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ILUC Still Unfit as a Basis for Regulation

Focus on Palm Oil

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A dismal time

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EDITORIAL

Extricating palm oil from the murky world of deception

Palm oil has undoubtedly become a victim of its own success. Ranked 10th in the world among oils and fats in 1962 with a production of only 1.3 million tonnes, it jumped to second position behind soybean oil with a recorded global production of 17.9 million tonnes in 2000. The next decade saw palm oil overtake soybean oil (35.8 million tonnes) as the most-produced vegetable oil at 45 million tonnes in 2009, and it has since retained pole position.

Palm oil's leap to the top was followed closely by rapeseed moving from 11th to 3rd position over the same period (1962-2009). Palm oil will continue to hold its position, facilitated by the ability of the oil palm to produce five times more oil per hectare than rapeseed.

Any success story would attract the envy of competitors. Early attacks on palm oil focused on aspects of health and nutrition. These were correctly addressed by engaging world-renowned laboratories to verify evidence that, in the end, nullified false accusations centred on the nutritional properties of palm oil.

Current attacks, though, have migrated to deceptive perceptions that are not easy to address. Perceptions are based on belief and, to some extent, amount to brainwashing. Perceptions are easily created and spread in an era where social media exerts a profound and extensive influence on decisions made by even the lay consumer.

For example, oil palm is being accused of being the main driver of deforestation. The proven facts show otherwise – that the livestock industry uses 73% of the global agricultural land of 5.8 billion ha. Oil palm only occupies 0.4% of global agricultural land. These facts have been repeated on many occasions and debated by scientific groups. Yet, the negative perception toward oil palm continues to proliferate unabated.

It is obvious that deforestation has been used as a front to demonise palm oil. This is blatant sensationalism. For example, claims are registered that 'an area equivalent to 300 football pitches is being cleared every day' to make way for oil palm planting. This is compounded by alleged loss of biodiversity, including wildlife, through campaigns designed only to capture the public imagination and create lasting anti-palm oil sentiments among consumers. The palm oil industry must therefore come up with new ideas and concepts quickly to counter the negative perceptions being generated.

Efforts are also being revived to subject palm oil to tests of 'sustainability'. One attempt seeks to examine the form of land use change, as a consequence of the diversion from food to non-food application of vegetable oils for use as biofuel feedstock.

Land use change is divided into direct (DLUC) and indirect (ILUC) land use change. Unlike DLUC, quantification of ILUC is rather questionable and the current prescribed models are not scientifically robust or water-tight. Given these anomalies in applying ILUC to classify sustainable and non-sustainable biofuel feedstocks, it calls into question the EU's rapid fire move to hastily adopt 'high' and 'low' ILUC risk and apply this to palm oil, especially for fuel and renewable energy.

It is clear that palm oil is being targeted to be unfairly phased out. The Malaysian industry is not pleased and stands ready to act, and ensure that the world is not denied access to palm oil – an essential, affordable and sustainable source of oils and fats.

Datuk Dr Kalyana Sundram,
CEO, MPOC

ILUC Still Unfit as a Basis for Regulation

Its effect differs case by case

The use of biofuels in Europe has been promoted at European Union (EU) level through several Directives with the aim of making the transport sector more sustainable, but has also been associated with pressure on land, leading to the conversion of carbon-rich land (e.g. deforestation). The concern is that biofuels may not reduce emissions as much as hoped, since they can spur increased emissions elsewhere through land use change, either directly or indirectly.

