

GLOBAL MARKET REPORT

Palm oil prices and sustainability

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Market Overview

Palm oil production continues to grow to match increasing demand.

Palm oil is found in half of all supermarket products, including shampoo, lipstick, body lotion, and packaged foods, in addition to animal feed, and biofuels (Rainforest Action Network, n.d.). Palm oil is a widely attractive ingredient due to its texture, taste, odour, consistency, and shelf life. It is relatively inexpensive, versatile, and the most widely produced edible oil, meeting 40% of global demand for vegetable oil on less than 6% of all land dedicated to producing vegetable oils (Ritchie & Roser, 2020; World Wildlife Fund [WWF], 2022). Consequently, its production has increased tenfold since the 1960s in response to the soaring demand for vegetable oils for food, feed, and fuel (European Palm Oil Alliance, 2022).

Originally found in West Africa, this tropical equatorial plant is cultivated on large plantations and smallholder plots, with global land coverage equivalent to the size of Brazil (Roundtable on Sustainable Palm Oil [RSPO], 2013). Oil palm yields are 11 times higher

than those of soybeans, 10 times higher than sunflower, and seven times higher than canola per hectare (Thomas et al., 2015). Although 85% of global palm oil comes from Indonesia and Malaysia, palm oil is also grown in parts of Africa, South America, and Southeast Asia. Oil palm is a highly productive perennial with a 25-year life cycle (Murphy et al., 2021). Its three main end products have different fatty acids and downstream uses: crude palm oil (CPO) extracted from the oil palm fruit is used primarily as edible oil, palm kernel oil (PKO) derived from the oil palm fruit seed is used for cosmetics, and palm kernel cake—what is left after the extraction of the oil from the seed—is used for animal feed (Murphy, 2018).

Fresh fruit bunches (FFBs) are harvested from the oil palm tree by producers and sent to mills for processing within 24 hours. They are sanitized and threshed at these mills, and FFB remnants are burned for energy or composted for fertilizer. Oil palm fruits are then digested and mechanically pressed to extract the oil from the pulp, which is composed of 56% to 70% edible oil (Rao, 2020). CPO is refined to extract various fractions with distinct melting points. These

LIVELIHOODS

More than 7 million smallholders globally cultivate oil palm as their main form of livelihood.

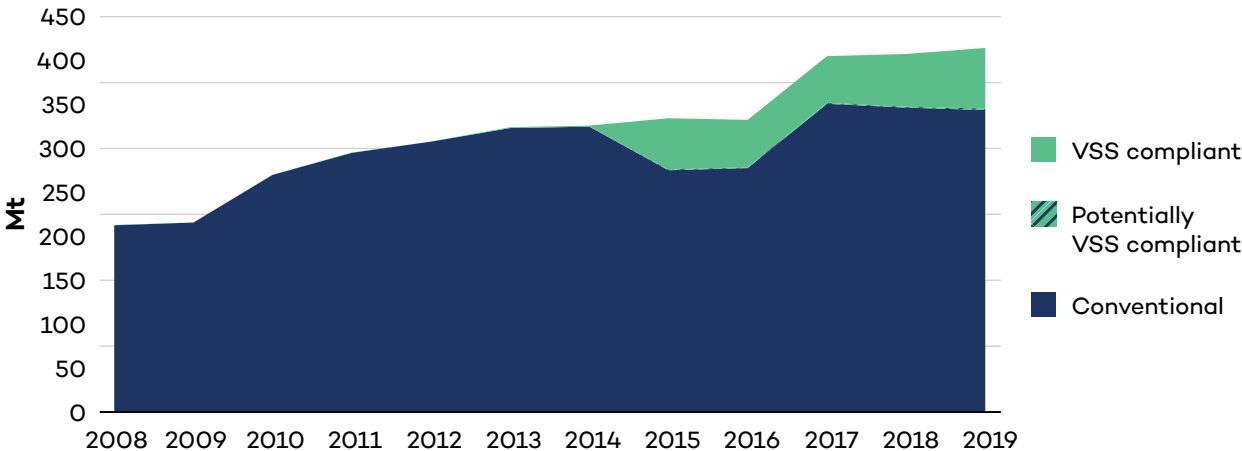
different extractions are integrated into various food products, such as margarine, cookies, and creams. The nut of the oil palm fruit is mechanically opened to access the kernel, which is crushed to expel its oil; this oil is refined and used in personal care and food products (Bhattacharya, 2019; Bockisch, 1998; Protein Feeds Ltd., 2022).

The palm oil sector grew to a market value exceeding USD 50 billion in 2021 and is projected to expand at a compound annual growth rate (CAGR) of at least 4%, reaching USD 65 billion by 2027 (Research and Markets, 2022). More than 7 million smallholders globally cultivate oil palm

as their main form of livelihood (RSPO, 2022b). In Southeast Asia, millions of smallholder farmers have transitioned over the past decades from cultivating rubber to oil palm to supply the more lucrative and diversified palm oil market (Shaw et al., 2018; Tan, 2014; van Noordwijk et al., 2017). In the two largest palm oil producers in the world, Indonesia and Malaysia, the palm oil sector directly employs almost 5 million smallholders and workers and indirectly employs an additional 6 million people (Russell, 2018, 2020). The sector is also responsible for an estimated 2.9 million downstream jobs in importing countries (Basiron, 2016).

Palm oil production has grown to 74.7 million tonnes (Mt) in 2020 from about 42.6 Mt in 2008 from cultivating 29 million ha of oil palm, according to the Food and Agriculture Organization of the United Nations (FAO) (FAOSTAT, 2022). Palm oil

Figure 1. Global oil palm production from 2008 to 2019: Oil palm that complies with voluntary sustainability standards (VSSs) reached 17% of total global production in 2019



Sources: FAOSTAT, 2022; Meier et al., 2021.

production has grown consistently over the last decade: its CAGR of 5.2% from 2008 to 2019 rose to 5.3% from 2014 to 2019. More than 60% of palm oil production was exported in 2020, providing an important source of foreign exchange revenue for exporting countries.

Indonesia, Malaysia, and Guatemala have been the largest exporting countries since 2016, shipping 25.5 Mt, 13.5 Mt, and 0.8 Mt, respectively, in 2021. India, China, and the European Union (EU) have consistently been the biggest importers, importing around 8.2 Mt, 6.4 Mt, and 6 Mt in 2021, respectively (FAOSTAT, 2022). Global palm oil supply and demand have remained steady over the last 5 years. Nevertheless, demand has surged with Russia's invasion of Ukraine, the largest sunflower oil producer in the world, restricting its exports. The conflict has triggered a shift in demand for other vegetable oils, such as palm oil, which has motivated farmers to expand palm oil production (International Food Policy Research Institute [IFPRI], 2022; Yu Leng, 2022).

The COVID-19 pandemic greatly curbed demand for palm oil as government lockdowns affected food services across the globe. Labour shortages have also had an impact on palm oil production. Exports to India and China declined as much as 91% and 17%, respectively, in certain months of 2020 (Sarkar et al., 2022). The pandemic especially affected sustainability efforts in the sector, shifting the focus to maintaining domestic food security and the economic viability of palm oil operations in the face of a 91% increase in the FAO global edible oils price index since June 2021 (Root, 2022). Smallholder farmers have been especially

vulnerable, as they have limited access to medical services, and serious illness and loss of daily income significantly affect their livelihoods (FAO et al., 2022; Sarkar et al., 2022; Tandon et al., 2020).

The war in Ukraine has also slowed the palm oil sector's recovery from the pandemic (IFPRI, 2022). While vegetable oils are substitutable for most purposes, supply chain bottlenecks and shortages, pandemic-related restrictions on farm labour, and higher production costs have profoundly disrupted global markets and caused vegetable oil prices to soar by an average of 30% since February 2022, with food manufacturers seeing a 41% rise in vegetable oil prices (IFPRI, 2022; Rowsell, 2022). Ukrainian sunflower oil plant and port closures have reduced its exports by half, placing pressure on alternatives such as palm oil (Jagtap et al., 2022; Laborde, 2022). The price of palm oil rose 7% in April 2022 following Indonesia's export ban to offset rising domestic cooking oil prices (U.S. Department of Agriculture, Foreign Agricultural Services, 2022). The rapid increase in palm oil demand, exacerbated by the invasion of Ukraine, has dramatically affected global vegetable oil markets, jeopardizing sustainability gains in oil palm operations (Shigetomi et al., 2020).

Palm oil production is increasingly vulnerable to the effects of a changing climate, while the sector is a main driver of climate change through deforestation and land-use change.

Besides adjusting to the challenges brought on by the COVID-19 pandemic and the invasion of Ukraine, the palm oil sector will have to continue to adapt to the impacts of climate change, such as rising temperatures, water stress, infestations of pests, diseases, and yield reduction (Michele, 2021; RSPO, 2022a; Sarkar et al., 2022). For instance, Malaysian oil palm yields are projected to decrease by between 10% and 41% due to changes in average temperatures (Sarkar et al., 2022). The effects of climate change are already being felt on global edible oil production, with direct implications for the palm oil sector. Declines in soybean and rapeseed production due to droughts in Brazil and Canada, as well as a drop in Malaysian palm oil exports due to Typhoon Rai in 2021, have contributed to rising global vegetable oil prices (Murphy et al., 2021). The sector is further affected by a general lack of climate resilience and concerns about indirect land-use change (ILUC) (i.e., deforestation, biodiversity loss), greenhouse gas (GHG) emissions stemming from crop expansion, and consumer backlash related to biodiversity and habitat loss (Rainforest Action Network, n.d.). Despite being a driver of ILUC—which contributes to climate change—oil palm productivity (more oil per

land area than any other equivalent vegetable oil crop) and employment benefits (especially for small farmers in developing countries) are significant and may partially offset the sector's contribution to climate change (RSPO, 2022c; Sron, 2019; Thomas et al., 2015; UN-REDD Programme et al., 2018).

Climate adaptation strategies in the palm oil sector include implementing climate-resilient varieties and sustainable agricultural practices, such as integrated pest management, and using palm processing waste as fertilizer (RSPO, 2022c; Thomas et al., 2015).

Establishing new plantations on degraded land can also reduce the sector's impact on biodiversity and habitat loss. In addition, oil palm is a perennial plant that can be grown in agroforestry settings, offering farmers the potential to cultivate a variety of crops and tree species alongside oil palms to diversify their income and mitigate climate change (Bryce, 2022; Murphy et al., 2021; Sarkar et al., 2022). Growing oil palms in agroforestry systems can also reduce the negative effects of monoculture, including soil erosion and biodiversity loss.

