defined while this deforestation risk assessment was initially conducted in 2022. We plan to update this assessment with latest available data, ideally every two years.

Remaining Challenges and Opportunities

During our implementation, we encountered a few key obstacles that we are striving to overcome, which will continue to challenge us as we work to close remaining gaps toward our target. These call for further collaboration of the agriculture sector and key stakeholders beyond our supply chains, exploring solutions, partnerships and innovation toward our shared goals.

Data Availability

Good quality data is essential for accurate deforestation and conversion risk assessment and due diligence. Geospatial data of crop production areas, forest and native vegetation coverage as well as their removals are available in certain regions, but not on a global scale.

LDC's Data Science teams will continue to build crop masks from the ground up, using state-of-the-art technologies and the latest available satellite images, aiming to cover all our global supply chains.

For land use data, forests are relatively well defined and monitored worldwide, while for other non-forest vegetation (savannas, woodland, etc.), data availability is much more limited. As such, our teams will continue to partner with academia and non-governmental organizations to help address data gaps, for example through our contribution to the [Forest Data Partnership](#).

Traceability and Supplier Engagement

As a key participant in international trade, we operate diverse supply chains and manage significant volumes of crops. In many cases, we are not able to originate crops directly from producers and therefore rely on third-party suppliers to aggregate volumes for domestic and international markets.

While our methodology applies to both our direct and indirect suppliers, we acknowledge the challenge of obtaining traceability information for indirect suppliers in certain cases, given their lack of awareness or commercial confidentiality concerns. For certain crops, such as palm oil, the sector has achieved a high level of supply chain transparency, thanks to years of work toward no-deforestation supply chains. Yet, for many other crops, especially those with less public awareness or scrutiny, it has been challenging to engage suppliers to improve supply chain traceability for deforestation and conversion due diligence.

Similarly, for palm oil, there is a sectoral tool on DCF commitments and methodology (the NDPE IRF), which facilitates sector-level DCF due diligence and progress measurement. This is not yet the case for other commodities, where sectoral progress is necessary to ensure alignment on DCF standards to be met for internationally traded volumes, which we receive as customs cleared for export by other crop originators. Being able to assess whether such volumes comply with LDC's DCF standards depends on such sectoral progress and collaboration.

While we continue to focus on our supplier engagement, sector-level DCF awareness and goals will be essential to achieving our DCF target. We will therefore continue to actively pursue and participate in sectoral initiatives and collaborations to drive sectoral progress.

Unlocking Conservation Incentives at Scale

We believe that preserving forests on and around farms is essential to maintain the long-term productivity and climate resilience of these farms – a view shared by many of the farmers we work with. However, farmers need to receive proper compensation and incentives to invest in forest conservation beyond what is legally required. This approach is key to mitigating deforestation and conversion risks and demands collective action beyond individual companies' supply chains. It is also a challenging task, given the current lack of effective mechanisms to value and market the environmental benefits of forests and native vegetation. For example, emerging carbon markets bring a possible tool for recognizing the carbon sequestration benefit of forests, but its economic and technical requirements are not always suitable for the agricultural reality.

Meanwhile on the carbon insetting side, surging corporate commitments on carbon reduction are driving much-needed investment toward supply chain decarbonization efforts. However, since forest conservation only prevents further carbon emissions increase (avoided emissions), rather than achieving carbon reductions, it is unlikely to attract the necessary investment from value chain partners.

While contributing to sectoral innovation around conservation incentive models (see details in our [latest Integrated Report](#)), we are investigating additional ways to unlock some barriers and aggregate at-scale incentives for farmers' conservation efforts, as part of our partnership with *The Nature Conservancy*. These are a combination of crop price premium, preferential financing rates and direct payments to producers. We expect to further pilot these models in collaboration with downstream value chain partners, financial institutions and foundations.

Glossary

Deforestation:

(For palm) Deforestation - loss of forest (areas of **High Carbon Stock** and **High Conservation Value**) i) conversion to agriculture or other non-forest land use; ii) conversion to a tree plantation; or iii) severe and sustained degradation.

(For other crops) Deforestation - Clearing of land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. Agroforestry systems, including where crops are grown under tree cover, as well as agri silvicultural, silvopastoral and agrosilvopastoral systems, should not be considered forests, but as constituting agricultural use.

