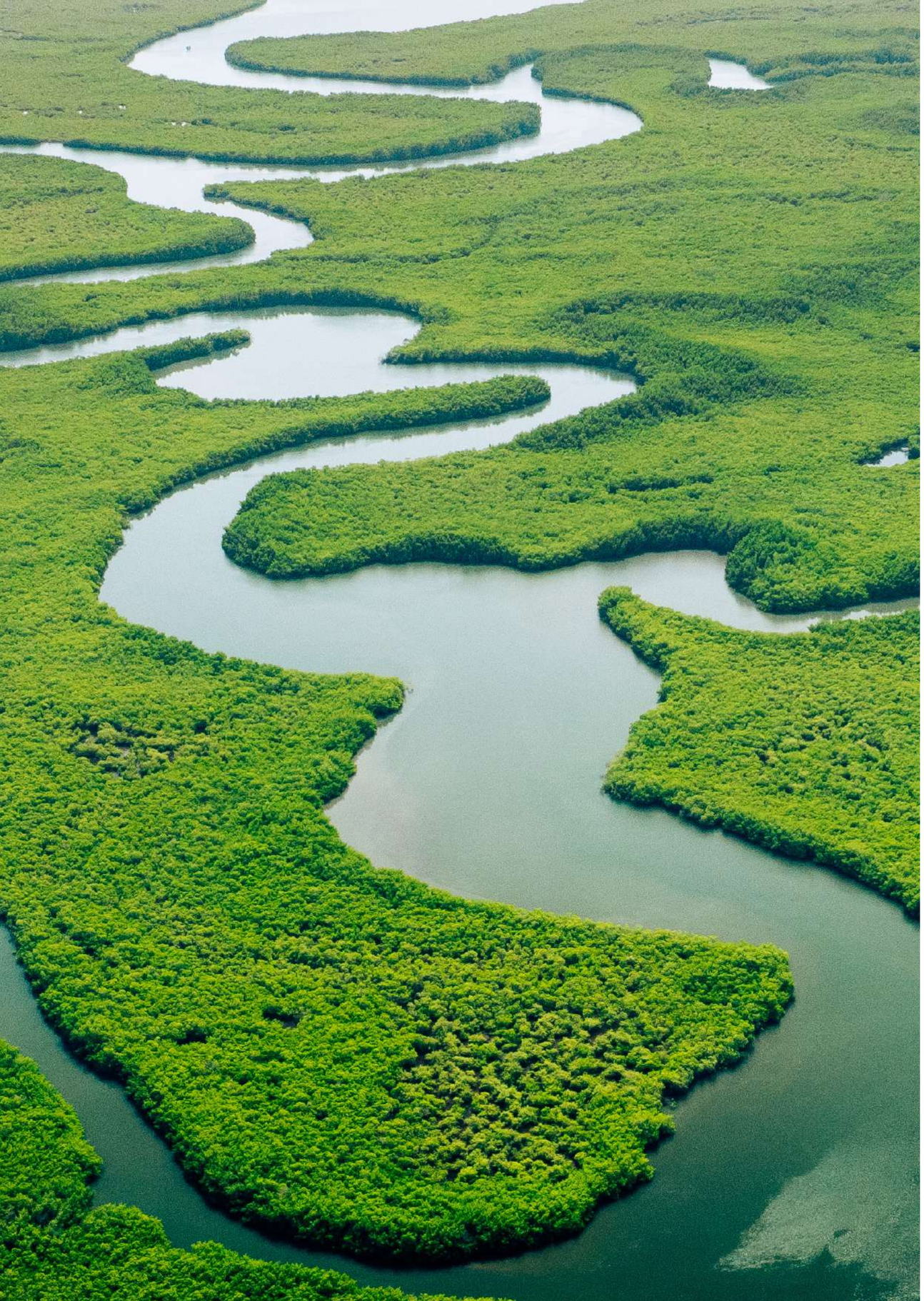
Global Canopy TESCO nature-based insights

Assessing ecologically sensitive locations in a food retailer and distributor's palm oil supply chain:

Reflections from piloting TNFD's LEAP approach



Contents

Funded by

USAID FROM THE AMERICAN PEOPLE

NICFI Norway's International Climate and Forest Initiative

Citation: Nature-based Insights, Tesco, and Global Canopy (2023) Assessing ecologically sensitive locations in a food retailer and distributors' palm oil supply chain: Reflections from piloting TNFD's LEAP approach

Primary authors: Dr. Gus Fordyce, Lead Scientist, Nature-based Insights & Thomas Hollick, Group Forests Manager – Sustainability, Tesco

Name of participating organisations: Tesco piloted the TNFD LEAP approach in partnership with Nature-based Insights as lead consultant for the analysis. Global Canopy was responsible for commissioning, project management support and output review.