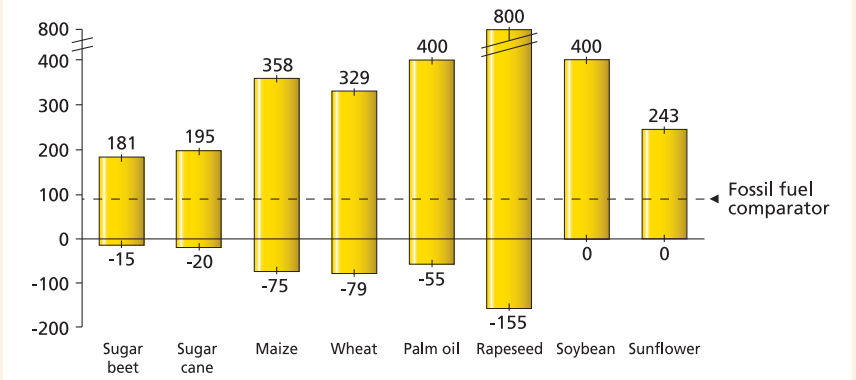
Direct land use change (DLUC) is when cropland is expanded for biofuel feedstock production, e.g. when a forest in Europe is cut down in order to grow wheat for biofuel production there. DLUC is observable and can be monitored; in case of non-compliance with rules (e.g. forest conservation rules), authorities can enforce penalties. Indirect land use change (ILUC) also describes conversion of land to cropland, but caused indirectly through displacement of production in other locations. If, for example, European wheat has been used for food production before, but is now used for bioethanol instead, this could give rise to wheat production (or the production of a substitute crop) elsewhere in the world due to increasing wheat prices. The land that may be converted to cropland for this purpose is the indirect land use change effect of the wheat-based ethanol.

While ILUC can be just as real as DLUC, it cannot be monitored in the same way. It is practically impossible to establish a clear, quantifiable causality between the production of biofuel crops and the ultimate land use change somewhere else in the world, since the latter is influenced by a countless amount of circumstances. In the attempt to estimate the ILUC effect of biofuels anyway complex economic models are used, which need to make assumptions regarding a large number of highly uncertain parameters as explained with some examples below.

Now in 2019, the ILUC discussion is back on the political agenda. The EU's recast of the Renewable Energy Directive to 2030 (RED II) includes an updated target for renewable energy used in transport of 14% with biofuels playing a major role in achieving this target. However, RED II limits the extent to which biofuels from feedstocks associated with high ILUC can contribute to the target of 14%: a Delegated Act is being prepared by the European Commission in an attempt to determine 'high risk' or 'low risk' biofuels, based at least in part on ILUC. Biofuels associated with high ILUC may not exceed 2019 consumption levels, and are then to be phased out to zero by 2030. As of today, there is no clear definition of what high ILUC vs low ILUC risk biofuels are, but the Commission is required to set criteria for classifying this in 2019. This is the role of the Delegated Act.

While we acknowledge the overall ambition, we conclude that the concept of ILUC should not be a part of such regulation. The Delegated Act, if it attempts to base regulatory decisions on 'high risk' ILUC, would be outside of the current scientific consensus. The reason is that there is no scientific consensus about the ILUC effects of different biofuels that would support such a classification; if it is done anyway, it is likely that it will do more harm than good.

Figure 1: Variance in ILUC estimates per feedstock across studies
g CO_2 equ./MJ biofuel



Note: Break in continuity in the y-axis.
Source: European Commission (2017) and Copenhagen Economics (2014)
[2] See European Commission (2017), Annex V part C, point 19.

The ILUC effect, or ILUC factor, is a term for the estimated emissions due to indirect land use change expressed in grams of CO_2 equivalents per megajoule of biofuel (g CO_2 equ./MJ biofuel). A negative ILUC factor means that the production of the biofuel entails an overall net reduction in greenhouse gas emissions. Positive ILUC factors mean positive net emissions, but those can still be lower than for fossil fuels. The fossil fuel comparator as determined by the Commission in RED II for the transport sector is 94 g CO_2 equ./MJ;[2] this means that the use of biofuels with a lower (higher) ILUC factor will entail a net decrease (increase) in emissions.

