

## Adapting Global Palm Oil Deforestation-free Trade to Benefit Local Economies and Landscapes

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### Key messages

- Current practices in palm oil production and trade result in economic and conservation trade-offs.
- There is an established link between global green deals and environmental certification in palm oil and local economic downturns and environmental benefits in palm-oil-producing countries.
- This brief recommends that all palm oil producing and market countries adopt policies and practices that align with the UK and EU's green deal initiatives and the Roundtable of Sustainable Palm Oil certification.
- Key interventions, which include carbon trading or taxes, ecological fiscal transfers, payments for ecosystem services, and premium palm oil pricing, are necessary to compensate for economic losses at the local landscape.

### Introduction

This brief aims to understand how public and private trade-related initiatives affect value added distribution and environmental sustainability for palm oil at the local landscape in Indonesia. To achieve this, we developed a Palm Oil Trade and Landscape Simulation model. This model provides scenarios for policy makers and sustainability leaders of different future palm oil pathways to achieve globally recognized levels of sustainability.

It is predicted that national and international demand for palm oil will grow until 2050 (Byerlee et al. 2016; Meijaard et al. 2020). Despite the challenges of market pressures and economic-environmental trade-offs, the palm oil sector continues to provide significant benefits and remains economically resilient. Although the palm oil sector experienced declines in demand and pricing due to the 1998 and 2008 economic crises, as well as the 2020 COVID-19 pandemic, national revenue from this sector remained strong during these periods (Olivia et al. 2020; Suryana et al. 2020).

Market awareness of sustainability has become a cornerstone for global value chain governance through sustainability standards and certification systems. The Roundtable of Sustainable Palm Oil (RSPO) is a prominent certification system for palm oil global value chain

governance, particularly for the EU market (Pacheco et al. 2017; Schleifer and Sun 2018). However, RSPO uptake is relatively low, as some countries still accept palm oil that is not RSPO certified (Schleifer 2016).

Public initiatives in buyer countries also increase pressure on the palm oil trade. The most prominent of these is the European Union's (EU) Renewable Energy Directive (RED) as part of its efforts to reduce transport sector emissions. First published in 2009, the EU's RED was updated in 2018 (RED II), taking into account high-risk indirect-land-use-change biofuels, including palm oil. In November 2021, the EU issued a proposal for regulation of deforestation-free products, which recommended that as of 31 December 2020, all commodities produced on land subject to deforestation be prohibited from entering the EU market. The proposal further recommended a due diligence process for relevant commodities to be implemented in line with the EU's RED II. Similarly, at the end of 2020, the United Kingdom (UK) government proposed a due diligence law on forest risk commodities to limit deforestation. Both the EU and UK proposals include palm oil as a relevant commodity.

### Palm Oil Trade and Landscape Simulation block diagram and interface

The palm oil value chain begins with corporations and smallholders converting 'forest areas' or 'other use areas' into palm oil plantations. In Indonesia, 'forest areas' (known

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locally as kawasan hutan) are defined as terrestrial areas that have been directed by the government to be maintained as permanent forest. Forest areas are divided into three types based on their function, as follows:

- Protection forest
- Conservation forest
- Production forest

'Other use areas' (known locally as *Areal Penggunaan Lain*) are public lands which are not designated as forest areas.

Palm oil crops require four years to begin producing their first fresh fruit bunches. Once harvested, fresh fruit bunches are transported to mills where they are processed to produce crude palm oil or palm kernel oil. Some crude palm oil and palm kernel oil is allocated for export, while the remainder is transported to refineries for downstream industries. Products from these downstream industries are distributed to domestic consumers, exporters and overseas consumers. Part of the crude palm oil and palm kernel oil that is allocated for export is transported to overseas refineries before reaching end consumers. Figure 1 details the palm oil value chain, resources, trade schemes, economy and environmental indicators.

The location selected for analysis in this brief is Kotawaringin Barat district (commonly abbreviated to Kobar), which is located in Central Kalimantan province, Indonesia (Figure 2). Central Kalimantan is host to 800,000 ha of palm oil plantations, and is the second largest palm

oil producing province in Indonesia, after Riau province. Kobar was selected as it is predominantly a high-risk forest landscape located near Tanjung Puting National Park. Palm oil plantations in Kobar encroach on forests in Tanjung Puting National Park, as well as other forest areas that are categorized for protection, conservation or production.