Overview

Scope

This case study outlines the methods and process for mapping Tesco's palm oil supply chain and identifying sensitive locations for further analysis. In the context of the incoming EU Deforestation-Free Regulation (EUDR), mapping supply chains is important both for meeting deforestation-free requirements and to put measures in place to prevent exclusion of smallholders in the supply chain. Volumetric analysis is used to estimate procurement volumes and biodiversity footprint of sourcing districts in Indonesia. This is used to inform selection of sensitive locations for further analysis.

- **Geography:** Indonesia
- **Sector:** Food and Beverage: Agricultural Products, Food Retailers & Distributors
- **Biome:** Tropical and sub-tropical forests (T1), Rivers and streams (F1), Intensive land use systems (T7), Vegetated wetlands (TF1)

Pilot timeframe

March – September 2023

Business summary

Tesco is a multinational grocery retailer, with its headquarters in the United Kingdom. Tesco is the largest retailer in the UK, with 27% market share as of September 2023. Today there are over 4000 stores in five markets: the UK, Ireland, Czech Republic, Slovakia, and Hungary. The Tesco Group also includes Tesco Bank; Tesco Mobile; a network of One Stop convenience stores; the UK's leading wholesale business, Booker; and our data science business, Dunnhumby.

In 2020 Tesco committed itself to becoming 100% deforestation and conversion free in palm oil (and separately in soy) with a target date of 2025. Currently 83% of Tesco's palm oil footprint is RSPO segregated and physically verified. In 2023, the European Union Deforestation Regulation came into law, something which will require extensive due diligence and a revolution in traceability. This law aims to eliminate all forms of deforestation including for products containing palm oil, though does not currently extend to conversion.

Key findings

Analysis of mill lists and procurement volumes of seven Tesco palm suppliers allowed identification of sourcing volumes associated with c.120 Indonesian districts. Land area footprints were calculated for each district, and overlaid with risk indicators for deforestation risk, lack of certification, proportion of land managed by smallholders and nature's contribution to people. Areas managed by smallholders, which lack certification and where people's dependence on nature is high, are identified as priorities for further engagement as smallholders may be at risk of being excluded from supply chains with incoming EUDR regulation.

About this case study: This case study forms part of a series of six TNFD pilots run as part of Global Canopy's TNFD piloting program. The pilots tested the v0.4 beta TNFD recommendations and its accompanying 'LEAP' (Locate, Evaluate, Assess, Prepare) approach. Due to slight variations in the structure between v0.4 and the final recommendations, specific components of the LEAP approach have not been referenced in this case study.

Business case

Palm oil is the most consumed vegetable oil in the world, and the highest yielding oil crop. But its mass production is associated with deforestation in some of the world's most biodiverse locations, especially in Indonesia. Using sustainable palm oil in own brand and retail products is a growing priority for Tesco:

- Incoming EUDR regulation means that no product can be placed on the European Market that has been found to be linked to deforestation that has occurred on land since the 2020 cut-off date. As a retailer operating in both the UK and EU, Tesco is closely following developments and upcoming guidance regarding the EUDR, including being required to provide geolocation data for supplying plantations.

- Tesco recognises the importance of halting deforestation and conversion and its role in tackling commodity-driven forest loss, as well the opportunity to drive that change through engagement with suppliers, our competitors and the wider industry including producers.

- Tesco is motivated to support community organisations and local smallholder producers. The EUDR creates a risk that smallholders may be excluded from the supply chain due to a lack of certification. Tesco currently invests in RSPO Independent Smallholder Credits to support smallholder attainment of certification, but these will not be accepted under the EUDR so need greater transparency on where to channel investments in smallholder empowerment and livelihood improvement, for example through their membership of the Consumer Goods Forum, the RSPO, Palm Oil Transparency Coalition and other groups. Tesco is also developing a smallholder project in Papua New Guinea focusing on deforestation and conversion-free palm oil production coupled with supporting the smallholder community.

