

Deforestation & Conversion Free (DCF) Methodology

Earthworm Foundation Guidance

Palm Oil – V1.0
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List of abbreviations

AFi	Accountability Framework Initiative
CGF	Consumer Goods Forum
CPO	Crude Palm Oil
DCF	Deforestation and Conversion Free
EF	Earthworm Foundation
FFB	Fresh Fruit Bunches
FPC	Forest Positive Coalition
HCS	High Carbon Stock
HCSA	High Carbon Stock Approach
HCV	High Conservation Value
IP	Identity Preserved
ISH	Independent Smallholder
IRF	Implementation Reporting Framework
MB	Mass Balance
MSD	Minimal Smallholder Deforestation
NDPE	No Deforestation, No Peat, and No Exploitation
NDV	No Deforestation Verification
PKO	Palm Kernel Oil
POCG	Palm Oil Collaboration Group
PPBC	Production and Protection Beyond Concessions
RSPO	Roundtable on Sustainable Palm Oil
SG	Segregated
SH	Smallholder
TTM	Traceability to Mill
TTP	Traceability to Plantation
UML	Universal Mill List

No Deforestation and Deforestation-Free are used interchangeably across this document.

1 Introduction

In 2010, Earthworm Foundation (EF), formerly The Forest Trust, supported Nestlé to make one of the world's first deforestation-free commitments. The commitment initially focused on palm oil, following years of sustained pressure from concerned stakeholders that palm oil expansion was driving deforestation and other related environmental and social impacts. Since then, more than 300 companies have committed¹ to end deforestation, not only from the production of palm oil but across a range of agricultural commodities.

Earthworm Foundation has played a strong role in supporting businesses to build transparency and traceability in their supply chains. These efforts are fundamental to any responsible sourcing commitment and are critical in the elimination of deforestation from global supply chains.

Evolution of EF's approach to reporting on deforestation-free

Progress on responsible supply chains in the palm oil sector has meant a growing number of methodologies aiming to support companies to become deforestation-free. However, the adoption of multiple methodologies across the industry has introduced complexity, leaving businesses to navigate a range of approaches and definitions. **With this in mind, EF recognises value in aligning our approach with the broader industry to accommodate alternative pathways for categorising volumes as Deforestation and Conversion Free (DCF).**

As such, this document offers practical guidance on use of the [DCF methodology](#) for palm oil as developed by the Consumer Goods Forum (CGF) Forest Positive Coalition (FPC). It also clarifies how EF interprets and reports on DCF for its members.

The guidance incorporates the language and concepts from the Accountability Framework Initiative's (AFi) [Common Methodology for Assessment of Progress Towards Deforestation-And-Conversion-Free Supply Chains](#), to promote consistency and standardisation of No Deforestation assessments and reporting across the industry. In addition, we reference the Palm Oil Collaboration Group (POCG), an industry-wide initiative dedicated to aligning methodologies and best practice related to No Deforestation, No Peat, and No Exploitation (NDPE) commitments. Outcomes of the POCG's working groups and how these are recognised in DCF reporting are mentioned below.

Where there may be gaps in existing industry guidance, this document seeks to provide additional recommendations and practical advice. Please note the guidance will evolve with industry developments and be updated as required.

¹ <https://www.supply-change.org/#remove>

In line with the Forest Positive Coalition DCF methodology, EF's NDV work will now fall under Option C (traceable to production area assessed remotely).

2 Key definitions

Forest

EF uses the forest definition developed by the High Carbon Stock Approach (HCSA)² Steering Group. The HCSA defines forests based on vegetation structure and density, classifying land into six categories of land cover. The HCSA methodology aims to protect High Carbon Stock forests (*categories 1-4: High Density Forest, Medium Density Forest, Low Density Forest and Young Regenerating Forest*) due to their critical carbon storage, ecosystem services, and biodiversity roles, while identifying degraded lands (*categories 5-6: Scrub and Cleared/Open Land*) with lower carbon and biodiversity values that may be suitable for development.

For awareness, HCSA assessments must be integrated with identification and protection of High Conservation Values (HCVs), following the guidance and best practices established by the High Conservation Value Resource Network (HCVRN). These assessments should be conducted by licensed HCV assessors under the Assessor Licensing Scheme (ALS) to ensure consistency and quality in evaluating conservation priorities. They must also be conducted through processes that respect communities' rights to Free, Prior, and Informed Consent (FPIC).

Deforestation-free

Along with many companies in the palm oil value chain, EF defines No Deforestation/ deforestation-free as: Fresh Fruit Bunches (FFB) supplying a mill that come from areas that have not replaced forest since the cut-off date (31st December 2015).

EF recognises that a large proportion of palm oil production comes from smallholders, for whom HCS and HCV studies are often unfeasible. There are efforts within the HCSA and the HCVN to make available simplified assessment tools at both landscape/jurisdictional and smallholder levels. Meanwhile, EF employs a risk-based approach to assess deforestation linked to palm oil expansion potentially associated with smallholders. Requirements for mills or smallholders located in low-risk regions may differ.

² <https://highcarbonstock.org/what-is-the-high-carbon-stock-approach/>

A note on varying definitions

We acknowledge that various definitions are used across the industry, such as the AFI's deforestation definition³ and the AFI/ FAO forest definition⁴. These definitions have been recognised as credible within the wider industry, particularly in relation to the European Union Deforestation Regulation (EUDR). The key is for companies to be transparent in the definitions they have used for reporting.

3 EF's interpretation of the FPC Deforestation and Conversion Free (DCF) methodology

As outlined in the FPC DCF guidance, four steps are required for production volumes to qualify as DCF compliant:

1. Trace the supply chain back to the production area at the scale needed for the relevant implementation option (see Table 1 below).
2. Confirm the production area was not converted after the palm oil cut-off date.
3. Monitor natural vegetation and address new conversion. Natural vegetation is composed of natural forest and natural non-forest land cover (e.g. grasslands), identified through an HCV assessment.
4. Verify that the methodology, data and claims are credible.

Additionally, the guidance highlights the five 'implementation options' to make DCF claims for palm oil. EF provides additional context to these in the table below:

³ <https://accountability-framework.org/use-the-accountability-framework/download-the-full-framework/downloads/definitions/>

⁴ <https://www.fao.org/4/ad665e/ad665e03.htm>

Table 1: Overview of the DCF methodology

DCF Implementation Option		Option A Certified under the acceptable scheme and Chain of Custody	Option B Traceable to a defined area with negligible risk of deforestation	Option C Traceable to production area assessed remotely as DCF	Option D Traceable to production area with field assessment as DCF	Option E Control Mechanism
AFi DCF pathway		A3: Certification	A1: DCF sourcing area	A2: Farm-level monitoring	A2: Farm-level monitoring	A1, A2 or A3
Requirements	Minimum level of traceability required	Palm Oil Mill	Smallholder Sub-District	Production Unit: GPS Point or Polygon	Production Unit: GPS Point or Polygon	Acceptable control mechanisms are shared further
	Data required	Volumes purchased as IP/ SG	EF smallholder risk assessment (for palm oil, Option B only applies to smallholders)	Traceability to Plantation (TTP) & monitoring system	Assessment report for designated Production Unit incl. the DCF conclusion (and action plan to address any identified DCF gaps)	below but include IRF v6.0 (with minimum requirements), validated supplier methodologies and recovery plans
	Confirm production unit was not deforested after cut-off date (31 Dec 2015)	Indirectly (<i>through Certification scheme</i>)	Indirectly (<i>through risk assessment</i>)	Directly	Directly	Indirectly (<i>through specific control mechanism</i>)
	Monitor remaining natural vegetation and respond to new deforestation	Mill certification status monitored	Monitor regularly to confirm negligible risk status	Monitor regularly (remotely) for new forest clearing	Monitor regularly (onsite) for new clearing	Dependent on control mechanism selected
Proof of compliance		Volumes purchased as IP/ SG (certificates provided)	Production areas overlaid with smallholder risk assessment to confirm areas of negligible risk	Polygons detected deforestation-free via satellite monitoring	Field assessment of farms confirms deforestation-free	Independent 3P verified IRF 6.0 profiles; volumes from RSPO IP mills that cannot be classified under the other DCF Options (volumes untraceable to plantation but not low-risk smallholder or dealer volumes; volumes linked to deforestation)

To confirm DCF compliance, upstream supply chain actors (e.g., refineries, suppliers) can implement any of the options A, B, C, and/or D. Option E functions as a confirmation tool downstream actors can

use to ensure their suppliers have adequately implemented one or more of the upstream options (A, B, C, and/or D). Each option can be used individually or in combination with others.