## Palm oil future projections under Business As Usual

In Indonesia, new palm oil plantations are established in different forest area classifications (i.e., convertible production forest (*Hutan Produksi Konversi*), production forest (*Hutan Produksi*), protected forest (*Hutan Lindung*), and non-forest area or other land uses (*Areal Penggunaan Lain*)). This brief focuses on plantations that are established in forest areas classified as deforestation in Kotawaringin Barat. In 2017, palm oil plantation conversion accounted for a total deforestation of 9,500 ha. During this same period, almost 50% of all conversion occurred through the conversion of production forests, followed by convertible production forests and protection forests (Figure 3). After 25 years, our model suggested that no more forest is available for conversion, and deforestation will stop. The deforestation trend is decreasing toward zero deforestation after 25 years.

Not all palm oil plantations in Indonesia are established through a process of deforestation. Some plantations are established in non-forest areas or other land use areas.

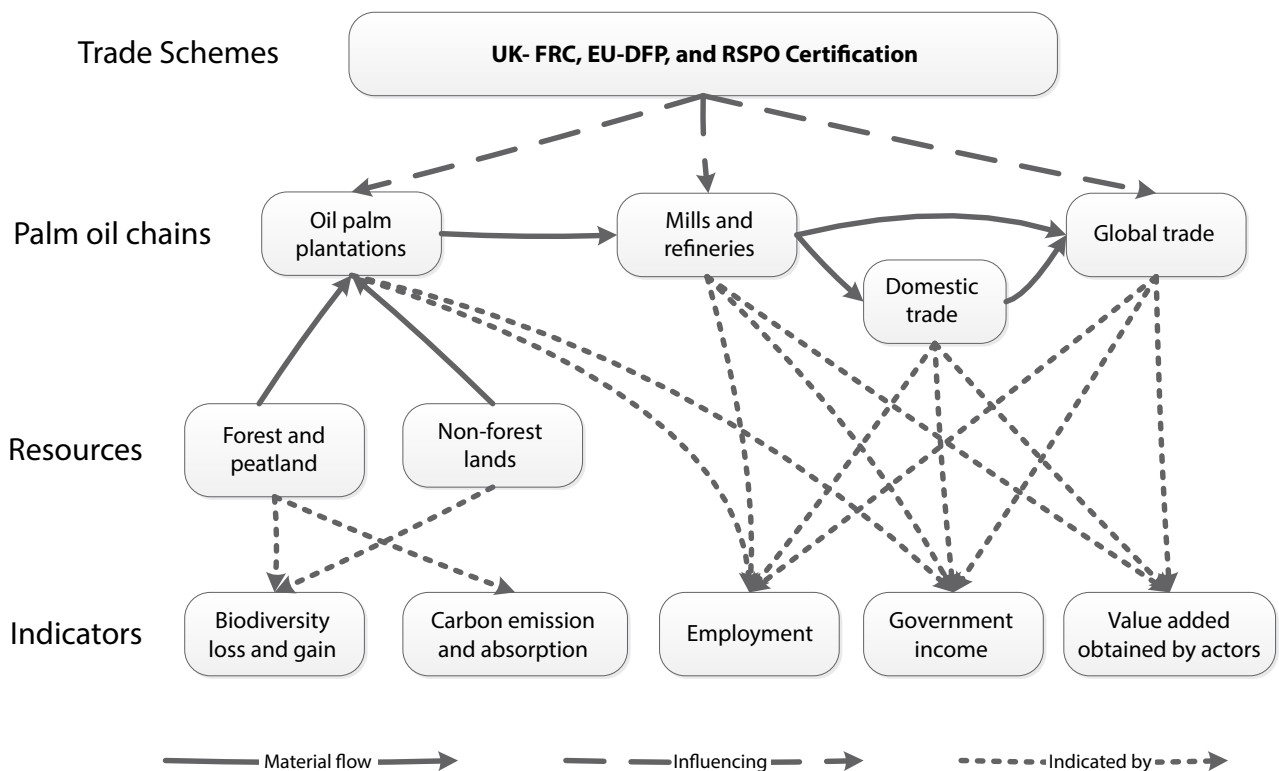


Figure 1. Model block diagram

In 2017, total deforestation was 9,500 ha, comprising 4,100 ha of legal deforestation and 5,400 ha of illegal deforestation. The relative biodiversity index at the landscape level decreases following deforestation. Conversion from forest and peatland to palm oil reduces biodiversity, whilst conversely, planting palm oil in areas without vegetation or on bare land increases biodiversity.