Reversing deforestation associated with the palm oil sector represents an important climate mitigation opportunity. Palm oil development in Indonesia and Malaysia over the past 30 years has led to significant forest loss since the 1990s (Wicke et al., 2011). Commercial agriculture drove an estimated 60% of tropical forest loss worldwide from 2013 to 2019, with 69% of this agro-conversion arising from illegal land-use change (Wolosin, 2022).

To curb deforestation associated with palm oil production, many countries, such as EU member states, the United Kingdom, and the

United States, are establishing regulations and policies to reduce and prevent illegal logging and deforestation, targeting the companies in their respective jurisdictions and their value chains. These measures have spurred concerns among developing countries, as they can create barriers to trade and generate additional costs to ensure deforestation-free operations (Sarmiento & Oeschger, 2023). Successful measures to prevent deforestation are needed to help smallholders and palm oil operators conserve forests and restore degraded land.

Public and private sector zero-deforestation commitments and a moratorium on expanding large-scale palm oil plantations are expected to lower deforestation by 25% to 28% (Mosnier et al., 2017). Indonesia's ban on new palm oil plantations in primary forests and peatlands in 2018 reduced deforestation by 75% from 2016 levels (Centre for International Forestry Research, n.d.; Global Forest Watch, 2022). A recent study found signs that deforestation associated with palm oil in Indonesia declined from 2018 to 2020, even though palm oil production continued to grow in this period, driven by zero-deforestation commitments and associated efforts (Gardner & Rylander, 2022). As a result of these public- and private-led measures, GHG emissions from land-use change in the palm oil sector could drop by 13% to 16% between 2010 and 2030 (Rainforest Action Network, n.d.; Ritchie & Roser, 2020). Furthermore, the United Nations Sustainable Oil Palm Production Initiative promotes the implementation of sustainable practices in the sector and the reduction of emissions from deforestation and forest degradation (REDD+) with action plans that hold promise to reduce

deforestation (FAO, 2021; UN-REDD Programme et al., 2018).

In addition to forest conservation measures, lowering GHG emissions from oil palm plantations on peatlands, which are important carbon sinks, is also necessary. Draining or clearing peatlands to grow oil palm accelerates soil decomposition and carbon losses (Carlson et al., 2015). At the mill level, using biogas can displace fossil fuels and lower carbon footprints (De Rosa et al., 2022; Hashim et al., 2018). A case study of Nigerian palm oil found that producing biogas from raw palm oil mill effluent and using it as a substitution for diesel consumption in large-scale and semi-mechanized smallholder mills can reduce global warming by 66% and 44%, respectively (Anyaoha & Zhang, 2022).

The FAO estimates that the agri-food sector must generate 50% more food by 2050 to maintain food security in the face of climate change. Being the most productive edible oil-bearing crop in the world, oil palm will continue to be instrumental in maintaining global food security and alleviating poverty among smallholder farming communities (FAO, 2018; Sron, 2019). In fact, Indonesia plans to ramp up production by 125% between 2010 and 2030 to meet projected demand (IFPRI, 2022). This production increase must ensure the conservation of forests and peatlands. Palm oil also plays an important role in displacing fossil fuels as a feedstock to the production of biodiesel, particularly in Europe. Nevertheless, biofuel mandates and export bans have affected global palm oil supplies and prices due, in large part, to mandated blending in fuel supplies and targeted subsidies to support their production, as was the case in 2008 and

MARKET VALUE

More than 160,000 farmers produced between 68.9 Mt and 70.72 Mt of VSS-compliant oil palm fruit with a market value of at least USD 5 billion.

CAGR

Conventional production grew at a CAGR of 4.47% from 2008 to 2019 and 1.14 % from 2014 to 2019.

VSS-compliant production grew at a CAGR of 75% between 2008 and 2019 and at a CAGR of 129% between 2014 to 2019.

2012 (Glauber et al., 2022; Laborde, 2022). EU demand for palm oil biodiesel feedstock is expected to decline as exporters struggle to meet the required ILUC certification to gain market entry (European Commission, Directorate General for Agriculture and Rural Development, 2021).

VSSs can help build climate resilience and reduce and prevent deforestation if properly implemented.

Efforts are ongoing to move the palm oil sector toward sustainability to address challenges such as climate change. Implementing VSSs is an effort that began in the palm oil industry more than 30 years ago (Palm Today, 2021). Implementing VSSs allows farmers to differentiate themselves in the marketplace from conventional palm oil (Voora et al., 2019). In exchange for adopting more sustainable farming practices, farmers

can label their products as VSS compliant or produced in accordance with a VSS.

The presence of VSSs in the sector increased dramatically following the establishment of the RSPO in 2004, which aims to provide major palm oil sourcing companies, such as L'Oréal, PepsiCo, and Unilever, with a more sustainable alternative to conventional palm oil that is produced in large-scale palm oil plantations (RSPO, 2022c; Unilever, 2022). International Sustainability and Carbon Certification (ISCC) is another important scheme that started operations in the sector in 2010. Indonesia and Malaysia have both established their own certification schemes linked to national regulations to strengthen the competitiveness of their palm oil operations and improve their sustainability performance. The Indonesian Sustainable Palm Oil (ISPO) was launched in 2011, and the Malaysian Sustainable Palm Oil (MSPO) was launched in 2013. Both are mandatory certification schemes targeting plantation operators and also smallholders (by 2025 for ISPO), who were largely absent from international VSS programs.

The certification schemes operating in palm oil include several requirements that can support building climate resilience and mitigating climate change. These include integrated pest management, the use of renewable energy, and the prohibition of new oil palm plantations in primary forests, peatlands, and High Conservation Value Areas. Nevertheless, as each scheme is different in terms of the scope and rigour of implementation, their impacts on the ground vary. Regarding forest conservation, recent studies reveal that while VSSs have “the most demonstrated positive impact in preventing deforestation” (Ingram et al., 2020, p. 45),

How much oil palm fruit is compliant with a VSS?

Figure 2. VSS-compliant oil palm fruit production volumes in 2019



Source: Meier et al., 2021.

especially at the farm and plantation levels, there are reported cases where VSSs have had mixed results. These studies call for a combination of measures and approaches to prevent and reduce deforestation (i.e., regulations, certification, technology, and landscape certification) (Peteru et al., 2022).

A total of 68.9 Mt to 70.72 Mt of VSS-compliant oil palm fruit was produced in 2019 by more than 160,000 farmers with a farm gate value of at least USD 5 billion (FAOSTAT, 2023; Meier et al., 2021). That number increased by 8 Mt to 9 Mt from the previous year. The most prominent VSSs in the oil palm fruit sector included in the data set, ordered by 2019 production volumes, include RSPO (68.47 Mt), Rainforest Alliance¹ (2.18 M), and Organic (0.74 Mt). ISCC reports 1.88 million ha of certified oil

palm FFBs in 2021 (ISCC, 2022). Growing at a CAGR of 76% between 2008 and 2019, VSS-compliant oil palm fruit now represents 17% of total global production. There are signs that the supply of VSS-compliant oil palm fruit may be accelerating, as its CAGR rose to 129% from 2014 to 2019. Most VSS-compliant production growth is attributed to RSPO oil palm, which jumped by 59 Mt in 2015 to 69 Mt in 2019 (Meier et al., 2021), mainly due to EU brands' 100% VSS commitments (see Figure 4).

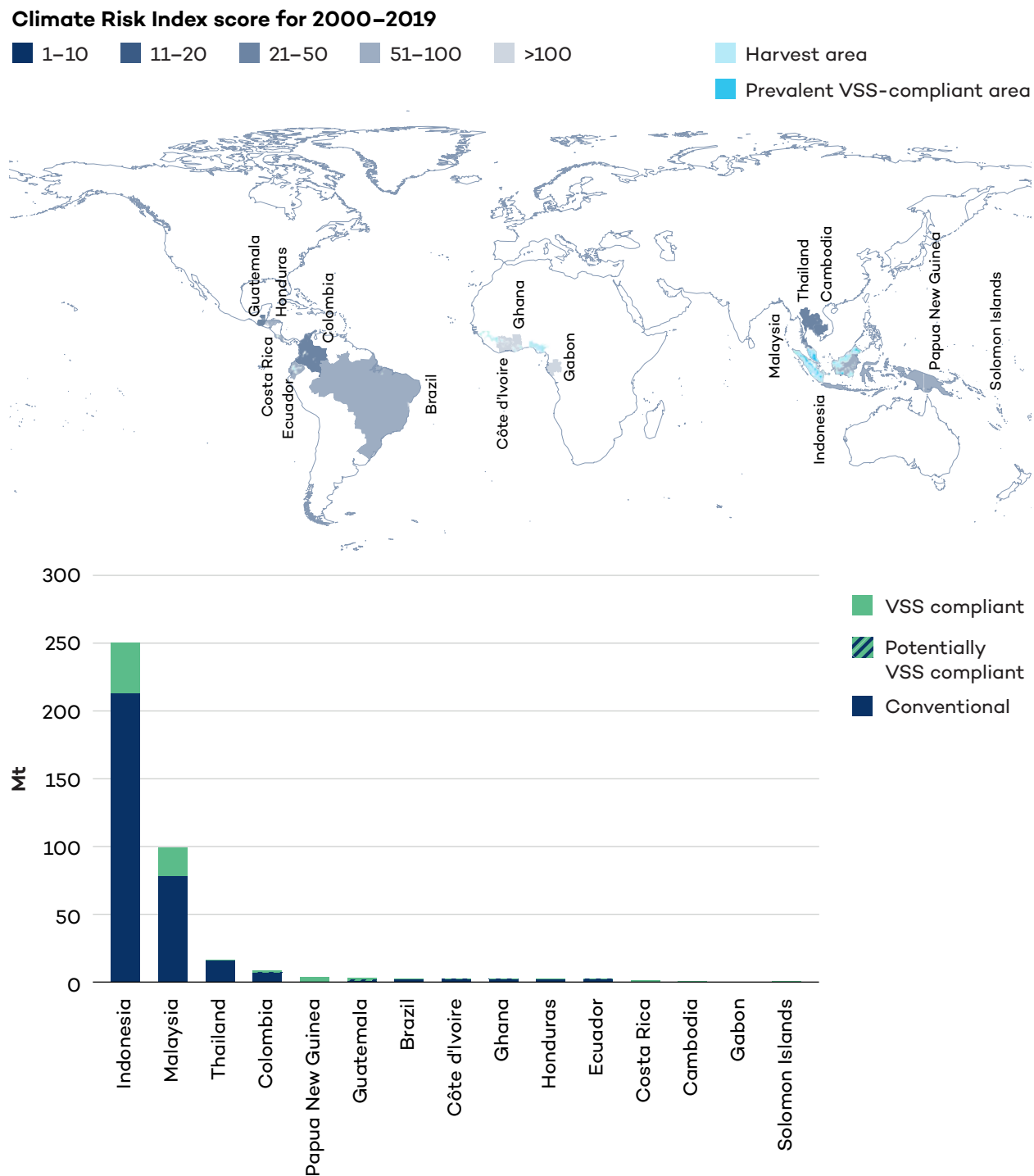
Another challenge oil palm producers face is the availability of VSS-compliant palm oil sold as a conventional product. Important progress has been made to address this issue: about 50% of crude RSPO-compliant palm oil was sold as such in 2019, improving to more than 64% by 2021 (RSPO, 2019c, 2021c). This amount was driven largely by an agreement by all RSPO members to adopt mandatory 100% RSPO-certified sourcing across their supply chains, with public reporting and accountability as part of their shared responsibility. All crude sustainable RSPO-compliant PKO was sold as such in 2021 (RSPO, 2021). With unpredictable challenges facing the agricultural sector—notably those flowing from the COVID-19 pandemic, Russia's invasion of Ukraine, and rampant inflation—it is vital to ensure that VSS-compliant farmers can sell their palm oil as VSS compliant so they have the resources needed to maintain their certification and continue implementing more sustainable and resilient oil palm farming practices.