Data granularity and variability in transparency between implementation options

Not all five implementation options are equivalent in terms of the specificity of data and assessments required to be considered as DCF. Earthworm Foundation considers Option C to be the most thorough and precise approach and encourages businesses to maximise the proportion of their DCF compliant volumes assessed through this implementation option. Beyond Option C, EF recommends prioritising implementation options in this order:

C → A → B → D → E

For example, if a supplier relies heavily on Option E, we encourage increasing confidence in their compliance by using options with higher transparency.

Nevertheless, whilst compliance is a useful tool, we encourage members to strengthen the rigour of their practices, always striving for forest positive supply chains. Gaining deeper supply chain insights equips businesses with better data for more informed decision-making for both future avoidance of deforestation and protection of forests. Where businesses are 100% or almost 100% DCF *and* proven compliant through Option C, we recommend exploring opportunities to work at a landscape level whilst also looking at deforestation in the wider supply shed of (critical) sourcing areas.

3.1 Option A – Certification

To qualify as DCF through Option A, volumes must be certified under approved schemes (e.g. RSPO) and purchased as Identity Preserved (IP) or Segregated (SG), with mills certified as IP or IP/MB. Companies must have evidence that they are specifically purchasing segregated volumes and must share a complete mill list. EF will confirm that the mill is certified. EF will not collect SG purchase certificates, but we recommend the supplier keeps these on file for requirement in auditing or verification processes.

If a mill is RSPO IP or IP/MB certified but the company is purchasing conventional oil, the following conditions apply:

- If collected geospatial data confirms no deforestation, volumes fall under Option C.
- If collected geospatial data is missing but the source is a smallholder or dealer low-risk area, volumes fall under Option B.
- If the mill is RSPO IP but we have no geospatial data, volumes fall under Option E.

- If the mill is RSPO IP and we have geospatial data detecting deforestation, volumes fall under Option E. However, EF will flag significant cases to members for investigation with the supplier and then with RSPO.
- If the mill is RSPO IP/MB, MB or non-certified and:
 - There is deforestation and a recovery plan in place, volumes fall under Option E.
 - There is deforestation and NO recovery plan in place, volumes are non-DCF (Red).
 - There is missing TTP, volumes are non-DCF (Amber).

3.2 Option B – Negligible Risk Area

3.2.1 EF Smallholder Risk Assessment

The approach for scoring sourcing boundaries outlined above is also applicable for smallholders. However, EF recognises the complexity in mapping and verifying origins of hundreds and thousands of smallholder farms and acknowledges that little traceability back to farm exists currently. In the absence of smallholder geolocation data, Earthworm Foundation runs a risk assessment to determine locations where deforestation is more or less likely linked to smallholders expanding palm oil plantations.

This methodology consists of three steps:

1. Categorise subdistricts, by analysing trends of small-scale alerts (<5ha) within terrain suitable for palm cultivation & overlaying with the remaining forest area in the subdistrict, as shown in Figure 1.

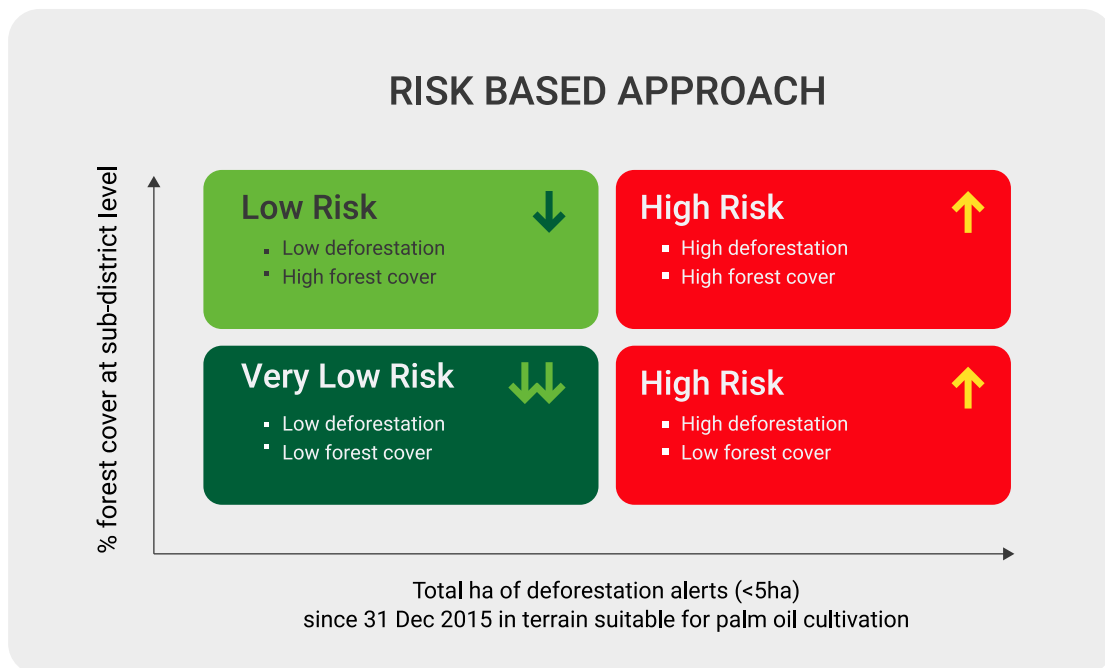


Figure 1: Matrix illustrating the process for categorising subdistricts

2. Categorise mills, by analysing their 50 km radius to determine if the mill is likely to be sourcing from low-risk and/or high-risk sourcing areas. As illustrated in Figure 2, a mill is classified as low risk if <10% of its volume is sourced from high-risk subdistricts

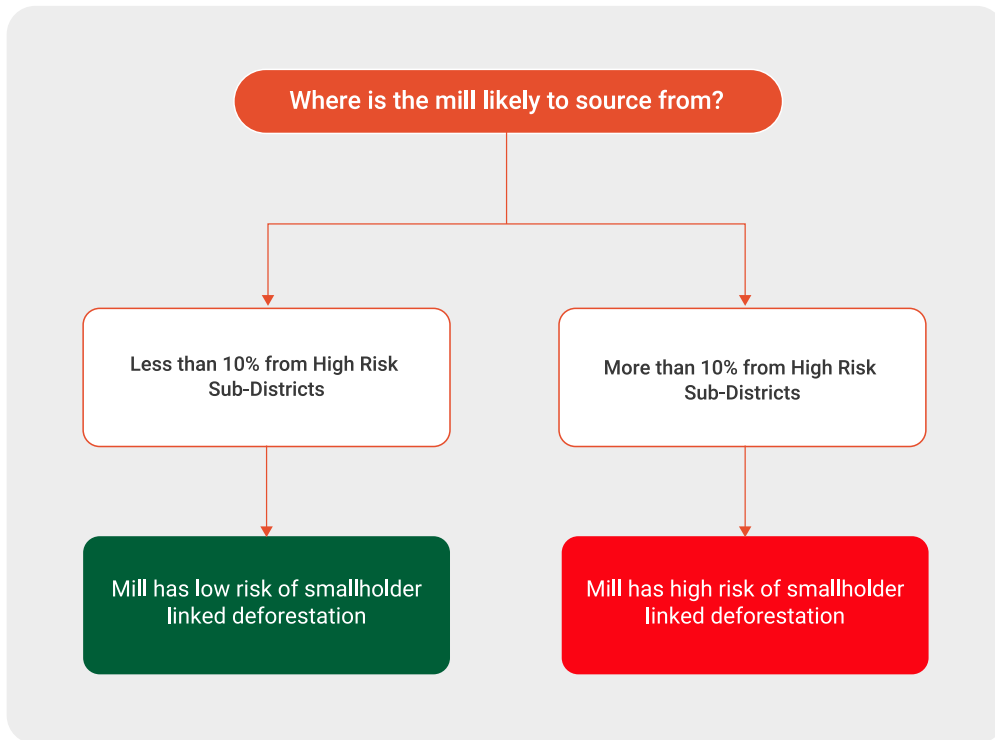


Figure 2: Decision tree for categorising mills

3. Categorise smallholders and the traceability requirements per mill, shown in Figure 3. Mills classified as 'high risk of smallholder-linked deforestation' should be the priority to collect full plantation traceability.