In 2017, total emissions were 3 million tons CO<sub>2</sub>e, with a projected increase to 6.3 million tons after 21 years (Figure 4). The highest sources of emissions levels were a

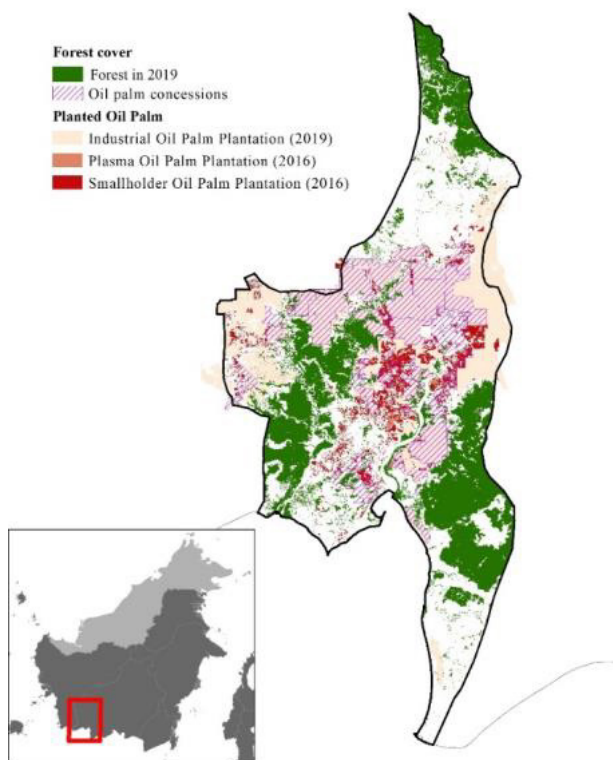
result of peat oxidation, mills, plantation operations and refinery emissions. It is projected that land use and forestry will experience negative emissions after 22 years. This negative emissions projection is expected to be primarily driven by CO<sub>2</sub> absorption from palm oil plantations that are established on previously non-vegetation lands or on lands with less carbon stock than palm oil.

## Trade policy schemes and impact projection

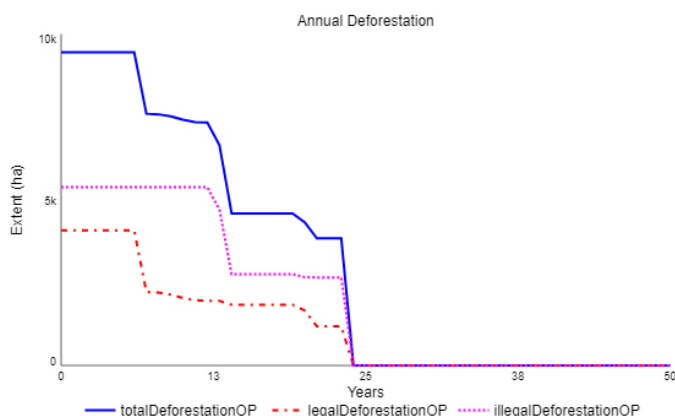
The UK proposed law on Forest Risk Commodity (UK-FRC) will impact the illegal expansion of palm oil plantations into forest areas, peatland clearance for palm oil production, and CO<sub>2</sub> emissions from the palm trade. Table 1 details these technical specifications.

Figure 5 details the trade-off impacts of the UK-FRC on the local landscape, palm oil products, and economy. If the landscape seeks to comply with the UK-FRC, it will be required to stop palm oil expansion through illegal forest conversion and peatland clearance, and incentivize reductions in CO<sub>2</sub> emissions. Such measures will reduce deforestation in the landscape from 4,000 ha annually to 0 ha in less than 25 years, reduce CO<sub>2</sub> emissions and maintain biodiversity. However, these same measures will also reduce crude palm oil and palm kernel oil production by 500,000 tons and negatively impact employment levels. Furthermore, the palm oil economy will decrease by 30% from current levels, equal to an estimated USD 2 billion.