- Increasing consumer and investor interest over environmental sustainability, and Tesco's position within the market, presents an opportunity to have widespread social impact by achieving sustainability commitments.

As part of this wider landscape, Tesco had committed to achieve net-zero deforestation in its sourcing of palm oil by 2020. Following this achievement, Tesco's commitment has moved to becoming deforestation and conversion free via 100% segregated palm oil sourcing. Since 2007 Tesco has been an active member of the Roundtable on Sustainable Palm Oil (RSPO) which supports sustainable palm oil production and are active members of the Consumer Goods Forum (CGF) Forest Positive Coalition.

Tesco has continued to only source 100% RSPO certified palm oil within its Tesco Own Brand products as of 2022 (98% certified to a physical standard and 2% certified via independent smallholder credits). Uncertified supplies remain in its scope 3 supply chain via other products/ suppliers. The sub-national origins of palm supply in Indonesia, the world's largest palm oil producer and a hotspot for both biodiversity and deforestation, are not known. Upstream supply chain mapping is needed to support Tesco's investment in RSPO Independent Smallholder Credits, commitment to deforestation and conversion free palm oil sourcing and engagement with the Science Based Targets Network.

Analysis

Part 1: A volumetric supply chain breakdown for Indonesia

The Indonesian palm oil supply chain is extensive and diffuse with >1000 mills across >200 provinces. In addition to producing a mill list, a volumetric breakdown was used to estimate the volumes and land area footprint associated with each district (administrative division level 2) in Indonesia to support identifying priority landscapes for further investigation.

Volumetric breakdowns are a complex task relying on several assumptions and transparency by tier 1, 2 and 3 suppliers. But given the significance of land conversion and degradation, the scale of the palm oil supply chain and the need for companies to efficiently target action within a country of nearly 2 million km2, this exercise can help identify material sourcing locations for Tesco to focus on.

Data gathered, analysed and provided by 3Keel identified ten tier 1 suppliers of Tesco. Five of these suppliers, constituting 47% of Tesco's 2022 supply, had publicly available sourcing data, which could be linked to Indonesian palm oil production. The remaining five suppliers were either confidential, did not source from Indonesia, or did not have publicly available traceability data. For those suppliers included in this analysis, the first step was to map out supply pathways that include trading between companies and refineries at multiple stages in the supply chain (Figure 1).