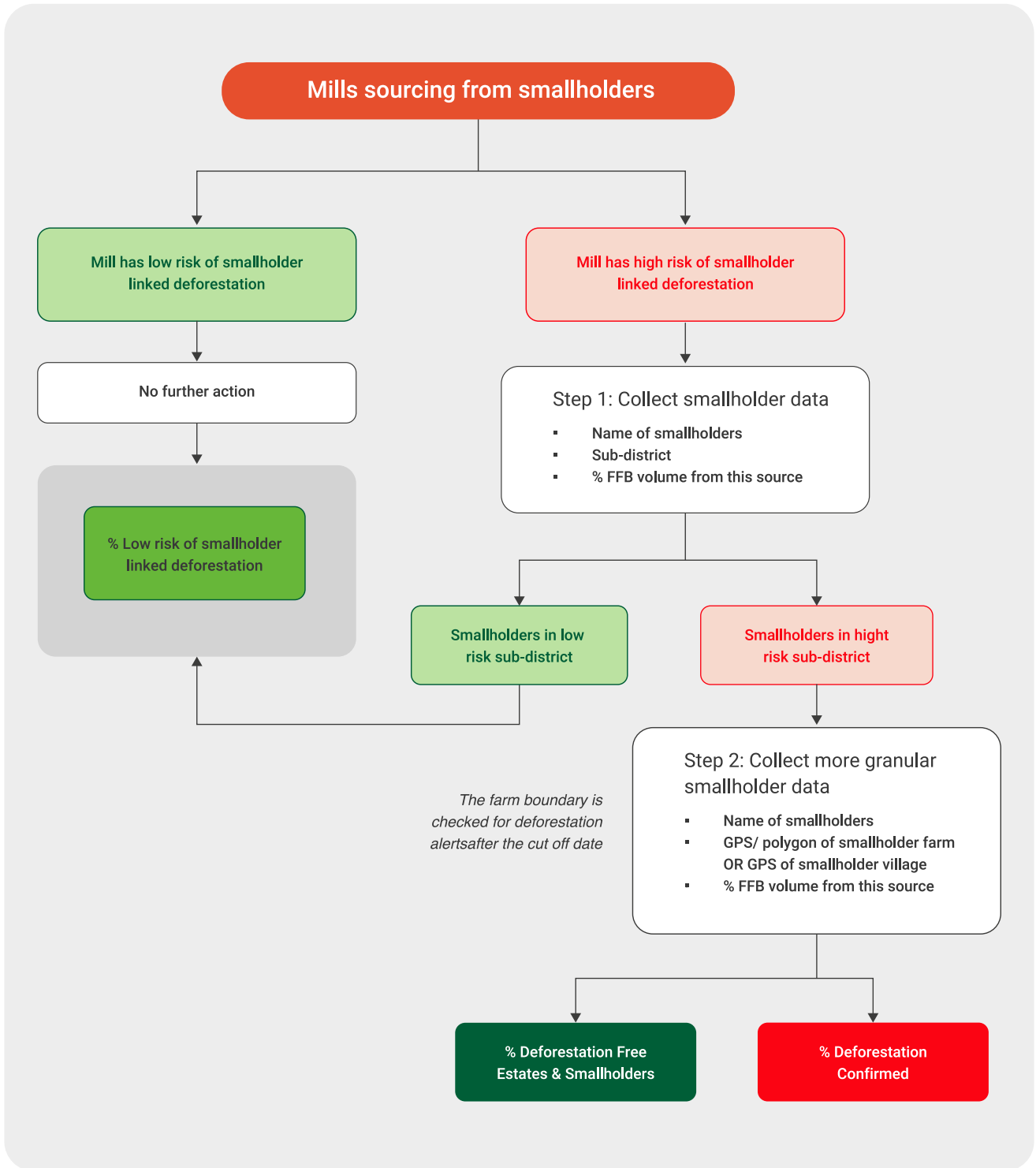


Figure 3: Decision tree for categorising smallholders

Smallholder volume from *low-risk mills* will be categorised as 'low risk of smallholder-linked deforestation', even if no further traceability information is provided.

Smallholder volume coming from *high-risk mills* where no smallholder subdistrict is provided will be categorised as ‘high risk of smallholder-linked deforestation’, and full plantation traceability will be flagged as priority.

Smallholder volume coming from *low-risk subdistricts* will be categorised as ‘low risk of smallholder-linked deforestation’, regardless of the mill list, even if no further traceability information is provided beyond the smallholder’s subdistrict.

Smallholder volume coming from *high-risk subdistricts* will be categorised as ‘high risk of smallholder-linked deforestation’, and full plantation traceability will be flagged as priority.

For awareness, the upcoming European Union Deforestation Regulation (EUDR) will require all smallholders in the EU supply chain to be mapped with either a GPS point or a polygon for farms equal to or under 4 hectares, and a polygon for farms greater than 4 hectares. These requirements will be considered for supporting businesses with meeting the regulation requirements.

3.2.2 Minimal Smallholder Deforestation (MSD) layer

The POCG Production and Protection Beyond Concessions (PPBC) group has been working to define the Minimal Smallholder Deforestation (MSD) Risk Layer for Indonesia and Malaysia. This is due to be released in Q2 2025. Once published, EF intends to gain a deeper understanding of this layer and refine our approach to smallholder risk accordingly, ensuring both a high-integrity and globally consistent framework moving forward.

3.2.3 Other approaches to a Negligible Risk Area

EF acknowledges that as suppliers improve their in-house sustainability practices, they may develop their own approach under Option B. To incorporate this into EF’s DCF score calculation, EF will first assess the supplier’s approach to ensure robustness and alignment with member expectations and best practice, before determining whether it can be included in overall DCF scoring. EF will make this assessment on a case-by-case basis.

3.3 Option C – Remote Assessment (Satellite Monitoring)

When a company has visibility on the geolocation data (at minimum a GPS point) of production units within its own operations or supply chain (i.e. Traceability to Plantation (TTP) data), Option C can be used. This involves a remote assessment using satellite imagery (e.g. Starling) to monitor land use change and assess whether deforestation or conversion has occurred within those production units after the specified cut-off date.

EF maintains that Option C offers the highest level of precision in assessing the impact of deforestation for palm oil development, making it the most effective approach for determining whether companies are DCF and enabling transformative action on the ground.

3.3.1 EF's approach to Option C (remote assessment) – STARLING

In 2016, EF partnered with Airbus to develop [Starling](#), which provides a range of businesses, governments and stakeholders with up-to-date land cover and land cover change data to use for various applications, including assessing deforestation. Figure 4 provides a summary of EF's methodology for integrating traceability data and land cover/land cover change data to assess deforestation-free supply chains.