Indonesia, Malaysia, Thailand, Nigeria, and Colombia offer VSSs the greatest potential to

¹ It is worth noting that Rainforest Alliance is phasing out palm certification. All certifications related to oil palm will expire in June 2023 at the latest (Rainforest Alliance, 2021).

Oil palm-growing regions of the world

Figure 3. Distribution of oil palm production in the top 15 producing countries in 2019



Source: Eckstein et al., 2021; FAOSTAT, 2022; Meier et al., 2021; Voora et al., 2020.

expand based on the size of their conventional oil palm fruit production. Among the least-developed oil palm fruit-producing countries, the Democratic Republic of the Congo, Guinea, Sierra Leone, Liberia, and Senegal offer VSSs the greatest opportunities for enabling sustainable development via the adoption of more sustainable oil palm fruit farming practices based on their share of global oil palm fruit production, the limited presence of VSSs, and their Human Development Index ranking. As importantly, VSS-compliant oil palm fruit farming can also result in higher yields compared to conventional production. In 2019, VSS-compliant oil palm fruit yields were higher in 14 oil palm fruit-producing countries but lower in four. VSS-compliant yields were higher in large oil palm fruit-producing countries, such as Indonesia, Malaysia, Thailand, and Nigeria, in 2019.

Demand for VSS-compliant palm oil must develop in the main consuming countries, such as India and China, to boost sustainable production.

Despite the pandemic, exports of palm oil were stable and—in some cases—rose due in large part to its versatility as a raw material (European Palm Oil Alliance, 2022). Global demand for VSS-compliant palm oil is forecast to increase, as poor labour conditions and deforestation associated with conventional palm oil have made governments and consumers wary (Rainforest Action Network, n.d.). Preferences for more

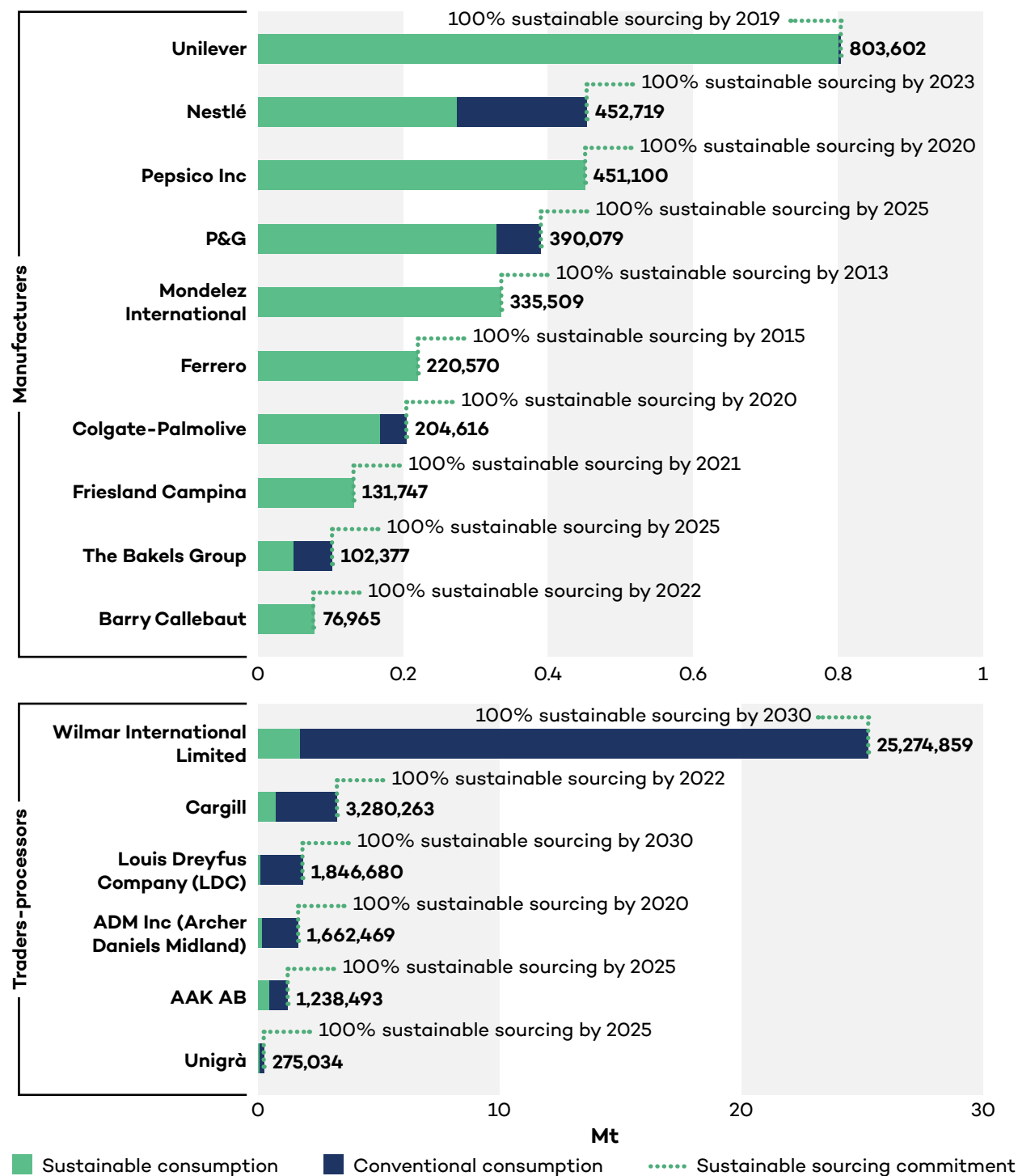
sustainable, nutritious, and healthy food are also motivating companies to source VSS-compliant palm oil (Ritchie & Roser, 2020; RSPO, 2013). As a result, import restrictions on conventional palm oil to the EU and some Asian countries are being implemented (European Palm Oil Alliance, 2022; WWF, 2022). Furthermore, in 2021, Switzerland approved a preferential tariff for palm oil and palm oil derivatives coming from Indonesia that are compliant with three certification schemes—the RSPO, the ISCC, and the Palm Oil Innovation Group—as part of the European Free Trade Association-Indonesia Comprehensive Economic Partnership Agreement (Larrea et al., 2021).

Demand for VSS-compliant palm oil will likely remain strong in Europe and the United States in the coming years. Recent figures show that Europe consumed about 45% of RSPO-compliant palm oil in 2021, though that fell from about 55% in 2019, while North America consumed 16% in 2021, about the same percentage as in 2019. Demand for VSS-compliant palm oil from emerging economies is expected to increase. Price and availability are important procurement priorities that are challenging for businesses looking to source VSS-compliant palm oil, which usually has higher prices, lower volumes, and needs some traceability (Rainforest Action Network, n.d.; Thomas et al., 2015). Furthermore, VSS-compliant palm oil supply often exceeds demand, as only 60% of RSPO-certified palm oil was sold as such in 2020 (F. Naranjo, personal communication, 2020).

Expanding VSS-compliant palm oil demand will require policy support to enable price competitiveness and raise consumer awareness (Bhattacharya, 2019; Murphy,

Progress on sustainable sourcing commitments

Figure 4. Major palm oil-consuming companies, their sustainable sourcing commitments, and progress in 2020



Source: RSPO, 2019a, 2020a–n.

Notes: (i) Aggregated volumes include crude and refined palm oil, PKO, and derivatives and fractions.

(ii) Sustainable sourcing volumes may include palm oil certified under a book-and-claim system. A book-and-claim system is a non-physical traceability system that allows the sale and purchase of certificates of volumes of palm oil certified under a VSS. However, the certificates are decoupled from the product and are transferable to the market to drive demand for VSS-compliant palm oil.

(iii) Please note that this table focuses on RSPO sourcing volumes only, based on the availability of data. Buyers may source from other schemes or might have their own corporate scheme that operates in palm oil.

2018; Murphy et al., 2021; Rao, 2020;). Asian countries, particularly India, have great potential to shape the sustainability of the sector, as India will continue as one of the largest importers of palm oil in the foreseeable future: the 9.4 Mt of palm oil that India consumed in 2019 represented 40% of all edible oils consumed (Bhattacharya, 2019; Bockisch, 1998; Protein Feeds Ltd., 2022). Nevertheless, most Indian consumers are expected to continue prioritizing affordability over sustainability due to a lack of means (Bhattacharya, 2019; Bockisch, 1998). In addition, palm oil sold in the local market is not labelled, hindering the recognition of more sustainable options (Solidaridad, 2021a). Furthermore, the Indian government is working to lower its import dependence by increasing its domestic production without due consideration for sustainability (Bhattacharya, 2019). This dynamic may change as several initiatives for promoting more sustainability in the sector are being developed in the country. These include the Sustainable Palm Oil Coalition for India (Research and Markets, 2022), established in 2018 by the Centre for Responsible Business (2022), WWF India, RSPO, and Rainforest Alliance to raise awareness and promote the sustainable consumption and trade of palm oil among buyers, retailers, and consumers, and the adoption of the Indian Palm Oil Sustainability (IPOS), a national framework aiming to provide guidelines to local industry actors to promote sustainable production

and trade in the sector (Indian Palm Oil Sustainability Framework, 2017).

In Latin America, improper labelling impedes efforts to raise the sustainability awareness of consumers, preventing more informed and sustainable consumption choices (F. Naranjo, personal communication, 2020). RSPO is overcoming this challenge by partnering with supermarket chains in Latin America, such as Grupo Exito, the largest supermarket chain in Colombia. This partnership allows RSPO to focus on promoting sustainable sourcing of palm oil among corporations such as retailers and processors instead of end consumers directly (RSPO–Latin America, personal communications, 2020).