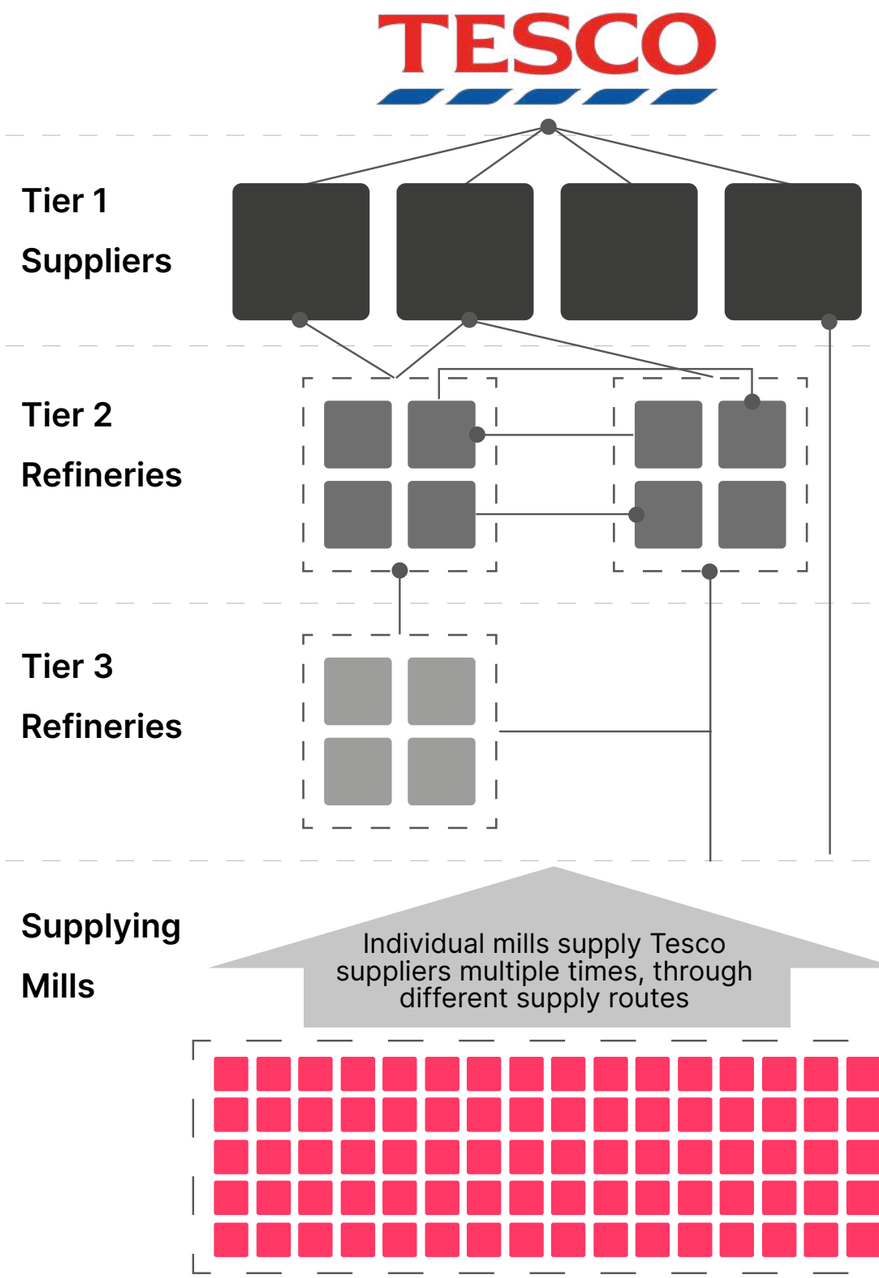


Figure 1. A simplified diagram highlighted the general structure of the Tesco palm oil supply chain. Dots indicate supply travel downstream toward Tesco. Some tier 1 suppliers will source directly from mills and publish mill lists, others from multiple tier 2 refineries. Several tier 1 suppliers procure from the same tier 2 refineries. Tier 2 refineries source directly from mills, trade with other refineries in the same tier, and procure from additional tier 3 refineries. As each tier 1/2/3 supplier publicly declares different percentages of their procurement originating from Indonesia, and has a different mill list, these supply pathways need to be mapped for volumetric breakdowns. Ultimately, a single mill may supply Tesco suppliers multiple times through different supply routes.

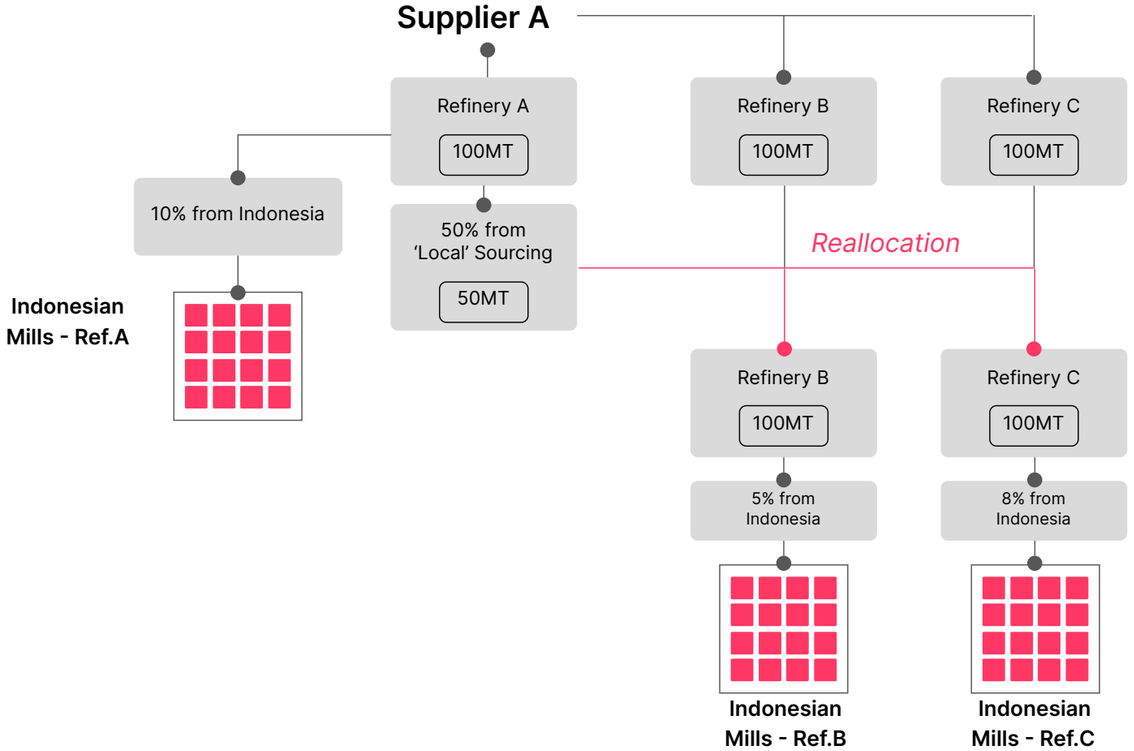
While the specific methods varied for each supplier (hereafter suppliers A, B, C, D & E), in principle the same process was followed with the aim of arriving at a volume and associated mill list linked to specific areas in Indonesia (Figure 1):