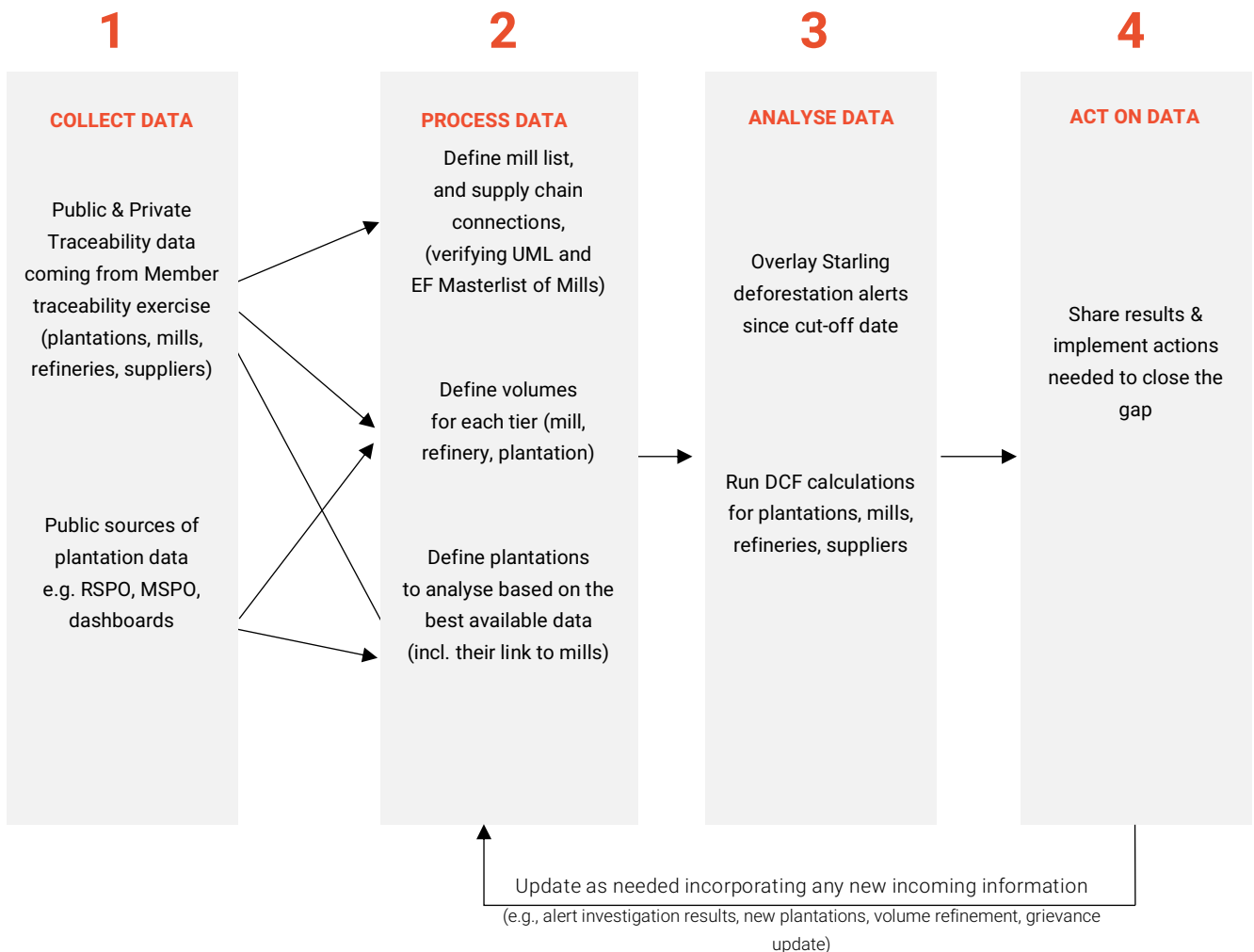


Figure 4: Steps undertaken in assessing deforestation-free palm oil supply chains

The Starling remote assessment of deforestation-free supply chains involves several key steps, including the mapping of the supply chain back to plantations and farms, calculating volumes exchanged in the supply chain when volume data is absent, assessing plantation and farm geolocation data against deforestation alerts, and calculating the deforestation-free score across the various tiers in the supply chain. Each of these steps is **described below**.

3.3.1.1 Collecting and processing traceability data

Full traceability is defined as knowing all palm sources within a supply chain all the way to plantation level (including dealers and smallholder farmers)⁵. A traceability exercise refers to the practice of documenting the different stages of the supply chain and recording the involved stakeholders: from the location where the raw material is grown (e.g., estates, plantations, smallholders), through the processing and aggregation points (e.g., mills, bulking and refineries), to the final product buyer. Figure 5 below provides a generalised overview of the palm oil supply chain, including the main stages and the typical palm product that is exchanged.

A deforestation-free assessment of supply chains using Starling is only possible where traceability data exists. Traceability To Plantation (TTP) data provides the highest level of supply chain granularity, enabling robust analysis using land cover and land cover change datasets and thus increased ability to reduce risk of deforestation on the ground. Traceability To Mill (TTM) also plays a crucial role as the first major aggregation point in the supply chain.

Traceability data is collected continuously because supply chains are dynamic. EF's approach using Starling remote assessment continuously integrates new traceability data to provide buyers and suppliers with the most up-to-date analysis of their supply chains. This provides insights into where additional effort is required to close traceability data gaps or address evidence of deforestation occurring in the supply chain.

⁵ Palm Oil Traceability Working Group (TWG), 2016

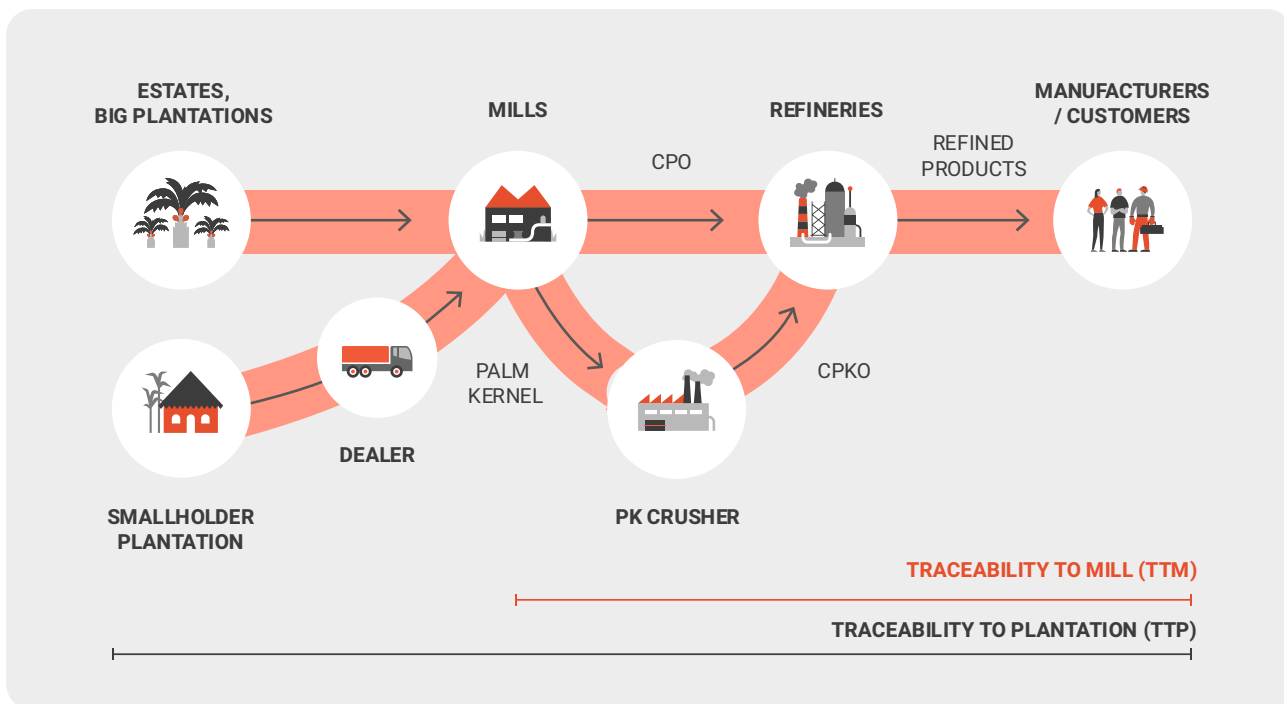


Figure 5: Generalised palm oil supply chain

3.3.1.2 Data requirements for No Deforestation scoring via Starling remote assessment

Data requirements on mills

A palm oil mill is defined as traceable (Traceable to Mill, TTM), when the following data points are made available:

- UML ID
- or
- Mill name
- Parent and Group company names of the mill
- Geolocation coordinates of the mill location

The volume supplied by a mill is important information. Suppliers are highly encouraged to declare this information as it will enable more accurate scoring. However, confidentiality concerns can arise. Where volume data of each mill is not declared, the volume is estimated (see Section 3.3.1.3).

When mill traceability data is submitted to EF, each mill's details are checked and validated against the EF Masterlist of mills, which includes but is not limited to the Universal Mill List (UML)⁶. Additional to the suppliers declaring the mills in their supply chain, EF also uses a range of other data sources to support mill level traceability analysis. These include certification scheme websites (e.g. RSPO

⁶ <https://data.globalforestwatch.org/documents/gfw::universal-mill-list/about>

providing mill information on public summary documents of audits), company websites (e.g. refinery dashboard providing mill list), and government or NGO websites.

Once the analysis of each mill is completed, a score of Traceable to Mill (TTM) is calculated. The score can be generated for any tier of the supply chain downstream of the mill, e.g. a kernel crusher, a refinery, or a consumer goods company.

Data requirements for estates and smallholders

To assess for deforestation using data on estates and smallholders, the following information is required:

- Name of plantation
- Type of plantation: estate or smallholder
- Parent and Group company names of the estate
- Geospatial data for the plantation, ideally in the form of a polygon, or at a minimum, GPS coordinates for estates
- Name of the subdistrict (mukim in Malaysia, desa in Indonesia) for smallholders

Geolocation data for plantations remains challenging for suppliers to declare due to inconsistent traceability records at mills, data disclosure resistance among some stakeholders, and limited efforts to capture smallholder farm data in some regions.

Beyond the declaration of plantation traceability data made by suppliers and mills, EF utilises other data sources to support deforestation-free analyses as above (certification schemes (e.g. RSPO and MSPO audit reports that provide plantation data), and data from companies, governments and NGOs).

The exact boundary of the supplying plantation is not always available for analysis. In such cases, EF approximates the boundary based on available data (see Figure 6), with more precise data leading to more accurate boundary approximations for assessing deforestation-free.