Indeed, we are currently far away from a consensus about the ILUC effect of different biofuels. The researchers' attempts to model the ILUC effects of biofuel production have resulted in estimates that vary enormously and do not allow for any robust conclusions. The

predicted ILUC factor across models for wheat-based bioethanol, for example, ranges from -79 to 329 g CO_2 equ./MJ biofuel (Figure 1). This means that its ILUC effect lies somewhere between an emission reduction by 184% and an emission increase by 250% compared to using fossil fuel. The other feedstocks feature similarly large ranges in estimates. It becomes clear that no meaningful conclusions can be drawn from estimates with such variation.

Substantial variation can be observed not only between, but even within models. A study from 2015[3], for example, yields ILUC factors between -20 and 175 for sugar cane, and between 10 and over 400 for soybean. This illustrates how uncertain and complex ILUC modelling is: even when using the same modelling approach and overall assumptions, the ILUC effect is difficult to narrow down.

As a consequence of the large variation within and between models, no robust conclusions can be made about the relative ILUC effects. There is no clear consensus regarding the relative ranking of feedstocks in terms of ILUC effects. A study by OECD[4] for example estimates rapeseed-based biodiesel to have a lower ILUC effect than wheat- and maize-based bioethanol, while other studies[5] come to the exact opposite result.

This large variance in ILUC estimates is not a surprise. The results will vary depending on which modelling approach is taken, and which assumptions are made.[6] To arrive at an ILUC estimate, the model needs to go through several steps, all of which contain new assumptions and uncertainties. An example is whether and how by-products of biofuel feedstock production are included in the model. By-products are parts of the harvest that cannot be used for biofuels, but for other purposes, typically for animal feeding, e.g. soybean and rapeseed cakes.[7] Different studies reveal that, when by-products are taken into account, it may reduce the estimated land requirement by approximately 23-94%.[8] If taken into account, the approach of doing so matters, too. An increase in rapeseed biofuel production, for example, can lead to a net expansion or net reduction in cropland, just based on different assumptions in the models regarding the market response to the by-product of rapeseed production.[9]

Overall, we observe that the ILUC effect will differ case by case, depending on a wide range of circumstances, of which the feedstock is just one small component. Assigning a single ILUC factor to individual feedstocks has, therefore, no scientific basis.

Copenhagen Economics

2 See European Commission (2017), Annex V part C, point 19

3 IIASA et al. 2015, Annex V.2 Sensitivity and uncertainty analysis, detailed results per scenario, page 225ff, and Wageningen et al. 2017, Table 9. This study applies to the GLOBIOM model.

