



中外对话
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Palm oil: making supply chains fairer



**True sustainability
means addressing
social justice as well as
environmental impacts**

Introduction

Dr Josie Phillips,
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In its native West Africa, the oil palm (*Eleais guineensis*) has been central to livelihoods and community-based food production for thousands of years. But during the colonial era, it was expropriated for large-scale plantations across the tropics. As companies sought to profit from rising demand in an increasingly industrialised Europe, palm oil seeped into myriad processes and end products. Today, it is deeply embedded in modern life, used to manufacture everything from foods to biofuels, plastics and cosmetics.

Though the industry has brought significant economic development, its rapid expansion – a seven-fold increase in production since 1990 – has not delivered benefits to all. In Indonesia and Malaysia, which together produce around 85% of the world's palm oil,

agricultural expansion has come largely at the cost of tropical forests and peatlands which are full of biodiversity and carbon. It has provoked conflict with local communities and indigenous peoples whose ways of living have frequently been sidelined in favour of corporate control of land.


The campaigning of environmental and social justice groups has raised the profile of palm oil and its supply chains. Their focus on the industry's impacts, supported by powerful imagery, has created a negative perception in some consumer markets. It has done little to dent demand for palm oil, but it has triggered a response from companies keen to source the commodity sustainably.

Several certification schemes have been developed to improve the sustainability of production. The most widely recognised is the Roundtable on Sustainable Palm Oil (RSPO) which covers around 19% of global production.

While RSPO has catalysed change in developing industry best practices, the volume of certified oil traded has stagnated in recent years, and the organisation faces criticism from NGOs for failing to hold member companies accountable for errors and violations.

China Dialogue has been examining the industry's efforts to transition to a more sustainable model. This year, our network of reporters has contributed thought-provoking pieces on the industry's development challenges and brought to light actions that can drive positive change.

From Sierra Leone, Abdul Brima covered the decade-long conflict between residents of the town of Malen, their leaders, government and a subsidiary of Luxembourg-based plantation company Socfin. People shared stories of how their lives have changed since the company arrived, for better and worse. Despite accusations of human rights violations,



corruption and environmental degradation, in December 2021 the plantation was awarded initial RSPO certification.

Over the past year, the industry has been following Europe's plans to reduce its impact on deforestation by restricting imports. Between 1990 and 2008, the EU consumed a third of globally traded forest-risk commodities, accounting for around 10% of worldwide deforestation linked to the production of goods and services. In an opinion piece that drew on a study he co-authored, Jonah Busch suggested that by banning imports of high-deforestation palm oil, Europe would only have a minimal impact on Indonesia's deforestation and greenhouse gas emissions. Busch showed that positive support for conservation may be more effective.

The need to generate revenue streams to help producers transition to sustainable production methods and

reduce pressure on forests is a theme of our coverage. An article I wrote explored the additional actions needed from stakeholders if Europe is to build a "forest-positive future", with a focus on how social justice can eliminate deforestation from supply chains. By including and respecting diverse perspectives in decision-making processes, the industry can transform itself and pave the way for transforming other commodity markets.

It's one thing for consumer countries to force action by restricting trade, but as Andre Barahamin explores, palm oil producer countries like Indonesia have the power to "lead the market by example". But, despite recent updates to its mandatory national palm oil standard, ISPO, Indonesia is yet to ratify a convention recognising indigenous peoples' right to self-determination within a nation-state, including the right to a land base. If it were to step up, and place sanctions on companies operating

illegally in customary forests, that would boost national efforts to fight deforestation and combat the climate crisis. Right now, ISPO is struggling to impose any authority over these companies, in part due to unclear ownership of plantations.

Some consumer countries may be restricting trade, but the Indian and Chinese markets are burgeoning. According to the US Department of Agriculture, they accounted for around 11% and 7% of global consumption respectively in 2021. Both markets are highly sensitive to price. Their need to keep costs down is hampering progress on sustainable palm oil, which relies on generating price premiums for producers.

Omair Ahmed examined the Indian government's ambitious plan for developing large-scale domestic production through its "national mission" on oil palm. While the government has been trying for some

time, efforts to scale up production have so far yielded little. A recent decision to offer a minimum price to farmers so they don't lose money may offer some encouragement, but it remains unclear whether large-scale production is viable in India.

These themes were also followed by Bikash Kumar Bhattacharya who visited farmers pioneering oil cultivation in the Himalayan foothills of Arunachal Pradesh. But without critical infrastructure to support the development of production, farmers have nowhere to send their palm fruit. For now, it seems this region is failing to experience the prosperity promised as part of the government's push for expansion.

Unlike India, China is entirely reliant on imports to meet its demand for palm oil, at a cost of over US\$4 billion each year. This has prompted its government to explore producing palm oil at home. Jiang Yifan provides a fascinating account of China's research in developing specially bred varieties of oil palm and the trials towards a domestic plantation sector. The many challenges, including high costs and poor yields, mean it's unlikely that palm oil grown in China will be commercially available anytime soon. But Chinese companies developing plantations overseas are benefiting from these learnings and may develop new solutions for sustainable production.

Fang Lifeng, head of RSPO China, explains that China's reliance on imported vegetable oils makes it vulnerable to supply disruption and price shocks. Fang describes how support for sustainable palm oil in China could strengthen the stability of its supply chains, especially through national strategic planning and bilateral dialogues between producer and consumer countries.

China Dialogue continued to examine the environmental impacts of palm oil production. Nithin Coca

examined the yield argument used by proponents of palm oil to justify its prevalence in global vegetable oil production. While it is true that oil palm is far more productive per area of land than soya, sunflower, rapeseed or coconut, this comparison fails to consider location-specific impacts in terms of land use change and emissions. As palm oil demand continues to rise, we must examine more critically both the key narratives used to justify industrial-scale production and the industry's murky supply chains.

Another area that continues to warrant focus is the demand for palm oil for producing biofuels. Monica Prestes reported from Brazil on recent plans to develop a new "green diesel" biorefinery whose supply will require the country to increase its oil palm hectareage by 60%. While many see biofuels as less polluting than fossil-based diesel, environmentalists warn that expanding infrastructure for palm oil production in the Amazon could be devastating for forests, biodiversity and indigenous communities.

One pathway to developing fairer production systems is regenerative agriculture, and this is being increasingly recognised in global discourse. In her article, Emma Bryce explores the methods of intercropping and agroforestry to transform farmland into mixed-use systems which deliver ecosystem services, alongside economic and social benefits. Despite the benefits, significant questions remain over how to encourage small-scale farmers to adopt them and whether these practices can be scaled to massive commercial plantations.

Another article from Emma Bryce followed an interview with Martin Huxtable, director of sustainable sourcing at Unilever, the world's largest single user of palm oil. It has been connected to palm oil for over a century, but today the company is focusing on new technologies to eliminate deforestation from its

supply chains. Unilever's ambitions to improve transparency around the critical "first mile" could, if successfully implemented, set a new benchmark for major users of palm oil.

Economist Khor Yu Leng describes how the impacts of Covid-19, government mandates on biofuels and supply shortfalls, created "a perfect storm" for surging prices, even before Russia's invasion of Ukraine sent global vegetable oil supply into disarray. In the past, palm oil price spikes have been linked with oil palm expansion, but deforestation rates have declined in recent years under certification and other initiatives. However, there is still concern that deforestation may enter supply chains through expansion of smaller estates and smallholder farmers. Khor Yu Leng explains why transparency on the RSPO price premiums for certified products is needed to distribute premiums equitably and incentivise growers to make the shift to sustainable production.

One area where transparency may be hindered is the production of palm derivatives and oleochemicals. Chih-Ching Lan and I explain the process of breaking down palm oil into these imported value-added products. Downstream users of these products say that the complexity of the supply chain is preventing them from sourcing sustainable palm oil derived products. But until awareness is raised of the many industrial processes and products that depend on palm oil, and its environmental impacts, there really is little impetus for change.

In the next year of its reporting, China Dialogue will continue to share stories at the intersection of the impacts and opportunities of palm oil in both established and developing production regions. It will also focus on the policies and practices shaping national and international markets, and the actors who are driving positive change towards more inclusive and equitable supply chains. 🌱

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Sierra Leone's conflict palm oil certified as sustainable

Some community members accuse Socfin of land-grabbing and pollution. We visited the company's plantation in Malen to find out what's happening beneath the palm fronds.

Abdul Brima
| July 8, 2022

Malen Chiefdom sits on a dusty highway, 90 minutes' drive from the district capital of Pujehun in southern Sierra Leone. The past decade has seen the landscape here transformed. Gone are the bushlands and subsistence farms more typical of this region. In their stead are thousands of hectares of oil palms.

Equally transformed is the peace and tranquillity of this far-flung corner of West Africa, rocked by violence and division since the arrival of the oil palms. The conflict over land that disaffected locals say was taken from them without their consent or proper compensation continues to this day. Meanwhile, the plantation company at the heart of it all has just been awarded

the coveted seal of approval by the world's leading sustainable palm oil body, the RSPO.

It all started in 2011, when the Socfin Agricultural Company (SAC) entered into a 50-year land lease agreement with the government of Sierra Leone and Malen's local authority, the Chiefdom Council. SAC is a subsidiary of the Socfin Group, an agro-industrial multinational headquartered in Luxembourg. The original agreement leased 16,249 acres (6,576 hectares) to the company, but additional agreements over subsequent years have added substantially to that number. On paper, SAC's concession currently covers 18,473 hectares (ha), nearly 70% of the chiefdom's total area of 27,000 ha. Of this, 12,349 ha is now planted with oil palm, making it the largest active

oil palm plantation in the country, according to data from non-profit GRAIN.

A decade of conflict

This land deal has proved controversial since the beginning. A selection of community members denounced it as illegitimate shortly after the signing of the first lease. Organised under the Malen Affected Land Owners Association (MALOA), in October 2011 they sent a letter to the government claiming among other things that the agreement was made without transparency or proper consultation with local stakeholders, and that compensation for the land leased was "a pittance" and "unacceptable". The letter also accused Malen's Paramount Chief



The location of the Socfin Agriculture Company's oil palm concession in Pujehun district, Sierra Leone (Graphic: China Dialogue)

Victor Kebbie – head of the Chiefdom Council and the main force behind the deal – of accepting bribes from SAC and intimidating landowners into signing the lease.

In the same month, tensions over the deal erupted into a protest, with over 100 landowners blockading roads leading into SAC's concession area. This was met with the arrest of 40 people, 15 of whom were charged with "riotous conduct, conspiracy, and threatening language" according to US thinktank the Oakland Institute.

Since then, the situation has continued to escalate, leading in January 2019 to violence that resulted in the deaths of two men from gunshot wounds. In their report on the incident, local NGO Green Scenery, which has followed the conflict since the beginning, alleges human rights abuses, warning that the use of "arbitrary arrest" and "excessive force" by a "heavily armed military and police presence" in the chiefdom has resulted in "an

unprecedented climate of tension and fear".

There have been many attempts to resolve the conflict over the years, but none has so far succeeded, according to the Belgian arm of global human rights organisation FIAN. In 2018, Sierra Leone's president, Julius Maada Bio, made a campaign promise to resolve the situation – a promise he



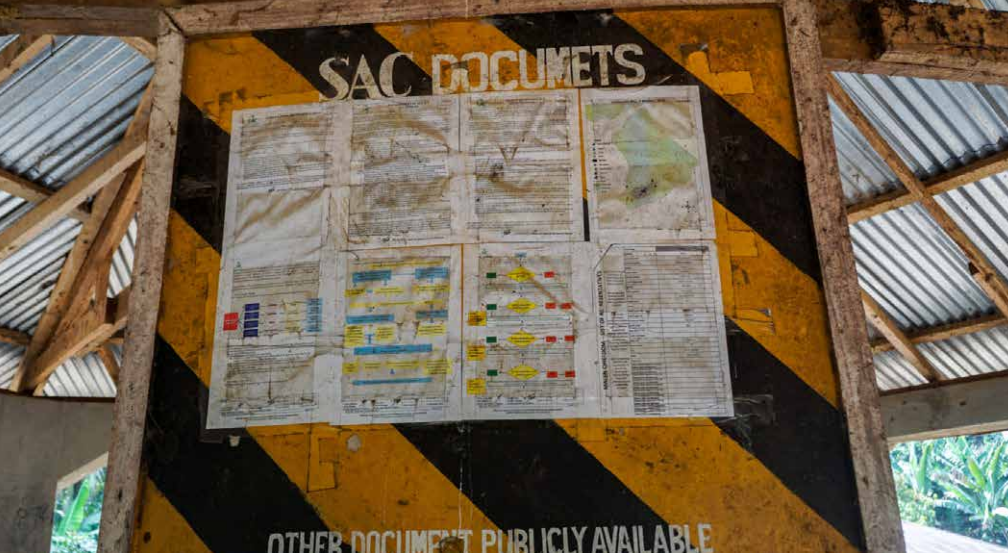
"Reconciliation, unity, peace and development" states a sign in Malen's main town of Sahn (Image: Saidu Bah / China Dialogue)

followed through with once elected, by setting up a mediation committee. The committee proceeded to investigate, and the following year submitted a 17-page report supporting many of the grievances of the community against SAC and the Malen authorities. These included the fact that SAC's concession exceeded its on-paper area of 18,473 ha by more than 650 ha. Although a leaked version of the report is freely available online, it has yet to be officially released. According to MALOA and NGOs supporting the group, no action has so far been taken by the government in response to it. The latest effort to mediate, as part of a two-year peacebuilding project funded by the UN Development Programme and the World Food Programme, has also fallen foul, with MALOA again expressing their dissatisfaction after apparently not being invited to participate.

Enter the RSPO

It was against this backdrop that, in December 2021, the plantation and its mill were awarded initial certification by the Roundtable on Sustainable Palm Oil (RSPO). This means that all of the palm oil produced by the plantation is now certified as sustainable: it is deemed to have met the RSPO's Principles & Criteria – a wide-ranging set of standards that serve as a benchmark for measuring sustainability within the palm oil industry. Central to these standards is respect for community and human rights, including the need for "free, prior and informed consent" from users when their land is repurposed for oil palms, and proper compensation for the loss of user rights.

To gain RSPO certification, SAC went through a lengthy audit process – including two visits to the plantation by third-party auditor SCS Global Services in the second half of 2020. According to their report, which was only made available on the RSPO's website in February this year, SCS Global's team met with a wide range of stakeholders during their audit, including MALOA (although MALOA seems to deny this).



A public notice board in a Malen village meeting hall where SAC publishes information about its operations. With low levels of literacy and education in rural Sierra Leone, documents like this need to be explained verbally for community members to fully understand their meaning. (Image: Saidu Bah / China Dialogue)

The report recorded the grievances aired by each party during these meetings. And yet, in its findings, it only listed three “observations” against RSPO principles applicable to the land conflict. Observations are considered no more than “notes from the audit team”, and corrective actions are “voluntary and do not affect the standing of the certification”.

The audit report listed four “critical nonconformities”, which if not corrected would lead to a failure to gain certification. By the end of last year, when certification was granted, three of these had been corrected by SAC. The one that remained referred to the clearance of land without first assessing it for its conservation value or value as a carbon store. SAC was given 12 months to find a way to remediate or compensate for this or have its certificate suspended. The audit report states that the RSPO is confident the company is “committed” to this process. But the body has also rejected all of the remediation methods SAC has so far proposed. It seems there are “difficulties” finding a way to make amends in Sierra Leone, so SAC’s latest remediation proposal is a project in Cameroon instead.

Given how little time remains and how controversial a sticking point this appears to be, SAC may well lose its new-found sustainable status come the end of this year.

‘We were forced into it. We had no choice.’

The Malen land deal and the arrival of SAC have had a very real impact on the ground, quite beyond the violence of the conflict.

Before being covered by oil palms, the land now under SAC’s control was the main source of food for the people of Malen. A 2019 report by FIAN describes how communities farmed “a nutritious range of foods”, and even land they’d left fallow to regain its fertility – a practice of rotational agriculture common across Sierra Leone – “continued as a source of firewood, bush meat, wild plants, honey

and herbs”. The loss of access to this land has had a major impact on food security in the chiefdom, the report says.

Even those who were compensated for the loss of their land are suffering this impact. Hawa Koroma is a widow in her early 60s who lives in the village of Heinie, where she raised her eight children. She received a one-off payment of two million leones (then worth roughly US\$460) when she leased her land to SAC in 2012. This money was quickly used up paying for school fees and buying zinc to fix her leaking roof. She continues to receive a small sum of 20,000 leones (currently about US\$1.50) as rent every year – but this in no way makes up for the loss of her land, on which she used to be able to grow enough crops to feed her family. Now, to survive, she relies mainly on backyard gardening and a small business selling cooking oil, cigarettes, biscuits and other food items from a wooden table on her veranda.

Along with her land, Koroma lost an asset that many in rural Sierra Leone consider vital: her own oil palms. The species is native to West Africa – those households with enough land will tend to cultivate the crop, producing oil from the fruit using traditional, manual techniques. The oil has long played a



Hawa Koroma felt forced to lease her land to SAC in 2012. Now she survives by selling small items from a makeshift stall outside her home. (Image: Saidu Bah / China Dialogue)



Video: Saidu Bah & Abdul Brima / China Dialogue



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central role in cuisine and culture across the region, and remains valuable not only for food security, but also to the grassroots economy. Koroma used to be able to sell her surplus palm oil, but can now no longer rely on this much-needed boon to her household finances.

For Koroma, though, there are deeper injustices. She claims her household owned four acres (1.6 ha) of land, but SAC only compensated her for two acres after making their own measurements. Plots of land have yet to be clearly mapped in rural Sierra Leone, with traditional property boundaries “demarcated by things like big branches”, says an article by Mongabay. Even with the best will in the world, this makes things difficult when a company like SAC moves in with a survey team. For MALOA, it allowed for “high levels of corruption”, with SAC cheating landowners “by entering the wrong figures”.

Even with fair demarcations, Koroma is adamant she would not have leased her land if she’d been free to choose. “It was a matter of either leasing the land or running the risk of losing both the land and the money. We were forced into it. We had no choice,” she says.

One of the reasons Koroma felt she had no choice takes us back to Malen’s Chiefdom Council and Paramount Chief Victor Kebbie. Paramount chiefs wield a huge amount of power in rural Sierra

Leone. This is in large part due to the laws governing land tenure. Since colonial times, when “native ownership of the land by the tribes” was recognised, a system of either community or family tenure has been in place in rural areas, according to an analysis of the Malen deal by legal adviser Patrick N. Johnbull. However, due to the communal nature of this ownership, land is seen to be held in trust on behalf of these groups by the “Tribal Authorities”. These continue to be defined in Sierra Leone’s current land laws as: “paramount chiefs and their councillors, and men of note, or sub-chiefs and their councillors, and men of note”.

What this means in practice differs from chiefdom to chiefdom. In Malen, the paramount chief is “the highest custodian” of land with a central role in granting access to it, according to a case study by Welthungerhilfe, a German NGO active in the region. Add to this the fact that Victor Kebbie is, according to Mongabay, one of the most powerful paramount chiefs in the country, and it’s easy to understand why a landowner like Koroma might feel obliged to do as she’s told.

The other side of the coin

Why then did Malen’s paramount chief feel inclined to turn over 70% of his chiefdom to an oil palm plantation? Chiefdom Speaker Shempbe Robert

Moiguah gives an answer of sorts: development. “Before this time, there were lots of thatched houses in Malen. But now there are very few, and the population has grown, so too the [number of] good roads,” he says, half asleep under the eaves of his home. Moiguah insists that SAC is in the area to stay, and that the Chiefdom Council will do what is necessary to make sure the company fulfils all its promises to the community.

Many of these promises were laid out as “community development action plans” in the company’s 2011 Environmental, Social and Health Impact



Video: Saidu Bah & Abdul Brima / China Dialogue



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A water pump installed by SAC in Heinie village (Image: Saidu Bah / China Dialogue)



Tailor Mohamed Keita benefits from a contract to make uniforms for SAC workers (Image: Saidu Bah / China Dialogue)

Assessment, a necessary prerequisite for obtaining an environmental licence to operate in Sierra Leone. In its 2019 report, FIAN analysed the company's spending against these plans between 2011 and 2017, and identified "major gaps" between what was promised and the reality on the ground.

One such gap is a planned smallholder out-grower scheme, whereby local farmers could sell the oil palm fruit they produce to the company. SAC earmarked US\$7,824,000 for this scheme between 2014 and 2025. FIAN found that none of this had been spent by 2017.

Other promises have yielded results, though. More has been spent on building and maintaining roads around the plantation than had been planned. While this clearly benefits SAC, it does also make it easier for local residents to get around. Investment in community projects such as wells and schools are also clearly in evidence.

It is also true that many have benefited from the employment the plantation has brought to Malen. "Working in this company is good for me," says Ibrahim Amara, a SAC employee. "If it was not for this job, I would struggle to provide for my family." Amara works as a palm fruit harvester who also cleans around the plantation. With the money he earns, he has managed to build himself a house, and can also send his children to school. Despite allegations of poor working conditions by groups like MALOA, there

tailor who runs a shop in Malen's main town of Sahn, and was contracted in 2015 to make uniforms for the company's workers. "I make roughly 500 uniforms [a year] and earn about 10 million leones (currently just over US\$750) from that, all thanks to the company," he says.

'Now they are polluting our water'

The pros and cons of the land deal have been forensically examined by both NGOs and the media. Less well covered is the environmental impact SAC's arrival has had in Malen.

Beyond the loss of their farms and the bushland that once provided for them, local people are also being impacted by pollution. The culprit is not only the roughly 100 metric tonnes of chemicals used on the palms each year to keep them productive, but also the mill, built on the plantation in 2015 and expected to produce over 45,000 tonnes of crude palm oil this year, according to the RSPO's audit report.

Those living within the plantation concession area (an extraordinary total of more than 32,000 people by FIAN's reckoning) are especially vulnerable due to the lack of buffer zones, according to the 2019 government report on



Amara's hands show how hard the work on the plantation is (Image: Saidu Bah / China Dialogue)

is still a long queue of people waiting to be employed by the company.

SAC's presence has also had a trickle-down effect, creating jobs within the community. Mohamed Keita is a



SAC's oil palm mill was built in 2015 to process fruit from its Malen plantation. The mill is expected to produce over 45,000 tonnes of crude palm oil this year. (Image: Saidu Bah / China Dialogue)

the land conflict. Both the company's Environmental, Social and Health Impact Assessment and the RSPO's Principles & Criteria emphasise the need for buffer zones or greenbelts around plantations. This is not only to keep communities safe from pollutants like agrochemicals, but also to protect watersheds and conserve biodiversity and ecosystem functions.