Governments play a crucial role in addressing the challenges identified above. Sustainable public procurement has great potential to increase demand for VSS-compliant palm oil. Furthermore, through industry collaboration, growing consumer awareness, strengthened partnerships, and better and credible labelling, supply chain actors can cooperate to enable the consumption of VSS-compliant palm oil. For instance, in Colombia, a partnership among Fedepalma (Colombia's National Federation of Palm Oil Producers), Solidaridad Network, and major market players and investors (Grupo Hada and Alianza Team) is working to promote the consumption of local and more sustainable palm oil to benefit local producers and

the economy without compromising the environment (Portafolio, 2022).

According to our analysis of data illustrated in Figure 4, the seven largest palm oil trading companies sourced 33.6 Mt in 2020, up from 13 Mt in 2017 (Voora et al., 2020). The 10 largest manufacturing companies sourced 3.1 Mt, down from 3.7 Mt in 2017. According to our own analysis, traders may have purchased about 46% of the total palm oil produced in 2020 (FAOSTAT, 2023). From the total palm oil purchased in 2020, traders bought 3.3 Mt that was compliant with a VSS (up by CAGR 13% from 2017), while manufacturers purchased 2.8 Mt (up by CAGR 8% from 2017). This represents only 10% for traders and about 90% for manufacturers (own analysis based on sourcing information illustrated in Figure 4 and Voora et al., 2020). These companies may also source palm oil in compliance with a corporate sustainability program. Corporate sustainability initiatives refer to sustainable palm oil production programs established by private companies rather than an independent third party (i.e., Colgate-Palmolive Policy on Responsible and Sustainable Sourcing of Palm Oil) (Colgate-Palmolive, 2022). According to our research (see Figure 4), except for three companies, all trading and manufacturing companies have sustainability sourcing commitments in place for 2020 and beyond. Most of the trading companies examined missed their 100% sustainable palm oil by 2020 sourcing targets (Voora et al., 2020), leading them to set later dates to achieve this goal. AAK AB came the closest, sourcing 38% VSS-compliant palm oil in 2020.

As laid out in Figure 4, ADM fell 90% short of its 2020 sustainability sourcing target, as it sourced just 10% of the total, electing to set a

new target for 2027. Dupont's sustainability target remains unverifiable, as its palm oil consumption data remain confidential. More than half of the manufacturing companies examined are sourcing almost 100% sustainable palm oil, including Ferrero, Barry Callebaut, Friesland Campina, PepsiCo, Mondelez International, and Unilever. Colgate-Palmolive and P&G are close to reaching 100%, having sourced 82% and 84% more sustainable forms of palm oil in 2020, respectively. The Bakels Group still has a way to go, sourcing 48% sustainable palm oil in 2020, which would need to rise to 100% by 2025 to meet its target. Nestlé revised its sustainability sourcing target of 100% to be achieved by 2025 to 2023, indicating that it aims to reach its goal faster. Based on the sourcing commitments of the largest palm oil traders and manufacturers examined and assessing them against current palm oil sourcing information, traders could source an additional 30 Mt of sustainable palm oil by 2030. Manufacturers could source an additional 335,000 tonnes by 2025.

Increasingly extreme weather exacerbated by unprecedented economic and agricultural supply chain disruptions from the COVID-19 pandemic and the conflict between Russia and Ukraine have highlighted the importance of palm oil to global food security. Although conventional palm oil production is likely to remain steady in the future, forecasting VSS-compliant production is less predictable. Taking a more pessimistic outlook weighs the short-term and temporary drop in VSS-compliant production trend more heavily—for example, due to an inability to sell all VSS-compliant palm oil as such. In this case, the production of VSS-compliant oil palm fruit would initially drop but would rebound

to around 67 Mt by 2025 due to a greater focus on producing conventional palm oil.

A more optimistic outlook weighs the increasing long-term VSS-compliant production trend more heavily and projects a significant and rapid increase to exceed 159 Mt by 2025. Although several potential futures exist between these outlooks, we

predict that VSS-compliant oil palm fruit production will reach almost 113 Mt by 2025 as demand for sustainable palm oil grows, motivating more aggressive sustainable sourcing commitments. Consequently, we expect VSS-compliant oil palm fruit production to range from 67.24 Mt to 158.88 Mt by 2025.

A Dive Into Palm Oil Prices

Internalizing natural capital costs in pricing models is critical to building a more resilient and competitive palm oil sector.

Pricing is an important factor, as it can determine if palm oil producers stand to gain financially from complying with VSSs. Efforts to shift the sector toward sustainability, such as by abiding by VSSs, are partly driven by a need to internalize the external costs associated with the industry. For instance, natural capital costs associated with palm oil production—such as GHG emissions due to deforestation and peatland loss and pesticide toxicity effects—should be factored into the price of palm oil to reflect its actual cost. The average natural capital costs of producing 1 tonne of conventional CPO and PKO across Brazil, China, Colombia, Côte d'Ivoire, Guatemala, Honduras, Indonesia, Malaysia, Nigeria, Papua New Guinea, and Thailand in 2013 was estimated at USD 790 and USD 897, respectively (Raynaud et al., 2016). When compared to the average international

market price of USD 760 per tonne of CPO the same year (International Monetary Fund, 2023), internalizing the natural capital costs of palm oil production in the final market price of CPO and PKO would require at least doubling its price (Raynaud et al., 2016).

Furthermore, VSS-compliant palm oil plantations can save money by implementing more sustainable practices. For instance, one RSPO-certified company in Indonesia reported annual savings of up to USD 250,000 by reducing pesticide use across its estates as specified by the standard (Raynaud et al., 2016; Salman et al., 2017). This company saved not only production costs but also natural capital costs associated with the toxic effects of pesticides on the environment. Internalizing these external costs in the market price would make VSS-compliant palm oil much more attractive and competitive with conventional palm oil in the export markets. Therefore, examining how palm oil prices intersect with the sector's sustainability is paramount.

As with other commodity markets, palm oil prices are largely correlated with shifts in supply and demand and with price

movements of competing products, such as other vegetable oils (e.g., sunflower and soybean oil) or biodiesel. In the international markets, exchange futures prices are the most important indicators of palm oil prices along the chain, with the Malaysian stock exchange (Bursa Malaysia) as the main index. Unrefined CPO is the most important price indicator in the market, given that most other palm products originate from CPO and their prices are therefore tightly linked to it.

International CPO prices have enjoyed a steady long-term increase over the last 2 decades, reaching record highs in recent years as global demand for palm oil has grown faster than supply (Trading Economics, 2021; World Bank Group, 2022). Indeed, CPO prices have doubled in the last 5 years, rising from an average of USD 560 per tonne in 2018 to an average of USD 1,156 per tonne in 2022 (International Monetary Fund, 2023). The market also experienced volatility during this period caused by external shocks, such as the COVID-19 pandemic. During the pandemic, restrictions on the movement of people and other public health measures implemented by several countries led to temporary slowdowns in demand and the short-term disruption of supply chains, resulting in CPO price declines in 2020/21. More recently, the Russia–Ukraine conflict, which has led to significant disruptions in the production, transport, and trade of energy and food commodities, including oilseeds and oilseed products (World Bank Group, 2022), has pushed the price of CPO up in the international market. Nevertheless, it is expected that continued productivity improvements in palm oil-producing countries in the next couple of years will put downward pressure on prices again

(Organisation for Economic Co-operation and Development & FAO, 2022).

Aside from supply and demand dynamics, factors such as policies and regulations imposed by palm oil-producing and importing countries and changes in taxation and import duties all influence palm oil prices at international and domestic levels. For instance, Indonesia changed its export tax structure in 2014, lowering taxes for CPO and crude PKO and eliminating taxes for processed palm oil and biofuels to encourage the production of refined palm oil, which resulted in Malaysia also lowering its export prices to recover the market share (Wong, 2016). More recently, in April 2022, Indonesia temporarily banned palm oil exports to improve availability and reduce the price of cooking oil in the domestic market. This measure followed the imposition of a domestic market obligation in January 2022 that required palm oil producers to supply a portion of their output to the Indonesian internal market to get export permits to help address food security demands (Fitch Ratings, 2022). India restricted refined palm oil imports in 2020 to increase domestic demand for locally produced CPO, causing a drop in global demand that pushed international prices down and led to a price war between Indonesia and Malaysia (S&P Global, 2021a, 2021b).

Also, the EU has been a major buyer and importer of palm oil, mostly used for biodiesel production. The recently adopted regulation aiming to curb deforestation and forest degradation in products consumed and produced in the EU will have implications for the industry, as it could lower demand for palm oil. The Renewable Energy Directive II requires a gradual phase-out of

palm-oil-based fuels in the region by 2030 (International Union for Conservation of Nature, 2022). The United States and the United Kingdom are also developing laws to regulate commodity-linked deforestation, which may lead to more restrictions on palm oil imports (Bakhtary et al., 2021; Rijk et al., 2021). These developments will likely result in a reduction of importing volumes by important market players, leading to negative effects on global prices (S&P Global, 2021a).

Overall, the palm oil sector is subject to a complex set of social, political, and economic challenges, while external factors add uncertainty in the market and volatility in the prices along the chain. This has affected farmers, particularly smallholders in developing countries, as oil palm is a perennial crop that requires considerable time and capital investment to establish plantations, undermining their ability to switch to alternative crops and protect themselves from low prices and difficult market conditions when they arise (Mehraban et al., 2021).

Low farm gate prices and the rising costs of production threaten oil palm farmers' incomes.

Farmers produce and sell FFBs to mills. Farm gate prices for FFBs are typically determined by the mill and are calculated considering several factors, including the oil extraction ratio assessed by the mill, the international price of CPO and PKO, and other variables, such as processing and transportation costs, incentives, and discounts provided. FFB prices also vary according

to the country of origin, the marketing channels, production volumes, and the type of association farmers have with companies or mills, as farmers selling to intermediaries usually receive lower prices than those selling directly to a mill (Alamsyah et al., 2021). Other factors influencing FFB prices are seedling quality, fertilization levels, and the protection of plants from weeds, pests, and diseases. Also, farmers' skills in farm management and their farming experience positively affect the quantity and quality of output, which is critical for determining better farm gate prices.