4 OECD 2009 as discussed in JRC 2010

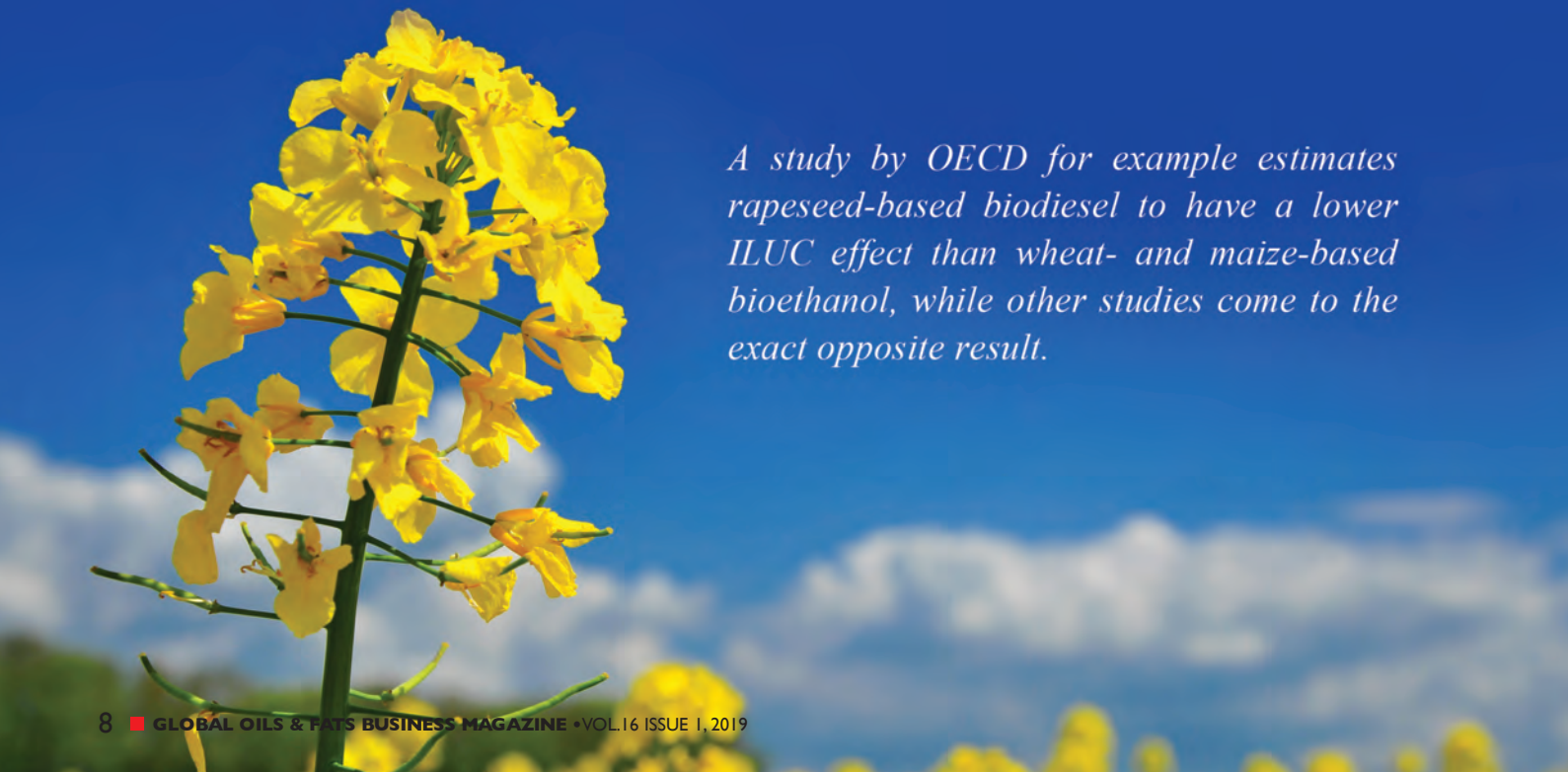
5 E.g. IIASA et al. 2015

6 While all assumptions are within reasonable.

7 Wageningen et al. (2017) page 76

8 DG Energy 2010, page 15

9 See chapter 2.2 of the Full Report, Copenhagen Economics, BIOFUELS AND INDIRECT LAND USE CHANGE – Fundamental uncertainties make ILUC factors no good basis for regulation



A study by OECD for example estimates rapeseed-based biodiesel to have a lower ILUC effect than wheat- and maize-based bioethanol, while other studies come to the exact opposite result.

Putting the Brakes on Oil Palm

Or, how *not* to feed the world

The world's population stands at 7.6 billion today and is expected to reach nine billion by 2050. At the same time, the availability of arable land remains roughly the same. In fact, arable land is becoming scarcer, relative to the number of people who have to be fed.

According to UN figures, an additional 2.7-4.9 million ha of cropland will be required every year to feed the world's population. But climate change, urban development and rural population migration affect agriculture directly.

Every year, between one million and two million ha of land become unsuitable for cultivation due to land degradation. Efforts to rehabilitate such land are extremely expensive. Therefore, more innovative and efficient agricultural land use policies are needed to step up food supply.

The first fact to recognise when considering food security is that the world is not homogeneous. Global food production is not evenly distributed among all countries.

Countries with a conducive climate and human capacity have surplus food production and will not encounter food security issues. Those that are less well-endowed will encounter food security issues. Very often, they are countries with large populations. This, clearly, is a potential cause of significant economic and social instability.