Fisher Salia Lebbie, 53, has lived all his life in the tiny village of Massao, 1.5km downstream from SAC's mill on the banks of the Malen River. Lebbie's community relies on the river for their drinking water, as well for transportation and washing, and as a source of food.

"I grew up knowing this water as the source of our livelihood. I learnt how to fish and ride boats in it," says Lebbie. Now without as much land as before to grow groundnuts, cassava, beans and other crops, the river has become even more essential. "My family's survival depends on it," he explains.

But all is not well with the river. Lebbie describes how "there are times the water changes colour to brown and sometimes we see dead fish floating in it". He's clear of the cause, accusing SAC of releasing waste from the mill, indirectly via the occasional overflow of ponds used to treat the effluent, as well as directly through pipes that empty straight into the river and its wetlands. "They took our land, and now they are polluting our water," he says.

The situation is equally troubling in Kortumahun, which is right next to the mill. Residents say the stench generated by waste from the mill is so bad they must cover their noses. They are also worried about the potential health implications, complaining of not being able to sit outside at night because of the profusion of mosquitos – a situation they blame on the ponds used to treat the mill waste.

For 34-year-old farmer Sidie Swaray, the situation really hit home when his



Residents of Kortumahun village, which is right next to SAC's mill, rely on the Malen River for everything from drinking water to transportation (Image: Saidu Bah / China Dialogue)



Kadiatu Fofanah shows off the fish and snails she has caught in the river, an essential source of protein for the people of Kortumahun (Image: Saidu Bah / China Dialogue)



Video: Saidu Bah & Abdul Brima / China Dialogue



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two children came down with malaria in December last year. The problem gets worse during the rainy season (May to October), he says, when people also report more cases of diarrhoea and cholera.

Roughly 30 minutes' drive south from Kortumahun is Hongai village, where there is a small community health post managed by two healthcare providers. Josephine Yankuba, the nurse in charge of the facility, says they provide care to nearly 2,000 people across 10 catchment communities including Kortumahun and Massao.

Yankuba confirms that cases of malaria, cholera and diarrhoea are common during the rainy season, but says they now see high numbers even during the dry season (November to April). Between September and December last year, the facility treated 69 cases of diarrhoea alone – many of the patients were children. Yankuba attributes the situation to a lack of access to clean water, with many patients complaining their rivers have been contaminated by SAC's operations.

"We have cried a lot about this pollution. We have even lodged a formal complaint to the Environment Protection Agency," says MALOA Coordinator Kinney James Blango. He tells China Dialogue the government agency has investigated the matter, but the affected communities still await its findings.

Palm oil for all?

One of the reasons SAC gives for its presence in Sierra Leone is the unmet domestic demand for palm oil. On its website it claims that the average monthly consumption in the country is one kilo per person. Traditional, artisanal production is unable to meet this demand, it says, and in 2019, “50% of oil consumed on the local market was imported”.

SAC gives the strong impression that this consumption is all food-related, but this is misleading. A 2019 value chain analysis by the European Commission agrees that there is an “overall deficit of palm oil for food use” in Sierra Leone. But it argues this is mainly because high volumes of the oil are diverted into the production of soap for export to the wider West African market. As such, it would seem SAC’s self-proclaimed goal to be “the main palm oil supplier on the domestic market” has very little to do with supporting food security in Sierra Leone, which the company acknowledges is “at the bottom of the list of food-producing countries”.

On the ground, the deficit of what in Sierra Leone is considered an essential food item is clearly evident in its high prices – a pint of palm oil currently costs up to 6,000 leones (US\$0.45). This, combined with one of the world’s highest rates of inflation (that pint of palm oil has more than tripled in price over the past decade), has made palm oil unaffordable for some consumers, especially in a country where more than 50% of the population lives on less than US\$1.25 a day.

It is only those who have access to their own oil palms that enjoy some protection from these market pressures. In Malen, this means the small group of landowners who have resisted the expansion of SAC’s plantation.

Bockarie Landa lives with his wife and five children in Jao, a village to the northeast of SAC’s plantation still surrounded by forest. Landa owns about three hectares of land, which includes his own small plantation of oil palms.



Bockarie Landa has resisted the expansion of SAC’s plantation and retained control over his own oil palms (Image: Saidu Bah / China Dialogue)



Landa’s elder sister works to extract oil from the oil palm fruit. Men are traditionally the ones to harvest the fruit, but women provide most of the labour needed to produce the oil. (Image: Saidu Bah / China Dialogue)

He has never regretted the decision to keep hold of these assets, but it wasn’t easy. He wouldn’t have been able to resist pressure from the Chiefdom Council without the support of MALOA, many members of which have suffered repeated arrests and threats to their safety. And now Landa and those like him in his community are fighting again – this time for the freedom to work their own farms.

“They don’t allow us to process our palm oil. They try to stop us because they know that if we process our oil, we



Video: Saidu Bah & Abdul Brima / China Dialogue



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Bockarie Landa has resisted the expansion of SAC's plantation and retained control over his own oil palms (Image: Saidu Bah / China Dialogue)

will get enough money and we will not need to work for them," he says.

Bockarie has to keep the palm oil he makes secret, producing it in a hidden location in the bush, and smuggling the oil to market in a canoe. "Otherwise, they will seize all of it and arrest me for stealing [oil palm fruit] from the company," he says. Others in Bockarie's village repeat the same allegation, noting that some community members have previously been arrested and forced to pay a hefty fine or risk being thrown into prison.

What of the future?

SAC's recent success in gaining RSPO certification gives its plantation in Malen an extra air of permanence. The palms are already mature, and the company has made good on its plan to provide thousands of jobs for Sierra Leoneans – although half of the 3,027 total SAC advertises are not permanent employees but rather "daily workers" and contractors. In short though, it's not going anywhere. Even the government's 2019 report, which was highly critical in its findings, accepts that as a given. It says all the parties agree "the company should continue with its operations, in an atmosphere of inclusiveness, mutual respect, trust and benefit."

SAC and its 18,473 ha stand in stark

contrast to other attempts to develop oil palm plantations in West and Central Africa since the early 2000s, when foreign companies rushed to acquire land on this "new frontier". As a new report by Chain Reaction Research shows, things have not gone according to plan, "with substantial disparities between awarded concessions and areas eventually developed into industrial oil palm plantations". One of the reasons



Many community members in Malen continue to protest against SAC and the deal that took away their land (Image: Saidu Bah / China Dialogue)

given for these failed plans is widespread community resistance.

Why then has the unflagging opposition to SAC by groups like MALOA failed to stop its expansion? One reason is government involvement in the land deal. It was the government that invited the Socfin Group to Sierra Leone, and the government that signed head leases with Malen's Chiefdom Council – SAC only entered into sub-leases, not directly with the authorities in Malen, but with the government.

This is perhaps why SAC has been able to remain relatively aloof to the whirlwind of accusations and protests around them. They are not above attempting to set the record straight though, nor to legal action against groups like Green Scenery, which they accuse of defamation. It is also, perhaps, why the government has largely ignored complaints about pollution and inadequate compensation, according to MALOA's Blango.

Blango says his group of landowners want their land back. Failing that, they want the company to sit with them and renegotiate the terms of the deal. "We are not against the company. All we want is fair and honest dealing. We cannot be landowners and be suffering like this while the company is making millions of dollars," he says. 🔄

Banning high-deforestation palm oil imports would barely reduce forest loss

Support for conservation, not palm oil trade restrictions, can best save forests according to new research

Jonah Busch | February 16, 2022

Consumer countries are increasingly attempting to combat tropical deforestation by restricting imports of palm oil, soy, beef and other commodities. However, banning imports of commodities grown with high levels of deforestation may have a much smaller effect than anticipated, according to a new study by my co-authors and I published in December 2021 in the journal *Environmental Research Letters*.

If Europe had banned imports of high-deforestation palm oil from 2000-2015, then deforestation in Indonesia over that time period would only have been 1.6% less than it actually was, while the carbon dioxide emissions from deforestation would have been 1.9% less.

We chose to study palm oil because, due to land clearance for plantations, this commodity is one of the biggest contributors to tropical deforestation and has seen some of the sharpest pressure from campaigners. We studied exports from Indonesia because it grows more than half of the world's palm oil, and because its deforestation routinely puts it in the top five countries for climate-

changing emissions. And we studied imports to Europe, the consumer of 10% of the world's palm oil, because European countries have been at the forefront of imposing import restrictions.

Trade restrictions as climate policy

Tropical deforestation is the second largest cause of climate change behind burning fossil fuels. And the leading cause of tropical deforestation is conversion of forests to land used to grow commodities such as palm oil, soy and beef.



Forest cleared to make space for oil palm plantations in West Kalimantan, Indonesia (Image: Ulet Ifansasti/Greenpeace)

It's understandable that consumer countries seeking to reduce global forest loss should scrutinise their connection to tropical deforestation through the food they import. The European Union recently proposed restricting imports of commodities linked to high or illegal deforestation. Similar policies have already been enacted in the United Kingdom and Norway, while the US is to debate a bill prohibiting imports of commodities produced on land "undergoing illegal deforestation".

Such import restrictions shift the costs of ensuring that globally traded agricultural commodities are deforestation-free from



Transporting fruit from an oil palm plantation in Nagan Raya, Indonesia. Consumer countries are increasingly trying to reduce global forest loss by restricting imports of forest-risk commodities. (Image: Dita Alangkara/CIFOR CC BY-NC-ND 2.0)



relatively wealthy consumers in Europe and North America to farmers in the tropics. Unsurprisingly, they are viewed unfavorably by commodity-exporting tropical nations. Indonesia and Malaysia perceived earlier European restrictions on palm oil as protectionism, and brought legal challenges to the World Trade Organization.

Modelling the effects of import restrictions

Despite the central – and controversial – role of import restrictions, their effectiveness at reducing deforestation has not been examined until now. Previous economic studies did not distinguish whether palm oil was produced with high or low deforestation. The current wave of public policies makes this distinction, and our model does as well.

We modelled the effects of import restrictions in Europe on deforestation and emissions in Indonesia by combining a global trade model with a model of land-use change in Indonesia. We distinguished palm oil grown with high and low levels of deforestation using satellite-derived maps of forest and oil palm plantations over time.

As mentioned, we estimated that if Europe had banned imports of high-deforestation palm oil from 2000-2015,

the impacts of a ban would have been small: 1.6% less deforestation and 1.9% fewer carbon emissions. That's because about half (52%) of the high-deforestation palm oil that would have been exported to Europe would shift to regions without a ban. Furthermore, even big changes in the price of palm oil barely budge deforestation – every 1% decrease in price was associated with just a 0.13% decrease in conversion of forest into oil palm cropland. Finally, only one-third (32%) of deforestation in Indonesia was due to oil palm, with the rest due to pulp and paper plantations, small-scale agriculture, conversion to grasslands and other uses.

The impact of an import ban would be increased by expanding the set of countries which restrict imports, but not by much. If China and the US had joined Europe in banning high-deforestation palm oil, Indonesia's deforestation from 2000-2015 would have been 2.7% lower, and its emissions 3.2% lower. Even if the whole world outside of Indonesia and Malaysia restricted imports of high-deforestation palm oil, Indonesia's deforestation still would have only been 3.8% lower, and its emissions from deforestation 4.5% lower.

What should wealthy consumer countries do?

Tropical countries' policy options to address their own deforestation domestically are often described as positive “carrots” or

punitive “sticks.” But consumer countries have neither option – they can only hope to persuade other sovereign nations to reduce deforestation using “vinegar or honey”.

Trade restrictions are sour, confrontational vinegar: “If you deforest, we'll curtail our trade with you.” An alternative approach offers sweet, cooperative honey, in the form of international carbon payments: “If you keep your forests standing, we'll pay for the climate benefits.” Our paper finds that hypothetical carbon payments to Indonesia for reducing emissions caused by deforestation could have exceeded the effects of trade restrictions at just \$0.81 per tonne of CO₂ equivalent – an order of magnitude or two cheaper than current prices in most carbon markets.

These are disheartening times for proponents of international carbon payments. Since 2005, an international climate program called REDD+ (Reducing Emissions from Deforestation and forest Degradation) has sought to make tropical forests worth more alive than dead through results-based payments for the carbon they store. Since its inception, REDD+ has been hamstrung by levels of finance far too low and far too slow to compete with profits from deforestation. And in recent years, high-profile international results-based payment agreements between Norway and two large tropical forest countries, Brazil and Indonesia, have collapsed.

Frustration with results-based payments has surely driven some of the momentum toward more confrontational approaches. And yet, in the absence of positive and cooperative approaches, international relations around tropical deforestation and climate change risk descending into rancour.

Perhaps the best we can hope for is that the vinegar of trade restrictions will be complemented with the cooperative honey of positive support for forest conservation.

Without such support, our paper shows, trade restrictions should not be expected to have much impact on keeping forests standing. 🍯

Europe wants to be ‘forest-positive’, but how to drive action on the ground?



The 2021 European Sustainable Palm Oil Dialogue conference tried to address the need for the palm oil debate to include the industry’s negative impacts on workers, smallholders, indigenous peoples and local communities (Image: Icaro Cooke Vieira/CIFOR, CC BY-NC-ND 2.0)

The palm oil industry must sharpen its focus on social justice to eliminate deforestation from supply chains

Josie Phillips | October 28, 2021

The palm oil debate has focused on the industry’s negative impact on forests and biodiversity. Far less attention has been paid to workers, smallholder farmers, indigenous peoples and local communities. There is a need to humanise the conversation and ensure that palm oil delivers positive social and environmental impact on the ground. This was a key theme at this year’s European Sustainable Palm Oil Dialogue.

The conference convened representatives of consumer goods manufacturers, palm oil suppliers, certifying bodies, governments and NGOs. It avoided tricky conversations over sector-wide failures to meet 2020 No Deforestation, No Peat, No Exploitation (NDPE) commitments.

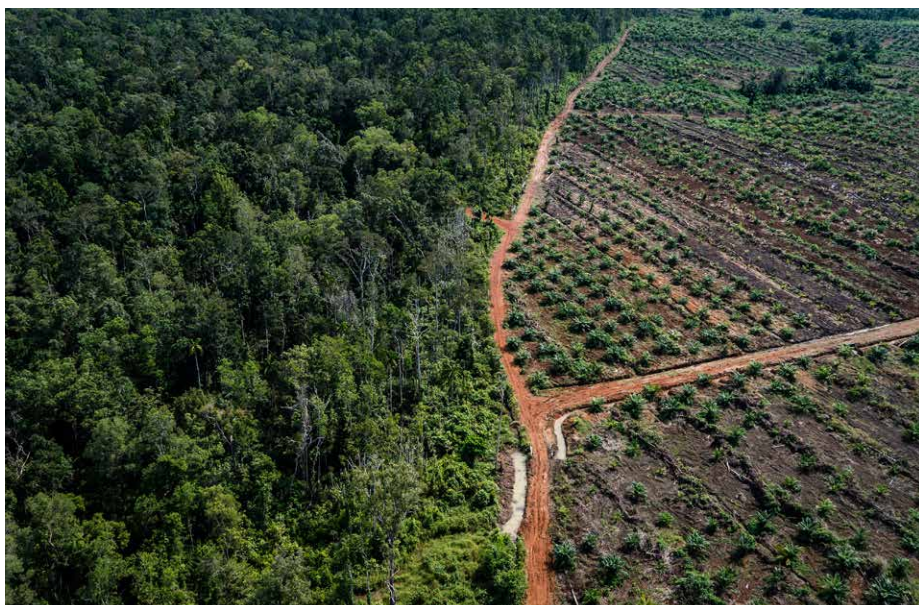
Instead, it focused on how Europe can eliminate deforestation from key commodity supply chains and help build a “forest-positive” future.

About 80% of global deforestation is driven by agricultural expansion, and the EU is a major importer of forest-risk commodities such as palm oil, beef, soy, cocoa, maize, timber and rubber. Between 1990 and 2008, the EU consumed a third of globally traded forest-risk commodities, accounting for around 10% of worldwide deforestation linked to the production of goods and services.

The EU is a major importer of forest-risk commodities, such as palm oil, which cause deforestation around the world. New legislation is set to be proposed to reduce the presence on the EU market of products associated with deforestation.

In July 2019, the European Commission published its plan on Stepping up EU Action to Protect and Restore the World’s Forests. The plan prioritises sustainable, deforestation-free supply chains, transparency and cooperation (between producer and consumers countries, businesses and civil society). These commitments were then re-iterated in the European Green Deal, the EU Biodiversity Strategy to 2030, and the Farm to Fork Strategy. The latter two noted that the Commission “will present in 2021 a legislative proposal and other measures to avoid or minimise the placing of products associated with deforestation or forest degradation on the EU market”.

This upcoming proposal will represent a more holistic, integrated approach to protecting and restoring forests, according to Astrid Schomaker, director for global sustainable development for the European Commission, who was speaking at the conference. Like the EU Forest Law



*Oil palms planted on deforested land in the Indonesian province of Papua
(Image © Ulef Ifansasti/Greenpeace)*

Enforcement, Governance and Trade Action Plan (FLEGT), it will include mandatory due diligence for large operators and traders. It will prioritise forest partnerships with producing countries and the strengthening of international cooperation. But the new proposal will have a greater focus on labour and human rights, to try and build responsible value chains.

Ruben Brunsveld, deputy director for Europe, Middle East & Africa at the Roundtable on Sustainable Palm Oil (RSPO), a body that certifies as sustainable about 19% of the world's palm oil, highlighted the moral responsibility for Europe to become forest positive. Its colonial history of exploitation means action is needed to reconcile past harms and help producing nations to make positive change on the ground. A request for direct finance to help achieve these goals was made clearly and repeatedly at the conference.

For the millions of workers who earn a living in palm oil production, there is certainly need for change. Elles van Ark, managing director at CNV Internationaal, which works with trade unions in developing countries



Collective bargaining rarely exists for workers in the palm oil sector, and independent unions that protect their interests are few and far between

to protect workers' rights, explained that collective bargaining rarely exists for workers in the palm oil sector, and independent unions that protect workers' interests are few and far between. In the same presentation, van Ark called on the RSPO to create a multi-stakeholder taskforce on social dialogue following their roadmap.

Inclusivity should also extend to oil palm smallholders and their perspectives should be part of decision-making, attendees heard. Until recently, and despite producing up to 40% of the fresh fruit

bunches that Indonesia and Malaysia's palm oil is derived from, smallholders, who tend to farm oil palm on small areas of land, have been largely left out of the discussion. Now it seems there is more concerted effort to engage them, with both the RSPO and Indonesian Sustainable Palm Oil (ISPO) certification schemes including separate requirements for certification to make commitments more realistic for smallholders.

As certified oil fetches a higher price, there is a financial incentive for mills run by major palm oil companies to support smallholders in getting certified: both stand to earn more. Beyond generating additional income for farmers, certification offers positive social impacts for farmers and their communities on the ground.

Rukaiyah Rafik from FORTASBI (Forum Petani Kelapa Sawit Berkelanjutan Indonesia), a forum for Indonesia's sustainable palm oil farmers, was optimistic about the impact of certification on farming communities. She explained that certification empowers groups to get organised and identify needs within their communities, and that certification has a notable impact on gender equality, with gender inclusivity an integral part of attaining RSPO certification. Rukaiyah also said cost is a major barrier for smallholders, and that direct financing will be key to increasing certification.

Members of the Consumer Goods Forum, including Unilever, Nestlé and Pepsico, were represented at the conference, and their respective contributions to the dialogue indicate they are aware of what is needed. Beyond certification, corporate action can make a considerable positive difference: these organisations have the power, influence and finance to help drive change at a systemic level.

According to IDH, a sustainable trade initiative who hosted the conference online in collaboration with the European Palm Oil Alliance



Corporate action can make a considerable positive difference. These organisations have the power, influence and finance to help drive change at a systemic level.

(EPOA), 90% of palm oil imported to Europe for food, animal feed and oleochemicals in 2020 was certified by the RSPO. Moreover, 100% of the palm oil used in Europe's refineries was covered by NDPE policies. This is clear progress, but Europe only accounts for 10% of global palm oil usage. Today, India represents the largest market, followed closely by China as the second biggest importer. The importance of these other major players cannot be overstated when considering how to drive forest-positive impact.


Discussions on how companies can uphold their commitments and take direct action often note the logistical and technical challenges of understanding what is happening on the ground. These may be real, but multinational companies can leverage their position and extend their sustainable palm oil commitments to their operations in other countries.

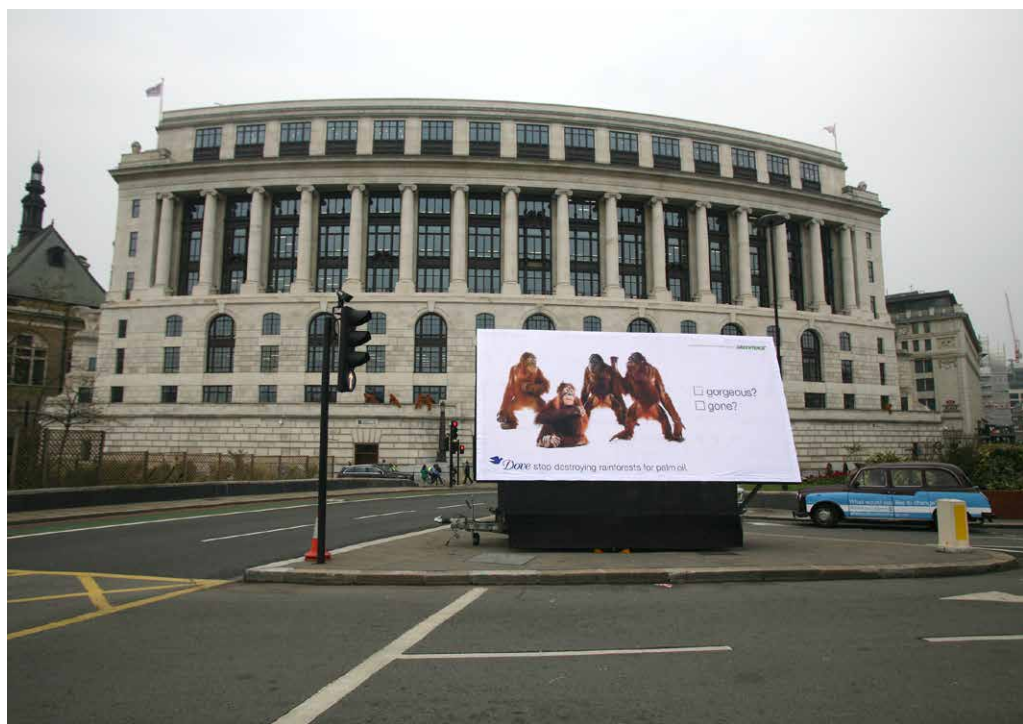
For example, Unilever's 2018 Annual Communication of Progress (ACOP) to the RSPO, reported that 97% of palm oil used to manufacture their products in Europe was RSPO-certified. That number was just 48% and 41% in China and India respectively. Even if it is too challenging to use high volumes of certified palm oil, companies can purchase RSPO credits from independent smallholders which help generate finance to support smallholders to get certified. Such efforts

can strengthen company commitments to back sustainable palm oil.