While international CPO prices have increased in recent years, farm gate prices of FFBs in major palm oil-producing countries have declined. For instance, farmers in Indonesia received about USD 98/kg in 2017 and about USD 60/kg in 2019 for their FFB, while the price of FFB in Malaysia fell from about USD 140/kg in 2017 to USD 100/kg in 2019 (FAOSTAT, 2023), representing a reduction of 38% and 28% over 2 years, respectively. The same downward trend has been reported in other producing countries, such as Thailand and the Philippines (FAOSTAT, 2023). The COVID-19 pandemic put additional pressure on producer prices, which declined about 30% in 2020 due to a lack of demand in the market, cutting profits for many farmers with 40 ha of land or less. At that time, farm gate prices for FFB were at USD 73.63/tonne in Malaysia and about USD 67.70/tonne in Indonesia (Chu & Das, 2020). These prices were unsustainable for many farmers, who also had to cut back on spending on inputs such as fertilizers or investing in new oil palm plants. Many actors across the supply chain,

including farmers, also faced a credit crunch and cash flow issues (Chu & Das, 2020).

Independent smallholder farmers in countries such as Indonesia tend to receive lower prices than large-scale independent farmers or those smallholders associated with company-managed plantations with leased community lands. Also, many independent farmers lack access to technical and financial support and depend largely on informal sources of finance, such as loans from local traders (Bakhtary et al., 2021). In Indonesia, for instance, farmers participating in the Plasma Transmigration Program² set up by the government in 1987 receive far better prices than small-scale independent oil palm farmers, who also remain outside any sustainability initiative promoted in the sector (Bakhtary et al., 2021).

Data published by the Indonesian Oil Palm Farmers Association (APKASINDO) show that the FFB price for independent farmers hovered between USD 56 and USD 77 per tonne in 2018, while farmers participating in the plasma program received around USD 110 per tonne (Harian, 2018). This price difference is because many independent producers buy low-quality seeds from local agents, which results in lower yields. Also, mills believe that small and independent growers know less about farming practices and use lower-quality inputs than plasma farmers, which is often, but not always, the case. This assumption has given independent smallholders' FFB production a bad reputation among palm oil mills, so they

avoid purchasing FFBs from smallholders because they are uncertain about the types of seeds they use and their ability to apply cultivation techniques, including plant maintenance and harvest handling (Alamsyah et al., 2021).

In Malaysia, the low profitability of the sector, constant labour shortages, and rising production costs, such as fertilizers, threaten oil palm farmers' incomes (Organisation for Economic Co-operation and Development & FAO, 2022). Farm-level production costs differ according to the type of plantation and the topography of the palm estate. For instance, new plantations could have 20% to 30% higher costs than an area being replanted. The hilliness of the terrain makes the upkeep of roads, bridges, and drainage systems more expensive and means higher transportation costs inside the estate. The size of the palm estate and the management style also influence costs. In general, the bigger the farm area, the lower the unit cost of FFBs, so big estates of 2,000 ha to 2,500 ha have a much lower unit cost than small holdings with fewer than 100 ha (EOS Data Analytics, 2021).

Production costs also depend on who owns the palm estate. For instance, private companies have the lowest production costs, as they tend to manage large-scale plantations; sole proprietorships follow. Labour and inputs are typically the highest costs for an oil palm plantation. Fertilizer makes up 30% to 50% of the cost of production for smallholders (and up to

² Under the plasma program, villagers from rural parts of Indonesia were relocated to oil palm-growing areas and given 2.5 ha of land to farm, build housing, and cultivate food crops. They were partnered with a local company that provided employment and technical support while the land to grow oil palm was prepared. As the oil palm delivers FFBs, the farmer agrees to sell their produce to the company at a price set by the government (Sri Rahayu et al., 2022).

60% for high-yielding plantations), and any lower application of the nutrients can lower productivity 6 months to a year later (Ghazoul, 2015). For instance, a 50% reduction in fertilizer usage at a farm could reduce yields by 20% to 40% over a year (Chu & Das, 2020). As a result, growers remain highly dependent on costly inputs to sustain production.

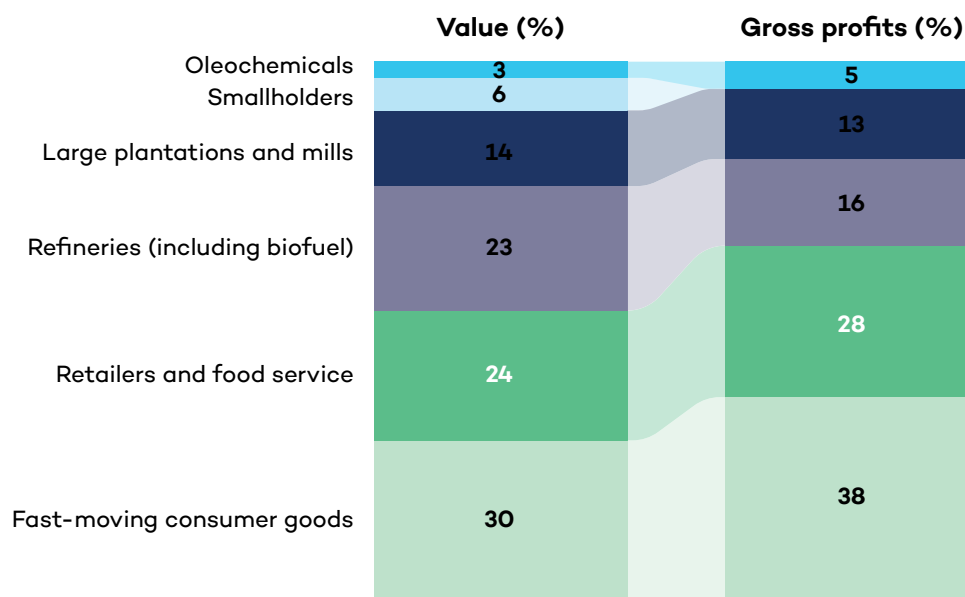
In addition, while independent farmers in countries such as Indonesia might consider selling FFBs directly to mills—which could offer them a higher price than intermediaries—they may be reluctant to enter into contracts with mills or longer-term contracts with companies because it ties them into a fixed price and prevents them from taking advantage of short-term, and sometimes more advantageous, changes in prices. In Indonesia, independent smallholders rarely have direct relationships with mills but instead sell their produce to intermediaries. This happens because farmers may not be able to cover the transportation costs and do not want to be bound by contractual commitments to mills; at the same time, the mills do not want to commit to providing any services without a contractual commitment from the smallholders (Bakhtary et al., 2021). Also, forward contracts pose a risk to small farmers, as they would not have enough fruit to deliver if pests or weather changes reduced production. A renegotiated contract would leave the small grower indebted to the mill for future delivery of the following year's harvest for the quantity undelivered at the lower price. This makes small farmers hesitant to commit a large portion of their fruit in forward sales or contracts, especially when prices are weak and they have no opportunity for upside benefit.

While farmers associated with large palm oil plantation groups or company-managed plantations usually receive better prices than independent smallholders in countries such as Indonesia, they also face challenges related to the lack of transparency in prices and payments from palm oil companies (Ruml & Qaim, 2021). For instance, smallholders participating in Indonesia's plasma program have reported a lack of access to complaint mechanisms and, in many cases, a lack of written contracts between the companies buying the FFBs and the smallholders. Typical complaints from farmers relate to infrequent or delayed payments from companies, a lack of clarity about calculations for payments or high deductions from their payments to cover other expenses related to management issues, debts, and lower prices than expected for their FFBs (Sri Rahayu et al., 2022; Tomte, 2018).

Market concentration at some stages of the value chain has led to low farm gate prices.

The palm oil value chain is short but complex. A handful of corporate groups dominate the processing and trade of palm oil due to the high capital investments required to set up processing and transport facilities. They also tend to capture the largest portion of value (Pacheco et al., 2017). Traders usually buy palm oil from refineries that can operate large palm plantations and source from thousands of palm oil mills and smallholders to produce CPO, PKO, and other derived products that are used by several industries, such as the fast-moving consumer goods industry,

Figure 5. Distribution of value and profits captured by different actors in the embedded palm oil value chain in 2020



Source: Authors' elaboration with data collected from Rijk et al., 2021.

oleochemicals, pharmaceuticals, and the retail and food service sectors.

The refining and trading stages of the palm oil chain are very influential drivers of the price at international and local levels. Market power is centralized in a few processing companies operating in Indonesia and Malaysia, with five large corporate groups controlling about two thirds of the total refining capacity and export volume from these countries, namely Wilmar International, Musim Mas, Golden Agri-Resources, Sime Darby, and FGV Holdings (Jong, 2020; Pirard et al., 2020; Rijk et al., 2021). At the country level, companies such as Wilmar, Sinar Mas, and Musim Mas own more than half of the refinery capacity and dominate palm oil exports from Indonesia. This market concentration means that smallholders—who account for about 40% of global CPO—have

limited power to negotiate the prices they receive (Pirard et al., 2020; Rijk et al., 2021).

In every step, palm oil is further processed or mixed with other ingredients to create different products, which adds value to the processed material but also complexity to understanding the profits obtained by each actor and in each stage in the value chain. A study by Chain Reaction Research in 2021 showing the value and profits of each actor in the palm oil value chain based on the estimated volumes of the processed or embedded palm oil used in each stage finds that the downstream part of the chain captures the most value and profit (about 54%). Specifically, the retail segment (supermarkets and food service) and the fast-moving consumer goods industry capture about 30% and 24%, respectively, of the total value in the embedded palm oil

value chain. These sectors also receive the largest gross profits across the chain, about 66%. The factors that contribute to such value share at this stage are the final value added and the investments made by these companies to process the palm oil, which explains the elevation or price premiums at the end of the chain.

These sectors are highly fragmented, however, with countless large and small companies sourcing palm oil to embed it into food, home, and personal care products globally. As a result, the value share and profits obtained from the use of palm oil may vary by company, depending on its size and the type of goods sold. Large multinational companies such as Unilever, PepsiCo, and P&G generate the biggest profits in this group as they specialize in marketing global brands, which can generate premium pricing, as well as efficient production (Rijk et al., 2021). As for other actors in the chain, the oleochemical sector generates about 3% of the total value and obtains roughly 5% of profits, while refineries, including biofuel refineries, generate around 23% of the value and about 16% of profits of the total value created in the palm oil chain.

The distribution of value and profits generated at the farm level varies depending on the type of plantation. For instance, plantation groups managing large areas of oil palm generate about 14% of the value of the embedded palm oil used along the value chain, with a similar proportion on profits. Independent smallholders tend to generate around 6% of the value of the embedded palm oil value chain, while their profits are close to zero (Rijk et al., 2021).

This shows how smallholders—who produce a large share of oil palm in countries such as Indonesia, Malaysia, and Thailand—are the big losers in the chain. Not only is their production not profitable, but they also must cope with rising production costs and a lack of access to finance and quality inputs. Furthermore, smallholder farmers are particularly susceptible to market fluctuations, as they are less buffered against risks compared to other actors downstream in the supply chain (Chu & Das, 2020; United Nations Development Programme [UNDP] China, 2020). Large commercial oil palm companies, processors, and retailers capture the most value in the chain and generate higher profits while also enjoying better access to capital and credit, buffering them from price volatility and market shocks.