By 2050, an additional 35 million tonnes of oils and fats will be needed every year around the world. This posts a major challenge in that large areas of land will be required to meet the additional demand.

In order to produce 35 million tonnes of oils and fats, 88 million ha of land would be required for soybean cultivation or 58 million ha for sunflower. In contrast, only nine million ha of oil palm would be needed to produce the same volume of food – the actual area may be smaller due to productivity improvements over time.

Realising this, the UN Food and Agriculture Organisation has recognised the importance of planting oil palm for food security, especially in developing countries. Although oil palm occupies only 0.3% of total agricultural land, the crop contributes more than 30% of the world's supply of oils and fats.

Sustainability certification

World-leading efficiency on its own has not been sufficient to lead palm oil into the good graces of decision-makers. Consistent negative campaigns about palm oil's alleged environmental impact have damaged its image and forced the industry to respond to prove its sustainability credentials.

The Roundtable on Sustainable Palm Oil (RSPO) is today the most widely accepted sustainability certification scheme for palm oil, particularly for use in food and chemicals. Indeed, the RSPO has made significant progress and impact in promoting the production, supply and use of sustainable palm oil.

However, there are signs that the RSPO is increasingly alienating oil palm growers; they have become disillusioned by the continuously shifting sustainability criteria or application of these during audits.

Let's look at the statistics of membership. In 2008, four years after the RSPO's formation, member-growers made up 19.1% of membership; 10 years later, a mere 4.4% of the total membership comprised member-growers. These statistics showing a gross under-representation of growers should be a wake-up call for the RSPO and the advocates for sustainable palm oil.

Growers are the ones who bear the brunt of the hard work, undergoing regular audits involving almost 100 criteria. They form the source of the palm oil supply chain on which the very existence of the RSPO depends. If the goose that lays the golden eggs disappears or shrinks substantially, it would be meaningless for the remaining members – food companies, retailers and NGOs among other stakeholders – to talk about promoting the use of sustainable palm oil.

The RSPO's core objective is to 'promote' the production, supply and use of sustainable palm oil. 'Promote' means 'encourage' and has an underlying tone of voluntary effort and incentives.

However, membership for growers has turned into an avalanche of complaints against their production practices, and hardly any complaint against other member-groups. With this – coupled with the less than 50% uptake of the certified production volume as well as the fast-

declining RSPO premium – it is not surprising that expansion of the growers' membership is so slow and that under-representation of member-growers is so stark.

Due to the stringent RSPO criteria and significant certification costs, there is a real need for other schemes that are cheaper, less complex and more broad-based. The Malaysian Sustainable Palm Oil standard, for example, is a much-welcomed certification scheme which is backed by the government and can be adopted by a much wider spectrum of growers, including smallholders.

Negative activism

The era of the Internet and social media has proved a boon to environmental NGOs from western countries, as they are able to reach out to netizens around the world and garner a strong following to promote their causes. Palm oil has become a favourite target of these NGOs.

Armed with academic knowledge gained from western institutions, as well as information extracted from studies based on dubious science, activists who are mostly in their 20s and 30s have a tendency to exert their opinions on oil palm growers who have spent many years practising their trade.

The NGOs are relatively small in size, with manpower as low as five for the smallest to perhaps a few hundred for the bigger ones. However, with clever use of social media and shrewd propaganda tactics, they are able to sway consumer perception. They also dictate to oil palm grower communities, which total several million people, on how environmental conservation should be carried out in less developed countries.

It is acknowledged that activist groups play an important role by providing alternative views and serving as a check-and-balance on matters of interest. However, in many instances, their approach to resolving issues could be less confrontational, more sympathetic and more collaborative. The fact is that growers are the ones who do the tough job of ensuring that oil palm is grown in an economically, socially and environmentally sustainable manner.