Companies also need the opportunity to take direct action, which is why collaboration is needed. The National Initiatives for Sustainable Oil Palm Smallholders (NI-SCOPS Programme) from Solidaridad and IDH, is developing a government-to-government initiative in Indonesia, Malaysia, Nigeria and Ghana. The

programme takes a "landscape-level approach", meaning it integrates policy and practices across multiple land uses in a given area. This is usually to help ensure responsible and fair use of land while empowering local actors to mitigate and adapt to climate change. This is another tangible way to achieve impact and improve governance at the national and local level, as well as giving agency to smallholders and local communities.

There is no doubt that certification has and will continue to catalyse change in the palm oil sector, but the landscape approach may offer an alternative and complementary model for delivering forest-positive impact. Palm oil is just one forest-risk commodity produced in tropical landscapes. But the lessons learned by this sector, and the apparent willingness of powerful organisations, like those members of the Consumer Goods Forum, to do better could certainly pave the way for transforming the wider commodities market. 



A Greenpeace billboard put up in front of Unilever's London headquarters, 2018. The European Sustainable Palm Oil Dialogue discussed how large companies like Unilever could extend their sustainability commitments to operations outside Europe. (Image © John Cobb/Greenpeace)

Indonesia, not the EU, needs to make its palm oil sustainable

Importers must step up support for sustainable palm oil, and producers be bold in revoking the licences of illegal palm estates, writes Andre Barahamin

Andre Barahamin | May 3, 2022

The majority of global forest loss is caused by land clearance for six commodities: cattle, timber, palm oil, soy, cocoa and coffee.

In response, the European Union published a draft regulation in November 2021 designed to minimise Europe's consumption of "deforestation-risk" products.

While legal NGO ClientEarth called the proposal a "leap forward in global environmental governance", the governments of producer countries say it shifts the burden of ensuring that commodities are deforestation-free from wealthy consumers to poorer farmers.

Indonesia and Malaysia have called it part of a smear campaign against palm oil. Between them they produce 85% of

the global total of the commodity. In a joint statement released a few months before the proposal, the nations' leaders stated their intention to "continue to fight against palm oil discrimination".

Both countries have lodged trade disputes with the World Trade Organisation (WTO), claiming the EU is trying to protect its own vegetable oil producers from international competition. They also cited the EU's decision in 2018 to phase out, by 2030, the use of palm oil in transport fuel in Europe.

They are reportedly trying to hire an advocacy firm to run a campaign to change the perception of palm oil in Europe.

Trucks loaded with oil palm fruit navigate through the smoke of peatland fires in Sumatra, Indonesia. Although illegal in the country, fires continue to be used to clear land for palm oil production. (Image @ Ulet Ifansasti / Greenpeace)



“Cleaning up the supply chain to the EU won’t necessarily help reduce global deforestation,” said Mardi Minangsari, the president of Kaoem Telapak, an Indonesian NGO that investigates deforestation. Recent research has suggested that banning imports of deforestation-risk commodities may have a much smaller effect on stemming forest loss than anticipated.

Nevertheless, addressing demand is important, said Minangsari, and must be done in a way that improves policies in producing countries. She holds that the EU’s proposal fails to recognise the difference between producer countries and sectors with weaker laws and those with more robust regulations, such as Indonesian timber and its EU FLEGT (Forest Law Enforcement, Governance and Trade) licence. Recognising these differences would incentivise countries to comply with the regulation, Minangsari said. Otherwise, exports will shift towards less-regulated countries, she added.

Alternative markets

“Indonesia will not run out of demand for palm oil and has been looking to expand the market for its crude palm oil, including in China,” said Montty Girianna, the country’s deputy coordinating minister for energy and mineral resources. Girianna’s optimism is based on an announcement made back in 2019 by China’s Ministry of Commerce that it will remove tariffs on palm oil imports.

In fact, on 22 April, Indonesia shocked the international market by announcing it would ban all palm oil exports until further notice. The move is an attempt by the government to address ongoing domestic shortages of cooking oil and rising prices.

According to data from Trade Atlas, from 2019 to 2021 Indonesia exported 1.4 million tonnes of palm oil to China, double the amount in 2016–2018. China is the world’s second largest importer of palm oil.



Indonesians in a suburb of Jakarta queue to buy subsidised cooking oil. To help tackle shortages in the country, the government last month banned exports of palm oil until further notice, a move expected to worsen food price inflation across the world. (Image: Agung Kuncahya B. / Alamy)

“Indonesia’s response towards the EU proposal is worrying. We have seen that palm oil companies without NDPE commitments can sell their products to China,” Minangsari said.

NDPE stands for No Deforestation, No Peat, No Exploitation and represents a series of commitments made by palm oil producers to clean up production.

Only seven of the top ten suppliers of Indonesian palm oil to China have NDPE policies, as of January 2021, according to a report by sustainability analysts Chain Reaction Research. The report found refiners without an NDPE policy, or those lagging in their implementation of such policies, accounted for at least 12% of Indonesian palm oil supplies to China.

China-based importers are under growing pressure from consumers, brands and investors to source this risky commodity more sustainably, and are making efforts to do so.

In 2018, the China Sustainable Palm Oil Alliance (CSPOA) was launched, featuring big firms such as Mars Wrigley, L’Oréal, China National Cereals, Oils and Foodstuffs Corporation, Yihai Kerry, and SGS China. The companies made a joint

commitment on promoting the adoption of sustainable palm oil in the Chinese market. The initial goal was to make sure that 10% of palm oil imports were certified as sustainably sourced by 2020, though this was not met.

“The current global trend is leaning more into sustainable palm oil,” Minangsari said. “Indonesia should use it as the leverage to strengthen its ISPO to prevent unsustainable palm oil harms.”

ISPO and indigenous people

The ISPO (Indonesian Sustainable Palm Oil) standard is Indonesia’s own certification scheme, started in 2009 to encourage oil palm plantations to make their operations more sustainable.

ISPO certification is mandatory for palm oil companies operating in Indonesia, unlike the voluntary certifications available from the industry’s pioneering regulator, the Roundtable on Sustainable Palm Oil (RSPO).

However, the ISPO seems to have fallen even further short than the RSPO on protecting human rights and the environment. It has faced particular criticism for ignoring

input from indigenous peoples and local communities affected by palm plantations.

According to an analysis by UK-based the Environmental Investigation Agency (EIA) and Indonesia-based Kaoem Telapak, the ISPO standard includes the right to consent for the indigenous peoples in a tokenistic manner, with palm oil companies required to tick a box saying they have consulted, without any subsequent verification. Moreover, secondary forest (which has regrown after being cut down) continues to be overlooked in the country as a natural landscape that warrants protection.

Minangsari says it is necessary to include in the ISPO standard the consent mechanism and ILO Convention 169 “if Indonesia wants to lead the market by example”.

Indonesia is yet to ratify ILO Convention 169, which recognises indigenous peoples’ right to self-determination within a nation-state, while setting standards for national governments regarding their wider rights, including the right to a land base.

Muhammad Arman shares a similar view. He is policy, law and human rights director of the Indigenous Peoples Alliance of the Archipelago (AMAN), which advocates for indigenous peoples in Indonesia.

“Without addressing the indigenous peoples’ rights over their ancestral domains, we will watch more palm oil estates’ expansion on unconsented indigenous territories, which is not in line with the spirit of the proposal to source responsible palm oil,” Arman said.

AMAN has been campaigning for an indigenous rights bill since 2013, which would provide recognition of the customary laws and land rights of indigenous communities across Indonesia. But the Indonesian parliament has been slow to act.



Protestors wait outside a West Papuan court in February 2021 during the trial of Johny Kamuru, head of Sorong Regency. Kamuru was being sued by palm oil companies after revoking their permits to plant on land claimed by indigenous groups. Moves like this to protect ancestral land against big agribusiness are rare in Indonesia. In this case, the court ruled in favour of Kamuru – a landmark victory for indigenous groups. But the companies are expected to continue their legal battle. (Image © Agustinus Kalalu / Pusaka Bentela Rakyat)



The Indonesian government needs to step up its game and be bold

Timer Manurung
executive director of Auriga Foundation

“Various laws and regulations have been issued that touch on the issue of indigenous rights to some degree,” Arman said. “The indigenous rights bill would tie them all together.”

Passing the bill is urgent given the increased threats of violence and land grabbing against indigenous peoples since the Job Creation Bill was passed in 2020. That law was passed despite staunch criticism from Indonesian and international civil society.

The lack of provision for indigenous peoples undermines the credibility of ISPO certification. A 2017 report by Forest Peoples Programme ranking certification schemes for biofuels and edible oils put the ISPO at the very bottom.

The new ISPO standard, updated by a presidential regulation in 2020, may potentially instil greater confidence. In particular, monitoring of plantations by an independent third party is now mandatory. However, watchdog Kaoem Telapak believes the monitors may be tokenistic, as there is a lack of details on how complaints will be processed.

The rollout of ISPO certification itself has been slow according to Minangsari: “Only about 38% [of Indonesia’s oil palm acreage] is now certified,” meaning the ISPO is still failing to meet the target it set to certify all palm oil companies by 2014.

The ISPO’s struggle to impose its authority is linked to the fact that, according to Greenpeace, a fifth of the oil palm plantation area in Indonesia lies in protected forests. In addition, it’s difficult to trace the supply chain from upstream to downstream industries and link the plantations with companies that own processing facilities or refineries. Joint research by Trase, the Auriga Foundation and Santa Barbara University found the ownership of more than half of Indonesia’s palm oil plantations to be unclear.

“The Indonesian government needs to step up its game and be bold,” said Timer Manurung, the executive director of Auriga Foundation. “Brave initiatives to revoke the licences of illegal palm oil estates are still rare and still threatened by hit back from these companies.”

He believes that exercising and imposing administrative sanctions on palm oil companies, including by revoking licences for errors or violations, will boost Indonesian efforts to fight deforestation and combat the climate crisis, as well as benefit the country’s palm oil in the global market. 🌿

What would large-scale cultivation of oil palm mean for India?

Palm oil is cheap, versatile and mostly imported. Now, the government has an ambitious plan for the large-scale domestic production of this crop



Despite environmental and feasibility concerns, Indian prime minister Modi has advanced plans to lessen the country's dependence on palm oil imports from large-scale cultivators such as Malaysia, pictured here (Image: Melvin Migin/Alamy)

Omaisr Ahmad | November 4, 2021

In his Independence Day speech in August, India's Prime Minister Narendra Modi announced a scheme to support the growth of palm oil in India. Three days later, the Cabinet approved a ₹11,040 crore (US\$1.4 billion) outlay over five years for a scheme called the National Mission on Edible Oils – Oil Palm, based on the argument that India needs to reduce its dependence on importing edible oils. Since then, there has been much discussion on whether this is good for the environment or not. The

discussion has largely been framed within the rubric of “environment versus development”, and many valuable details are being ignored to the detriment of a logical discourse.

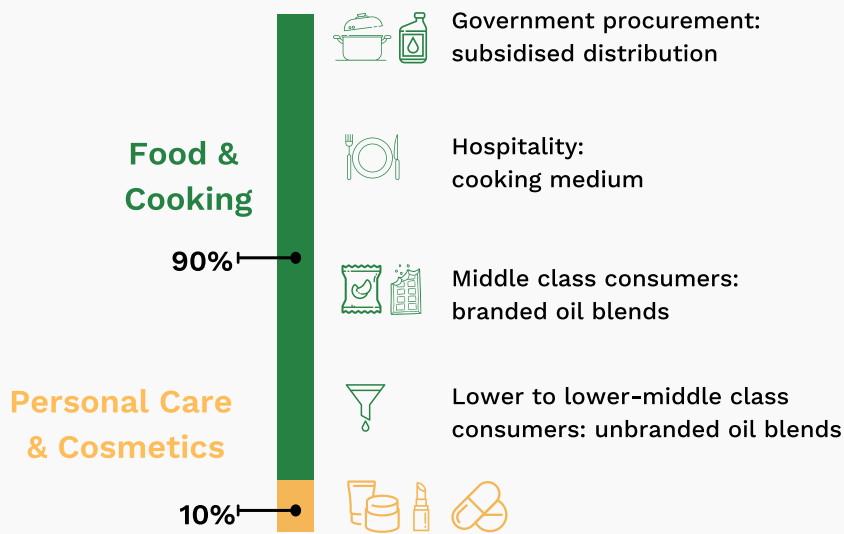
There is nothing new about palm oil. The plant originated in west Africa and reached global markets with the Atlantic slave trade five centuries ago. As its efficacy was discovered by European nations, it transformed from a luxury product into a cheaper replacement for things such as tallow in soaps and as a cooking oil. Over time, demand outstripped supply, and

the market needed more production. This was when company-owned oil palm plantation development began in Southeast Asia.

Cornered market

According to the US Department of Agriculture, the world will produce approximately 76.5 million tonnes of palm oil in 2021, 58% of this in Indonesia, and 26% in Malaysia. No other country produces even 5% of the global supply. Palm oil is cheap and versatile. It is found in everything from lipstick to ice cream. For Indians,

Palm oil use in India

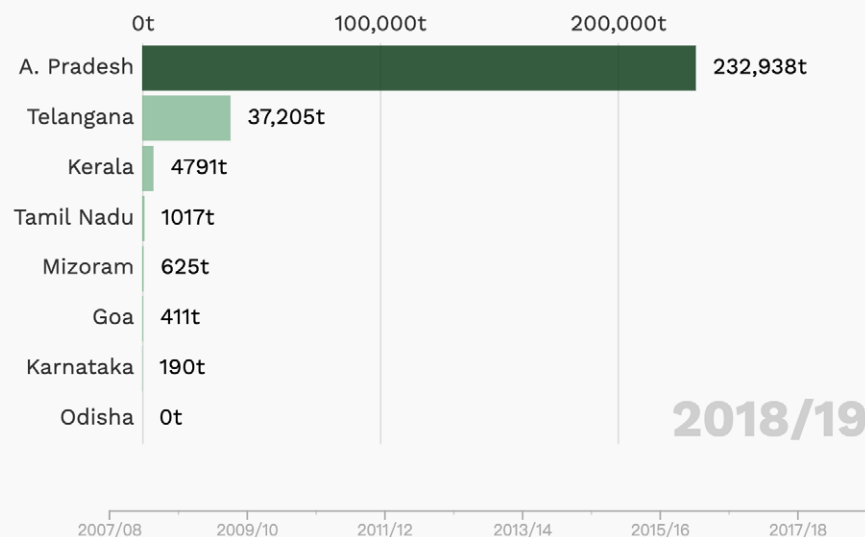


Source: WWF India

Crude palm oil production in eight Indian states

Volumes have increased more than five-fold over the period 2007/08 - 2018/19

(t = tonnes)



Source: [Agricultural Statistics at a Glance 2019, Indian Ministry of Agriculture & Farmers Welfare](#) • Note: Data for the 2018/19 crop year is provisional • Graphic: China Dialogue

though, its primary use has been as a cooking oil. India is the world's largest importer of palm oil – outstripping China, the European Union, Pakistan, Bangladesh, and the US. Over 90% of the palm oil imported is used for cooking, replacing various types of oil seeds, and the total import quantity has grown almost 10 times in the last 20 years. It is to deal with the huge import bill that the government is supposedly floating this scheme.

But again, this is nothing new. The Ministry of Agriculture launched the Oil Palm Development Programme in 1991-92. It has continued in one form or the other since then. The National Mission on Oilseeds and Oil Palm was started in 2012, as part of the 12th Five Year Plan (2012-17), and it identified two million hectares of cropland where palm oil could be cultivated. Incentives, like the one currently proposed under the latest scheme, were offered. In April 2017, the Ministry of Agriculture raised rates of support for planting, maintenance, inter-cropping and borewells for the promotion of oil palm cultivation. Many of the states identified under the scheme were from the northeast of the country, which is highlighted in the current scheme as well. Even the Andaman and Nicobar Islands saw oil palm cultivation started by the Kerala state government in the 1970s.

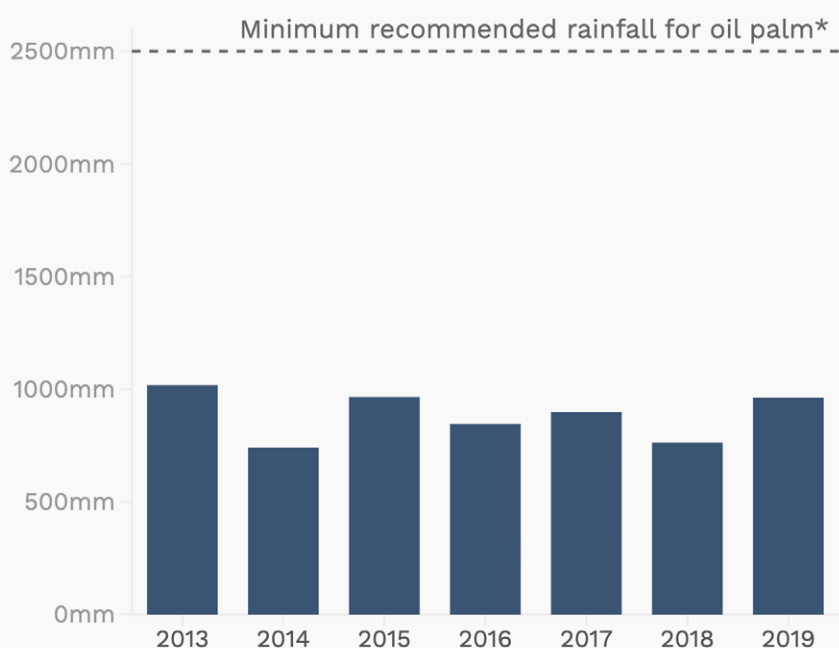
Zero growth

What is worth noting, though, is that the area under cultivation remains largely unchanged. According to the US Department of Agriculture, that area was 80,000 ha in the market year 2012-13. It is projected to be 80,000 ha in 2021-22, a change of a big fat zero. India ranks 17th in terms of production, at about 200,000 tonnes a year, less than 0.5% of what Indonesia produces.

Will more subsidies really make a difference? Has oil palm cultivation benefited the Indian farmer? Has it benefited the Indian economy? Is it appropriate for the environment?

Average annual rainfall in Andhra Pradesh (2013-2019)

(mm = millimetres)



Source: [Central Ground Water Board](#) • *According to guidelines from India's National Mission on Oilseeds and Oil Palm • Graphic: China Dialogue

Maybe the place to ask these questions would be Andhra Pradesh, which produces nearly 90% of India's palm oil. And it is here that a number of people who had started growing the crop are shifting back to coconut. The primary reason is that – as a fast-growing and large plant – a palm requires lots of water. Both Indonesia and Malaysia have an average annual precipitation of over 2,500mm. India's average annual precipitation comes to a little over 1,000mm. The demand for water cannot be met by rain alone, and needs irrigation systems. This, in turn, means greater strain on water sources, especially groundwater, which leads to a falling water table.

The government expects the expansion of palm oil to happen in

existing farmland, replacing other crops, or – since the plant requires three to four years to mature – inter-cropping. More than half the Indian farmers are totally dependent on rain-fed agriculture, with no access to irrigation. In short, this scheme is not for them. In fact, the leading players in palm oil production in India are corporate players such as Patanjali-owned Ruchi Soya, 3F Oil Palm Agrotech, and Godrej Agrovet.

Support price

One thing, though, is new. This is the offer of a viability price for the crop to buffer producers from market fluctuations. This raises the question: why is the government, often said to be reconsidering a minimum support price for essential commodities,

guaranteeing a profit for just this commodity? And this, too, from taxes that might be paid by other farmers. A viability price would mean that those engaging in oil palm cultivation, led by large agro-businesses (even if they procure from smaller farmers), would receive subsidies both in setting up the plantations as well as in selling their produce. Does this make sense for a crop suited to far more rainy countries, which needs to have a guaranteed water supply to grow? Remember, a city like Chennai came close to running out of water not so long ago.

This brings us back to the question of why we import so much palm oil anyway. Bear in mind that the vast majority of this is used for cooking. It is not that India does not have other forms of edible oil, or that we did not cook with them before the sudden increase of palm oil imports over the last two decades. The truth is that palm oil has replaced other forms of edible oils, and this has a larger impact on the economy, one which often goes unseen.

In his book, *Despite the State*, M. Rajshankar refers to the surprising drop and rise of palm oil consumption in India. In 2002 it was about 40%, and then it fell to just under 25% of all edible oils consumed by 2005-06. By 2009 it had increased to over 40%, hitting about 50% by 2014. In a similar period, between 2001-02 and 2014-15, groundnut oil consumption plummeted from 15% of total edible oils consumed to about 1%. Rajshankar matched this with how import duties, which had been about 70% for crude palm oil and 90% for refined palm oil in 2002, fell to zero for crude palm oil, and just about 10% for refined palm oil by 2008. He quotes the Solvent Extractors' Association of India (SEA), which represents Indian oil producers, to show that the fall in import duties tipped the balance in favour of imports, and that imported edible oil went from about 3% of the edible oils consumed by Indians in 1992-93 to 75%.



*An oil palm plantation in Andhra Pradesh, southern India
(Image: Kevin Samuel / China Dialogue)*




***We may be able to buy cooking oil
for a slightly cheaper price, as long
as we ignore the price in terms of
water, the environment and the
livelihoods lost***


When the latest subsidy to help palm oil cultivation was announced on Independence Day, the SEA stated that such policies should have been extended to other oil seeds as well. Without that, they said, it was unlikely to change Indian reliance on imported edible oils.