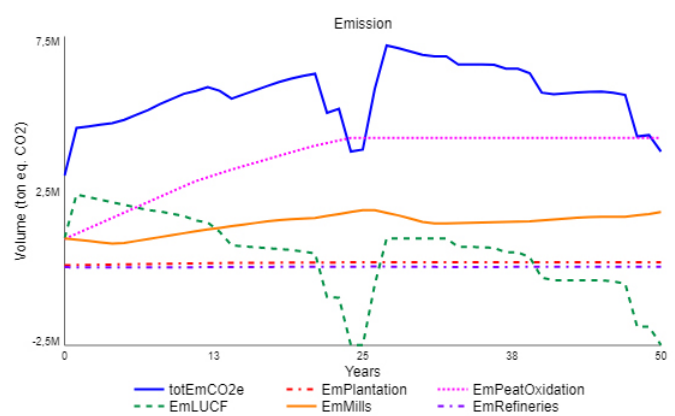
In Figure 6 we outline proposed policies and actions to adapt to green deals while sustaining the palm oil economy. We compensate for the decrease in the palm oil economy due to the UK-FRC, EU-DFP, and RSPO by proposing a carbon tax (PES option 1), rewarding the forest ecosystem (PES option 2), and implementing ecological fiscal transfers (PES option 3).



**Figure 2. Distribution of palm oil concessions and planted palm oil in Kobar**



**Figure 3. Projected annual deforestation due to oil palm plantations in Kotawaringin Barat district**



**Figure 4. Oil palm related CO<sub>2</sub> equivalent emission in Kotawaringin Barat district**

Table 1. The impact of UK law on Forest Risk Commodity (UK-FRC)

Trade Scheme Influence on landscape	UK-FRC	Impact on landscape and trade	How to comply with UK-FRC
Expansion from legal forest conversion	No	Palm oil expansion into 'convertible production forest' is allowed. The products can enter UK markets.	No action is needed.
Expansion from illegal forest conversion	Yes	Palm oil expansion into forest areas such as production, protection, and conservation forests is not allowed.	Stop palm oil expansion into forest areas, but acceptable for the non-forest areas (other land uses).
Peatland usage	Yes	Palm oil expansion into peatland is not allowed.	Stop peatland conversion to palm oil plantation.
Emissions consideration	Yes	Emissions levels from palm oil (dis)incentivizes trade to the UK.	Reduce CO <sub>2</sub> emissions from the palm oil value chain (plantation, mill, refinery, trade, and government) to enable participation in carbon trade or tax schemes.