The campaigns by activist groups in restricting oil palm planting have been effective, as seen from the much slower expansion of the planted area over the last few years. The Indonesian government has extended a moratorium on approving new land for oil palm planting. Recently, the Malaysian government also announced a restriction on oil palm expansion.

These are good short-term measures that allow proper environmental protection to be implemented effectively on the ground, and to moderate the growth of palm oil supply in the global vegetable oil market.

However, a proper balance should be struck to avoid other socio-economic problems such as food insecurity, food price inflation and an imbalance in rural development from surfacing in the longer term.

Dato' Lee Yeow Chor,
Chairman, MPOC

This is an edited version of an article published in the Star on Jan 7.

Errors, Omissions and Assumptions ...

... in WHO claims about palm oil

The World Health Organisation (WHO), in a recent article, turned its sights on the palm oil sector. The article is riddled with errors, omissions, assumptions and other evidence of bias. The fact that such bias exists is a major issue, but this is not the only problem.

The WHO takes issue with the palm oil industry for making use of 'lobbying to the detriment of scientific evidence'. In doing so, the WHO itself regurgitates the talking points of anti-palm oil lobbyists, while ignoring voluminous scientific evidence on the benefits of palm oil. This lack of self-awareness is painful.

Are the WHO's claims substantiated? Let's start by looking at the issue of poverty.

The authors complain that the palm oil sector relies on 'poverty alleviation arguments'. In this, the WHO is correct. Oil palm cultivation has lifted millions out of poverty by providing a regular income for small farmers and rural communities. It has helped Africans, Asians and others build better, healthier lives for themselves and their children.

Is the WHO saying that this is a bad thing? If so, it needs reminding that poverty is one of the most significant drivers of poor health. As the World Bank notes: 'Poverty is a major cause of ill health and a barrier to accessing health care.'

Palm oil offers a unique dual benefit to producers and consumers, many of whom are based in the developing world. The producers include small farmers who can make a living and attain better quality of life. Consumers – including the poor – receive key nutrients including Vitamin E tocotrienols and tocopherols from consuming palm oil. In both instances, the main benefit is better health.

Lifting millions of people out of poverty has done more to improve global health than the WHO could visualise. But perhaps the real criticism is that palm oil producing countries 'talk too much' about poverty alleviation. In this respect, the Malaysian palm oil sector is guilty as charged.

For years, Malaysia has provided data, studies and articles that highlighted how the country has built successful rural communities and derived economic growth based on oil palm cultivation. Malaysia was able to reduce poverty from 50% to less than 5% within a few decades. As a result, its model of oil palm cultivation is being studied and replicated in many poor countries.

Surely, this should be celebrated by the WHO? Sharing knowledge on proven poverty alleviation efforts leads to better health conditions in poor countries. Instead, the WHO chooses to fall back on wearisome attacks on palm oil.

Repeat of allegations

The WHO next criticises palm oil in the context of trans fats. Just to be clear, trans fats have been universally condemned as deleterious to human health. In its natural state, palm oil has zero trans fats, while serving the required functions in food preparation. Again, the simplest answer is the correct one: this is a clear win for human health.

The WHO article ignores this positive as well. Instead, it asserts that 'the palm oil industry may benefit from increased sales'. Are the authors claiming they would prefer lower health outcomes or a reintroduction of trans fats into the food supply chain?

The article moves on to adopt a copy-paste version of extremist NGO attacks on palm oil, even though these have been repeatedly debunked. If the authors had done basic research, they could have easily discovered the facts:

- On allegations of large-scale burning for land clearing: Malaysia imposes a strict zero-burn law.

- On claims linking oil palm cultivation to deforestation: UN figures show that Malaysia's forest area is increasing, and remains far higher than that of most western nations.

- On analysis by the Harvard and Columbia universities linking transboundary haze to 100,000 premature deaths in three Southeast Asian countries in 2015: This was thoroughly discredited by the countries, including Malaysia.