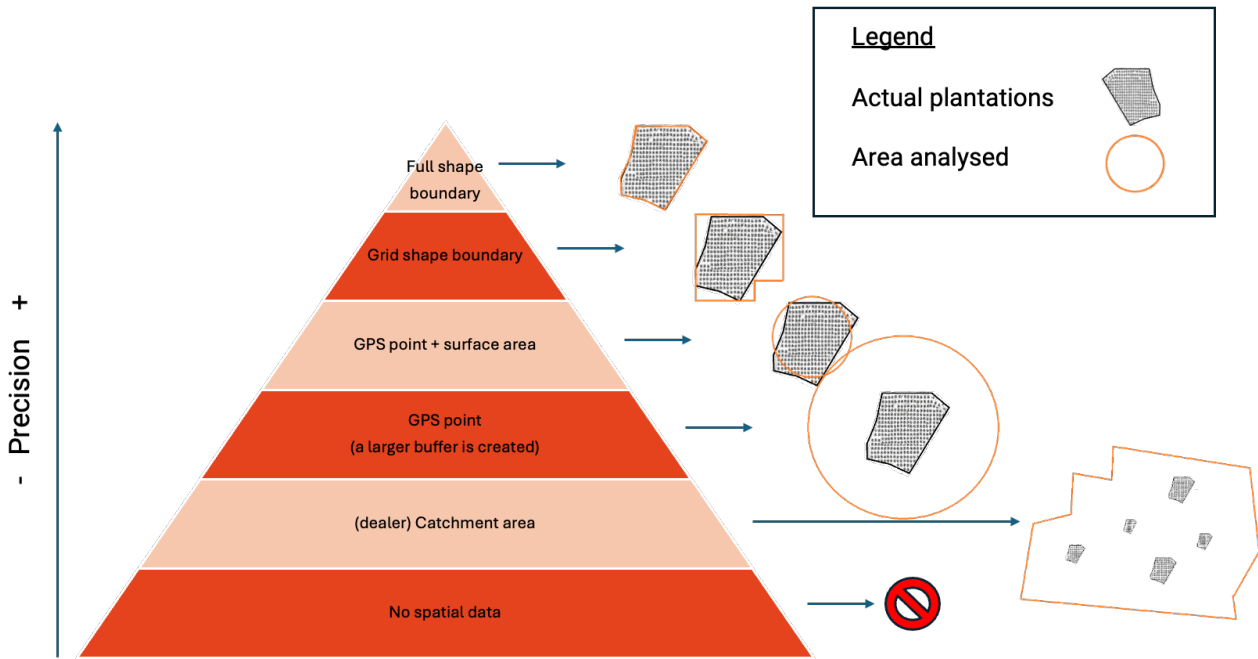


Figure 6: Relationship between data provided and boundary approximation used

Overall, the precision of the geolocation of the sourcing boundary area increases the accuracy of the analysis. Therefore, the ideal geolocation data is the shapefile of the sourcing boundary owned by the estate or smallholder.

Dealer catchment areas

We recognise the challenge in obtaining full shape plantation boundaries for dealers. Therefore, dealer catchments are considered TTP (Figure 6).

3.3.1.3 Collecting and processing volume information

To run deforestation-free assessment calculations using Starling, volume information is needed at each step of the supply chain, since a deforestation-free score is a statement of the tonnes of palm oil product that meet the deforestation-free definition stated in Section 2. **The accuracy of the volume information increases the accuracy of the score** attributed to each tier of the supply chain, directly impacting the results (i.e. the deforestation-free scores, as well as TTP and TTM calculations).

There are two general sources of volume information, as listed below in points 1 and 2. While not required, data specifying the volume of FFB from each supplying plantation allows EF to calculate more accurate deforestation-free scores. However, in the absence of volume data, a volume estimation is calculated as described under point 3:

1. Volume declared by companies via EF’s traceability exercise, or following their own traceability
2. Volume available on public domain sources (e.g., RSPO certificates, MPOCC MSPO trace)
3. Volume data unavailable, in which case the following estimations are made in accordance to the total CPO and PKO volumes:

- a. *If refinery volume is unknown*, each refinery supplying the above Tier is assigned an equal volume

$$\text{Refinery to Tier1 Volume (\%)} = \frac{\text{Total Tier 1 volume}}{\text{No. Refineries supplying the Tier 1}}$$

- b. *If mill volume is unknown*, each mill supplying the above Refinery is assigned an equal volume

$$\text{Mill to Refinery Volume (\%)} = \frac{\text{Total Refinery volume}}{\text{No. mills supplying the Refinery}}$$

- c. *If plantation volume is unknown, but the area (ha) is declared*, a volume is estimated based on the declared area, the regional annual average yield, and the annual mill capacity:

$$\text{Plantation to Mill Volume (\%)} = \frac{\text{Area (ha)} \times \text{Yield (MtFFB} \times \frac{\text{Year}^{-1}}{\text{area (ha)}})}{\text{Mill capacity (MtFFB} \times \text{Year}^{-1})}$$

- d. *For mills where all plantations are declared but incomplete area (ha) and volume are communicated*, equal volumes are attributed to each plantation. E.g.: if 5 plantations supply 100% of the mill consumption, each one will be attributed 20%.

$$\text{Plantation to Mill Volume (\%)} = \frac{\text{Total volume \% coming from plantations declared}}{\text{No. of plantations declared}}$$

3.3.1.4 Analysis of traceability data against deforestation alerts

After traceability data has been collected and validated, EF runs an analysis of this data against deforestation alerts to determine the status of each plantation.

Deforestation alerts are generated by Starling and EF’s GIS technicians perform human validation on select alerts. The purpose of this validation is to 1) confirm that forest *has* been lost within the sourcing boundary and 2) assess whether the forest loss is likely connected to palm oil production.

The process of validating alerts is defined by the Alerts Decision Tree (see Annex 1). This has been developed in collaboration with our members committed to end deforestation from agricultural supply

chains. It was developed with feedback from suppliers and works to continuously align with other decision trees developed in the industry.

Implementing the decision tree has three possible outcomes:

Confirmed Alerts

When, following review, it is established that forest was indeed cleared inside the plantation, the alert will be *confirmed*.

In such cases the sourcing boundary owner may choose to implement a restoration plan to compensate for the forest loss. Successful implementation of an appropriate restoration plan may result in the connected alerts not counting toward the deforestation score and recorded as DCF (Green).

False Alerts

It may happen that EF's GIS technicians identify the alert as a false positive. For example, temporary loss of foliage due to a drought might have been incorrectly classified as clearing of forest. When such cases are identified, the alerts in question are classified as *false alerts*. All satellite monitoring is probabilistic in nature, which is why we perform validation.

Not Connected Alerts

The purpose of the validation process is to establish a connection between a particular deforestation event and a given commodity. If it is confirmed that forest *has* been lost, but this forest loss is not connected to palm oil (e.g. for construction of high voltage power lines), the alert is disconnected. Such *Not Connected Alerts* are kept for future analyses but no longer impact deforestation-free scores for palm oil.

3.3.1.5 Calculating deforestation-free scores via Starling remote assessment

Once each plantation is assessed against deforestation alerts, the boundary is categorised using EF's 'Red, Amber and Green' (RAG) classification system. A boundary is classified as Green or 'DCF compliant' if the sourcing boundary is mapped and there are no deforestation alerts since the cut-off date. Details on how volumes are classified as Amber or Red (both non-DCF) are outlined in Section 4 on Scoring.

Boundary level score

For full-shaped boundaries, we use Starling to detect deforestation occurring after the cut-off date. For GPS points, a radius is set to assess deforestation risk, determined by the known plantation area or a default of 15km if unspecified. For smallholders and dealers, the radius is set according to

country-specific legal limits on the maximum smallholder plantation size. Refer to Figure 6 for further details.

3.3.2 Other approaches to Option C (remote assessment)

As with Option B, EF acknowledges that as suppliers improve their in-house sustainability practices, they may adopt their own approach for remote assessment under Option C. To incorporate this into EF's DCF score calculation, EF will make an assessment of the approach to ensure it follows best practice, is robust and is aligned with member expectations, before integrating it into DCF scoring. EF will make this assessment on a case-by-case basis.

3.4 Option D – Field Assessment

Option D allows volumes to be classified as deforestation-free through on-the-ground field assessments. Whilst this is a less commonly used implementation option, it can be of use to companies further upstream (e.g., primary producers) that have limited access to technologies such as satellite monitoring.

3.5 Option E – Supplier Control Mechanisms

Option E functions as a confirmation tool downstream actors can use to ensure their suppliers have adequately implemented one or more of the upstream implementation options (A, B, C, and/or D). Providers (EF, Proforest etc) are working to expand the range of available control mechanisms and strengthen the guidance on their implementation, but for now, the following represent the currently recognised mechanisms.

3.5.1 Acceptable Control Mechanisms

- The NDPE Implementation Reporting Framework (IRF) v6.0 verified profiles – further guidance provided below.
- Volumes traceable to plantation with confirmed deforestation inside the boundary, but with a recovery plan in place.
- Volumes from RSPO IP mills that cannot be classified under other DCF categories (volumes untraceable to plantation but not low-risk smallholder/ dealer volumes; volumes linked to deforestation).