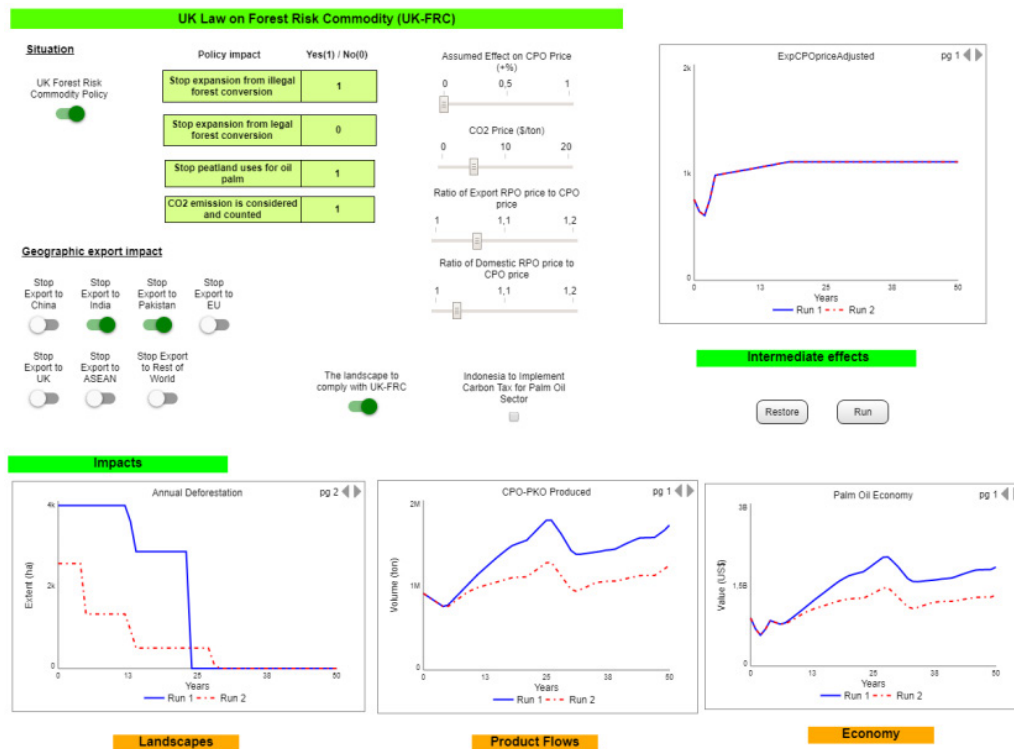


Figure 5. Economic and environmental trade-offs between BAU (Run 1) and UK Law on Forest Risk Commodity (UK-FRC) (Run 2)

Figure 6 details the modelling results of:

- Scenario A: The continuation of current practices, BAU (Run 1).
- Scenario B: The implementation of the three trade schemes, or green deals, implemented unilaterally by the UK and EU (Run 2).
- Scenario C: The implementation of the RSPO (Run 3).
- Scenario D: The implementation of green deals, RSPO, and carbon offset payments (Run 4). Scenario D is similar to Scenario B and C, with carbon tax implementation by the government.
- Scenario E: The implementation of Scenario D and PES options 1, 2, and 3 (Run 5).
- Scenario F: The implementation of PES and crude palm oil premium price (Run 6). The implementation of Scenario E with an increase of crude palm oil price by 50%.

An analysis of the simulation results indicates that the BAU scenario (Run 1, not shown in Figure 6) of the palm oil economy cannot be compensated for by Scenario E (Run 5), even with the implementation of policy options 1, 2, 3 (Run 4). In Scenario E, we set the CO<sub>2</sub> price at USD 5/ton, rewarding forest ecosystem at USD 100/ha, and ecological fiscal transfer at USD 230/ha. However, the BAU scenario can be compensated by Scenario F (Run 6), which is equivalent to Scenario E plus an increase of the crude palm oil price by 50%.

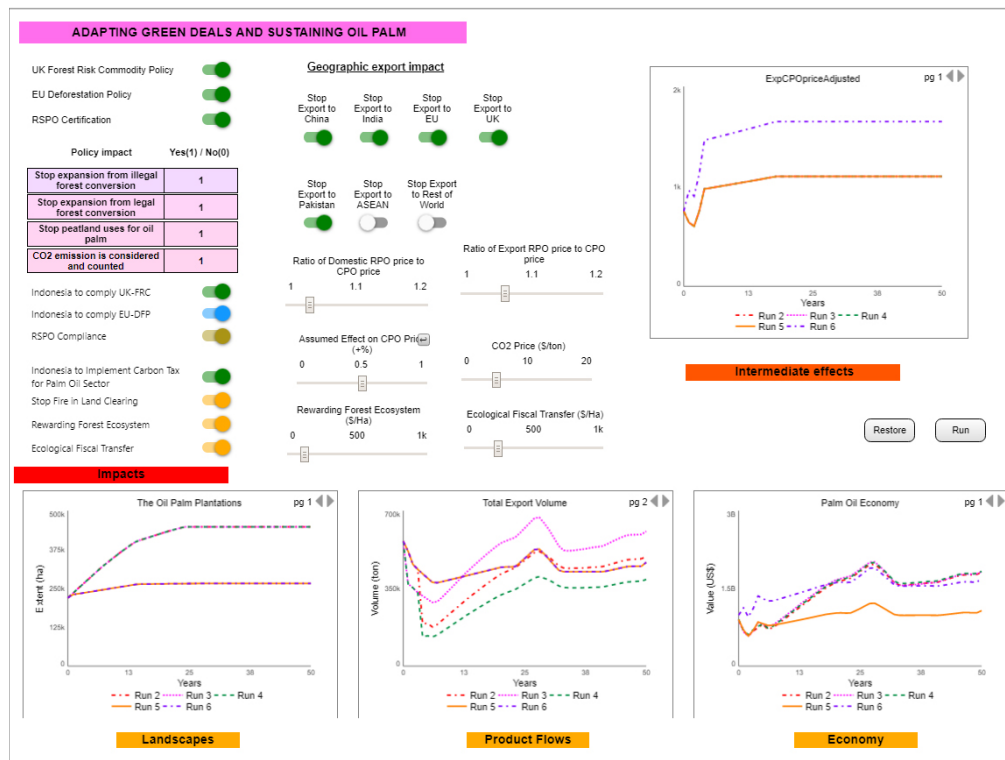


Figure 6. Simulation outputs of Scenario A, B (Run 2), C (Run 3), D (Run 4), E (Run 5), and F (Run 6)