1. Publicly available mill lists were sourced from each supplier's website, from either 2022 or 2021 depending on availability.

2. In all but one case, suppliers had publicly declared the % of palm oil supply originating from Indonesia. This was used to reduce the total procured volume at Tier 1.

    a. Suppliers A & B were conglomerates of several refineries (tier 2) within Europe, and each refinery had an available mill list. Starting tier 1 volumes were divided equally amongst tier 2 refineries. Several refineries' mill lists included other refineries (tier 3), listed as 'local sourcing'. In almost all cases, mapping the supply chain revealed supply pathways indicating trading amongst tier 2 of the supply chain (i.e., refineries A and B both buying from and selling to each). As each tier 2 refinery declared a different % originating from Indonesia, and each declared a % being sourced 'locally', we were able to reallocate volumes along these trade routes (Figure 2).

Figure 2. Simplified diagram highlighting the process of reallocating volumes along trade routes where refinery purchases from 'local' sources (i.e., other refineries). Given that each refinery declares a different % originating from Indonesian palm oil mills, reallocating volumes is necessary to trace volumes more accurately to individual mills.



In many cases, palm oil supplied by tier 3 refineries was traced to Malaysia and therefore the % supply from these refineries was excluded. One of supplier A's tier 2 refineries sourced from four tier 3 refineries, all linked to Indonesia, and two of these belong to supplier C therefore the volumes were reallocated to tier 1. After reallocating volumes along trade routes, each refinery's mill list was cross-referenced with the Global Forest Watch's Universal Mill List (using the UML ID) to identify districts (Kabupaten) of origin. Using the Trase Earth's Supply Chains data tool, the total 2020 production volume from the identified districts, and the proportion (%) originating from each district, was calculated. These proportions were used to estimate the supply volumes coming from each district within each refinery's supply chain, and these results summed across refineries.

    b. Supplier C & D were primary exporters and/or importers from Indonesia with global mill lists. Both were listed on Trase Earth's Supply Chains data tool, which has linked those companies' total imports and exports from Indonesia to sub-national regions in 2020. Their public mill lists were filtered to identify Indonesian mills and cross-referenced with the Global Forest Watch's Universal Mill List to identify the districts that they exported/ imported from in 2022. Trase's company-specific supply chain mapping data was then used to estimate the relative % of total supplies coming from each district.