EF will continue to use Starling to monitor and flag alerts for potential deforestation linked to RSPO IP mills, as well as instances of missing TTP, even if the volume is classified as DCF under Option A or E. This practice serves as a risk mitigation measure and helps to strengthen practices and transparency of certified suppliers, recognising that there have been past instances where IP

mills have lost their certification over time. Therefore, if alerts are raised concerning RSPO IP mills, it may be constructive to notify the relevant supplier and/ or company for further investigation, as these cases could lead to future grievances that may affect the companies involved.

3.5.2 Implementation Reporting Framework (IRF) v6.0

The NDPE IRF is a reporting tool that provides palm oil suppliers the ability to declare to their customers the level of *progress* the supply chain is making to address NDPE.

An IRF profile classifies the volume from mills that a refinery processes into categories - *Unknown, Known, Aware, Commitment and Starting Action, Progressing and Delivering* - based on NDPE-related criteria. In practice, refineries complete a questionnaire on each mill, assessing social and environmental issues related to NDPE commitments. The responses generate a profile, visualised through a red-to-green traffic light system.

The DCF methodology and IRF are closely linked; whilst the DCF methodology is binary (compliant via Options A-E or not), the IRF is an opportunity for suppliers to showcase ongoing NDPE progress and a breakdown of what is happening in the volumes not yet 'Delivering'. The 'Delivering' classification is compliant as DCF (Green) under Option E.

Various IRF templates exist, with Labour and Land Rights in early stages, while the No Deforestation and Peat (NDP) template recently launched version 6.0. EF acknowledges IRF v6.0 as a stronger framework, more aligned to EF's remote assessment methodology, including more refined TTP data definitions. Together with best industry practice, EF requires specific criteria to be met for the 'acceptance' of IRF 6.0 profiles in EF's DCF scoring, as summarised in Table 2.

Table 2: EF's additional requirements for acceptance of IRF v6.0 profiles

Areas for Consideration	IRF v6.0	EF requirements
Deforestation-free Definition for 'Delivering' mills:	The IRF serves as a tool for suppliers to report their progress towards NDPE commitments. In this context, 'No Deforestation' as defined in this NDPE document , requires adherence to the High Carbon Stock (HCS) and High Conservation Value (HCV) approaches to prevent deforestation.	To ensure that the definition of Deforestation-free/ No Deforestation follows industry best practice, as outlined in the NDPE document.
3rd Party Independent Verification	Verification is not mandated.	Industry best practice is for IRF scores to be independent third-party verified on an annual basis. Verification audits should follow Peterson's updated NDPE IRF Verification Protocol for v6.0, launching soon.
Publicly Available Reports	Not all suppliers make their IRF reports publicly available. There is also inconsistency in the presentation of IRF reports. POCG is working to help suppliers transition from using different versions of IRF templates (i.e. v5.8 to v6.0).	Companies are to report publicly and include the following: <ul style="list-style-type: none"> ○ % of total volumes in scope ○ An explanation of the % excluded from scope

Transparency and reporting expectations

In addition to refineries publishing their IRF score and a mill list, EF advocates for greater transparency beyond the refinery level. Specifically, EF encourages greater disclosure of mill-level IRF scores rather than aggregated refinery-level data. Best practice is that the list of mills classified as 'Delivering' and their corresponding percentage should be made publicly available.

Implementation timeline

Although formal reporting on v6.0 is not required until 2026 (based on 2025 volumes), EF suggests adopting the new IRF template in 2025. This early adoption will help identify gaps in achieving the 'Delivering' classification under the updated framework and ensure preparedness for the 2026 reporting cycle.

For more information on IRF and its requirements, the IRF [Technical Documents page](#) includes links to the [requirements for each classification](#) as well as the [v6.0 reporting template](#).

3.5.3 Other supplier control approaches

As part of building commitments to robust sustainability practices, we are supportive of suppliers advancing their in-house approaches to monitoring and responding to deforestation. EF is open to conducting a gap analysis, comparing a supplier’s methodology with industry best practice. Where gaps may exist, EF can offer both guidance on customer expectations for how they should be assessing their supply chains and recommendations for improvement.

3.6 Verification

Verification, in the context of No Deforestation serves as validation of compliance, performance, and/or actions relative to a stated commitment, standard, or target, so that such information can be trusted both internally and externally. Verification processes typically utilise monitoring data but may also include other sources of information and analysis. Forms of verification are shared in Table 3.

Table 3: Forms of verification

	Definition	In the context of verification...
First-party	Entity who initiates the interaction (e.g. a brand EF works with).	Verification is performed by a different team within the company itself.
Second-party	Entity doing business with or a direct partner of the first party (e.g. suppliers, customers, EF).	Verification is performed by an entity with an interest in the company or operation being assessed (e.g. business customer of a production/processing operation or a contractor that also provides services other than verification).
Third-party	External entity not directly involved in the original transaction or interaction; entity is independent of the first and second party (e.g. Standards such as FSC, ISO) *.	Verification is performed by an entity that does not have an interest in the company <u>nor</u> provides other services to it.

* Note that industry allows for financial transactions among first and third parties i.e. where an audited party pays an auditor. Instead, credibility of the audit depends on factors such as the auditor’s ISO certification, professional qualifications, and reputation (not financial independence).

EF is best defined as second party given its partnering role with businesses and that it is not exclusively hired by companies to audit against their standards.

In line with industry, EF recommends annual independent, third-party verification of the DCF score and deforestation-free claim; in other words, ensuring it is conducted by an external party with no involvement in the operation being assessed, and by an approved verification body. For verification purposes, EF’s methodology for Option C, our Starling remote assessment (formerly named No Deforestation Verification (NDV)), is available upon request.

Verification must also follow key elements for credibility. It must be consistent, transparent, be carried out by a competent auditor, and follow a rigorous methodology (full list and details provided in the [AFi Monitoring and Verification summary](#)).

EF guidance to members on how to approach verification

In addition to the above, best practice is for verification to be both process-based and performance-based. The former confirms compliance whereas the latter provides evidence of on-the-ground impact. EF recommends process-based verification at a minimum, but ideally suppliers should support the undertaking of performance-based verification.

The following table provides clarity on the difference between the two and resources that summarise verification guidelines for an auditor.

Table 4: Process-based vs. performance-based verification

	Focus	Verification method	Verification guidelines
Process-based verification	Ensures that specific processes/ procedures/ management systems (e.g. a supplier NDPE methodology) are in place and being followed.	Auditors check the right steps (e.g. document review, policy audits) are being followed rather than assessing the outcome.	Peterson’s Independent Deforestation-Free Verification Framework (Part 3)
Performance-based verification	Verifying the results or outcomes of the approach, the real-world impacts.	Requires field assessments, data collection and performance metrics.	RSPO accredited bodies

EF’s Starling remote assessment (Option C) will be audited through the process of a member having their DCF score/ claim audited. If required for auditing purposes, EF can make available the

comprehensive methodology for how it carries out its Starling remote assessment of No Deforestation/deforestation-free.

4 Scoring

EF uses the following decision tree for the calculation of DCF volumes for a member (Figure 7):