## Scenarios to adapt green deals and sustain the palm oil economy

Current BAU practices of palm oil plantations in high-risk landscapes such as Kobar will lead to legal and illegal deforestation, biodiversity reduction, and CO<sub>2</sub> emissions. However, we note that the palm oil industry is a key economy for corporations, smallholders, and the government and is a significant source of employment. The BAU is representative of the palm oil economy that occurs in Kobar and other districts in Indonesia. However, the research in this brief has the potential to calculate and project future impacts of different trade schemes and how the landscape authorities (district, provincial, and national governments) can adapt to green deals and act to compensate economic loss in the palm oil sector at the landscape level. The key findings are summarized in Table 2.

Green deals will alter the current palm oil sector by establishing trade-offs between the economy and the environment. Green deals like the UK-FRC and EU-Deforestation Free Products (Scenario B) and international certification such as RSPO standard (Scenario C) will eradicate illegal and legal deforestation. Green deals alone will not prevent legal deforestation in the landscape but RSPO will. Green deals endorse the carbon economy more clearly than RSPO. However, the carbon tax (PES option 1) implemented by the government (Scenario D) will not be adequate to recover a shrinking palm oil economy caused by green deals and RSPO. Consequently, in addition to a carbon tax, we suggest the need to employ other environmental service payment mechanisms.

Rewarding the forest ecosystem (PES option 2) and implementing ecological fiscal transfers (PES option 3), Scenario E produces a high PES economy in the region. However, this increase will not compensate for the overall reduction in the palm oil economy. Therefore, to increase the efficacy of green deals, the price of crude and refined palm oil must increase. This requires downsizing or scarcity, and the increased costs of greener or more sustainable crude palm oil production must be reflected in its price. The costs of scarcity and green crude palm oil is significant, suggested to be 50% of the original or BAU price.

These findings suggest that the method of implementing green deals on palm oil must be negotiated between producing and consuming countries, i.e., Indonesia and Malaysia, and the UK and EU country members. We suggest that the UK and EU could mitigate potential economic losses by adjusting palm oil prices and providing support and a market for carbon and forest ecosystem services.

We further recommend significant adjustments in palm oil prices due to the increased costs associated with green deals or RSPO certification. To this end, we also recommend labelling those palm oils that meet green deals and RSPO certification. For example, labelling protocols could be developed based on a particular jurisdiction such as sub-district, district or province. These protocols could be developed once the governance of palm oil is in place. This will require that all processes of interactions of laws, norms, and power of a particular jurisdiction lead to the implementation and endorsement of green deals and certification.

**Table 2. Comparison of simulation results from green deals and RSPO if implemented and endorsed globally**

Scenario Indicator	A: BAU	B: Green deals	C: RSPO certification	D: Green deals, RSPO, and carbon policy	E: Scenario D and PES	F: Scenario E and premium price
Deforestation	H	L	N	N	N	N
CO <sub>2</sub> emission	H	L	L	L	L	L
crude palm oil production	H	L	L	L	L	L
Carbon economy	N	H	N	H	H	H
PES economy	N	N	N	N	H	H
Palm oil economy	H	L	L	L	L	H
Total palm oil economy and ecosystem services	H	L	L	L	L	H

N=None; L=Low; H=High

## Recommendations

This brief makes four key recommendations, as follows:

- All palm oil stakeholders at the sub-national, national and international levels should understand and address the trade-offs between environmental and economic benefits in the sector.
- All palm oil producing and market countries should understand and negotiate steps and timetables for green deals and certification implementation.
- Palm oil market countries should identify additional incentives to the PES economy as this is not substantial enough to compensate for the economic losses resulting from green deals.
- Sustainable, or green, palm oil must attract a significantly higher price than un-clear palm oil.

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