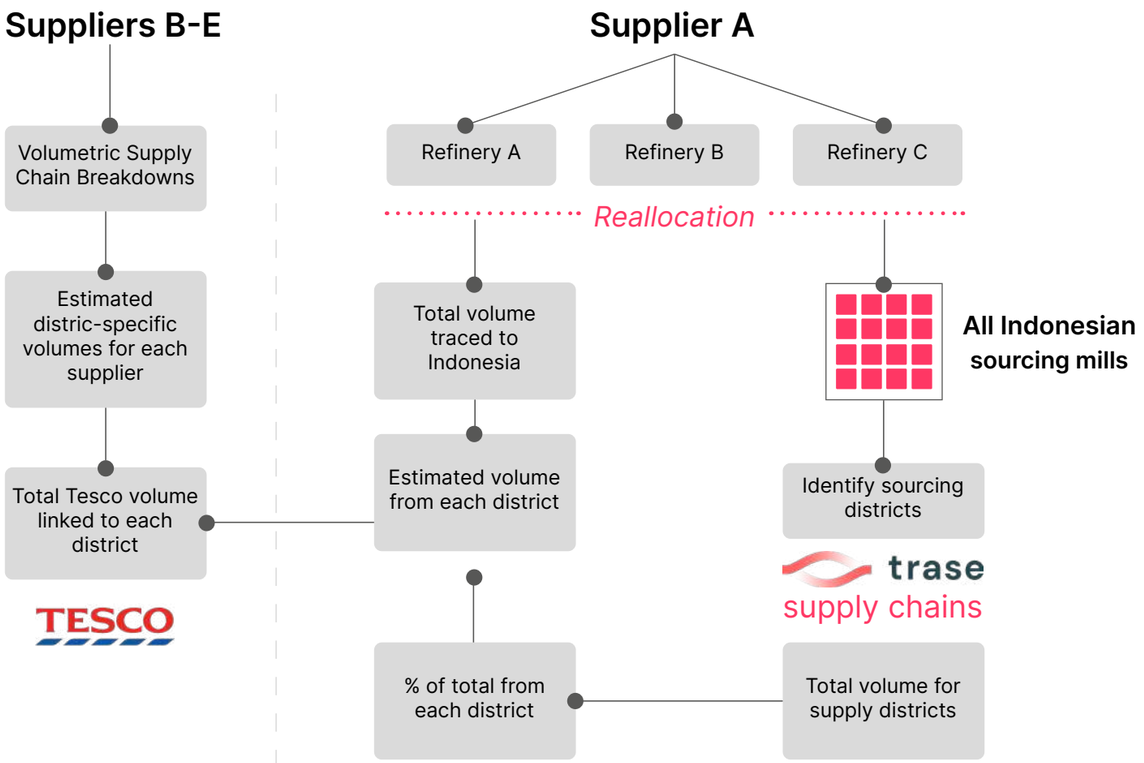
    c. Supplier E had not publicly disclosed the % supply originating in Indonesia but accounted for nearly 20% of Tesco's 2022 procurement. To overcome this, the global mill list was first used to identify national origins. This was used to filter FAOSTAT national palm oil production data and estimate a % originating from Indonesia. This supplier was listed on Trase, and so the company-specific production data traced to sub-national origin was used to allocate proportions of the total supply coming from each district.

3. After sourcing mill lists from each tier 1, 2 or 3 supplier/refinery, and allocating volumes to districts using the UML and Trase's company-

specific or national production data, data were aggregated to produce an estimate of volumes that Tesco had ultimately procured from each district. A total of 120 districts were identified as potential sourcing locations within Tesco's palm oil supply chain.

4. Simultaneously all sourced mill lists were aggregated and deduplicated using the UML ID. This allowed identification of the number of suppliers linked to each mill, and the % of RSPO certified mills in each district.

Figure 3. Process diagram for how an individual supplier's volumes are traced to Indonesian districts, using Trase data (right panel). This process is repeated for each supplier (left panel), and the results summed to arrive as a total volume from each district linked to Tesco.



Key Assumptions (gap analysis)	Tools used	Outputs
Tier 1 suppliers procure equal volumes from tier 2 refineries; a small number of supplier-listed mills are not in the Universal Mill List; Trase palm oil procurement/production patterns in 2020 are representative of 2022 sourcing.	Travse Earth Supply Chains; Global Forest Watch Universal Mill List; FAOSTAT; Public company mill lists/supply breakdowns; Microsoft Excel	Volumetric breakdown of Tesco's supply to 120 Indonesian districts (Kabupaten); de-duplicated mill list for 2021/22

Part 2: Tesco's biodiversity footprint

After arriving at estimates of sourcing volumes linked to each Indonesian district, we used palm oil yield data for 2020 from Trase to calculate a corresponding land area footprint. This was one of three components used to calculate the Biodiversity Impact Metric[1] (Figure 4), a tool which allows Tesco to evaluate, compare and prioritise its impact, taking into account areas of high biodiversity importance.