What have VSSs done to pricing in the palm oil sector?

RSPO certification is the only VSS in the sector that has developed a system to trade certified palm oil and negotiate prices based on supply and demand for RSPO-compliant palm oil. RSPO also makes data on average prices and premiums obtained by its associated farmers and mills available. However, it has not yet implemented minimum prices for palm oil produced under its scheme. There is no formalized mechanism for arriving at a set price for farmers and mills producing VSS-compliant palm oil—including RSPO, Rainforest Alliance, ISCC, and Organic. The common practice for buyers and traders is to take the international commodity price and add a percentage

increase, often called a price premium, on which both the buyer and seller agree.

For the RSPO-compliant palm oil traded through different chain-of-custody models, premium pricing happens physically or through the PalmTrace platform (RSPO, 2023b). This is an online marketplace that allows mills, independent smallholders, and outgrowers to anonymously sell credits for their certified sustainable palm oil (CSPO) volumes while crushers can sell credits for their CSPKO and certified sustainable palm kernel expeller-certified volumes (RSPO, 2023b). Traders, refiners, manufacturers, and retailers can buy these credits under the book-and-claim model. The platform also allows physical transactions of palm oil under the identity-preserved, segregated, and mass-balance chain-of-custody models. Buyers pay an administration fee for the use of the platform per credit or per tonne of physical sales purchased (RSPO, 2023c).

One RSPO credit equals 1 tonne of RSPO-certified CSPO, CSPKO, or palm kernel expeller. The credit system depends on the willingness of buyers to make offers and liquidity in the marketplace. Credit prices are not fixed but rather determined by the interaction between sellers and buyers and depend on factors such as yields, credits offered, and the number of direct deals. The price received for the credits will determine the premium earned for producing CSPO. However, there are separate off-market or direct deals that offer the possibility to agree on a credit sale privately and offline at a different price (RSPO, 2023c).

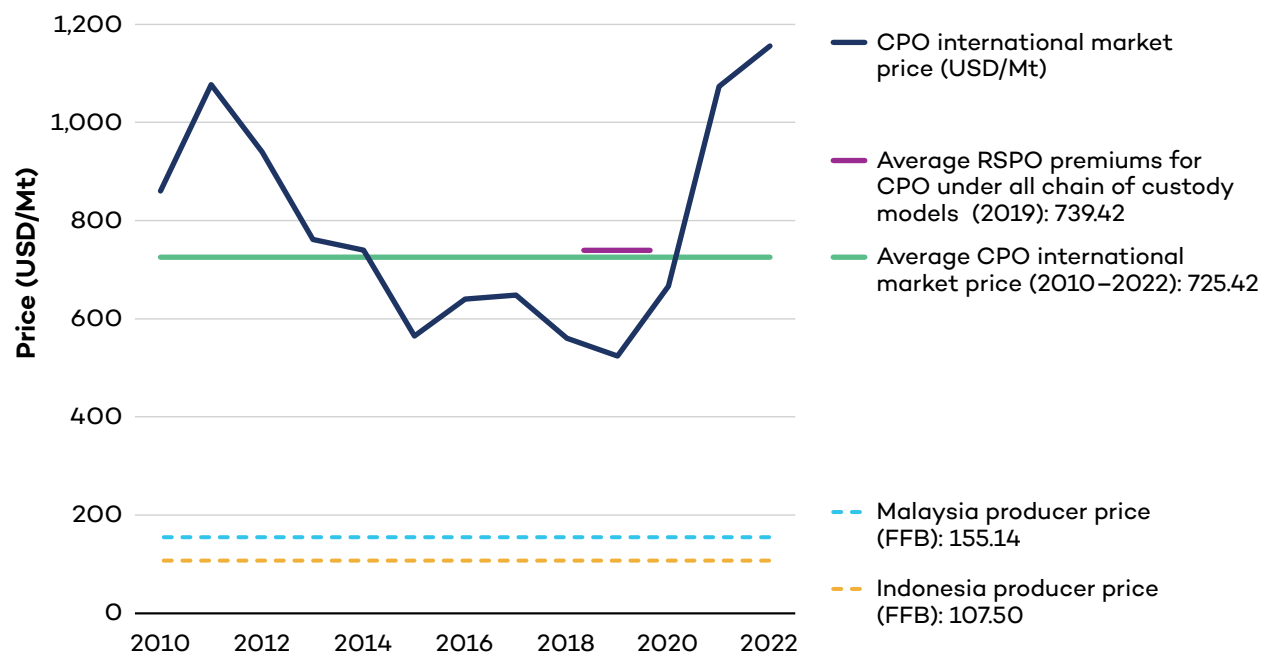
Research carried out by Proforest in 2019 shows that premiums paid for CSPO fluctuate with market demand (Enam,

2020). On average, the price and premium paid for CSPO exceeded the international conventional price that year. Among the chain-of-custody models, premiums were the lowest for palm oil bought through book and claim, ranging from USD 2.50 to USD 3.50 per tonne in 2019. This premium rose to between USD 6 and USD 17 per tonne for mass-balance palm oil and between USD 25 and USD 30 per tonne for RSPO-compliant palm oil bought through segregated or identity-preserved models (China Dialogue, 2021; Enam, 2020).

As for other VSSs in the sector, such as ISCC, which sells palm oil mainly to the biofuels market, public data on prices and premiums along the chain are non-existent, and it is unclear if premiums are provided to growers under the scheme and their amount. Given that premiums are not always secured when adopting VSS-compliant practices, with very few farmers receiving premiums, incentives to adopt VSSs or maintain certification remain minimal, especially for smallholders. However, smallholders have benefited in other ways from participating in VSSs in the palm oil sector, including the implementation of good agricultural practices that maintain soil health, improved understanding of fertilizer use and storage, and increased yields.

To better illustrate how RSPO premiums are positioned in the palm oil sector, Figure 6 showcases the average price for CPO in the international market from 2010 to 2022 and the average RSPO-certified CPO prices, including premiums (CSPO), in 2019. It also shows the average oil palm producer prices for FFBs in Malaysia and Indonesia from 2010 to 2020. It should be noted that the prices represented in Figure 6 are estimates

Figure 6. International market price – CPO (2010–2022); average prices and premiums for RSPO-certified CPO in 2019; and average oil palm prices (FFBs) received by producers in Malaysia and Indonesia in 2010–2020 (all USD/Mt)



Source: Authors' elaboration based on data from Enam, 2020; FAOSTAT, 2023; International Monetary Fund, 2023.

and do not reflect the reality of all oil palm growers in these countries.

Figure 6 shows that producers of FFBs in major exporting countries such as Malaysia and Indonesia received about 14% and 20%, respectively, of the final average price of a tonne of CPO sold in export markets from 2010 to 2020. Also, mills in these countries selling CPO for export markets under RSPO terms received slightly higher prices than the average market price for conventional CPO in 2019. On average, the RSPO premiums were about 2% higher than the market price in the period analyzed.

The figure shows that in 2019, farmers and mills selling RSPO-compliant CPO under any of the chain of custody models covered by the scheme may have received higher prices and premiums than those selling conventional CPO. Also, according to the literature, premiums above the market price may have differed slightly depending on the chain of custody model used, with growers selling book-and-claim credits getting USD 3/tonne in additional premiums, those selling mass-balance palm oil obtaining premiums of around USD 11.50/tonne, and those selling under segregated or identity-preserved models receiving around USD 27.50/tonne above the international CPO market price, based on data from 2019 (RSPO, 2023c).

From this, we can infer that buyers may be more willing to pay premium differentials for CSPO under segregated or identity-preserved supply chain models when international prices are low—while premiums are less common—or lower, when the international market price is high. Buyers would also have the incentive to use the book-and-claim credit system or the mass-balance model as cheaper alternatives to buy and report more sustainable purchases of palm oil.

Overall, the trade and pricing system implemented by RSPO gives farmers an opportunity to negotiate premiums for their production of more sustainable palm oil while also increasing market and price transparency by making data on transactions and prices paid available. The trade of RSPO credits is an alternative way for growers to receive a markup for sustainably produced CSPO and to protect them from market volatility. For instance, premiums for certificates under the RSPO standard rose due to increased demand for greener CSPO and CSPKO from 2008 to 2013, while the international price of CPO showed a sharp drop in 2011 (Butler, 2014). Also, the average premium for CSPKO certificates more than tripled to USD 21.08 per tonne in 2013, representing a 2.3% markup over conventional PKO (Butler, 2014).

Nevertheless, we can conclude that compliance with RSPO certification is profitable only if farmers can consistently receive high premium prices, either through physical sales or several credit transactions for RSPO-compliant palm/kernel oil, and if buyers are willing to make sufficient offers either for physical or credit transactions. Due to the complexity of the chain of custody, however, only large companies

that are vertically integrated can adopt the chain-of-custody models that lead to higher premiums, specifically under the segregated and identity-preserved models. This means that big and consolidated mills and vertically integrated palm oil companies can benefit from the highest price premiums of RSPO certification, rather than small producers in developing markets who have access to credit transactions under the book-and-claim model, only with lower premiums (Enam, 2020).

Evidence of the direct effects of VSSs on farmers' prices and incomes is very limited. Some studies show that the benefits for farmers complying with VSSs in the palm oil sector are not based on the provision of minimum prices and premiums but rather on other factors that ultimately increase their incomes, such as the implementation of good agricultural and management practices that result in productivity increases; more production efficiency that helps save costs; and less use of water, land, and fertilizers, as well as better access to international markets (UNDP China, 2020). A 2012 study showed that RSPO-certified farms in Thailand presented a 15% increase in FFB yield per ha, with compliant farmers earning about USD 2,383 more per year than conventional oil palm farmers as a result of both this yield increase and better agricultural practices that resulted in higher-quality fruits (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH, 2012). Another study, conducted in Indonesian Borneo, showed that farmers and mills associated with the RSPO scheme had almost three times higher yields of FFBs over time than non-certified farmers and mills (Morgans et al., 2018; UNDP China, 2020).

Although VSSs such as RSPO contribute to more transparency in the sector and offer a better understanding of pricing calculations for palm and kernel oil transactions, there are concerns that VSS-compliant palm oil still has a limited market and lacks a formalized system to calculate prices and premiums across the board. Also, monetary incentives to growers—such as price premiums—are absent or insufficient to cover the recurrent costs and fees of accessing certifications (China Dialogue, 2021; Rietberg, 2016; Suhada et al., 2018). Compliance with certifications adds an estimated cost of USD 8 to USD 12 per tonne, in addition to expenses such as audit fees, logistics, and environmental assessments, leaving oil palm growers with low margins (Enam, 2020).