Cost of cheapness

The truth is that Indians have switched to palm oil not because of some great choice but merely because it has come cheap. For most people cooking their food in palm oil or some mixture thereof, the content makes little difference. It is just another vegetable oil to them. The very versatility of the oil is what allows us to use it as a substitute for other kinds of oil. But the low price point of palm oil is inherently linked to the conditions of Southeast Asia. It is the massive clearing of old growth forest, abusive labour conditions that often mimic those of colonial days, and high precipitation levels that allow the price to be so low. Indian conditions are different, and thus the state is subsidising both the production and buying of the oil to create the illusion that it is cheap. In doing so, we are destroying the industry and livelihoods of those in other industries, such as groundnut oil, and destroying existing domestic industries that have taken much time and effort to build.

Nothing comes free, and in the low price of imported palm oil, what is being excluded is the massive destruction of habitats that threatens the survival of nearly 200 species. We are able to ignore the smog that periodically envelops parts of Malaysia and Singapore from the burning of forests and we are ignoring the cost that Southeast Asia's ecosystem pays for the cheap oil the world imports.

Apart from anything else, in trying to replicate that price point in India, we will be extracting a ruinous cost in water that we are increasingly running short of. We may be able to buy cooking oil for a slightly cheaper price, as long as we ignore the price the country will pay in terms of water, the environment and the livelihoods lost. 



Oil palm fruit being left to rot on a 200-hectare plantation in Rukmo, Arunachal Pradesh. The lack of a local mill means oil palm harvests in this remote region are currently going to waste. (Image: Sumit Das / The Third Pole)

Oil palm pioneers doubt crop will take off in Himalayan foothills

India's efforts to reduce its dependence on palm oil imports come at a cost for farmers, communities and biodiversity

Bikash Kumar Bhattacharya

| April 29, 2022

As he talks about his 200-hectare oil palm plantation, Dature Miuli becomes visibly emotional. A passionate farmer and agro-entrepreneur in mountainous Arunachal Pradesh, the 59-year-old has tried planting every new crop from rambutan to rubber. Ten years ago rubber was touted by the local government as the next big cash crop; today the focus has moved to palm oil.

Miuli was one of the first to adopt oil palm back in 2017, in response to the government pushing its cultivation by local farmers. The government offered some subsidies but little in terms of training, so Miuli travelled to the state of Andhra Pradesh, and later to Malaysia, to learn the best cultivation practices.

Now, despite his palms being full of fruit, Miuli thinks it was a mistake to switch to the new crop, and says the venture is currently financially unviable. If the government doesn't intervene soon to support the creation of a robust palm oil supply chain, he says he will have no option but to uproot the palms.

India is the world's biggest importer of palm oil. Between 2020 and 2021, it imported USD 5.8 billion of crude palm oil, around 98% of its total consumption, mostly from Malaysia and Indonesia. As demand increases, the government has been trying to ease the burden on the public coffers by incentivising domestic oil palm cultivation. But farmers in Arunachal Pradesh have little faith that the efforts will be beneficial to them or India's self-reliance.

No supply chain for Arunachal Pradesh's palm oil

"I sold my produce on two occasions [in 2021] to the 3F Oil Palm company that has an agreement with the government to buy our yields," Miuli explains. "But I was offered a mere INR 7 per kilogram [around USD 0.1]. I could barely manage to pay the expense of the fertilisers."

3F Oil Palm is a multinational corporation with plantations in Gabon and Suriname as well as across India. Under its agreement with the government the company has to buy farmers' oil palm harvest in Arunachal Pradesh – although the prices are not set.

However, to date all of the fruit bought by 3F has been left to rot on



Agro-entrepreneur Dature Miuli was one of the first to plant oil palm in Arunachal Pradesh in response to a government push (Image: Sumit Das / The Third Pole)



Miuli's oil palms are already producing fruit. Although he has a guaranteed buyer, as there's nowhere for the fruit to go, the price he's being paid doesn't even cover his costs. (Image: Sumit Das / The Third Pole)



Miuli's farm. There are no mills for processing palm oil in all of Arunachal Pradesh. Oil palm fruit has to be crushed quickly, usually within 48 hours of harvesting, or it begins to deteriorate and harmful fatty acids can build up. This is why mills are usually located close to plantations – or even on them. 3F had claimed it couldn't transport Miuli's produce to a mill outside the state.

“If oil palm is to thrive, we will need three things here: a mill, a stable market and better road networks connecting the remote oil palm farms,” Miuli says. “The government should make sure that we are able to fetch a competitive price for our fruit.”

Two years later, the state government passed the Arunachal Pradesh Oil Palm (Production and Processing) Regulation 2014, setting guidelines for the promotion of the crop. The policy mandates that farmers in a so-called “factory zone” – the area covered by a particular processing company – sell their produce only to the allotted mill, paving the way for what are known as “captive plantations”. This, critics say, means there is no free market for oil palm processing.

According to the policy, the Lower Dibang Valley district has been assigned as a factory zone to 3F Oil Palm. But the company has yet to establish a mill to process the fruit and, according to Miuli and local officials, says the land under cultivation in the district is too small to make one feasible. Miuli says that “3F Oil Palm has been saying that to make a processing plant viable, the district will need to have a few thousand hectares of oil palm crop”. Although there isn't an official estimate of the district's

India's bet on the northeast

Arunachal Pradesh's foray into oil palm cultivation started in 2012 with 3F Oil Palm establishing a nursery and an office in Lower Dibang Valley, where Miuli's plantation is located.

Video: Sumit Das / The Third Pole



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Once harvested, oil palm fruit needs to be processed quickly. At present there are no mills in Arunachal Pradesh, and due to the area's remoteness, transporting fruit elsewhere is not a viable option. This means there's no way for farmers like Dature Miuli to access the palm oil supply chain. (Image: Sumit Das / The Third Pole)

area currently covered by plantations, Miuli believes that it is far less than 3F's requirement for a processing plant.

The Third Pole asked the manager of 3F's office in the Lower Dibang Valley to comment for this story but did not receive a response.

Speaking with The Third Pole, Idar Nyori, a development officer with Arunachal Pradesh's Department of Agriculture, explains that the policy is meant to guarantee that farmers sell their produce.

Miuli concedes that without an agreement with 3F, he would not have sold any of his produce as currently there is virtually no local market for palm oil. However, he adds that the scheme could prove counterproductive in the long run: should the market take off, the factory zoning rules would mean farmers cannot choose where to send their produce.

In 2018, the local government introduced a new land settlement regulation that, for the first time, confers land property rights to individuals in a state where most of the lands are customarily owned by communities. This means that crucial decisions such as whether to lease

the land to big companies will become the responsibility of each farmer, making them vulnerable to potential pressure from powerful businesses.

Far from being a technicality, this kind of legal framework has paved the way for the unfettered spread of large-scale oil palm cultivation and other monocultures in the northeastern state of Mizoram, and there is concern this



Traditional agriculture in Lower Dibang Valley is done on a small scale, preserving biodiversity. These fields near the village of Abongo border foothills covered in lush virgin forest, part of the Mehao Wildlife Sanctuary. Oil palm planting is being encouraged even here. (Image: Sumit Das / The Third Pole)

will happen in Arunachal Pradesh to the detriment of local communities.

According to the latest data from the Indian government's National Mission on Oilseeds and Oil Palm (NMOOP), only 1,416 hectares were cultivated with oil palm in the state as of March 2018. The area identified for the expansion of the crop amounts to 133,811 hectares – around 1.6% of the state's total area.

The elusive wastelands

Pema Khandu, chief minister of the state, is an aggressive backer of oil palm cultivation. He was the first to mention the 133,811 hectare figure, stating in September 2021 that the land that could support the growth of the palm oil industry is currently "wasteland".

Idar Nyori says that the government is looking to promote the crop in the "degraded forests and barren lands" in the Himalayan foothill areas along the Assam-Arunachal Pradesh border, which have "little biodiversity value".

However, the definition of wasteland is contentious in India. Historically, the definition is linked to the economic value attributed to land, and researchers have pointed out that the label is often used



Smallholder Eketo Mendo, who farms in the Abongo area, refuses to plant oil palms, and deliberately leaves wild areas like this stand of bamboo to encourage biodiversity (Image: Sumit Das / The Third Pole)



A family of hoolock gibbons often takes shelter in Mendo's bamboo grove. The species is rare and populations fragmented in Arunachal Pradesh, so the family's recent loss of a baby was a significant blow. (Image: Sumit Das / The Third Pole)

without examining the ecological features of an area.

“If the government is claiming that Arunachal Pradesh has about 134,000 hectares of wasteland, that must be the government’s own definition of wasteland,” says Sailajananda Saikia, associate professor of geography at Rajiv Gandhi University, in Itanagar, Arunachal Pradesh. “I am not aware of the criteria behind this assessment, but I am almost certain that it is not based on a comprehensive ecological assessment.”

Egam Basar, assistant director of Arunachal Pradesh’s state horticulture department, says that the low-elevation foothills in the state are perhaps the only suitable area for oil palm cultivation. However, he says, “these foothills also contain the last few remaining tracts

of lowland tropical rainforests and grasslands in the region”. Palm expansion, he cautions, “shouldn’t end up replacing these valuable forests”.

Umesh Srinivasan, a conservation biologist and one of the authors of a 2021 study published in Nature on the prospects of sustainable oil palm in India, says that plantations will likely replace other forms of traditional agriculture and community forests in Arunachal Pradesh. “Around 62% of Arunachal’s forests are so-called Unclassified State Forests (USFs), which are owned and managed by indigenous communities,” he says.

“While in the rest of India it will primarily replace other crops, in Arunachal Pradesh expansion of oil palm runs the risk of replacing USFs,” says Srinivasan, who has previously warned that the unfettered promotion of oil palm could damage India’s biodiversity-rich northeast region.

The Nature study Srinivasan was part of found that while in the rest of India it is possible to expand oil palm cultivation while protecting local biodiversity, such prospects in northeast India – home to the Eastern Himalayan and the Indo-Burma biodiversity hotspots – are dim. For instance, the unprotected dipterocarp-dominated tropical rainforests in the Himalayan foothills that the cash crop may replace are home to important wildlife species such as hoolock gibbons, hornbills, elephants and leopards.

In addition, questions have been raised about the suitability of the crop in certain areas identified for its expansion.

Originally grown in the tropics, the oil palm is adapted to temperatures between 22 to 32 degrees Celsius and requires about 2,500-4,000 mm of relatively even annual rainfall. But most of the districts selected for growing the plant in Arunachal Pradesh are well below 22C and have uneven rainfall. Tawang, a remote mountainous district identified as a potential site for oil palm in 2021, has an annual average

temperature of 10.3C, and 1,500-2,000 mm of uneven rainfall, most of which occurs between July and September.

Between tradition and modern monoculture

According to activists, oil palm monoculture in corners of northeast India like Arunachal Pradesh will irreparably alter ecosystems while potentially affecting indigenous communities’ land rights, a phenomenon that has been documented across Southeast Asia.

The government, on the other hand, says oil palm will be cultivated only on degraded lands, which in Arunachal Pradesh largely means targeting fallow *jhum* fields, managed by local people using traditional agricultural



In a field surrounded by woodland in Bhisimnagar, Sipa Mena Miuli (Dature Miuli's wife) and her relatives burn stubble from last year's harvest to clear space for new crops (Image: Sumit Das / The Third Pole)



Mustard seeds are then sown by hand. Sipa Mena Miuli grows a variety of other crops on her fields, including buckwheat, maize and ginger. (Image: Sumit Das / The Third Pole)

practices. Expert opinion on the trade-off between jhum cultivation and oil palm is divided, with some arguing jhum is less ecologically damaging than monocultures like oil palm, and others holding the opposite view.

Biodiversity on the line

The Forest Survey of India, the institution responsible for assessing the size and health of the country's forest cover, includes palm plantations in the definition of forest cover, along with bamboo and orchards. This means that converting natural forests into palm monoculture would not diminish forest cover in India's accounts, and replacing land cultivated by local communities with monoculture would actually increase forest.

However, research by scientists tells a different story. According to a 2016 study that appeared in the journal *The Condor*, oil palm plantations in Mizoram support less biodiversity than jhum fields. The authors found that oil palm plantations had the lowest richness of forest birds (10 species), followed by teak plantations (38), while *ghum* (50) had only slightly lower species richness than the rainforest edge (58) and interior (70).

Since bird species diversity is widely considered an indicator of overall biodiversity, this count suggests that *ghum* complements forests far better than oil palm when it comes to environmental sustainability.

The findings are confirmed by other studies. A 2018 study by researchers at the National Centre for Biological Sciences (NCBS) in Bengaluru and the University of Virginia in the United States found that shifting cultivation with a long fallow period can be beneficial for the soil.

However Nyori, the agriculture development officer, insists that "oil palm is better than *ghum* as the latter destroys forest", referring to an article he wrote for *The Arunachal Times* in 2016.

As the academic debate around the two models continues, their practical

differences are stark to the farmers of northeast India.

The Miuli family has experienced them first hand. The 200-hectare plot Dature Miuli has planted with oil palm was a traditional jhum field until five years ago. "Initially I wasn't convinced about planting oil palm, as it requires a lot of money and hard labour and we didn't know much about the crop," says 52-year-old Sipa Mena Miuli, Dature's wife and a traditional farmer herself. "But seeing my husband's enthusiasm, I conceded."

The family previously cultivated mustard and maize on their plot, and Sipa Mena Miuli would help work the fields, as she still does on small areas of land she farms with her relatives not far to the northeast in Bhismanagar. "But with oil palm now we must employ labourers and it is hard for women to do the physically demanding harvesting work in oil palm plantations," she says. The replacement of traditional agriculture with oil palm monoculture could alter gender dynamics in indigenous societies – a phenomenon that has been recorded among oil palm growers in neighbouring Mizoram.

Sipa Mena Miuli regrets that despite plentiful yields from her fields in Bhismanagar she doesn't make good profits, because the government doesn't



Video: Sumit Das / The Third Pole



Scan the QR code to watch on your phone or click the screenshot to watch on computer

mandate a minimum price for her crops. "It is the absence of a stable market price for traditional crops like mustard seeds, maize and vegetables that is pushing people here to try any new crop, whenever the government promises a stable market for it."

Eketo Mendo, a smallholder farmer in Abongo, a village near Bhismanagar, is among the farmers who refuse to switch to oil palm monoculture. He says traditional crops like maize, millet, vegetables and fruit trees support a wide range of wildlife. The farm that Mendo inherited from his father is full of bamboo groves, mango and other trees,



Oil palms are usually grown as a monoculture crop, allowing very little space for biodiversity. On Dature Miuli's plantation, other crops were grown between the palms when they were small, but this is no longer possible. (Image: Sumit Das / The Third Pole)



Video: Sumit Das / The Third Pole



Scan the QR code to watch on your phone or click the screen-shot to watch on computer

where a hoolock gibbon family has been living for decades. Now there are only three hoolock gibbons, after a juvenile succumbed to its injuries from falling from a tree. “Every year I plant maize and fruit trees. The gibbons feed on a portion of the yield. If I switch to oil palm, even if I spare the trees they live on, what will they eat?” says the farmer when asked why he hasn’t switched to oil palm.

Lessons from the jatropa plantation drive

Saikia, the Rajiv Gandhi University geography professor, says that the oil palm expansion plan should learn from the failures of the jatropa project. “This should not be another mad rush without proper research,” he cautions. “Transparency is key to the success of any development project. The farmers should not be kept in the dark about the pros and cons of oil palm.”

The planting of jatropa was a much-hyped scheme under the National Mission on Biodiesel initiated in 2003. It was alleged to be riddled with corrupt practices and deemed a total failure in Arunachal Pradesh.

The oily seeds the *Jatropha curcas* bush produces can be processed into biodiesel. In the 2000s, many countries, including India, promoted jatropa plantations. However, investors soon realised that while the plant could survive

on arid soils, it still needed plenty of water and nutrients to produce enough seeds, thus creating competition with food production for fertile land.

Nabam Tagam, an anti-corruption activist from Arunachal Pradesh, says that the state has a history of corruption and abuse of power by government officials and politicians. “Therefore, whenever the government is aggressively promoting a development project, we wonder whether it is for the genuine benefit of the people, or it is simply another ruse to mint money for those in power.”

“As for the oil palm expansion project, the central government is providing 90% of the funds.” The plan, he says, “should not turn into a cash cow for those involved in the implementation of the project”. If oil palm is not benefiting anyone but the project is being pushed in spite of that, “then the first thing I’d ask for is transparency,” Tagam says.

Between 2017 and 2019, NMOOP allocated just over INR 179 million (about USD 2.34 million) to Arunachal

Pradesh under a plan to develop 6,000 hectares of oil palm, though the state achieved only about one-quarter of the target by March 2018.

‘It’s unlikely to take off here’

Mendo, the smallholder farmer in Abongo who refuses to embrace oil palm, says that the crop isn’t going to spread in Lower Dibang Valley despite government subsidies because of the need for capital to start an oil palm plantation and the long period before the investment pays off. “In my village, very few have the capital needed to start oil palm cultivation,” he says, even after receiving the subsidies.

Miuli, the pioneer oil palm farmer, echoes these concerns. Even for a resourceful entrepreneur like him the heavy maintenance cost of the plantation without the prospect of a stable market is not sustainable. “If the government doesn’t take a bottom-up approach, with continued appraisal with the farmers and the company involved, all the grandiose plans on paper will yield nothing.”



Eketo Mendo farms a wide variety of crops on his small farm, including fruit trees, providing food for the gibbons as well as other animals (Image: Sumit Das / The Third Pole)



A field on Eketo Mendo’s farm prepped to plant ginger. He says he doesn’t have the necessary knowledge or enough land to plant oil palms. (Image: Sumit Das / The Third Pole)

Will China produce its own palm oil?

China wants to increase its supply of edible oils, but as producing palm oil would be hugely expensive, developing production overseas may be the alternative

Jiang Yifan | February 8, 2022

Palm oil is produced by pressing the flesh and kernel of the fruit of the oil palm, a tropical plant originating in West Africa. People in the region may have consumed the reddish oil even in prehistoric times. Archaeologists have found evidence of palm oil in 3,000-year-old tombs in Egypt, according to the Cambridge World History of Food, indicating long-distance trade in the commodity. It was colonialism and the industrial revolution that led to widespread use of palm oil in the global west, as an important raw material in the making of soap, margarine, candles and lubricants. Introduced to other tropical regions, including Central Africa, Southeast Asia, the Pacific Islands and South America, oil palm has become one of the world's most important oil crops.

Today, the major producers are Indonesia and Malaysia, which together produce 80% of the world's palm oil. China relies entirely on imports – about 7 million tonnes annually in recent years, at a cost of over US\$4 billion. It is the world's second largest importer



Colleagues from the Ministry of Agriculture's Oil Palm Trial Planting Network examine fruit in Yunnan province. China is investigating ways to boost domestic production, but faces challenges to do so cost-effectively. (Image courtesy of Zeng Xianhai)

of the commodity, after India. What many don't know is that over the past few decades the Chinese government has made multiple attempts to set up oil palm plantations, as part of efforts to produce more edible oils locally, and to manufacture biofuels. More recently, in Hainan, a team of scientists has, after over two decades of work, bred oil palm varieties suitable for growing in China, and now it hopes to popularise commercial plantations.

With China reliant on imports for 80% of its edible oils and fats, and the Communist Party's central rural work conference calling in late 2021 for more planting of soy and other oil crops, will the country restart domestic palm oil production?

Rises and falls

The first recorded planting of oil palms in China was on a small-scale in 1926, by a group of overseas Chinese who had imported them as an oil crop from Southeast Asia to places such as Hainan, on the northern edge of the tropics.

Hainan is considered to have seen two rounds of large-scale oil palm planting. The first was in the 1950s and 1960s, during a national shortage of edible oils. The state spent 100 million yuan on importing oil palms and planting them in places including Yunnan, comparable to the annual GDP of some small cities in the late 1950s. By 1965, 43,300 hectares had been planted, 41,300 hectares of which were in Hainan.



The palms imported back then were unimproved low-yield varieties with thick-shelled fruit, known as dura, said Zeng Xianhai, head of the palm oil development group at the Rubber Research Institute of the Chinese Academy of Tropical Agricultural Sciences. Add in a lack of farming and management expertise, and production never took off. Between the 1950s and 1980s, each mu (1/15 of a hectare, or 666 metres squared) of land produced only 20 or 30 kg of oil. Today, the major producing nations in Southeast Asia achieve 270 kg per mu.

But, in the late 1970s, China's household responsibility system came in, giving farmers more say in what they planted. With rubber, pepper and mangoes worth more, oil palm fell out of favour.

The second round of oil palm planting came in the early 1980s, when a Singaporean company partnered with a state-owned farm in Chengmai, Hainan, to plant 2,660 hectares of a more productive variety of oil palm known as tenera, that has fruit with a thinner shell, making it easier to extract the kernel oil. However, production never properly started, due to poor management and the planted area being too small to benefit from economies of scale. Meanwhile, Nanbin Farms, a state-owned company in the Hainan city of Sanya, imported thin-shelled oil palms from Malaysia and Zaire (now the Democratic Republic of the Congo), for new commercial plantings, and to upgrade existing plantations. But the firm halted commercial palm oil production in 1991, due to low profits, and research activity almost ground to a halt.

Zeng Xianhai describes the eight years following the end of Nanbin's production as a "blank", as far as palm oil research goes. Since then, oil palms introduced over the decades for their oil have come to be planted only for the sake of greenery and scenery. However, those ornamental trees, and their descendants, have become the foundation of Zeng's research, as he looks at how oil palms will grow and adapt in China. He's found

the trees growing as far north as Dali in Yunnan, at a latitude of 25 degrees north, flowering and bearing fruit as normal. They have likely spread due to a combination of being grown as ornamentals and natural dispersion, said Zeng.