Figure 4. The Biodiversity Impact Metric was designed by the Cambridge Institute of Sustainability Leadership to support companies in calculating and comparing biodiversity footprints across multiple geographies and value chains.

Biodiversity Impact Metric = Land area X Proportion of biodiversity lost X Biodiversity importance

Following the BIM methods, Mean Species Abundance (MSA) was used as a measure of 'proportion of biodiversity lost'. Elsewhere, MSA has been proposed as a measure of ecosystem integrity across land uses (croplands, pasture, plantations, and natural vegetation) but in this case was applied only to the plantation. MSA was calculated using the PREDICTS database[2] following the methods of GLOBIO 4[3]. MSA is representative of the mean abundances of warm-blooded vertebrates and vascular plants. While this was calculated directly from the PREDICTS database in this case study, the BIM supplementary documentation has pre-defined coefficients for 'proportion of biodiversity lost' based on a prior version of GLOBIO (3.6)[4].

For biodiversity importance, we used the rarity-weighted species richness (RSR) data layer downloaded from the IBAT online tool, as recommended by the CISL[5]. This spatial data layer has aggregate values that combine species richness in an area with the 'uniqueness', i.e., the proportion of a species' total extent of occurrence contained in a single spatial pixel aggregated across all species present in that pixel. Therefore, high values represent areas that have high species richness and/or many range-restricted species.

[1]CISL (2018) Measuring business impacts on nature: A framework to support better stewardship of biodiversity in global supply chains.
[2]Hudson et al. (2017) The database of the PREDICTS (Projecting Responses of Ecological Diversity In Changing Terrestrial Systems) project.
[3]Schipper et al. (2020) Projecting terrestrial biodiversity intactness with GLOBIO 4.
[4]Schipper et al. (2016) The GLOBIO model. A technical description of version 3.5.
[5]CISL (2018) Measuring business impacts on nature: A framework to support better stewardship of biodiversity in global supply chains.

Key Assumptions	Tools used	Outputs
All plantations have the same proportion of biodiversity lost relative to a natural forest (i.e., not accounting for local management practices.	Microsoft Excel; R Programming; Trase; IBAT; PREDICTS.	Map of supply chain biodiversity footprints in each location

Part 3: Prioritising locations for landscape analyses

After calculating Tesco's biodiversity footprint across ca. 120 districts in Indonesia, priority areas were identified for the next stage of analysis. This was done by combining biodiversity footprint data with multiple additional data layers. A global map of critical natural assets was used as a proxy for evaluating supply-specific dependencies (Table 1)[6]. While not all services are directly related to palm oil production, this dataset provides a spatially explicit understanding of the dependencies of communities upon nature.

Risk relating to the EUDR regulation was assessed across three dimensions (Table 2):

- deforestation exposure
- extent of RSPO mill certification
- smallholder plantation coverage .

Table 1. List of local ecosystem services included in the analysis by Chaplin-Kramer et al. (2022), termed 'nature's contribution to people' (NCP). Ecosystem services in bold are those that directly benefit palm oil production.

Nitrogen retention for water quality regulation
Sediment retention for water quality regulation
Pollinator habitat sufficiency for pollination-dependent crops
Fodder for livestock
Timber production
Fuelwood production
Flood regulation
Riverine fish harvest
Access to terrestrial nature for local recreation and gathering
Coastal risk reduction (terrestrial and marine)
Marine fish harvest
Marine recreation (coral-reef tourism and associated livelihoods)

Table 2. Dimensions of risk assessed for 120 districts within Tesco's supply

Data Layer	Description	Source
Deforestation Risk	Companies' risk of being associated with deforestation from palm expansion.	Trase
Mill RSPO Certification	% of all supply chains mills certified to RSPO standard	Universal Mill List
% of plantations managed by smallholder	% of all plantations within district managed by smallholders	Descals, A. et al. (2021)

Together these parameters are indicative of areas where Tesco is linked to non-certified supply, and where there is a high proportion of smallholders. It is these landscapes/producers that are most likely to be excluded from the supply chain as a result of EUDR. Supporting attainment of RSPO certification in these areas can promote the inclusion of smallholders in the palm oil industry and allow them to reap its economic benefits.