It is also difficult for participants to quantify non-monetary incentives derived from accessing VSSs, such as long-term improvements, greater efficiency, cost savings, and higher yields. This diminishes the business case of VSSs in the sector and excludes smallholders from accessing certification (Bloomberg, 2019). Certification costs are also high for other actors along the supply chain, especially those at the segregation level, as the oil must be kept physically separated from conventional palm oil throughout the chain (WWF, 2012). This also explains that while CPO may be purchased as certified, it does not mean that PKO is later sold as such (RSPO, 2021).

While some farmers can benefit from premiums and prices that usually exceed the market price, these premiums are limited, depend on market conditions at the time of the negotiation with buyers, and are not guaranteed. Another challenge is the oversupply of VSS-compliant palm oil.

Demand is low because many buyers are unwilling to pay or negotiate higher prices than the market for certified palm or kernel oil. As already mentioned, about 36% to 50% of VSS-compliant palm oil was sold as conventional, without premiums, from 2019 to 2021 (Bloomberg, 2019; RSPO, 2023b). This situation affects VSS-compliant growers, who bear the risks and costs of certification but are not necessarily receiving the financial benefits of it.

In response to these concerns, RSPO's Shared Responsibility rules, approved by its members in 2019, emphasize the need to join efforts to address some of the challenges in the palm oil sector. RSPO has taken steps to improve the uptake of more sustainable palm oil across the board by requiring all supply chain actors to commit to the original goals of procuring 100% physical CSPO, as well as mandatory time-bound plans and public reporting, including a recently launched scorecard. This reiterated the original resolution that RSPO credits are acceptable for specific strategies but are considered a transitional tool toward 100% physical CSPO (RSPO, 2019b). The rules also establish specific requirements for other actors, such as RSPO member banks, to promote financial incentives and lower risks for RSPO-certified growers. In addition, they require all members—including banks and investors, retailers, processors, traders, and non-governmental organizations—to report publicly on their commitments and actions to support palm oil smallholders (RSPO, 2019b).

VSSs also recognize that many smallholders struggle with the cost of certification. They have adopted initiatives to help independent and small growers become certified and eliminate some barriers by

lowering the costs and accessibility to VSSs. Most certification systems (RSPO, ISCC, ISPO, and MSPO) have developed specific streams for the certification of independent smallholders that tend to have fewer criteria or indicators to reduce the burden while allowing time for continuous improvement and progress toward meeting the standard's requirements. These standards also encourage individual smallholders to join through group certification, usually under a single certificate, which can reduce efforts and costs (Peteru et al., 2022).

RSPO has helped smallholders by providing financial assistance to reduce costs through its Smallholder Support Fund. The fund disbursed MYR 20.1 million (around USD 4.5 million) to smallholder programs from 2013 to 2018, supporting 18,100 smallholders across Asia (i.e., Indonesia, Malaysia, and Thailand), Africa, and Latin America. RSPO also created a Smallholder Engagement Platform to connect smallholder groups with project partners, resources, and financial resources. During the pandemic, the standard waived certification costs for existing groups for a year (RSPO, 2023d). Though ISCC does not provide extra financial support to smallholders, it has initiated projects such as the ISCC Smallholder Academy to provide training and tools to enhance access to financial resources and offer a more effective but less costly certification process to smallholders (ISCC, 2018).

Public and private sector actors adopt other supporting measures.

Public and private sector actors have adopted initiatives to support farmers financially, promote better trade relations, and reinforce the regulatory environment in the palm oil sector. A few producing and exporting countries have also taken steps to protect the competitiveness of their palm oil export market, and some retailers are supporting direct trade relationships and providing better remuneration to oil palm growers that implement more sustainable production practices.

For instance, the Government of Colombia created an oil stabilization fund (FEP Palmero in Spanish) in 2012 to protect domestic palm oil prices from unexpected increases on international markets, ensure the domestic market is well served, and limit imports of higher-priced palm oil. As a result, local producers have more favourable conditions to sell palm oil on the domestic market, as those who sell to the export market and receive higher prices must pay a fee to the fund while those selling exclusively to the domestic market receive compensation (Brounen et al., 2021; Fedepalma, 2021). The Colombian government has also adopted the Andean Price Band System mechanism to stabilize import prices of certain agricultural products. It updates the import duties of the affected products, including palm oil imports, every 2 weeks to protect farmers from low international prices (Ghazoul, 2015; Global Trade Alert, 2023).

In India, the government has launched the National Mission on Edible Oils to improve production by providing subsidies in support of reimbursement on fertilizers and providing price guarantees to farmers to stimulate production and reduce dependence on imports. Oil palm farmers in India get 100% reimbursement on fertilizer usage during the gestation period of 4 to 5 years until fruits start bearing; they also get planting materials at subsidized rates. The government is considering expanding the assistance by providing direct cash transfers to cover additional costs that farmers incur to maintain the plantations. In addition, the government is planning to provide a guaranteed crop price to be fixed at 150% of the cost of oil palm production in the country, which would help increase smallholder farmers' incomes and protect them from the impacts of international price volatility (Financial Express, 2021).

More recently, in 2022, the government of Indonesia released a minimum price regulation after a dialogue with oil palm farmers, aiming to match the minimum prices they are paid with CPO international prices to reduce farmers' burden from higher fertilizer prices in recent years. The directive encourages oil palm plantation entrepreneurs to buy FFBs from farmers and their partners at prices above USD 0.13/kg or USD 130/tonne (Voi, 2022). In July 2022, the government temporarily removed the CPO export levy, which involved banning exports of CPO; cooking oil; and refined, bleached, and deodorized palm oil and palm olein to improve the availability and reduce the prices of these items in the domestic market (Fitch Ratings, 2022). FFB prices rose at the

national level, supporting farmers' prices as a result (Wapresri, 2022).

As for private sector actors, palm oil processors and other manufacturers in the fast-moving consumer goods industry are generally less focused on producers' prices and incomes and more concerned about protecting the human and labour rights of workers and smallholder farmers and their commitments to forest conservation in oil palm-growing regions. Companies using and processing palm oil, such as Nestlé, Ferrero, Cargill, and Unilever, are working to provide more transparency by sharing data on their progress in achieving deforestation-free palm oil and more sustainable sourcing commitments beyond VSSs. Yet commitments and more specific data on premiums paid and prices received by the smallholders from whom they purchase are still missing. For example, Cargill announced on its website in 2021 that it had paid about USD 165,000 in RSPO premiums to seven Indonesian palm oil cooperatives comprising 7,300 smallholders. However, it is not clear how the money was dispersed among the cooperatives, how much actually went to smallholders, and how often this type of premium is paid, limiting transparency on the benefits of certification for smallholders (Cargill, 2021).

Still, some buyers are starting to promote premiums and better trade relations in the sector. For instance, California-based personal care company Dr. Bronner's is working toward sourcing more sustainable palm oil in countries such as Ghana while providing higher wages than the market for Organic palm oil farms (Ellen Macarthur Foundation, n.d.). Non-governmental organizations and industry actors have organized other initiatives to promote more

transparency on pricing and trade in the sector. In 2016, the Asian Sustainable Palm Oil Network was created to generate a space for negotiation and support industry actors and VSSs, including ISPO and MSPO. Through this platform, new initiatives were spurred that addressed policy gaps around issues such as product quality and price management (Solidaridad, 2021a).

The Palm Oil Innovation Group, which has been established and endorsed by several key players in the palm oil supply chain—including Agropalma, DAABON, Ferrero, the Forest Peoples Programme, Greenpeace, Musim Mas Group, Rainforest Action Network, and WWF—is one of many multistakeholder initiatives that have committed to implementing responsible palm oil production practices by supporting the adoption of the RSPO. They also act as a forum to discuss and share innovations and improvements in plantation and mill management practices, as well as responsible procurement, and have started to work toward understanding and applying living wage benchmarks to workers in palm oil plantations across their operations (Palm Oil Innovation Group, 2023; UNDP China, 2020).

A Way Forward: What is needed to build a more sustainable palm oil sector?

Despite some efforts to provide better prices and stable incomes to farmers in the palm oil sector, more must be done to ensure that palm oil production can expand sustainably, producers are rewarded for implementing

more sustainable practices, and market access is assured. Addressing farmers' needs, especially in training on business, good agricultural practices, and access to market pricing information, can help to improve the livelihoods of the large number of smallholders around the globe who make up the palm oil sector.

The complexity of the value chain, with multiple and fragmented actors, significantly weakens the leverage of stakeholders acting on their own to produce meaningful change in the industry. Collaboration is needed from all actors in the value chain to create effective incentives to promote a more sustainable value chain, develop coordinated government policies, and allocate responsibilities and financial costs for the negative externalities of producing palm oil to all actors in the chain, especially those at the downstream stages (UNDP China, 2020).

Greater coordination is also required between voluntary and mandatory standards, as well as among private initiatives. In addition, governments in major producing, exporting, and importing countries and the private sector can play a key role in enacting policies and implementing measures to make the business case for VSSs and increase demand for more sustainably grown palm oil. Following are some of the best practices that these actors can undertake to promote a more sustainable palm oil value chain while remunerating farmers for committing to more sustainable practices.

VSSs can establish price systems that include minimum prices and premiums to compliant farmers. One of the main challenges facing smallholders across palm oil-producing countries is the absence of

premium prices for their sustainability efforts. VSSs in the sector should work toward a clear pricing system and include price models such as premiums or minimum prices that reflect the investments made to join their schemes and adopt sustainable production practices. This approach can also protect compliant farmers, especially smallholders, from low farm prices and help offset certification costs.

VSSs' prices for palm oil are still based on conventional prices dictated by the international market, and premiums, when paid, depend on the willingness of the buyer and the negotiation skills of the farmers and mill managers. Farmers do not have incentives to switch from conventional production systems to more sustainable ones. RSPO, ISCC, and other national sustainability standards, such as ISPO and MSPO, have not yet formally incorporated approaches to better remunerate compliant farmers, even if, in practice, some of these farmers receive price differentials.

In addition, the whole smallholder farming system must be considered when determining VSSs' prices and premiums so that small and independent farmers are not excluded from accessing certifications, as smallholder farmers' profits are much lower than those obtained by farmers who are associated with larger mills or farmers selling FFBs directly to vertically integrated companies. Therefore, it is important that prices and premiums in the sector are defined considering living incomes and living wage benchmarks, as well as the cost savings of adopting more sustainable palm oil practices.