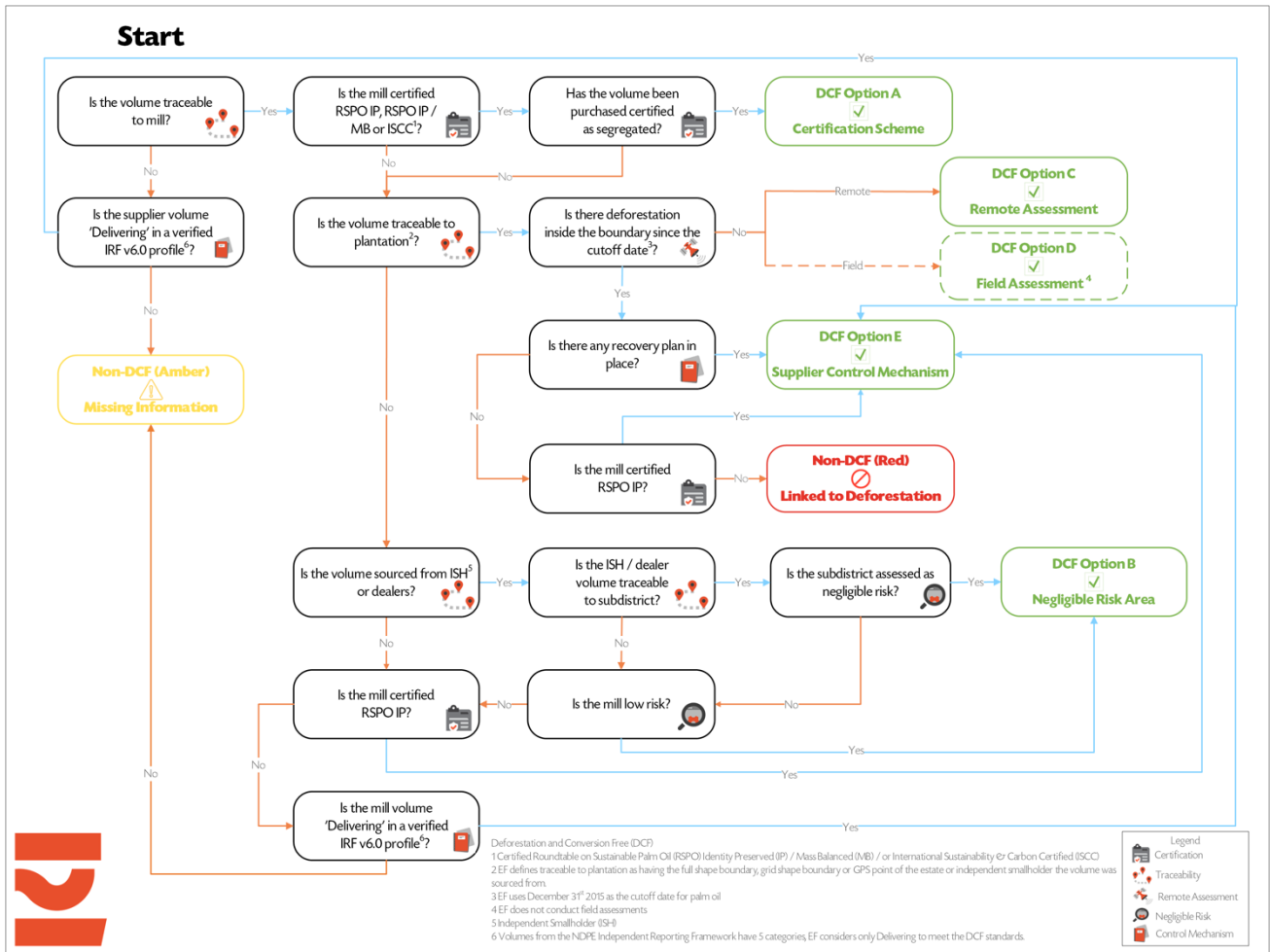


Figure 7: Earthworm Foundation Decision Tree for DCF scoring

DCF (Green)

For volumes to be classified as DCF compliant, any of the following approaches can be taken:

- **Option A:** Volumes must be certified under approved schemes (e.g. RSPO) and purchased as IP or SG, with the mill certified as IP or IP/MB.
- **Option B:**
 - Volumes sourced from smallholders or dealers without geolocation data but located in a low-risk subdistrict.

- Volumes sourced from smallholders or dealers without geolocation data, where the subdistrict is unknown but the mill they supply to is classified low risk.
- **Option C:** Volumes traceable to plantation (at minimum a GPS point), which are detected deforestation-free through remote assessment (e.g. Starling).
- **Option D:** Volumes traceable to plantation (at minimum a GPS point) which are confirmed deforestation-free through field assessment.
- **Option E:**
 - Volumes 'Delivering' on a verified IRF v6.0 profile.
 - Conventional (not SG) volumes sourced from RSPO IP mills missing TTP data.
 - Volumes sourced from RSPO IP mills with TTP data (at minimum a GPS point), but where remote assessment has detected deforestation.
 - Volumes sourced from areas with geospatial data confirming deforestation, but with a recovery plan in place.

As outlined in Section 3, the DCF methodology is binary; members are either DCF compliant (through options A-E) or not. However, EF further categorises non-DCF volumes to help better inform the follow-up actions taken: 'Amber' indicates missing information, whereas 'Red' signifies detected deforestation.

Non-DCF (Amber – Missing Information)

- Volumes which are untraceable to a mill.
- Volumes traceable to a RSPO IP/MB certified mill, but missing sourcing boundaries and volume not purchased as SG.
- Volumes not linked to low risk of smallholder-linked deforestation and missing sourcing boundaries.
- Volumes in all categories other than 'Delivering' under the IRF v6.0.

Non-DCF (Red – Detected Deforestation)

- Volume from a non-RSPO IP mill with where deforestation is detected within the sourcing boundary and there is no recovery plan in place.

DCF score calculations

Mill level score (for Options B, C & E (recovery plan only))

Using the estate plantation and smallholder plantation RAG categorisation and volume, we can attribute a DCF score to the mill. The mill's DCF score is weighted relative to the volume of each supplying plantation.

Member and supplier score

Using the mill’s DCF score and volume (estimates or %) and the refinery mill list, we can attribute a DCF score to any refinery, and similarly to any other entity buying from mills and refineries. This aggregated score is weighted relative to the volume of each supplying mill.

Example: PO Mill ID 200 – Score calculated based on the Traceability to Plantation & deforestation status

Sourcing Boundary	Type	Deforestation status	DCF	Non-DCF	Non-DCF	Volume (MT)
			Green	Amber	Red	
Estate 1	Estate	No Deforestation (Option C)	X			25
Estate 2	Estate	No Deforestation (Option C)	X			25
Estate 3	Estate	Deforestation alerts			X	25
Estate 4	Smallholder	Missing information on dealers & smallholders		X		25
Resulting Score for PO Mill ID 200:			50%	25%	25%	100 MT

Total Volume= sum
 Total Score = Weighted average
 (by volume)



Example: Refinery ABC – Score calculated based on Mill Level Scores

Mills supplying Refinery	DCF	Non-DCF	Non-DCF	Volume (MT)
	Green	Amber	Red	
PO Mill ID 100	25%	35%	40%	100
PO Mill ID 200	50%	25%	25%	100
PO Mill ID 300	100%	0%	0%	100
Untraceable to mill	-	100%	-	50
Resulting score for Refinery ABC:	50%	31%	19%	350

5 Reporting – essential elements of a robust DCF approach

The above guidance aims to provide clarity on each of DCF implementation options and EF's interpretation for member reporting. Beyond adhering to best practice for calculation of the DCF score, EF emphasises importance of the following elements in a member's DCF approach and public reporting:

1. A publicly declared target date for achieving DCF in the supply chain;
2. A deforestation cut-off date of 31st December 2015 or earlier (EF uses the former in its reporting);
3. Tracking of both DCF and non-DCF compliant volumes;
4. Public reporting of DCF volumes, including the percentage of the total volume included in the reporting scope and an explanation of any exclusions;
5. Use of suitably strong definitions, particularly for forest and deforestation (EF aligns with use of the HCS approach as outlined in Section 2);
6. Transparency on the definitions used;
7. DCF score verified by an independent third-party (refer to Section 3.6)

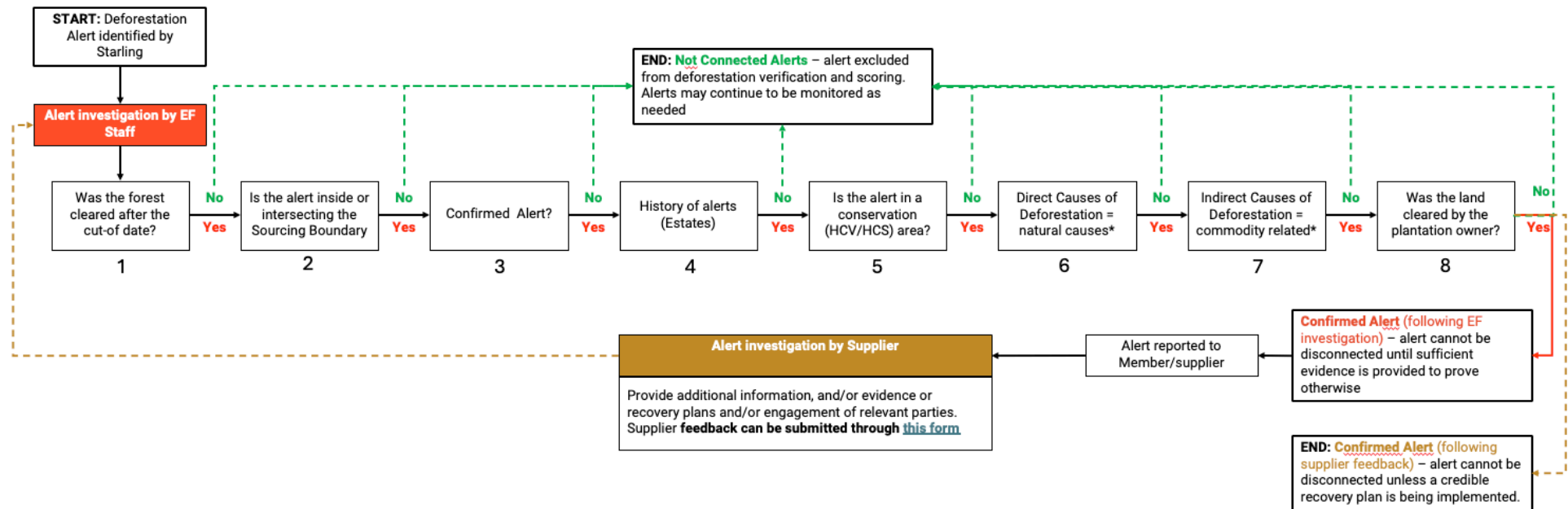
6 Conclusion

The use of the DCF methodology outlined above has been iterated with buyers and suppliers of palm oil. EF remains dedicated to ending deforestation and therefore will continue to work with those developing the methodology to ensure it remains robust, practical and credible. We welcome any comments, questions, or feedback—please feel free to contact us to learn more.