Conversion:

(For palm) Conversion - new development on peatlands regardless of depth.

(For other crops) Conversion - Anthropoc change of a non-forest primary native vegetation to another land use or profound change in a natural ecosystem's species composition, structure, or function.

Negligible risk:

Countries or sub-national regions are of negligible risks for deforestation and conversion, if they together make a very low contribution to agriculture-driven deforestation and conversion. Crops of such origins are exposed to negligible risks.

Primary native vegetation:

An assemblage of native plant species in a specific place or region that has adapted to environmental and biological conditions and has suffered little or no human intervention.

Cut-off date:

Date after which deforestation or conversion of native vegetation renders a given area or production unit non-compliant with a company's DCF commitments. For LDC, our cut-off date for palm is November 30, 2016, while our cut-off date for soy and other crops is December 31, 2020.

Target date:

The date on which a company intends to have fully implemented its DCF commitments or policies. For LDC, our target date for eliminating supply chain deforestation and conversion for agricultural purposes from global supply chains is end of 2025.

Annex 1 - Data Sources for Deforestation and Conversion Risk Assessment

Name	Coverage	Nature	Spatial resolution (m)	Method	Source name	Notes
ESA landcover mask	Global	Crop mask – Sugar (proxy for other countries than Brazil)	10	pixel-based	LDC	Apply 100km radius for sugar mills in global sugar mills database, for sugar mill-level risk assessment
GADM	Global (excluding Argentina)	Administrative Boundaries	N/A	pixel-based	GADM	Highest level (municipality) used to define “Priority” regions within a country
INDEC	Argentina	Administrative Boundaries	N/A	pixel-based	INDEC	Highest level (municipality) used to define “Priority” regions within Argentina
GFW Tree Cover Loss	Global	Tree cover loss	30	pixel-based	Hansen / GFW	
GFW Tree Plantations	Global	Crop mask – Citrus for other countries than Brazil	NA	pixel-based	GFW	Proxy for global citrus plantation mask
GLAD Soy extent	Latin America	Crop mask – LATAM Soy; also used as proxy for LATAM corn and wheat	30	pixel-based	UMD	
Hansen Tree Cover (min. 30%)	Global	Tree cover	30	pixel-based	Hansen / GFW	
Land Cover mapping INTA	Argentina	Crop mask - Cotton	30	pixel-based	INTA	Official data
Mapbiomas Brazil	Brazil	Crop mask - Cotton; Citrus; Sugarcane	30	pixel-based	Mapbiomas	
Mapbiomas Chaco V4	Chaco	Deforestation / Conversion	30	pixel-based	Mapbiomas	
Mapspam	Global	Crop mask - All	10,000	area-based	MAPSPAM	Used for global risk assessment for areas where we do not have accurately mapped crop information; we will refresh assessment with Mapspam 2020 data later in 2024
PRODES Brazil	Brazil	Deforestation / Conversion	30	pixel-based	PRODES	
Satelligence Forest Baseline	Global - Tropical Belt	Forest	30	pixel-based	Satelligence	To filter out non-deforestation clearing in tree cover loss data
Satelligence Oil Palm Map	Global	Crop mask - Oil Palm	10	pixel-based	Satelligence	

Annex 2 – Crop-specific Deforestation and Conversion Risk Assessment Results

Crop	Number of Priority Countries / Number of Priority Countries with LDC Presence	Total Number of Priority Municipalities in all Priority Countries with LDC Presence
Citrus	1/1	16
Coffee	9/6	Ongoing ²
Corn	10/3	686
Cotton	3/2	120
Rice	10/3	Ongoing ³
Soy	4/3	686
Sugar ⁴	10/6	210
Wheat	2/2	625
Barley	6/1	340
Canola	3/0	No LDC presence in Priority Countries
Sorghum	4/0	No LDC presence in Priority Countries

² Coffee is the only crop in LDC's supply chain that is grown in agro-forestry systems, as a result, high-quality coffee crop masks are not easily available.

We are exploring solutions with in-house and external teams to access high-resolution coffee masks in order to further our deforestation risk assessment.

³ Sub-national deforestation and conversion risk assessment on rice production is still ongoing and is expected to complete by the end of 2024.

⁴ For sugar, our sub-national risk assessment is at sugar mill level. As such, our assessment generated a list of priority mills in each priority country, instead of priority municipalities