To address these issues, the RSPO recently took a more active stance in understanding living wages in the palm oil sector. It

partnered with the Impact Institute, formerly True Price, to develop a definition of a living wage for palm oil by defining methods and making sample calculations for four palm oil-producing countries while ensuring that realistic estimates of living costs were considered. This gave RSPO a reasoned strategy to implement a living wage in the palm oil sector by weighing different factors, such as palm oil-specific working conditions, and varying national laws and local conditions (Impact Institute, 2022). VSSs can also promote the idea of companies downstream in the value chain signing long-term contracts with palm growers that include floor prices guaranteeing a return for producers. This would motivate more growers to get certified. As the costs of producing certified palm oil are unequally distributed across the production chain—with upstream producers covering higher production costs and certification fees while those further downstream get higher profits—these companies can also include other benefits in contracts, such as the provision of inputs; financing to balance fairness in the sector; and making the process of certifying palm oil more feasible for smallholders (China Dialogue, 2021).

Governments in major producing and consuming countries can implement mechanisms to support more sustainably produced palm oil by helping farmers join VSSs and improve their business cases. Growing demand for deforestation-free palm oil in markets such as the EU presents an opportunity for producing countries to invest in productivity improvements and replanting activities that support the environment. For this, they can join efforts and collaborate with VSSs already

operating in these countries, such as RSPO, ISCC, ISPO, and MSPO in Indonesia and Malaysia. Government agencies in producing and exporting countries can also use existing funds to help farmers access these certifications and offer monetary incentives and direct cash transfers to those adopting more sustainable practices. Supporting agroforestry systems is another opportunity, as it is seen as an effective mechanism to buffer against price volatility in palm oil and provide considerable economic and environmental improvements to farmers (Khasanah et al., 2020).

Some monetary incentives can be given to oil palm farmers who diversify or replant/replace low-yield oil palm trees with high-yield seedlings, including those complying with a certification scheme. These incentives could be payments for environmental services or carbon sequestration (Solidaridad, 2021b). Also, countries can support oil palm farmers in protecting the integrity of forests by enacting regulations and linking financial incentives to independent farmers who adopt measures to preserve forests and biodiversity. For example, in December 2021, Colombia's environmental ministry and the police jointly announced new measures to enforce deforestation as a crime, including a dedicated anti-deforestation police force and an online monitoring tool to track illegal sales of flora and fauna. The strategy emphasized prosecuting those directly responsible for environmental devastation (Cárdenas, 2021). However, these kinds of strategies should also offer compensation or rewards to those who prevent deforestation and implement better production practices, including palm oil farmers.

Some steps have been taken in this direction. For instance, in 2015, Indonesia and Malaysia launched the Council of Palm Oil Producing Countries, an intergovernmental palm oil council seeking to control the global supply of palm oil, stabilize prices, promote sustainable practices in the industry, and enhance the welfare and productivity of smallholders and the harmonization of the two national certification systems, ISPO and MSPO. Colombia joined the initiative in 2018.

Governments in producing countries can develop financing mechanisms for palm oil growers who adopt more sustainable practices by bringing the financial sector on board. Increasing access to credit and the development of new financing mechanisms would best meet the needs of smallholders and help them adopt palm oil growing practices that protect the environment and benefit communities. Between 2010 and 2016, international banks provided palm oil companies in Indonesia with more than USD 15 billion in corporate loans that have the potential to be linked to environmental practices that give positive results. Asian international financial institutions are the main financiers of the sector and have the potential to drive change through their practices.

Some efforts are being made in palm oil-producing countries. For instance, since 2018, Indonesia's financial services authority has discouraged financial institutions from lending to environmentally damaging projects and requires banks to include environmental sustainability standards, as well as social and governance aspects in loan assessment, which is a powerful incentive to create an enabling environment for green finance in

the country (Liebman et al., 2019; Raynaud et al., 2016). As a result, two of the largest Indonesian banks, PT Bank Central Asia and PT Bank Mandiri, have integrated sustainable financing criteria for the palm oil industry by requiring prospective debtors to comply with national policies and regulations related to human rights, labour, and the environment and to complete environmental impact analyses and undertake environmental management and monitoring efforts. They also require potential debtors to implement sustainable practices in their palm oil operations, including getting certifications such as ISPO and RSPO (Bank Mandiri, 2019; PT Bank Central Asia, n.d.).

Non-governmental organizations also play a crucial role in providing the support and capacity building required for smallholders to achieve certification and access to financial services (Apriani et al., 2020). For instance, the Sustainable and Climate Friendly Palm Oil Production and Procurement department in Thailand, supported by the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH, is developing a mobile-based app called i-PALM to provide tools and assistance to smallholder farmers in the country. The app allows farmers to obtain data on their practices (i.e., fertilizer amount used, harvesting period) to better understand and monitor their farming performance and improve their practices. It also has a checklist for internal audits, in preparation for certification requirements (Pongpiriyakit, 2021).

Support from the private sector for smallholder certification is important as well. One example is Wilmar International's work with Wild Asia, a Malaysian social enterprise that helps smallholders in Sabah

state obtain RSPO certification, and its offer of monetary and technical incentives in the form of premiums and agronomic advice to smallholders to encourage their interest in sustainability efforts and raise productivity (Wilmar, n.d.). Another example is Musim Mas, which supports smallholder ISPO certification in various provinces of Indonesia (Peteru et al., 2022).

Smallholder farmers and cooperatives should step up their collective action to improve their bargaining power.

Smallholder farms and their cooperatives also need more support to improve their bargaining power and access better resources and finance. In Indonesia, for instance, this can be done by developing more small- and large-scale refineries, as half of the domestic market is concentrated in a few companies that are vertically integrated into the value chain and have more leverage to dictate market prices in the country. Financial resources can help smallholders have an equal say in how prices are dictated and not be dominated by large corporations (Falak Medina, 2022).

Indeed, there are cases in the oil palm sector where successful collective action by farmers has resulted in comparatively high yields and incomes, thanks to organized and strong institutional arrangements, including effective conflict resolution mechanisms (Jelsma, Schoneveld et al., 2017). Organized smallholders and cooperatives could operate as important vehicles for accessing formal sources of inputs, disseminating knowledge in sustainable producing practices, facilitating collective bargaining, and strengthening direct linkages between corporate producers and independent smallholders. This suggests that upgrading independent smallholders at

scale and incentivizing investments require better collaboration among civil society, the private sector, and the state—for example, in developing coherent territorial policies and strategies, harmonizing resource allocations, managing risks, and exploiting differentiated capabilities (Jelsma, Slingerland et al., 2017).

The private sector plays a pivotal role in improving transparency on prices and premiums in the sector. Private sector actors, such as palm oil traders and other actors downstream in the value chain (i.e., manufacturers of food products and cosmetics), can lead the way toward greater transparency on prices and related information, including quality levels associated with prices or transportation costs in the palm oil sector. They have great power in the market, so they could have more insight and implement practices to better remunerate oil palm growers and plantation workers (Perkins, 2021).

Retailers, manufacturers, and processors sometimes issue a press release or report on premiums dispersed to cooperatives for a certain volume of palm oil used in their operations. Yet premiums are often communicated as a sum that goes to a group of farmers, and it is unclear how much is transferred to individual members and their equivalent per tonne. To tackle this, companies can support the implementation of tracing technologies such as blockchain, which would help improve transparency in a way that could benefit smallholders, as all transactions would be tracked in a transparent manner and in real time. They can also be more supportive of VSSs already operating in the sector by committing to purchase more physical volumes of CPO and collaborating with standards that provide long-term

support to smallholder farmers through business and good agricultural practices, education, and training.

VSSs and companies buying VSS-compliant oil can also work to ensure that communication on paid premiums is reported not only at the group level but down to the farmer level. While this can be difficult for companies, as they often buy directly from a group or a mill, they do have expansive monitoring programs that could improve transparency at this level. Also, more transparency could underpin stakeholder discussions on the fairness of costs to implement measures on forest conservation or other issues, such as the cost of reforestation/restoration, monitoring, and verification (Rijk et al., 2021).

Finally, industry associations can take steps to increase price transparency in the sector. There are several palm oil associations and networks, such as the Asian Sustainable Palm Oil Network, which brings together organizations such as ISPO, MSPO, and IPOS (Solidaridad, 2021a). Creating price transparency by reporting via these multistakeholder initiatives could reduce price uncertainty and disparity among different regions within a country. The publication of price dashboards, with anonymous data provided by companies, governments, and other actors along the chain, could help communicate the availability of pricing information.

Boosting demand for more sustainable palm oil, including VSS-compliant palm oil, in key consumer markets in Asia is crucial. Major palm oil-consuming countries are an important driver in balancing the market for VSS-compliant palm oil.

However, demand for more sustainable palm oil in countries such as China, India, and Indonesia is inadequate, as local consumers have little awareness of environmental and social concerns in the palm oil sector. Developing countries usually focus on price competitiveness, with no or limited concern for sustainability issues. Demand for VSS-compliant palm oil differs significantly among the biggest consumers of palm oil. For instance, three quarters of the palm oil imported into Europe complies with a VSS, while only 1% of Chinese imports are certified (UNDP China, 2020). As long as the demand for conventional palm oil remains strong in developing countries, voluntary standards will be ineffective in meaningfully curbing unsustainable practices in the sector. Powerful market incentives are missing for stakeholders along the chain and cannot therefore bring meaningful changes.

Signals and incentives should also come from the financial market. As a capital-intensive sector, funding from financial institutions is a key factor in enabling corporate oil palm expansion. Such funding can be pivotal in reversing environmentally destructive practices and strengthening and improving sustainability standards across the supply chain. China, for instance, is well positioned to leverage these instruments further and help other countries align private capital with sustainable practices in palm oil and the 2030 Agenda for Sustainable Development Goals (UNDP China, 2020).

China and India are key actors in expanding the sustainable consumption of palm oil globally, given their size and growing importance as palm oil end markets. Efforts from these countries to consume more sustainable palm oil would have major

implications upstream by incentivizing producers to integrate more sustainable practices and support the implementation of sustainability standards (UNDP China, 2020). This can be done through measures like preferential taxes or tariffs encouraging the consumption of more sustainable palm oil while offering strong economic incentives to producers. Concerted efforts to promote sustainable agriculture could also provide a platform to exchange innovation and technology, know-how, and successful experiences in social and environmental sustainability (UNDP China, 2020).

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The *Global Market Report* analyzes trends in palm oil production, consumption, trade flows, and other relevant areas. It uses 2019 data for palm oil production that is VSS-compliant, given that this was the most current data available when we conducted the analysis. The report also examines prices and margins in the palm oil sector, looking at how VSSs contribute to increasing farm prices. It also provides recommendations to VSSs and other actors to increase the price and income that farmers obtain for palm oil and build sustainable and resilient palm oil systems.

IISD's State of Sustainability Initiatives advances sustainable and inclusive value chains by providing credible and solutions-oriented research, dialogue, and strategic advice for decision-makers about voluntary sustainability standards and other supportive initiatives.

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