In 1998, a central government body asked the Chinese Academy of Tropical Agricultural Sciences to restart trials with imported oil palms, to ensure the country's supply of edible oils. That task fell to Zeng's teacher, rubber expert Lin Weifu, and others. In 2021, after more than 20 years and the efforts of two generations of researchers, the team – now led by Zeng himself – produced the first oil palm variety able to grow in China and produce more than 200 kg of oil per mu: the "Re-you 6". They have also bred a range of other varieties with valuable characteristics: cold resistance, high yield, high oleic acid levels, seedless fruit, long fruit stalk and short height, with the latter two making the fruit easier to harvest. In 2017, the team completed China's first large-scale test planting of oil palm seedlings grown from tissue cultures. Breeding new varieties from cultures is much faster than traditional hybrid breeding, and the seedlings are highly homogenous, allowing for faster propagation.

In a report on the new variety in the Hainan Daily, Zeng said that breeding its own varieties will change the current situation in which China's palm oil industry is reliant on foreign countries.

Lin Weifu said that, in theory, oil palms can be planted in any of China's rubber-growing areas. But rubber is a strategic crop, and those plantations cannot be turned over to oil palms. China's south does not have large expanses of flat land free for planting, but is home to marginal areas such as low-yield forestry, abandoned land and eucalyptus forests which could be used. He thinks up to 1.334 million hectares of oil palms could be planted. For comparison, China has 1.2 million hectares of rubber plantations. Assuming these lands were all planted with Re-you 6, which has a modest yield



"Re-you 6", the first oil palm variety able to grow in China with a yield higher than 3 tonnes per hectare (Image courtesy of Zeng Xianhai)

of 200kg per mu (3 tonnes per hectare), they could together produce a whopping 4 million tonnes of palm oil per year – nearly two-thirds of China's current palm oil import.

It is worth mentioning that, around the world, marginal land is often rich in biodiversity. But putting this potential drawback to one side, is China ready to start planting oil palms?

Fruitless planning

Ten years ago, there was plenty of discussion and planning around restarting oil palm planting in China.

In 2009, a proposal from the Hainan branch of the China Democratic League suggested developing the sector there, as it would be “an effective route to resolving both edible oil shortages and energy issues.” The provincial government replied that, first, earlier failures had left farmers and grass-roots cadres unenthusiastic, and second, there was little spare land on the island to use. However, it pointed out that trial plantings were being carried out at a number of locations, as part of a Ministry of Agriculture program.

In a 2010 document on promoting the growing of tropical crops, the State Council called for more introduction and breeding of oil palm varieties and the continuation of trial plantings, to create the conditions for the sector to grow when times were right. In 2011, the Ministry of Agriculture issued a plan for tropical crop development during the 12th Five Year Plan period (2011–2015), saying that by 2015 trial plantings would be completed and a feasible proposal for a Chinese palm oil sector would be published. Also in 2011, a decade-long trial planting project started, with nine trial farms across Hainan, Yunnan and Guangdong provinces established by 2020. The Rubber Research Institute was the technical lead for that project.

In 2015, Hainan attempted to go beyond trial planting and start planting commercially. The provincial government said that by 2020 there



Aviation biofuel made from palm oil and recycled cooking oil successfully fuelled a China Eastern Airlines test flight in 2013. China had big plans to expand oil palm farming for biofuel in the early 2010s, but there has been little progress since. (Image: Alamy)

would be two county-level centres of palm oil production, but that target was not met.

In 2011, China's then-president Hu Jintao, speaking at the first Asia-Pacific Economic Cooperation Meeting of Ministers Responsible for Forestry, called for the potential of forests to be realised, with tree-source edible oils and biofuels to be developed to ensure food and energy security. The Ministry of Forestry pointed out soon after that as oil-producing trees can grow on marginal land, they have strategic value: they don't compete with other agriculture or reduce production of other foods. Biofuel, meanwhile, can protect the environment and reduce reliance on oil imports, the ministry added.

This led policymakers to look at oil palms as a source of biofuel. In 2012, oil palms were included in the National Energy Administration's program for biofuel development during the 12th Five Year Plan (FYP) period (2012–17). They were to be planted in unproductive salty, unfertile or sloping areas, along with other non-food biofuel crops. By 2015, plantings were to reach 2 million hectares. In 2013, the National Forestry and Grassland Administration published

plans for biofuel development between 2011 and 2020, saying that by 2020 there would be an additional 30,000 hectares of oil palm biofuel plantations, mostly on the coast of the Beibu Gulf and in the mountains of southern Yunnan.

Those plans did not come to fruition either. In 2016, the 13th FYP (2016–2020) for biofuels made no mention of oil palms. It only mentioned using starchy energy crops such as maize and cassava to produce ethanol.

Today, China's biodiesel sector uses recycled oils from catering and elsewhere as the main raw material, and a system for recycling, reusing and trading waste oils and fats is quickly taking shape. Some waste oils are exported as raw materials, while a small number of firms are using imported palm acid oil, a by-product of palm oil refining, to make biodiesel. However it is manufactured, the bulk of biodiesel manufactured in China is exported, and any use domestically is restricted to trial projects.

So oil palm planting for biodiesel production hasn't yet happened, and it is not a priority. One senior industry source thinks this is due to the high cost of planting oil palms in China, and a wish to recycle waste.

High costs

Robert Hii, a palm oil industry observer and founder of independent website CSPO Watch, also emphasised cost factors. He says that despite the development of oil palm varieties suited to China being reported in English, the Malaysian and Indonesian palm oil sectors aren't concerned. This is because there is no explanation of how obstacles, particularly labour costs, will be overcome.

“While overseas writers like to describe palm oil as a ‘low-cost’ oil, that’s actually a misunderstanding. It may be more productive by area than soy or rapeseed oil, but it’s very labour intensive, and that’s never been reflected in global prices,” Hii said. He explained that soy and rapeseed can be planted, grown and harvested mechanically, while oil palm farming must be done by hand. The clusters of fruit, weighing over 20 kg, need to be picked and moved manually, and many of the plantation workers he has interviewed suffer from kyphosis – abnormal curvature of the spine – as a result of the hard physical work. The only comparable edible oil crop is the olive, but the extra labour is reflected in the price of olive oil.

The palm oil sector in Southeast Asia has a problematic reliance on cheap labour. According to a 2020 report on fair targets and wages in the sector in Indonesia, published by the Earthworm Foundation, the average picker earns only 120,000 rupiah a day (about 54 yuan, or US\$8.50) if they pick their target of 1.2 tonnes of fruit a day. Many do not. Malaysia, meanwhile, relies mainly on Indonesian migrant workers, paid somewhere around the minimum wage: in 2019, that was 1,100 ringgit a month (about 1,675 yuan or US\$262), and increased to 1,200 ringgits in 2020. Given the absence of a Chinese palm oil industry, the rubber industry can serve as a point of comparison. Zeng Xianhai told China Dialogue that workers on state-owned rubber plantations in Hainan and Yunnan will earn 3,000–4,000 yuan a month, and 4,000–5,000 on a private plantation.

Zeng and Lin Weifu both agree China is not yet ready for widespread



Palm oil is very labour intensive, and that’s never been reflected in global prices

Robert Hii
palm oil industry observer

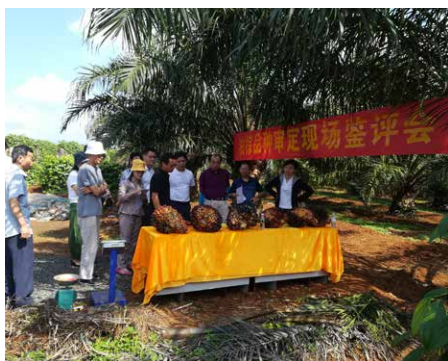
planting of oil palms. The huge presses needed have to be paired with plantations on the 10,000 *mu* (667 hectare) scale to be profitable. In China, land is worked in smaller parcels, and transferring usage rights is expensive. Establishing those large-scale plantations would be tough.

Lin Weifu explained that the market outlook for the new Re-you 6 variety is still hard to assess: costs can't be estimated without large-scale pressing, and there is no palm oil pressing sector in China. For now, all they can do is use laboratory tests.

Lin acknowledged there is a dilemma: if they go ahead with planting, the first crop will be harvested in two or three years with no presses to extract the oil. If a company builds the presses, there could be no raw material to feed them. A number of firms have spoken to the research team about cooperating on pressing the oil, but soon lose interest when they realise the amount of investment and planting



A palm oil mill in Southern Papua, Indonesia. Oil palm farms in China may not be profitable unless grown on huge plantations and paired with infrastructure such as oil presses, mills and refineries. (Image © Ulet Ifansasti / Greenpeace)



Comparing oil palm varieties at a meeting of China's National Committee for the Examination and Approval of Tropical Crop Varieties in Hainan, 2018 (Image courtesy Zeng Xianhai)

required. He thinks further expansion will only happen after small-scale production trials, and when the pressing and other infrastructure is in place.

Commenting on cost issues, Zeng Xianhai said that China cannot compete directly on price, but should look to differentiate itself from other producers. And that will require unique varieties. He gives “Re-you 40” as an example: its oil is less than 30% saturated fats and fatty acids, lower than the 50% in ordinary palm oil. That could help reduce the risk of cardiovascular disease. It’s also a short-growing variety, standing only half as tall as the regular variety when fully grown. That makes picking the fruit much easier. The lack of processing infrastructure has prompted the team to develop varieties which are easier to press. Fruit from the Re-you 40 has no kernel, meaning there is no need to remove it. That means smallholders can use simple oil pressing equipment designed for peanuts to produce crude palm oil.

Zeng says that while China is not ready for large-scale oil palm planting, it can start with small-scale trial production, to acquire the experience, equipment and staff for commercial operations. He thinks the market shouldn’t be the only driving force behind developing domestic production. “We need to think about planting oil palms in terms of the security of edible oil supplies, with China providing only

30% of its own edible oil consumption, tropical oil crops can make a contribution.” He added that palm oil production in China will require financial support via government policies, as well as private capital.

Lin Weifu, meanwhile, wants to see more backing for research. Currently, the only support available is from the Ministry of Agriculture’s Oil Palm Trial Planting Network, for the acquisition, breeding and trial planting of oil palm varieties, rather than for commercialisation.

Looking abroad

The outlook for palm oil production in China does not seem bright. However, Zeng Xianhai and other researchers have another aim: helping Chinese firms establish palm oil operations overseas.

The Rubber Research Institute, where Zeng works, has provided tissue-culture seedlings of China-developed varieties to Chinese firms working in the Democratic Republic of the Congo (DRC), the Republic of the Congo, and in the Pacific island state of Vanuatu. In the DRC, 10,000 mu (667 hectares) have been planted. In the Republic of the Congo, small-scale trial plantings have recently started. Vanuatu, meanwhile, is the first country to set up a palm oil project funded by Chinese overseas aid. In fact, back in 2005, the institute was working together with the China Machinery Engineering Corporation to send oil palm seeds and planting technology to Vanuatu, which has a climate suitable for palm oil production, but no oil palms. The introduction proved successful with the trees reaching harvestable age in 2014. According to a media report, in 2019 the institute started working with a Chinese firm on commercial plantings, with a plan for 10,000 hectares of oil palms on a “company + farmer” contract farming model.

“The techniques used overseas, particularly for high-yield cultivation, are mature. But we can do better in stress-resistant cultivation. Doing that

would give us a comparative advantage when promoting our varieties overseas,” said Lin Weifu.

Since 2010, another Chinese Academy of Tropical Agricultural Sciences body, the Coconut Research Institute, has also been studying oil palms. According to media reports, in August last year the institute signed a research agreement with the Tianjin Julong Group, one of a small number of Chinese firms with an oil palm plantation overseas. The institute will work with Julong’s Indonesian plantation on breeding improved varieties, preventing pests and disease, mechanisation, agricultural information technology, and staff training.

For a long time, the felling of tropical forests and draining of carbon-storing peat bogs has led to palm oil production being identified as the third biggest driver of deforestation worldwide. There are also associated problems with labour and indigenous people’s rights. Those issues have been garnering more attention over the last decade and more, leading to a range of approaches, such as certification, being developed to ensure environmental and social sustainability in the sector. As the world’s second-largest importer of palm oil, China, is starting to look at how it can apply pressure at the consumer-end to encourage greener production.

But as China becomes able to export palm oil technology and help its own firms to work overseas in the sector, it will have to tackle issues of sustainability from the production end, even if it produces none at home. For example, although high-yield technologies do have some sustainability potential as they can help spare forests from conversion into new plantations, monoculture harms biodiversity and means market risks to smallholder growers. Thus, the integration of oil palm into diversified agroforestry systems is becoming an emerging area of research. This could be a direction in which China’s future oil palm development also looks. 🌀

Opinion: Investing in sustainable palm oil is key to mitigating future crises

As the global supply of vegetable oil experiences shocks, sustainability efforts complement measures to safeguard supply stability, argues RSPO China's Fang Lifeng

Fang Lifeng | July 19, 2022

Millions of people around the world who have been grappling with extreme hunger in the wake of the pandemic must now contend with a shortage of vegetable oils. These oils represent one of the biggest weekly expenditures for poor families in low-income countries and about 10% of the world's daily calories, making them the second most important food group after cereals.

A constellation of factors has led to a tightening of global supplies of this staple ingredient of home kitchens, restaurants and packaged food. Chief among them is the war in Ukraine. Russia and Ukraine account for 60% of global sunflower oil production. Millions of tonnes of it, earmarked for export, has been stuck in Ukraine, sending prices soaring. This has compounded an already difficult situation in which droughts in Latin America reduced soybean yields; acute labour shortages and Covid-19 mobility restrictions in Malaysia reduced palm oil production; and the Indonesian government curtailed exports of palm oil by raising export tax to ensure local supply.

OECD-FAO Agricultural Outlook 2021-2030 statistics indicate global demand for vegetable oil is projected to expand by 33 million tonnes by 2030, a 15% increase on 2020 levels, with food use accounting for 68% of that demand. Palm oil remains an important part of a diversified and balanced market for vegetable oils.

Imported edible palm oil, canola oil, sunflower oil and soybean oil made up 24%



People buy cooking oil in Palu at a basic goods market, set up by the Sulawesi authorities, on 26 April 2022. To try and secure domestic supply, Indonesia would ban palm oil exports from 28 April to 19 May. (Image: Pacific Press / Alamy)

of China's 37 million tonnes of total edible oil consumption in 2021, or nearly 8.9 million tonnes. With high reliance on imports, any disruption and increased cost of supplies could have serious consequences.

Palm oil is the second most consumed vegetable oil after soybean oil in China, with a share of 20%. Of this, 80% is edible – mainly used in instant noodles, blended edible oil, processed foods, frying and industrial baking – with the rest going into industrial processes. The country's oil-processing industry takes in imported palm oil for refining and fractionation to generate margarine, grease, shortening and cooking oil and oleochemicals.

The vegetable oil market is likely to remain dominated by palm oil and vulnerable to external risks. It is therefore

crucial to manage these risks effectively and ensure the stability and sustainability of the palm oil supply chain.

Facing supply chain shocks

Safeguarding food security is a critical priority in China, and the central government has explicitly linked it to national security. But according to data from China's General Administration of Customs, palm oil imports contracted by 58% in the first five months of 2022, compared to the same period last year. Imports of other major edible oils, including soybean, rapeseed and sunflower, also fell. Recent Covid lockdowns in China, which have reduced visits to restaurants, where palm oil is more prevalent than in households, and high global vegetable oil prices, have resulted in demand disruptions. These

will have a lasting impact on domestic consumers and companies that rely on these commodities.

During the recent, short-lived palm oil export ban imposed by Indonesia, Chinese food producers scrambled as prices rose amid the supply shortage. Although vegetable oils are largely interchangeable, substituting them can cause headaches for food manufacturers due to issues including the functional properties of the oils, allergies and labelling requirements. Some companies, such as Fujian Panpan Food Group, opted to reformulate their products, while others contemplated closure.

Diversifying edible oil imports and boosting domestic production is China's main strategy to secure a steady supply of vegetable oils. While efforts are being made to address near-term supply chain issues, we still have to deal with the climate crisis and work towards achieving long-term sustainability goals.

Food sustainability and food security are not contradictory priorities; the two must go hand-in-hand if we are to ensure the resilience of our food systems now and in the future.

Supply security and sustainability are one

As the world's second biggest importer of palm oil, accounting for 10% of palm oil trade volume, China has a critical role to play in this regard. Supporting the sustainable development of the palm oil industry is in line with the national strategy of "ecological civilisation" as well as a green Belt and Road Initiative, and congruent with China's commitment to be a responsible country in combating the effects of climate change and protecting biodiversity. China has also pledged to peak its carbon emissions before 2030 and achieve carbon neutrality before 2060; and at COP26, it signed up to the Glasgow Leaders' Declaration on Forest and Land Use, committing to halting and reversing forest loss and land degradation.

Achieving these goals requires more companies along the supply chain to adhere to standards such as the RSPO's. Certified sustainable palm oil reduces the need for land conversion and deforestation. A life cycle assessment calculates that RSPO-certified oil emits 35% less greenhouse gas and is associated with a 20% lower impact on biodiversity than conventionally produced palm oil.

China has not yet issued a dedicated policy on the sustainability of palm oil importing. A positive development is that the Ministry of Ecology and Environment is leading on the development of a national strategy for a green value chain, which will involve a series of action plans such as sustainable importing policy, supply chain due diligence and international cooperation. In 2020, China and Malaysia issued a joint press statement recognising the significance of trade in commodities, especially palm oil, and committing to the sustainable development of the palm oil industry. This commitment is likely to guide trade with all palm oil producing countries, together with the coming national strategy.

Some may think that the face of surging prices and supply chain uncertainties, sustainability should take a back seat. But in fact pursuing sustainability has the potential to strengthen the stability of supply chains.

China is a key destination for exports from Indonesia and Malaysia, which combined are projected to account for 83% of global palm oil production by 2030. Bilateral dialogues with these producing countries to exchange information on supply and demand dynamics, thereby promoting the consistency of policies and actions, will help China improve the stability of the supply chain and secure palm oil inventories for its domestic vegetable oil consumption needs. China's policy signal of prioritising the sourcing of sustainable oil will also help transform the supply chain, spurring investment in sustainable production and trades.

A long-term increase in the uptake of certified sustainable palm oil in China can drive up production over time. Meanwhile, by getting involved in overseas palm oil production and the upstream supply chain, China could also leverage the financing of sustainable practices, carry out capacity building, and therefore increase the output of certified oil. This will also help reduce poverty, bring about economic growth and provide other socio-environmental benefits to palm oil producing countries in Southeast Asia, Latin America and Africa.

RSPO-certified palm oil takes innovation in oil palm cultivation and production one step further. It tries to make yields higher and more reliable than conventional palm oil by supporting growers, especially smallholders, to adopt the RSPO Principles & Criteria, in order to build their capacity via access to high quality training, project partners and resources. In the meantime, RSPO is also working with members from the supply side to ensure certified palm oil is available on the global market, and more importantly to scale up shared responsibility commitments from traders to retailers by setting annual percentage point uptake targets for them. It is hoped that these measures will boost the uptake of certified palm oil in China, where stakeholders have shown willingness to embrace the concept of sustainable palm oil, and the membership of RSPO is steadily growing.

The true test of resilience comes during times of crisis. Palm oil importers like China cannot and should not wait for a supply chain crisis to happen again. To mitigate future disruptions and stave off the climate crisis, action needs to be taken now to de-risk and future-proof China's edible oil supply chain. After all, it takes four years for the oil palm to yield fruit. 🌴

The author would like to thank Gu Keren, vice president of the Oil and Fats Branch of the Chinese Cereals and Oils Association, for his contribution and valuable comments on this article.



Palm oil's high yield masks environmental impact

Advocates see higher yields per hectare as a path to sustainable palm oil, but face scepticism around land conversion and life-cycle emissions

A palm oil nursery in West Kalimantan, Indonesia. The oil palm's high yield is often used as an indicator of sustainability, but this fails to take into account emissions from clearing tropical forests and peatland. (Image © Ulet Ifansasti / Greenpeace)

Nithin Coca | December 17, 2021

When it comes to sustainability, “palm oil is simply the superior crop for its effective land utilization,” according to the Malaysian Palm Oil Council. It argues that oil palm produces far more oil on far less land than other major global oil seed crops such as sunflower, rapeseed and soybean. The Indonesian Palm Oil Association, a government-aligned group of major producers in the world's top palm oil exporting country, says palm oil's land efficiency makes it “the perfect balance between land for conservation and land for agricultural development”.

These arguments have been regularly cited in global media. Articles in outlets such as Smithsonian Magazine use the productivity argument to conclude that “giving up palm oil might be bad for the planet,” if it gave way to more land-demanding alternatives, and even quote similar statements from environmental non-profits such as WWF (World Wide Fund for Nature) and CDP (formerly Carbon Disclosure Project).

One of the most recent sources backing this argument is a 2018 study by the IUCN (International Union for Conservation of Nature), which states

that oil palm produces up to nine times more oil per unit area than other major oil crops. Palm oil, the report says, produces 36% of food oil globally on just 8.6% of the land dedicated to food oil production. It's a common refrain from not only the palm oil industry, but also governments in key producing countries and even the Roundtable on Sustainable Palm Oil. The RSPO argues that if we shift to other food oils, we would need far more land, resulting in potentially more deforestation and biodiversity loss.

“There is a growing demand for vegetable oil,” said Juan Pablo Monzon,

Annual yields of different vegetable oils

(tonnes per hectare of farmed land)



Oil palm
3.74



Rapeseed
0.67



Sunflower
0.48



Soybean
0.38

a researcher at the University of Nebraska–Lincoln. “If it is not covered by oil palm, it will be covered by another crop.” Monzon, much like the RSPO, points to the potential environmental impacts this could have for countries producing alternative oil crops.

Productivity isn’t the same as sustainability

Many experts, however, have concerns with using productivity as a proxy for sustainability or climate impact.

“The tacit assumption is that all land has equal ecological potential. Clearly, that is wrong,” said Chris Malins, an expert in biofuels policy who runs the consultancy Cerulogy. “The idea that just because you get a better yield with palm oil in Indonesia than with sunflowers in Belarus or Ukraine, that palm oil is somehow automatically sustainable is trivial nonsense.”

Southeast Asia, which is responsible for more than 80% of global palm oil production, is a biodiversity hotspot, and both Indonesia and Malaysia host carbon-rich peatlands. Palm oil has been connected to deforestation and

peatland loss, which destroys the habitat of endangered species like the Sumatran rhino and orangutan. Malins believes the productivity argument not only ignores the type of landscapes in which different oil crops are grown, but also the life-cycle greenhouse gas emissions from oil palm.