Annex 1 – No Deforestation Alert Decision Tree

Deforestation Alerts in Sourcing Boundaries

Earthworm Foundation Deforestation in Sourcing Boundaries – Alerts Decision Tree



*note that the decision logic differs per commodity and method (e.g. DCF, EUDR). Please refer to sections 6 and 7 for relevant details.

Deforestation Alert spotted by Starling

Starling generates deforestation alerts on a monthly basis. While Starling is able to pick up very small changes in land use, only deforestation above a certain scale is report on the Starling platform and in EF's report. The minimum size differs depending on the method:

DCF	EUDR
1 hectare	0.5 hectares

1. Was the forest cleared after the cut of date?

Only deforestation that occurred after the relevant cut off date is reported and used for the purpose of calculating scores. The cut of date depends on the context and different cut off dates are used:

Palm Oil / Pulp & Paper	Cocoa
DCF: Dec. 31, 2015 EUDR: Dec. 31, 2020	DCF: Dec 31, 2017 EUDR: Dec. 31, 2020

2. Is the alert inside or intersecting the Sourcing Boundary?

Only deforestation that occurred in a location likely connected to the Sourcing Boundary is reported. To be considered, the alert polygon needs to intersect the Sourcing Boundary polygon. There are additional considerations depending on the commodity.

It is important to note that the quality of available spatial data (i.e. plantation maps) directly impacts EF's ability to identify accurate intersection. For example, when only GPS points or buffers are provided, these may capture alerts that are not in reality located inside the plantation. Thus it is crucial to provide accurate and precise maps.

Palm Oil	Pulp & Paper / Cocoa
In cases where less than 10% of the surface area of the alert is inside the Sourcing Boundary EF's GIS technicians review the alert with special attention to verify that the alert is indeed connected to the operation of the plantation. Considerations for this review are: <ul style="list-style-type: none"> • land development trends • palm oil development in the vicinity • alert size • number of alerts 	No special considerations

3. Confirmed Alert?

EF's GIS technicians perform human validation of alerts, during which photographic satellite imagery is used to confirm that the alert is an accurate reflection of forest loss.

DCF	EUDR
For an alert to be considered 'True' two conditions must be fulfilled. First, the landcover preceding the event must be confirmed as forest. Second, this forest must no longer be present following the event.	For an alert to be considered 'True' two conditions must be fulfilled. First, the landcover preceding the event must be confirmed as forest. Second, this forest must no longer be present following the event.
EF and the DCF follow the HCS definition of forest, for more details see this link	EUDR follows the FAO definition of Forest, for more details see this link

4. History of Alerts

Depending on the commodity and the context, historic trends have (limited) effect on the including of alerts in scoring and reporting.

Palm Oil	Pulp & Paper / Cocoa
<p>DCF If there is only a single alert intersecting the Sourcing Boundary of an estate, if this alert is smaller than 2 hectares and if it is older than 12 months- this alert is disconnected from that boundary. The consequence is that it will not be counted in scoring and will not be included in reporting.</p> <p>EUDR Alerts are included in scoring irrespective of historic trends</p>	<p>DCF & EUDR Alerts are included in scoring irrespective of historic trends</p>

5. Is the alert in a conservation (HCV/HCS) area?

If HCV/HCS studies were conducted by the plantation owner(s) before deforestation and land development, they will be considered if shared and if they reliably indicate the location and characteristics of the forest prior to the land use change. If it is determined that an alert is outside the HCV/HCS area, it may be disconnected depending on the commodity and methodology used. More details about the requirements for HCV/HCS studies are available on request in separate documentation.

Palm Oil / Pulp & Paper / Cocoa

<p>DCF Alerts located within a specific Sourcing Boundary but outside the reported HCV/HCS area for that Sourcing Boundary are considered disconnected from that Sourcing Boundary.</p> <p>EUDR If there are alerts or evidence of deforestation outside of identified HCV or HCS areas, it is still relevant to the EUDR's requirements. The regulation focuses on whether the land has been deforested after the cut-off date, regardless of whether this deforestation occurs within or outside of HCV or HCS areas. Companies must address all deforestation alerts to ensure compliance with the EUDR, not just those within HCV or HCS areas</p>
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6. Direct Causes of Deforestation

Deforestation, occurs due to direct and indirect causes. Direct causes refer to immediate actions that physically remove trees and vegetation. These include activities like logging, where trees are cut down for timber, fire, whether natural or human-induced, and mudslides, which can uproot large sections of forest. Thus, direct causes are the immediate actions that cut down or destroy forests, while indirect causes (see section7) set the stage for these actions to occur. **Depending on the commodity and the methodology the direct cause of the deforestation event may will determine whether it is factored into the relevant scoring exercise.**

Palm Oil	Pulp & Paper / Cocoa
<p>DCF Deforestation due to natural causes (e.g. Landslides, moving river banks, wild fires) is not counted against deforestation scores. However this factor is overridden by the ultimate land use and development (see next section). Meaning: an alert due to natural causes is disconnected from the Sourcing boundary until such a time that it is established that the land is <u>developed for Palm Oil after all.</u></p> <p>EUDR the regulation does not distinguish between natural events and human-led deforestation when assessing compliance. Consequently alerts are included irrespective of direct causes.</p>	<p>DCF Deforestation due to natural causes (e.g. Landslides, moving river banks, wild fires) is not counted against deforestation scores. However this factor is overridden by the ultimate land use and development (see next section). Meaning: an alert due to natural causes is disconnected from the Sourcing boundary until such a time that it is established that the land is <u>developed.</u></p> <p>EUDR the regulation does not distinguish between natural events and human-led deforestation when assessing compliance. Consequently alerts are included irrespective of direct causes.</p>

7. Indirect Causes of Deforestation

Indirect causes are underlying factors that create conditions or pressures leading to deforestation. For instance, infrastructural development, such as building roads or urban expansion, makes previously inaccessible forests vulnerable to logging or settlement. Agricultural expansion involves clearing forests to create space for crops or livestock. While these indirect causes do not remove trees directly, they drive the processes that lead to deforestation. **Depending on the commodity and the methodology the indirect cause of the deforestation event will determine whether it is factored into the relevant scoring exercise.**

Palm Oil	Pulp & Paper / Cocoa
<p>DCF EF's methodology using Starling (Option C of the DCF) excludes deforestation that was caused by land development for purposes other than Palm Oil. Meaning, forest which was cleared for the production of another commodity such as Rubber does not impact DCF scoring.</p> <p>EUDR Alerts are included in scoring irrespective of the indirect causes of the deforestation event. Meaning, forest which was cleared for the production of another commodity (e.g. Rubber) does impact scoring.</p>	<p>DCF & EUDR Alerts are included in scoring irrespective of the indirect causes of the deforestation event. Meaning, forest which was cleared for the production of another commodity (e.g. Rubber) does impact scoring.</p>

8. Was the land cleared by the plantation owner?

If the deforestation is not caused by the plantation owner, a statement to that effect should be provided. The responsible party should be engaged in order to prevent further encroachment and additional deforestation.

Palm Oil / Pulp & Paper / Cocoa

DCF
If credible evidence of active engagement is provided the alert is disconnected from the sourcing boundary, however if engagement proves to be ineffective and deforestation trends continue, EF reserves the right to revert that decision

EUDR
If a plantation owner or supplier claims that deforestation was carried out by others (e.g., illegal encroachment), the responsibility to ensure compliance with the EUDR still falls on the company placing the commodity on the EU market. Claims of encroachment or other justifications do not exempt a company from compliance.