Finally, IBAT's STAR Threat and STAR Restoration data layers were used to highlight which districts had the highest opportunities for mitigating species extinction risk by investing in threat abatement and habitat restoration[7]. For each of these dimensions (impact, dependencies, risks, opportunities), individual districts were scored by sorting them into 'high', 'medium' or 'low' based on their relative value compared to each other, then assigned numeric values (high = 3; medium = 2; low = 1) and summed these for each district. This highlighted Nagan Raya district in Aceh, northern Sumatra as the highest priority location. Although the overall volume estimated to be linked to this district was under 10 tonnes, the area has high species richness and endemism, a low proportion of certified mills, high deforestation exposure, and the majority of palm oil production in this district is managed by smallholders. This district was therefore selected for subsequent landscape-scale analysis.

Key Assumptions	Tools used	Datasets used	Outputs
The proportion of total planted area occupied by smallholders in 2022 is similar to 2019, when the map from Descals et al., (2021)was produced.	R Programming; Trase; IBAT; Universal Mill List	High-resolution global map of smallholder and industrial closed-canopy palm oil plantations (2019; Descals et al. 2021)[8]; Global map of critical natural assets (Chaplin-Kramer et al., 2022)[9].	Map of priority locations for landscape analysis

[6]Chaplin-Kramer et al. (2022) Mapping the planet's critical natural assets.

[7]Mair, L. et al. (2021) A metric for spatially explicit contributions to science-based species targets.

[8]Descals, A. et al. (2021) High-resolution global map of smallholder and industrial closed-canopy oil palm plantations.

[9]Chaplin-Kramer, R. et al. (2023) Mapping the planet's critical natural assets.

Part 4: What does this mean for Tesco?

How does this present potential nature-related risks/opportunities?

Tesco is committed to protecting nature in its supply chains and endeavours to sustainably source all commodities in its supply chains, particularly those most material, like palm. The nature of these supply chains and lack of consistent traceability pose a serious challenge for UK- or EU-based businesses, particularly in light of the need to accurately account for and disclose nature-related risks and opportunities.

The results of this case study provide Tesco with insight and understanding into its supply chains, coming at a critical time as the company prepares for landmark regulation like EUDR and initiatives like Science-Based Targets for Nature.

What will the organisation do going forward?

Tesco intends to use the insights from this work to help gather the origin information we need to be able to make targeted interventions on the ground. The work will also help Tesco more accurately assess nature-related risk in its palm oil supply chain, both for its DCF commitment and for future disclosure.

How does this align with, or not, TESCOs SBTN work?

Tesco is part of the Initial Target Validation Group for SBTN target setting. This process has proved challenging, primarily due to accessing the required data and interpreting it correctly into biodiversity impacts across different products and biomes.

Outside of the TNFD pilots and SBTN trials, Tesco will use the results of this study to practically inform the way Tesco works with supply chains to mitigate biodiversity risk.

Bibliography

Chaplin-Kramer, R. et al. (2023) Mapping the planet's critical natural assets. Nature Ecology & Evolution 7, 51–61.

CISL (2018) Measuring business impacts on nature: A framework to support better stewardship of biodiversity in global supply chains. Cambridge, UK.

Descals, A. et al. (2021) High-resolution global map of smallholder and industrial closed-canopy oil palm plantations. Earth System Science Data 13, 1211-1231.

Hudson, L. N. et al. (2017) The database of the PREDICTS (Projecting Responses of Ecological Diversity In Changing Terrestrial Systems) project. Ecology and Evolution 7, 145–188.

Mair, L. et al. (2021). A metric for spatially explicit contributions to science-based species targets. Nature Ecology & Evolution 5, 836–844.

Schipper, A. M. et al. (2016) The GLOBIO model. A technical description of version 3.5. PBL Netherlands Environmental Assessment Agency, The Hague.

Schipper, A. M. et al. (2020) Projecting terrestrial biodiversity intactness with GLOBIO 4. Global Change Biology 26, 760–771.

Schneider, M. et al. 2020. Universal Mill List: A Standardized Methodology for Creating a Global Database of Palm Oil Mills. WRI: World Resources Institute. United States of America.

Trase (2022) SEI-PCS Indonesia palm oil v1.2 supply chain map: Data sources and methods. Trase.

globalcanopy.org

Global Canopy