“The problem for palm oil is that its [carbon] footprint for every hectare of

land that is converted is really, really bad compared to the expansion footprint of other oils,” said Stephanie Searle, the Fuels Program Director at the non-profit International Council on Clean Transportation (ICCT). “Palm oil, much more than other oil crops, tends to expand in tropical forests with high carbon stocks.”

Studies from the European Union and the US Environmental Protection Agency, as well as non-profits and the ICCT (International Council on Clean Transportation) have all found that palm oil’s use in biofuels, which accounts for the majority of consumption in Europe, has higher emissions than not only most other oils, but fossil fuels as well.

“The greenhouse gas implications of palm oil use, in all the modelling, are shown to be much higher than rapeseed, soy or sunflower,” said Malins.

Yield and sustainability

Much as using productivity as a proxy for sustainability is problematic, assuming that all oil palm is grown on peatland or deforested land with high-climate and biodiversity impacts is also inaccurate. Many advocates believe that, if grown in the right landscapes and with



A palm oil plantation built in a cleared rainforest in Papua province, Indonesia. Palm oil has a high emissions footprint compared to other oil crops, as plantations tend to destroy tropical forests that contain a lot of carbon. (Image © Ulet Ifansasti / Greenpeace)



The idea that just because you get a better yield with palm oil in Indonesia than with sunflowers in Belarus or Ukraine, that palm oil is somehow automatically sustainable is trivial nonsense

Chris Malins

biofuels expert and consultant, Cerology

proper management techniques, palm oil can be produced sustainably. For example, growing oil palm on former cattle pasture land in Colombia has been found to reduce its carbon footprint.

One way to prevent increased deforestation is to increase yields on existing plantations. Malaysia averages 3.21 tonnes of oil per hectare, compared to Indonesia, where it is 3 tonnes per hectare. Within that, however, there are higher-producing industrial plantations and lower-yielding smallholder plantations.

“There has to be ways to improve the yields on areas that have already been converted to oil palm, because then you can produce more with existing land – that hypothetically is going to reduce the expansion of plantations,” said Pablo Pacheco, the Global Forests Lead Scientist at WWF.

In fact, increasing yields, particularly on smallholder plantations, is seen as key to meeting the growing demand for palm oil, including for its use in biofuels in Southeast Asia, and exports to countries such as India and China. Eliminating the conversion of tropical landscapes, and particularly peatlands, could significantly reduce palm oil’s impact on greenhouse gas emissions and ecosystems.

Since 2019, Monzon and a team of

researchers from Indonesia, Europe and the US have been working with smallholder oil palm plantations, who have the lowest yields, to see how they can increase production to meet Indonesia’s palm oil goals without requiring land conversion, and provide greater economic benefits.

“Oil palm is really important for Indonesia as it is one of their main exports, and more than 40% of the area planted is planted via smallholders,” Monzon told China Dialogue. “It’s very important as an income source. Millions of farmers and families depend on this crop.”

Monzon and his team found, as part of the first phase of their research, that it is possible to meet future demand by increasing yield, but it would have to increase at a particularly high rate. They are currently piloting test projects with smallholders in six provinces to determine what management techniques can best aid farmers – and have strong results so far.

“The first year, yields increased by 10%, and are now up 30%,” said Monzon. “We hope to increase the yield even more.”

There are concerns, however, that intensification of smallholder plantations could result in the shifting of multi-crop plots to monoculture

farms, bringing both social and environmental impacts.

“If farmers become too dependent on one crop, they become a bit more vulnerable to economic shocks,” said Pacheco. There are also potential spill-over effects too. “If there is going to be an increase in yields, that is going to increase the profitability of plantations, that could attract more palm oil. You can hypothetically save forests, but you can also produce new incentives to keep expanding plantations.”

Strong policies that prevent expansion are, Pacheco believes, key – and perhaps urgent. The recent expiration of a ban on issuing new licences for oil palm plantations in Indonesia could, some environmentalists say, increase the clearing of forests for oil palm expansion.

Palm oil in diverse landscapes

There is also a need to think beyond yields, especially when it comes to smallholders, who operate in diverse landscapes.

“There is now a discussion emerging on whether it would be possible to promote oil palm as part of more diversified systems,” said Pacheco. This may lead to lower yields of palm oil, but growing it in agroforestry systems that support local biodiversity, or with native crops like rattan or cassava.

“The productivity of each oil palm tree is not going to be affected if it is grown with other perennials, but the number of trees is going to decrease,” said Pacheco. Yet, it could provide diversified income, and could be more sustainable from an environmental perspective, despite its lower per hectare productivity.

For Malins and Pacheco, a more science-driven, holistic view of sustainability – beyond productivity talking points – will be necessary for the palm oil industry, if its commodity is to become a truly responsible choice globally.

Amazon palm oil: sustainable fuel or deforestation driver?

To supply a planned biorefinery, Brazil would need to increase its oil palm hectareage by 60%. An all too familiar debate is underway.



Brasil Biofuels' biodiesel plant in Envira, Amazonas state. The company is planning a new plant in Manaus to begin production in 2025. (Image: Brasil BioFuels)

Monica Prestes | May 18, 2022

Oil palm, known as *dendezeiro* in Brazil, can produce up to ten times more vegetable oil per hectare than other crops. But it is regularly condemned as harmful to the biodiversity of tropical forests in Asia, Africa and Latin America. Now, its cultivation looks set to advance in the Brazilian Amazon.

In December, Brasil BioFuels (BBF) and Vibra Energia – the country's largest distributor of biofuels – announced plans to build a biorefinery for “green diesel” in Manaus, the capital city of Amazonas state. Produced from soybean and/or palm oil, the fuel is seen by many as desirable for low-carbon futures, as it is less polluting than fossil-based diesel.

The refinery is currently in the study phase, and is still without an environmental licence or deadline to start construction. But with planned investments of 1.8 billion reals (US\$360 million) and a start of operations in 2025, the venture could produce up to 500 million litres of diesel per year.

To reach this volume of production, BBF plans to plant 120,000 hectares of oil palm by 2026, in areas yet to be defined. This would increase the area devoted to oil palm in Brazil by about 60%. The crop is already used in a variety of consumer products and occupies 201,000 hectares in the country, according to data from the Brazilian Institute of Geography and Statistics (IBGE).

Brazilian law states that oil palm should only be cultivated in areas that were deforested before 2007. BBF's president, Milton Steagall has assured that the crop already follows these sustainable standards, and also contributes to carbon sequestration in previously degraded areas.

“Oil palm does not occupy forest space. We are talking about areas that were ‘anthropised’ before 2007, and which would be difficult to recover, because frequently they have already turned into pasture,” Steagall said. “We take degraded areas and make a perennial crop, which is not mechanised, does not require much fertiliser, and produces for 35 years.”

PALM OIL USE

From soaps to margarine and biofuels, palm oil is used in almost everything, including in the generation of the electrical energy we use. It is the world's most widely used oilseed product

Steagall added that the refinery will help to power 20 thermoelectric plants in operation and another 14 being planned in the Amazon. For this reason, he said, it will be vital to offer a source of clean energy to the region's thermoelectric plants, which currently operate with fossil diesel.

However, researchers and environmentalists have criticised the expansion of infrastructure for the production of palm oil in the Amazon.

"This is the crop with the most devastating potential in the world being implemented in the heart of the world's largest tropical forest," said Lucas Ferrante, a researcher at the National Institute for Amazonian Research (INPA). He described oil palm as "a proven predatory crop, which causes enormous loss of biodiversity".

The advance of oil palm plantations can have multiple impacts on tropical forests – which have mainly been seen in the palm hotspot of Southeast Asia, where habitat loss has put at least 193 species at risk of extinction. And according to the Union of Concerned Scientists, only 15% of species that inhabit tropical forests can survive in oil palm plantations.

Palm oil in Brazil goes against the world

In 2010, the Brazilian government launched the Sustainable Palm Oil Production Programme with the expectation of leveraging Brazilian

production and developing in the Amazon region, but the programme has not taken off. Less than 3% of Brazil's biodiesel today comes from oil palm, according to the National Petroleum Agency.

Even though more than 90% of the crop's planting is in the nine states of the Brazilian Amazon, it has not brought the expected benefits to the region, partly due to the weak action of environmental agencies, says Carlos Rittl, a specialist in public policies from the Rainforest Foundation.

"There is no way to fulfil the commitment of only producing in an already deforested area without governance, without control and without enforcement of environmental laws," says Rittl. Even though oil palm contributes to sequestering carbon by replacing degraded pastures, it stimulates new deforestation. "Oil palm is pressuring cattle ranching into new areas of native forest," he adds.

This is occurring, Rittl says, amid the ongoing dismantling of environmental protection agencies in Brazil and successive record years for deforestation and invasions of protected areas. Between 2019 to 2021, average annual deforestation in the Amazon was 56.6% higher than in the 2016 to 2018 period.

Palm oil has a small share in Brazil's fuel matrix, and a sizeable proportion of what it does use, it imports. But cultivation of oil palm has almost doubled in the last decade in the country, according to IBGE, driven by fiscal stimuli that helped attract agribusinesses to the Amazon.

While Brazil invests in oil palm to target biofuel and energy markets, growing international pressures are leading two major buyers – Europe and the United States – to discuss import barriers.

The EU also hopes to eliminate palm oil based fuels by 2030 – five years after the Brazilian refinery goes into operation – while Germany has

announced it will stop using palm oil in biofuels from 2023.

In China, there are non-governmental pushes to increase uptake of certified palm oil, says Rittl. The industry's major certification body, the Roundtable on Sustainable Palm Oil (RSPO), has been working to reduce the environmental impact of the country's procurement, as it is also a major importer.

"If we have an expansion of production in Brazil beyond domestic use, there will soon be no room in the market," says Rittl.

Palm oil impacts on traditional Amazon communities

The advance of palm oil has already had negative impacts on traditional communities in the Amazon, according to André Carvalho, a professor at the Federal University of Pará (UFPA). "Studies confirm the almost complete loss of character of the way of life in the region, food insecurity, besides the expropriation of land and violence in the field, including murders," he said.

This is the case for Acará, a municipality in the northeast of Pará state, where Afro-Brazilian *quilombola* communities claim an area from which they say they were expropriated by Agropalma, a palm oil producer with RSPO certification.

José Joaquim Pimenta, president of the association that brings together six quilombola communities, said the expropriation occurred more than three decades ago. At first, Agropalma's expansion occurred "on a small scale", Pimenta says, through land purchase. But starting in 1987, the company acquired a farm and went beyond the limits of the property.

Pimenta says the company "invaded traditional territories, initiating *grilagem* [land grabbing]. Between 1987 and 1990, it cut down a very large natural reserve area to plant oil palm." In 2015, the legal fight to return to these areas began.



Expropriation of land for oil palm plantations in quilombola communities has generated conflict (Image: Negritar Produções)



Quilombola communities are resisting the encroachment of oil palm plantations onto their territories (Image: Joaquim Pimenta)

In 2018, the Federal Court suspended the registration of two Agropalma farms on suspicion of illegal occupation, falsification of documents and notary fraud, following a request from the State Public Ministry of Pará (MPE-PA).

Agropalma argued that the lands were “acquired in good faith”. After the Federal Court confirmed the irregularities, the company said it “did not oppose the court decision to cancel the registrations” and is waiting for the land title to be regularised.

However, even with the registrations suspended, Agropalma continues to occupy the area, and conflicts with the quilombolas have been intensifying. “Recently, we have been prevented by Agropalma from accessing part of the forest, stretches of

the Acará River where we used to fish, and even cemeteries where our ancestors are found,” says Pimenta. In February, the restrictions “almost led to a confrontation” against armed Agropalma security guards, Pimenta says. At the time, *quilombolas* were camping in the disputed area as a protest against the company’s failure to comply with a recommendation by the MPE-PA to allow access to the site. Human rights organisations have been trying to mediate the dialogue between them.

Oil palm reduces Amazon biodiversity

Oil palm already brings harmful consequences to biodiversity in the Amazon. Alexander Lees, a researcher at Manchester Metropolitan University, is one of the authors of a paper warning

of the loss of bird habitat in the municipalities of Moju and Tailândia, in northeast Pará, where there are extensive plantations.

“Oil palm is an extremely predatory crop for Amazonian biodiversity,” Lees said. “While in primary forest, we easily find more than 300 species of birds, in the midst of oil palm this number is around 20. It is even lower than in pastures.”

Incompatible with family-based agriculture, the palm also ends up competing with subsistence crops such as cassava, an important source of income for small farmers, according to Auristela Castro, researcher at the Federal University of West Pará. She explains that oil palm generates “an atmosphere of uncertainties and threats” to the quality of life of small-scale farmers.

“Oil palm production practices are still far short of the pillars of social equity and environmental sustainability,” adds Castro. Asked about the environmental impacts and the intensifying land disputes related to palm oil, Steagall replied that the company seeks to “respect the rules and plant only within the zoning areas [intended for oil palm]”.

Palm oil or renewable energy

Despite palm oil’s high yield per hectare, and even though it guarantees a cleaner fuel than those from fossil sources, Lees believes that the best way forward is to reduce demand. “Exchanging fossil fuels for biodiesel in thermoelectric plants and cars is very good, but even better would be to replace thermoelectric plants for solar and wind energy, replace cars for bicycles and electric buses,” he says.

Carlos Rittl agrees that it is necessary to prioritise renewable power over thermal plants, which is where most Amazon palm oil currently ends up. For him, photovoltaic energy is the best bet for Brazil: “In 2025, it will be the cheapest energy in the world.” 🌀



A farmer walks within a regenerative agriculture project in the Brazilian Amazon. Here, oil palm is planted alongside açai, cocoa and ingá. (Image: © Jimi Amaral/SAF Dendê via CIFOR-ICRAF Brazil)

Can regenerative agriculture transform palm oil?

Mixing other crops into palm oil plantations can improve soil health, fix carbon and open up new revenue streams for farmers

Emma Bryce | December 17, 2021

On a 100-hectare plot of land nestled in Malaysia, farmers will soon begin an experiment that will turn the idea of a palm oil plantation on its head. Instead of establishing a monocrop, they will plant their oil palms alongside a lush understory of other crops and trees. They will shun chemical fertilisers in favour of organic compost, and start weeding manually to limit disturbance to the soil. “We really want to make this the way of doing agriculture in the future,” says Marco de Boer, CEO of reNature, a Dutch foundation that finances sustainable farming initiatives, and is working with the Malaysian NGO Wild Asia to deliver the project.

The method he’s referring to is regenerative agriculture, though some

prefer the terms “agroecology”, “climate-smart farming” or “conservation agriculture”. While it doesn’t have a strict definition, there are two linked goals at its core: to increase biodiversity and improve soil health on farmed lands. It achieves the first through techniques such as intercropping and agroforestry, which transform farmland into mixed-use systems combining commercial crops with native shrubs and trees; and the second via methods like no-till, cover-cropping and mulching, which involves returning organic waste back to the earth.

These techniques aren’t new: indigenous cultures have been practising them for centuries. But now, proponents are calling for their application across modern monocrops – from wheat to fruit and

even livestock farms – where evidence is mounting that they can deliver ecosystem services, alongside economic and social benefits.

By enriching soils, this way of farming can boost yields and simultaneously reduce the need for harmful chemical fertilisers. Diversifying plant cover can provide habitat for wildlife and make crops more resilient to pests and disease – thus requiring fewer pesticides and herbicides. Meanwhile, careful soil management could also help lock away more carbon in the ground. And a landmark study recently showed that vegetables, wheat, beef and pork produced using regenerative methods were more nutritious than food farmed conventionally.

Mixed land-use could also give farmers more agency over the land: diversifying crops offers insurance against changing environmental conditions and disease, safeguards food security and can boost yields and earnings.



Different species are planted alongside oil palms to produce biomass and enrich the soil in Brazil. Methods like this can help increase yields and reduce the need for use chemical fertilisers. (Image: © Jimi Amaral/SAF Dendê via CIFOR-ICRAF Brazil)

While regenerative agriculture is finding a foothold in the farming of many crops, palm oil is still a relatively new frontier. But precisely because of the widespread deforestation and exploitation the palm oil industry causes, proponents see it as a critical one. The question is: can regenerative methods work at scale, delivering both high yields and environmental benefits in today's palm oil plantations?

Evidence from the field

It may still be relatively niche in palm oil, yet a handful of pioneering farmers have been testing regenerative methods for years.

In Brazil in 2008, an alliance of stakeholders launched a research project to investigate whether it would be economically and environmentally feasible to grow oil palm in mixed-use agroforestry systems. Known as SAF Dendê, the project brings together Brazilian cosmetics company Natura, a farmers' group called the Tomé-Açu Agricultural Cooperative, the Brazilian

Agricultural Research Corporation, and the World Agroforestry Centre. It now covers 18 small-scale farms over 60 hectares of the Brazilian Amazon. Across these lands, farmers have reduced herbicide and fertiliser use,

helped the soil to rebuild itself, and integrated oil palms with other cash crops like passion fruit and açai as well as native hardwood trees.

Results from ongoing research – some of which will be published later this year – show these plots hold more soil carbon and support more wildlife than conventional farms. “From soil biodiversity, to macrofauna to birdlife, the biodiversity is definitely greater in these systems than you would find in monocrops,” says Andrew Miccolis, Brazil country coordinator and lead scientist for the World Agroforestry Centre, who has been involved with the project since its inception.

Critically, these sustainable methods didn't have an economic trade-off: over the first decade of the experiment, oil palms raised in these lush agroforestry systems produced on average 40 kilograms more fruit per tree than their monocropped counterparts, Miccolis says. Farmers also benefit from the diversified yields, as the approach “enables adaptive management and a higher degree of flexibility, which is what farmers need for their livelihoods,” Miccolis says.



Oil palm fruit harvested by SAF Dende, a project using regenerative methods to grow oil palm in the Brazilian Amazon. The project's plantations have produced on average 40kg more fruit per palm than monoculture plantations. (Image: © Jimi Amaral/SAF Dendê via CIFOR-ICRAF Brazil)

These benefits are echoed at another long-standing palm oil project in West Africa. In 2007, soap company Dr. Bronner's established an organic and Fair Trade palm oil project in Ghana, run by its sister company Serendipalm, to ensure the sustainability of its own supply. Farmers there have built up soil nutrients by cycling organic waste back as mulch onto the land, and Serendipalm has set a standard that on newly planted sites at least 10 individual trees from other species should be included in the mix. For farmers, the greener measures have paid off: "There is evidence that you can increase annual yields by some 20%," compared to traditional farms, says Gero Leson, vice president of special operations at Dr. Bronner's, where he has helped the company transition to organic and Fair Trade sources for its primary ingredients.

Meanwhile, in Central Kalimantan, Indonesia, data gathered from small-scale farms that adopt greener farming methods, as laid out by the Roundtable on Sustainable Palm Oil (RSPO), suggests they enjoy higher yields. This is according to Heni Martanila, a community development manager with Indonesian non-profit Inobu, which helps farmers bring their production in line with sustainability certifications.

Yields are also mediated by factors such as the variety of oil palm that's planted, the palm's age, and general site maintenance, Leson says. Yet, although there's limited research looking at the paired yield and environmental benefits of sustainable methods on palm oil farms, it does generally support the discoveries from these real-world sites: that regenerative farming methods can help boost palm oil production, while giving back to nature too.

Scaling up

But, there's a caveat: regenerative agriculture techniques have been tested mainly on small-scale palm oil farms. These plots do generate about 40% of palm oil globally, making them a critical entry point for the approach, but the

majority of palm oil comes from industrial monocrops. Scaling up regenerative agriculture into massive commercial plantations may be a bigger challenge.

Miccolis's research with the World Agroforestry Centre has shown that in mixed-use farms, yield increases per palm, but not necessarily per hectare. That's because more land is given to other crops and trees (there are about 100 oil palms per hectare on agroforestry farms, versus around 142 on intensive monocultures, Miccolis says.) The worry is that large-scale palm oil agroforestry could drive further expansion of plantations, if we rely on this type of farming to generate the world's palm oil.

Miccolis explains that any potential extra land use could be offset by the incorporation of other crops onto palm oil farms if we fully embraced agroforestry across industries – which would in turn reduce the pressure of those monocultures on the land. "You might need more land to produce the

same [amount of palm oil], but you're producing several other things there as well. So the overall environmental footprint will be lower, in my view," he says. That's supported by modelling research showing that oil palm agroforestry could spare land by growing a greater diversity of crops in a smaller area. But more studies may be needed to understand how these trade-offs would play out at large scales.

In any case, palm oil agroforestry wouldn't necessarily need to expand into rainforest or peatland: research shows that farmers can successfully grow oil palms in already degraded lands such as former pasture. If cultivated using regenerative methods, palm oil farming could also then bring biodiversity and increased carbon capture to depleted soils, Miccolis adds.

Another challenge is how to bring regenerative farming onto established plantations. Here in fact, Miccolis reckons there could be an opportunity. Oil palm productivity declines after about 25 years,



Two men processing palm fruit in the traditional way to extract oil in Cameroon. Convincing small farmers to adopt regenerative methods is an obstacle to scaling up regenerative agriculture. (Image: Mokhamad Edliadi/CIFOR CC BY-NC-ND-2.0)

when trees are uprooted and replaced with palm seedlings. This changeover offers a chance to wipe the slate clean and begin farming regeneratively across large swathes of land. Miccolis and colleagues at the World Agroforestry Centre are now looking at how to “incentivise companies when they are replanting, to be more sustainable and to introduce more biodiversity,” he says.

Farmers may also find they have an economic incentive. By the end of their productive lifespans, conventionally grown oil palms can degrade soil, locking farmers into a cycle of dependence on expensive chemical inputs to enrich the soil for successive plantings. Switching to regenerative measures that build up soil health could break them out of this costly loop.

Perhaps the biggest obstacle to the spread of regenerative agriculture is the human element: farmers must be willing to adopt it, both Leson and Miccolis say. Leson cautions that it is even difficult to convince small-scale farmers to embrace regenerative methods, when the potential benefits of diversified income and food security are clear. “The rewards are sweet,” he says, but “setting it up is clearly more challenging than having a simple monocrop.” Owners of industrial palm oil plantations will only be more reluctant, since they’re already reaping huge profits by farming a single crop at scale. “Mixing tree species is not a very attractive concept for people who plant palm to make money,” Leson says.

In this and many other ways, palm oil distills the challenges of modern industrial agriculture, wherein huge profits are built on environmental destruction. So, what is required to change it? Miccolis thinks nothing short of a seismic cultural transformation in the industry – “a real shift in their business model, and how they make money from that land.”

Unpicking monoculture swathes and transforming them into mixed-use agroforestry would require a huge leap. But crucially for farmers it could also

unlock new revenue streams. Diversified crops could provide new income and be a buffer in changing markets; meanwhile sustainably grown palm oil could be sold at a premium. The growing carbon market – which is already tapping into the potential of agroforestry – could provide new credit-selling opportunities for farmers whose methods can be proven to lock more carbon in the soil.

These could help shift the farming paradigm towards what proponents of regenerative agriculture believe it should be: a system that makes profits by incorporating nature – fostering biodiversity, reducing pollution and capturing carbon – instead of by excluding it.



There are ‘shades’ of regenerative agriculture

Gero Leson

vice president of special operations at
Dr. Bronner’s


The outlook

For palm oil, that future still seems far off. Regenerative agriculture to produce this commodity is currently confined to just a handful of small farms. Because of the unique challenges of integrating it into palm oil systems, it’s likely to be some time before we see trials on large industrial plantations, Leson believes. But buy-in from large companies willing to take a leap could send the right messages to the industry and pave the way forward.

Inobu is now working towards incorporating regenerative agriculture principles across more of its projects, but until recently Martanila says that this principle hasn’t been commonplace in her work with thousands of small-scale farms in Indonesia.

Leson thinks one way to increase uptake on farms is to break it down into its component parts. “There are ‘shades’ of regenerative,” he says, explaining that not every farm has to transition to full agroforestry to make a difference. For instance, simply cycling agricultural biomass back into the ground to build up soil health and capture carbon, could be a powerful starting point on industrial monocrops, and may even be easier to accomplish on large farms with more labour and machinery, he says.

Otherwise, certification could be a tool to encourage wider adoption of regenerative agriculture in the long-term – and there is now one in development. In 2017, Dr. Bronner’s, along with several other companies, farmers and researchers established Regenerative Organic Certified (ROC), a high bar for what this type of farming should look like. Still in its infancy, Leson hopes the ROC standard will gain a foothold in the palm oil industry. ROC is joined by other efforts such as Palm Done Right, a standard developed by the company Natural Habitats in 2013 to endorse palm oil grown using organic and Fair Trade practices.

Meanwhile, pioneering farmers will continue testing regenerative agriculture out in the field. Back in Malaysia, if the experimental agroforestry plot delivers economic and environmental benefits, it could be expanded to hundreds of small-scale palm oil farms across the region, putting these measures into practice across several thousand hectares more. Progress may be slow and piecemeal, but Leson says, “I have this feeling that the concept of regenerative agriculture is going to grow.” 

Unilever sustainable sourcing director: ‘First-mile data is critical’

Unilever’s Martin Huxtable tells China Dialogue about the company’s efforts to illuminate palm oil’s origins, rooted in its bold commitment to cut deforestation by next year

Emma Bryce | July 29, 2022

As much as palm oil is celebrated for the convenience it brings to our lives, it is also denounced for its harms, including driving deforestation, biodiversity loss and social conflict in tropical ecosystems.

One company that understands this dichotomy is consumer goods behemoth Unilever, which, as one of the world’s largest buyers of palm oil, consumes just over 1% of global production each year, for use in its variously branded food, cosmetics and hygiene products. Over the last 20 years, the company has looked to lead on a shift to more sustainable palm oil. Recently, that culminated in an ambitious commitment to achieve a deforestation-free supply chain by the end of 2023.

However, the company operates within a system that is currently ill-equipped to deliver on that goal. The Roundtable on Sustainable Palm Oil (RSPO) is considered the gold standard for sustainable palm oil certification, and yet its certification schemes are criticised for serious flaws and failings. Not least of these is the mass balance system, a supply chain model on which much certified palm oil relies, which combines streams of certified and uncertified palm oil and makes it harder to know how oils are sourced. The industry’s generally opaque supply chains make it almost impossible to trace most palm oil back to its roots, meaning no one can be sure of the environmental, social and economic practices that go into producing this ubiquitous ingredient.



Using GPS to track oil palm fruit bunches as they leave a plantation during a 2013 investigation into illegal forest clearance in Tesso Nilo National Park, Indonesia. Unilever’s Martin Huxtable says data on the “first mile” of the palm oil supply chain is essential to ending deforestation associated with the product. (Image © Greenpeace)



Martin Huxtable,
director of sustainable sourcing at Unilever
(Image © RSPO)

Unilever says these discrepancies are why the company is starting to rely increasingly on its own measures. These include new company policies and digital innovations that bring together artificial intelligence, geospatial data and blockchain technologies to improve its sourcing. Many of these initiatives focus on illuminating the so-called “first mile” – the critical stage where palm oil is grown, collected, transported and processed – to enable better monitoring and also make sustainable palm oil traceable through the supply chain.

Martin Huxtable, director of sustainable sourcing at Unilever,

spoke with China Dialogue on why the company is taking a high-tech approach to this challenge, its plans for streamlining the palm oil supply chain, and his thoughts on whether Unilever’s fast-approaching no-deforestation target is still within reach. The interview has been edited for brevity and clarity.

China Dialogue: Unilever has been tied to the palm oil industry for over a century. What sparked interest in sustainable palm oil in recent decades?

Martin Huxtable: Growth in palm oil production has led to deforestation, biodiversity loss, marginalisation of indigenous people, land conflicts and human rights issues. However, it remains the most land-efficient oil crop, supplying [approximately] 35% of the world’s vegetable oil on just 10% of the [oil-producing] land. To get the same amount of oil from sources like soybean, you’d need anything between four and 10 times more land. The industry brings money, trade and jobs to producing economies and employs millions. In Indonesia and

Malaysia, 4.5 million smallholders rely on the palm oil industry for their livelihoods.

That's why we're choosing to be part of the solution in this important sector. We also believe that the palm oil sector must address social, environmental and economic issues to be truly sustainable. This is a shared responsibility between governments, the private sector and civil society.

In December 2020, we became the first company to launch a cross-commodity People and Nature Policy. This makes our requirements of suppliers clear when it comes to deforestation, but also the need to respect and advance human rights, deliver transparent and traceable supply chains, and be a force for good for people and nature. Our policy builds on strong standards like certification. But we've learnt that where we still don't have full traceability and the ability to monitor our supply chain, other measures are needed to prevent environmental and social issues.

Speaking of certification, which RSPO schemes cover the largest share of the company's palm oil? And since identity-preserved palm oil – from a single certified supplier, kept separate throughout the supply chain – is the only way to trace palm fruit back to a plantation, why doesn't Unilever use more of it?

In 2021, 90% of our palm oil was purchased RSPO-certified, the majority through the mass balance system. Identity-preserved production is not presently a viable solution in long and complex derivative supply chains, and forms only a small percentage of the available supply.

Certification does form an important base and we have always played a leading role in driving certification in the industry. [But] the effectiveness of certification systems depends on all actors in the supply chain taking responsibility. We also believe that engaging the uncertified supply base of independent mills and associated smallholders is critical to driving impact and positive change. We're now

going further by investing in emerging technologies such as satellites, geolocation, blockchain and artificial intelligence to trace our crops from their source and are working with major technology firms and start-ups to develop new approaches from which the whole industry can benefit.

In short, our approach is more holistic than simply relying on certification. We believe that to make the greatest impact, we must focus on generating change at our raw materials' origin. That's why we're concentrating on the critical "first mile" – from where our commodities are sourced, to where they are first processed.

In this vein, the company's People and Nature Policy requires direct suppliers to disclose the agricultural areas they source from. How often do you request this information, and for those that don't or can't provide it, are there consequences?

Our plan is holistic, and starts with reducing or limiting our raw material demand footprint as far as possible; focusing our sourcing from areas with lower risk of deforestation and human rights issues; partnering with suppliers that share our social, economic and environmental sustainability ambitions; using the latest technology to help with monitoring and traceability; and empowering smallholders so they can become powerful allies in the protection and regeneration of nature, while working towards a living income. We're redesigning our sourcing network so that the palm oil we buy will shift from 1,600 palm oil mills to around 500, to reduce the risk of deforestation and human rights issues.

All these actions will enable us to manage a far simpler and shorter supply chain and have a more purposeful engagement with our partners on collecting the data we need.

We contract with our suppliers to provide granular data on the land origins of raw commodities. We have developed a

framework for the independent verification of this information. While we collate this information from our suppliers on a quarterly or biannual basis, we're also able to overlay this declaration-based data with our geospatial tools to generate information in near real-time.

We work with our suppliers to help them develop the means to generate the information we require, or empower them to help collect the information we need through our own tools and monitoring systems. This is especially so in smallholder sourcing areas with independent mills, where capabilities are less developed.

The People and Nature Policy also requires direct suppliers to protect land and labour rights, as well as the rights of indigenous people and environment and human rights defenders. How do suppliers prove that these principles are being upheld on plantations? Is Unilever developing new approaches to give the company more direct oversight?

We realise that, together with our suppliers, we need to go further than certification, and have started additional monitoring. This year, we launched a much deeper management systems review with our suppliers, which will help focus our work on the salient issues in areas with greatest risk.

We're also working to address the eradication of forced labour with different organisations like The Consumer Goods Forum Human Rights Coalition that focuses on the development of responsible recruitment markets, starting with Malaysia. More and more, we're experimenting with inference and unconventional data sources such as crowdsourcing and AI analysis of internet data, to monitor land for signals or proxies for these types of issues.

Our investments in landscapes are also a very important future platform for addressing both environmental and human rights risks. Unilever has invested in five "jurisdictional landscapes" in Indonesia and Malaysia so far. Landscape and jurisdictional

approaches provide a mechanism to work with a diversity of stakeholders that go beyond our own supply chain, and usually include representatives from local government, smallholder farmers, civil society organisations and the private sector. Partnerships like these can overcome challenges that no one entity could solve alone.

Can you explain how Unilever assesses the risk levels of the mills it is supplied by? How does this work on the ground, and what factors are taken into account?

We collate data from a number of sources to build profiles of mills in our supply chain. We use information based on certifications like RSPO's, as well as Global Forest Watch Pro and World Resources Institute (WRI) data, [and data from] Earthqualiser, Google Earth Engine, Descartes Labs, Orbital Insight and others, to build a full stack of data for ongoing monitoring and risk assessment. This is combined with information declared by our suppliers directly, through audits, as well as through industry processes like the No Deforestation, No Expansion on Peat and No Exploitation Implementation Reporting Framework.

Along with WRI, UN Food and Agriculture Organization, NASA and Google, we have founded the Forest Data Partnership, which seeks to build consensus around these types of data, to monitor and manage risk of deforestation, and also opportunities for restoration.

Crucial to eliminating deforestation is having closer oversight on what goes on in the “first mile” of palm oil production. Can you tell us about one of your related projects: the pilot scheme in North Sumatra and Aceh, Indonesia? How does it work, what has been achieved and what have the challenges been?

“First mile” data is particularly critical – the point at which the oil palm fruit is harvested and processed. Sometimes the oil

palm fruit is traded through a middleman, with bunches dropped off and picked up at informal collection points, sometimes far from where they're grown.

Our partnership with Premise [a market researcher] is allowing us to create a community of local people who will help us track this process. Mill workers and suppliers provide photos and information about collection points and ramps via Premise's digital crowdsourcing platform. The platform runs materials through its quality control system, powered by AI, to verify their credibility and ensure collection points aren't double-counted. In North Sumatra and Aceh provinces, we've identified and documented more than 5,000 collection points. The pilot is helping to give an even fuller picture of our supply chain. We're now looking to scale up this project, inviting other companies to join us and increase their transparency too.

We have a clear strategy to include and empower independent smallholders in our supply chain, through developing on the ground relationships and business with independent mills. These mills have smallholders in their catchment areas and traceability is the most challenging in such supply chains. Technologies like Premise and Orbital Insight are [providing] a more informed view of the smallholders supplying these mills and, in particular, the villages where they are located. With this information we're designing impact hubs that connect and engage these smallholders in development and training programmes. In 2021, we launched a new partnership with Meridia Land [an organisation that coordinates land data and documentation], who are facilitating digital mapping with the smallholders in these areas. To date, we've mapped over 9,000 smallholder land parcels and aim to map over 30,000 smallholders in and around these sourcing hubs.

How reliant will Unilever be on digital approaches going forward in achieving its deforestation-free target?

Our collaboration with companies such as Descartes Labs and Orbital Insight has given us more transparency into the

critical “first mile”, as this is where the greatest deforestation risk lies. We believe that blockchain technology may have an important role to play, alongside many other tools we use. With broader adoption we could link the data from GreenToken [a blockchain-based transparency platform] to first-mile traceability systems, giving us a fuller, end-to-end picture of our supply chain.

It's an exciting and developing capability – the technology we're using wasn't available just a few years ago. However, technology cannot be used in isolation and, without partnerships and action on the ground, it risks being less impactful.

Does Unilever believe that collectively these initiatives can achieve a robust chain of custody between plantation, mill and facilities, ultimately ensuring full traceability across its supply chain?

Having a robust system in place that can be independently verified is central to our strategy. Shortening and simplifying our supply chain is critical to this journey, as is managing our footprint and diversity of feedstocks that we use. New technologies have allowed us to significantly increase our supply chain transparency – the change is happening fast, and we'll continue using these tools in parallel with our sustainable sourcing practices.

Does Unilever think it can achieve deforestation-free palm oil by the end of 2023? Does it have shorter-term targets to help it track progress towards that goal?

We've been working on tackling deforestation for two decades. The issue isn't new, but our current plan of action is. Now we have access to technology that wasn't available just a few years ago and this – together with strategic decisions we are taking regarding the design of our supply chain, our stronger and more engaging supplier requirements, and our partnership agreements – is giving us confidence that our goal can be achieved. 🌀

As war drives up the price of palm oil, is sustainable production at risk?

Strides have been made in slowing deforestation and certifying large plantations, but addressing smallholder sustainability in Southeast Asia is crucial as prices spike

Khor Yu Leng | April 28, 2022

Global palm oil prices have soared in recent months, with other vegetable oils including sunflower and soy on similar trajectories, driving the UN Food and Agriculture Organization's vegetable oil price index to a record high in February – a peak that has continued to rise.

A perfect storm of issues had already contributed to this skyward surge. The Covid-19 pandemic has brought various difficulties in logistics, and government mandates on using palm oil in alternative fuel blends have meant more demand. There have also been supply shortfalls, aggravated by droughts in Latin America, and labour shortages and floods in Malaysia.

Further price spikes have now been set off by the shock of Russia's invasion of Ukraine, and the subsequent rollout of sanctions on Moscow and its allies. Rising petroleum prices have impacted shipping costs and boosted the viability of using palm oil as an alternative fuel, and as a replacement for vegetable oils from Russia and Ukraine. US Department of Agriculture data shows that Russia and Ukraine together account for about 2%, 8% and 57% of global soybean, rapeseed and sunflower seed production respectively, and are significant presences in global exports of

soybean oil (7%), rapeseed oil (20%) and sunflower oil (77%).

The halt to shipping at Black Sea ports and sanctions on the SWIFT payment system are major concerns, which will only intensify if the war is protracted. The surprise moves earlier last month by Indonesia, the world's number one vegetable oil producer, to restrict exports – and a few days ago to ban them altogether – as it struggles to counter domestic cooking oil shortages, have also contributed to making palm oil more costly.

This blend of circumstances has triggered a remarkable rise on pre-pandemic prices. The palm oil futures price, traded on the Bursa Malaysia Derivatives, has risen from monthly levels of around US\$475 per tonne between June 2018 and September 2019, all the way up to US\$1,627 on the eve of the war. It has since spiked to a new high of about US\$1,942 on 1 March, before easing to below US\$1,642 in mid-March. In comparison, the previous peak was US\$1,280, in 2011.

As the market weathers soaring prices and supply pinches, how both industrial and smaller growers, and national regulators, respond will be of great importance to the continued progress of efforts to support sustainable



palm oil production, and to curtail palm-linked deforestation.

Declining deforestation in Southeast Asian plantations

The vast majority of palm oil is derived from the African oil palm, which has a 25-year life cycle. Malaysia and Indonesia account for about 23% and 59% of global palm oil production respectively, according to USDA. The recent trend has been rising supply constraints. Over the past five years, USDA data shows, Malaysia has produced an average of 19.3 million tonnes a year, but 2021/22 saw a 3% drop on this average – a result of acute labour shortages and the limited land left for expanding production in the country.

As for Indonesia, production is still on an upwards curve, despite slowing growth of land area used for cultivation, driven by policy moratoria on peatland development, deforestation and new concessions – freezes that have chafed



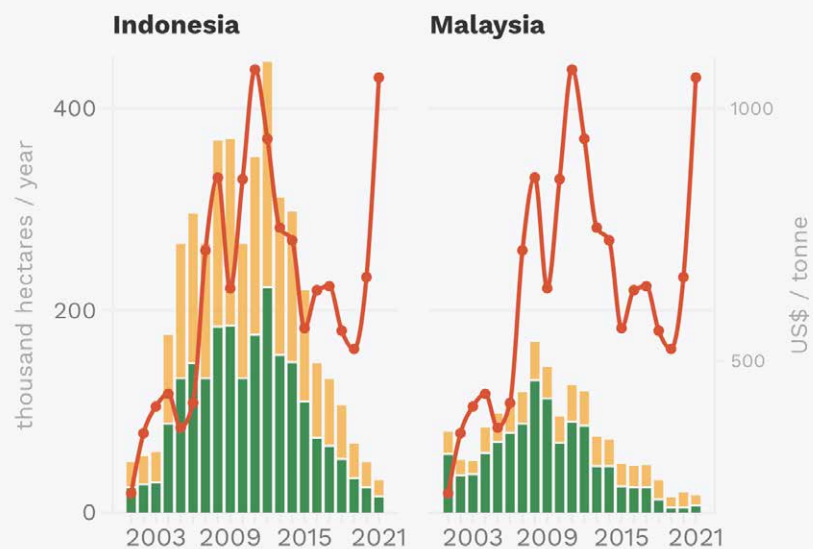
A worker at a cooperative in East Kalimantan, Indonesia handles palm fruit to be processed into oil. As prices rise, there is concern smallholders may expand unsustainably. (Image: Ricky Martin / CIFOR, CC BY-NC-ND 2.0)

with business aspirations. Meanwhile, the country’s hectareage with mature oil palms (aged 9 to 18 years for peak crop yields) is rising, with 2021/22 production hitting 44.5 million tonnes of palm oil, a 2.3% increase on the previous year.

Dominated by large plantations in Indonesia and Malaysia – including a few giant plantation groups that control hundreds of thousands of hectares each – the sector has in recent decades acceded to voluntary sustainability schemes, notably the Roundtable on Sustainable on Palm Oil (RSPO), which was initiated in 2004. This certification has greatly helped to reduce both upstream greenfield expansion by its members and limited them from acquiring plantations from non-members, who practised looser environmental standards to land development. In a landscape where three or four companies control three-quarters of global volume, efforts towards sustainability have been strengthened by moves by palm trader-processors to adopt pledges on “No

Prices rise, but oil palm expansion slows in Southeast Asia

■ Crude palm oil prices ■ Forest to plantation conversion ■ Non-forest to plantation conversion



Sources: [David Gaveau, The Tree Map](#), [The International Monetary Fund](#) • Notes: Data for Malaysia is for the states of Sarawak and Sabah; crude palm oil prices for 2021 are from January to November only.

deforestation, no peat, no exploitation” (NDPE). These have also been accompanied by numerous traceability efforts, including trace-to-mill or even stricter trace-to-plantation and trace-to-farm initiatives.

These endeavours have slowed the expansion of the area of industrial plantations, as illustrated by data from TheTreeMap, a forest-loss tracking initiative (see chart below). According to Chain Reaction Research, a sustainability risk analysis group, in 2021 a total of 19,000 hectares of forest land was cleared for industrial oil palm plantation development in Malaysia, Indonesia and Papua New Guinea – the world’s eighth largest producer country – far lower than the 90,000 hectares and 38,000 hectares recorded in 2019 and 2020 respectively.

But while these declining rates of forest conversion by industrial palm oil operations now offer some comfort in sourcing from bigger plantations, some

buyers and NGOs remain worried about deforestation that may enter supply chains by way of unfettered expansion of smaller estates and smallholder growers.

Small growers expanding fast under the radar

Industry observers have noted that, when prices spike, this is usually followed by an enthusiastic purchase of oil palm seeds. Findings from the consulting firm LMC International show a doubling of seed sales in 2021 on 2018 levels, but the area being planted in recent years for oil palm is substantially below historical averages. “With larger plantation companies unable to expand, the vast majority of this planting [of newly purchased seeds] will be by smallholders and smaller, less visible estates,” they said.

Looking ahead, the worries over deforestation-risk expansion now remain focused on smallholder production in Indonesia and Malaysia,

which represents around 40% of plantation area. Smallholders face fewer restrictions in their expansion, and policymakers and politicians favour their interests. There have been good indications that they are even encouraged to expand – especially during election years by provincial politicians seeking votes and bribes. Studies report deliberate forest clearance and fires used to clear land and increase land transactions during these periods. Weather can also influence land use change: when the dry-climate drivers of El Niño and Indian Ocean Dipole (sometimes known as the Indian Niño) coincide with election cycles, notably in 2015, the deforestation-by-fire risk seems to be greatly enhanced.

High base prices have recently made sourcing palm oils more costly than competitor oils, such as soybean and coconut oils, whose expansion are now – belatedly – also facing big sustainability questions. This is a



Fires are used to clear land for plantation in Papua, Indonesia. Tackling deforestation by smallholders is trickier, as they face fewer restrictions in expanding their plantations compared to the large companies that dominate the sector. (Image: Greenpeace)

significant turnaround for what was for a long time the cheapest vegetable oil. But the resultant tight supply outlook, plus extra demand driven by billions of dollars pumped in to support biofuels by both Indonesia and the EU, has helped to create a big price signal for small estates and smallholders. Where will the extra oil palm seeds enthusiastically purchased be planted? Can policymakers and politicians steer keen farmers away from forested areas?

Channelling sustainability premiums to small growers

As the Singapore Institute of International Affairs (SIIA) reports, the trigger of high palm oil prices increasing deforestation has become less significant in recent years. But could this revert? What has gone under the radar is the rise in the premium paid for producing certified sustainable palm oil products. These can now range from US\$10 per tonne for basic palm oil feedstock, to

US\$1,000 per tonne for refined fractions of specialty palm kernel oil paid to trader-refiners.

High premiums and supply shocks should be no surprise with the sizeable but still relatively limited availability of RSPO-certified sustainable palm oil, that accounts for about 20% of global supply. But efforts to sustain and increase RSPO share have been hampered, as some members face scrutiny for various actions, including allegations of destructive practices and forced labour. Furthermore, RSPO suppliers are often co-certified with International Sustainability and Carbon Certification (ISCC), the dominant certification for the EU biofuels mandate market, making their actual supply to the RSPO lower.

However, small estates and farmers may be swayed by a rhetoric that suggests Western markets now make too many environmental, social and governance demands, and that other markets such as China, India and Africa may be motivated by price only – and are therefore more reliable. They are also captured in a pervasive public discourse that says “sustainability doesn’t pay”, or that there may be a vast surplus of certified products. But, in fact, combining the production with RSPO and ISCC certifications, their supply and demand is not too far out of balance, as was already the case a few years ago. And if the big rise in RSPO premiums suggests anything, it’s that the supply is actually quite tight.

Nevertheless, for most certified palm oil materials there is a surprising lack of price discovery, and transparency around its process – for products certified with RSPO (the dominant certification for non-energy use markets) and those with ISCC. Rather, sustainability premiums are usually determined in over-the-counter transactions between big sellers and their clients, and the information they use is kept away from the public. The big sellers dominate the sustainable market and new suppliers have a hard time understanding what is going on.

As a consequence, smaller producers don’t see the financial incentive to shift to sustainable production. But in order to make an impact and drive financing upstream in the palm oil supply chain, more questions must be asked about how to make the premiums-discovery process public, and on how to share these premiums more equitably with small estates and farmers. If the RSPO, ISCC and others do not put it on their agenda, it is uncertain how this situation can change.

However, knowledge of these high premiums is starting to get through, presumably as a result of some independent mills in Southeast Asia joining the RSPO, and the outsized increase in Latin American and West African suppliers gaining certification in the last three years. Unlike traditional hotspots such as Indonesia or Malaysia, many newer origins for palm oil have started off with non-deforestation policies from the outset, seeking differentiation. Moreover, they have short and simple supply chains that offer easy traceability and are easier to certify, as their palm oil mills have straightforward links to a captive smallholder base. In contrast, Indonesia and Malaysia have to overcome systemic issues, including a history of forest conversion and a business landscape dominated by a complicated network of dealers that discourage traceability and certification.

If big buyers were to purchase certified smallholder products, could the difficult-to-certify and doubting smaller suppliers of Southeast Asia be left behind in value-added markets, overtaken by their counterparts in other regions of the tropical belt? Here we see the delicate challenge facing the region. In a landscape of spiking prices and changing climates, efforts to bring smallholders further into the fold on sustainability will require careful policies and action, balancing concerns of environment, production and livelihoods. Given their significant contribution to regional and global output, it is a challenge that can’t be ignored. 🌀



Breaking down palm oil

Crude palm oil can be broken down into many useful derivatives, but murky chemical supply chains may be hampering sustainable development

Chih-Ching Lan, Josie Phillips

June 29, 2022

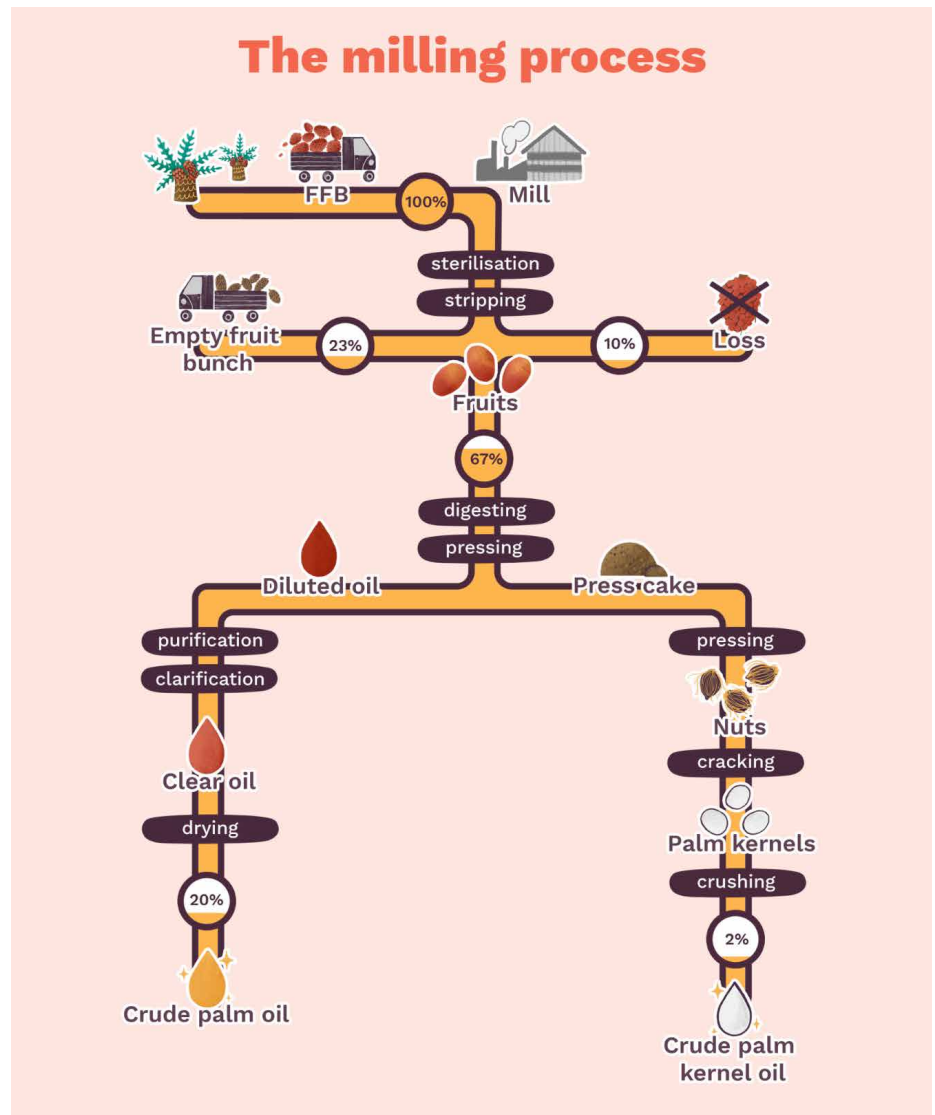
The media often highlights the prevalence of palm oil in food and household products, as well as the deforestation linked to it. But there is a general lack of awareness of the existence of the commodity in its other forms, such as fatty acids, fatty alcohols and glycerol. It is little understood just how widely and increasingly these forms are used in chemical and industrial manufacturing sectors such as pharmaceuticals, paint and plastics.

Such sectors have complex supply chains with very little transparency, which has perhaps helped them fly under the radar of campaign groups. But with the climate and biodiversity crises intensifying, it's never been more important to explore the ties between palm oil and these lesser-known industries.

Production of the world's most popular vegetable oil has increased five-fold in the past three decades, to nearly 77 million tonnes in 2021. The rapid expansion of oil palm plantations across the tropics has contributed to land degradation and greenhouse gas emissions, driving NGOs to campaign for sustainability and accountability.

Proponents draw attention to palm's high yield and low production costs compared with other vegetable oils, though this may mask some of its social and environmental impact.

Like most oils, it is a mixture of compounds that can be broken down into hundreds of derivatives. These are useful in myriad products, from chocolate and pizza, to toothpaste and shampoo, and even paper and fire retardant.



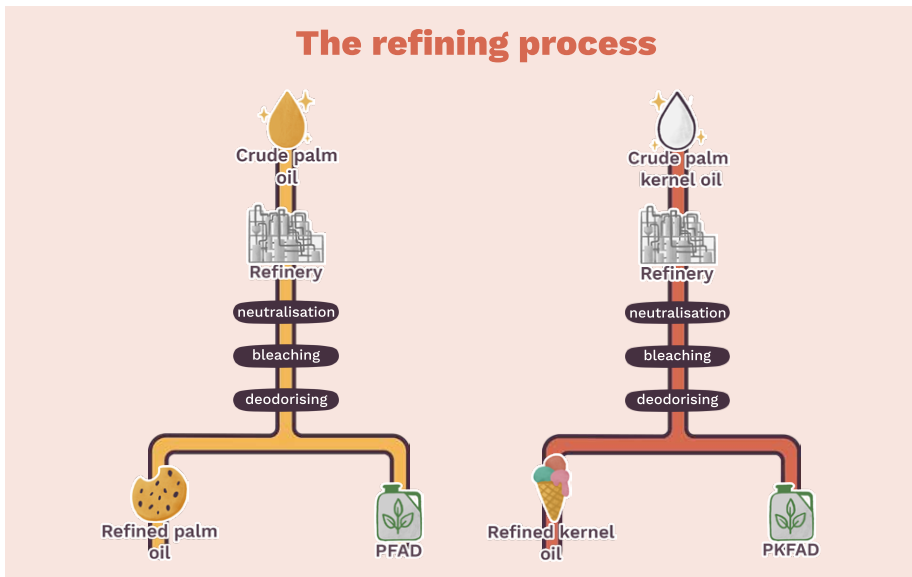
(Graphic: Rita Kruglova / China Dialogue)

Palm oil processing is a highly adaptable process: many different pathways can be followed. Because the oil is stable at high temperatures, blends well with other ingredients and has a natural preservative effect, it and its derivatives have become sought-after workhorse ingredients

in countless edible and non-edible products.

Like most oils, palm oil is seldom used in its crude form. The pungent, reddish-orange oil is first refined and physically separated into different components known as fractions.

The refining process



(Graphic: Rita Kruglova / China Dialogue)

Using chemical reactions, it may then be broken down further to produce compounds called oleochemicals.

Any material that is palm-based can be considered a palm oil derivative, and as we will see, it is no easy feat to examine the true extent to which palm-based derivatives are embedded in our lives.

What are palm oil derivatives?

Fractions and other derivatives of crude palm oil account for about 60% of global palm oil consumption. But the complexity of their supply chains makes it far more difficult to trace and assess whether they have been produced sustainably. In some cases, derivatives may go through double-digit transformations before reaching a final product.

Whatever chemical pathway palm oil follows, it all begins with the supply of fresh fruit bunches from an oil palm plantation to a mill. Once there, the bunches are stripped and processed into crude palm oil and crude palm kernel oil. While the crude oil is extracted by pressing the flesh of the fruit, the kernel oil comes from crushing the fruit seeds. The average extraction rate from fresh fruit is around 20% for palm oil and 2–5% for palm kernel oil – so for every

1,000 kg (1 tonne) of fresh fruit bunches, 200 kg of crude palm oil and 20–50 kg of crude kernel oil can be drawn out.

From the mill, the crude palm oil and kernel oil are transported to refineries where they are refined, bleached and deodorised. The physical refining process removes any unwanted substances such as free fatty acids, phosphatides and metallic compounds.

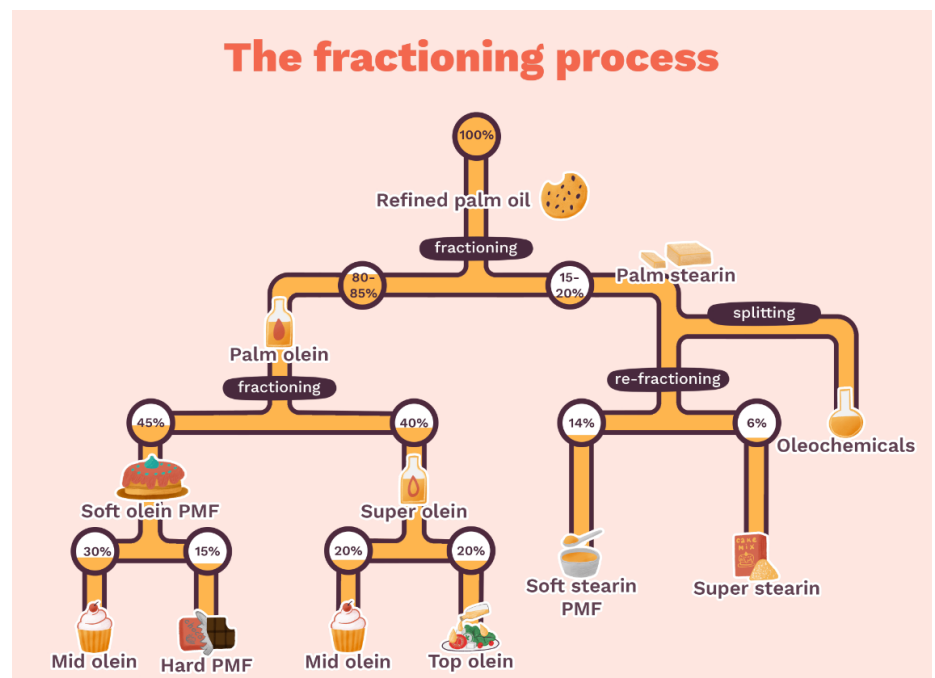
Physical refining is usually preferred to chemical refining because it requires less chemicals, produces less liquid waste and has a higher overall yield.

A by-product of the refining process is palm fatty acid distillate. This light brown, semi-solid, non-edible residue is becoming increasingly popular as a feedstock in biodiesel production, as well as to produce candles, soaps, animal feed and certain chemical products. Around 3 million tonnes of fatty acid distillate are produced globally every year through palm oil refining. There is some debate over whether it should be considered a “processing residue” at all, due to its market value and many uses.

Rising demand for palm oil in the manufacture of food and chemical products has underpinned huge technological advancement in its physical and chemical processing since the 1980s. Fractionation is the most common method of extracting useful products from refined palm oil and kernel oil. It entails physically separating the oil into liquid and solid fractions using crystallisation.

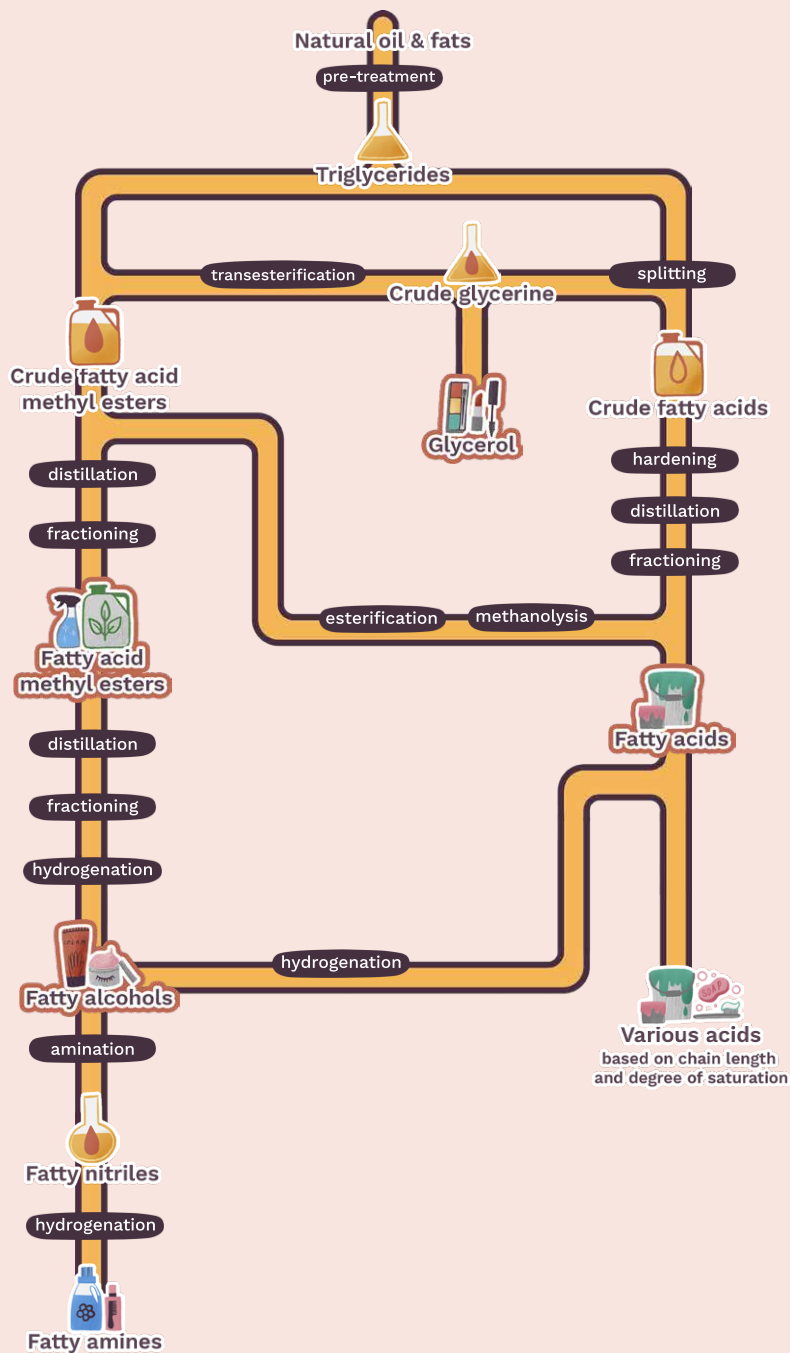
The liquid fat fractions or “oleins” contain unsaturated molecules making

The fractionating process



(Graphic: Rita Kruglova / China Dialogue)

How oleochemicals are engineered



(Graphic: Rita Kruglova / China Dialogue)

them perfect for products that melt at a medium heat, such as cooking oils. While the solid fat fractions or “stearins” contain more saturated molecules and are used in things like margarine and vegetable ghee that melt at a high heat.

Oleins and stearins can then be fractionated further to create super oleins, super stearins and harder palm mid-fractions. These multiple-step fractionation processes yield higher added-value products.

What about oleochemicals?

At its simplest an oleochemical is a compound chemically derived from animal or vegetable oils or fats.

All oils and fats consist of triglycerides – long carbon chains linked together with a glycerol backbone. The type and length of the chain determines its viscosity (thickness) and resistance to high temperature. Oleochemicals are produced through chemical reactions which alter the triglyceride chain structure to unlock further potential uses and applications, such as in adhesives and cleaning products. They may come from a mixture of coconut, soya and other vegetable oils – many of which are now facing questions over their sustainability, but since palm oil is the cheapest and highest yielding, it’s often the main raw material.

The major feedstocks for palm-based oleochemical production are refined oil and refined kernel oil, stearin and fatty acid distillate. There may be many transformations before the desired end product is reached.

According to Efeca, only 8% of the world’s palm oil and 70% of its palm kernel oil went into oleochemical production in 2016. But the market for oleochemicals is certainly growing, with chemical companies such as Cargill and DuPont increasingly touting bio-based feedstocks as a lower-emission alternative to fossil fuel-derived products.

The main process for deriving oleochemicals is hydrolysis (also known as splitting). This sees the large triglyceride molecules broken down into mixed length fatty acids using high pressure steam. Other reactions which alter the chemical structure and physical characteristics of the molecules include “transesterification”. This involves reacting fatty acids with alcohol to produce fatty acid methyl esters, which as we will see are used to produce detergents and biodiesel.

The complex nature and many transformations of these palm-based oleochemicals make it very difficult for downstream users to trace production back to source, and make sure of sustainability. To tackle issues around transparency, leading industry standard the Roundtable on Sustainable Palm Oil (RSPO) introduced rules for oleochemicals and derivatives back in 2013. These rules closed a gap between the business practices of downstream users of oleochemicals, and the RSPO's Supply Chain Certification Standard – which audits facilities handling certified oil palm products along the supply chain. They define fatty acids (FACs), fatty alcohols (FOHs), fatty acid methyl esters (FAMES) and glycerol as the four primary oleochemicals. Products that come from further chemical conversions of these are classed as secondary oleoderivatives.

Primary oleochemicals	Application examples	Secondary oleochemicals
Fatty acids	Surfactant, detergent, soap, rubber, plastics, paper, lubricant	Cocoamidopropyl Betaine, Sodium Stearate, Isopropyl Esters, Isopropyl Myristate, Capric Triglyceride, Fatty Isethionate, Glycerolesters, Polyglycerol Ester, Methyl Ester Sulphonate (MES), Sorbitan Monoglyceride, Sorbitan Triglyceride, Polysorbate 60, Propylene Glycol Monoester
Fatty acid methyl esters	Surfactant, lubricant, emollient, detergents, solvent (for inks in printing), biodiesel	
Fatty alcohols	Cationic surfactant, detergent, softening agent, personal care products, foaming agent, anti-caking agent, plasticizers (for paper production), biocide, adhesives, coatings, pharmaceuticals, fire-retardants, polymers (for bioplastics), agri-chemicals, emollient, synthetic fibers, water repellent, corrosion inhibitors, perfumes, paint stabilisers	Fatty amines, Sodium Lauryl Sulfate, Stearamidopropyl-dimethylamine, Cetyltrimethylammonium chloride, Alkylpolyglycoside, Glycerolesters
Glycerol	Cosmetics, solvent, animal feeds, pharmaceuticals, paint stabilisers, plastics, anti-freeze, lubricants, explosives, ethanol, vaping juice	

Why does it matter?

For years, environmental groups have targeted large users of palm oil with campaigns to raise awareness of the environmental and social impacts of its production. Their targets are usually large multinational corporations that use oil palm products in the manufacturing of fast-moving consumer goods – companies like Unilever, Nestlé and PepsiCo. These campaigns have gone a long way to raise consumer awareness of the prevalence of palm oil in many edible and non-edible goods, and to encourage brands to make decisions

over whether to go “palm-oil free” or source sustainably produced palm oil.

In line with consumer demand for sustainable produce, palm oil producers and users have been taking steps to improve the transparency and traceability of their palm oil sourcing. But for manufacturing processes and product materials that continue to fly under the radar, there is little opportunity to leverage for change and little impetus for users to step up action for sustainability.

Within these industrial and chemical manufacturing sectors, palm oil is being increasingly touted as a green and renewable feedstock. But with such murky supply chains and little assurance that palm oil has been produced free of deforestation and exploitation, work is needed to understand how viable it is as an alternative to petrochemical processes. By fostering a deeper understanding and awareness of these processes, we may yet unlock new pathways for sustainable palm oil. 🌱



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