The article is at least honest about its bias. Throughout, it quotes anti-palm oil rhetoric approvingly and at length, despite the absence of scientific verification. At the same time, it condemns published research with even the smallest link to the palm oil sector. This is a classic case of judgment based not on evidence, but on pre-existing prejudice ('NGOs good; palm oil bad').

Any balanced evaluation would conclude that the oil palm is a valuable crop. It uses less land (meaning more can be kept for conservation); fewer pesticides (which the WHO has acknowledged is a good thing); and less fertiliser.

The article compares scientific research on palm oil to studies sponsored by alcohol and tobacco companies to promote their products. When it is established, for example, that the tocotrientols in red palm oil provide essential vitamins to nutrient-deprived communities across the developing world, it is bizarre that the WHO lazily compares this to cigarettes or liquor. This would be laughable if it were not so irresponsible.

But if there is one saving grace, it is this: The WHO authors admit that 'we need to better understand … palm oil products'. Yes, it is clear that they do.

Faces of Palm Oil

This is an edited version of a blog-post. Faces of Palm Oil is a joint project of the National Association of Small Holders, Federal Land Development Authority, Dayak Oil Palm Planters Association, Sarawak Land Consolidation and Rehabilitation Authority and MPOC. It advocates on behalf of Malaysian small farmers.

Managing Forests

The Malaysian way

Palm oil production has often been blamed for deforestation in Southeast Asia. However, this does not do any justice to ongoing conservation efforts in Malaysia by both the authorities and non-governmental entities, as well as regional and international organisations.

To address the issue of expanding oil palm plantations, timber production and infrastructural projects, Malaysia has put in place regulations and initiatives related to the conservation and safeguarding of its forests and biodiversity.

Malaysia has about 55% of its land area under forest cover, the conservation of which was confirmed in October 2018 by Primary Industries Minister, the Hon. Teresa Kok. This is in line with Malaysia's commitment at the 1992 UN Earth Summit in Rio de Janeiro, to retain at least 50% of its land area under forest cover.

With respect to oil palm, Malaysia maintains a policy to limit the area for cultivation at 6 million ha, which is only slightly above the current 5.8 million ha. Also, areas used for other crops, such as rubber, cocoa, tea and rice, are being converted to oil palm plantations, meaning that forests need not be cleared.

Malaysia's forestry policy was established long before concerns arose with respect to expanding the cultivation of oil palm. The policy originates in the National Forestry Act 1984 (NFA) and National Forestry Policy 1992 (NFP). On those legal bases, Malaysia established Permanent Reserved Forests (PRFs).

The NFP is continuously reviewed, particularly in order to take biodiversity concerns into account. It also provides the institutional framework for cooperation and collaboration between the federal and state governments in the area of forestry development and management.

Malaysia has further established Criteria and Indicators for Forest Plantation Management (i.e. standards for forest management certification, based on the International Timber Tropical Organisation's Criteria and Indicators, as well as the Forest Stewardship Council's Principles and Criteria). These are the bases for sustainable forest management.

In recent years, several forest preservation and reforestation projects have been

At the regional level, Malaysia is implementing the 'Heart of Borneo Initiative'. This aims at conserving 20 million ha of forest within Malaysia, Indonesia and Brunei. It is a unique government-led and NGO-supported programme and was initiated on the basis of a joint Declaration by the three governments in 2007.

launched by the government, businesses and non-profit organisations. The projects have been supported by regional and international organisations.

At the end of 2016, forested land in the peninsula accounted for 5.8 million ha or 43.8% of Malaysia's land area of 13.2 million ha. Of this, 4.8 million ha are gazetted as PRFs under the NFA. The PRFs are managed under the sustainable forest management principles and practices for economic, social and environmental benefits.

As at 2016, the Forestry Department of Peninsular Malaysia has maintained 4.5 million ha as forested land, comprising three main forest types – Inland Forest (4.1 million ha), Peat Swamp Forest (0.3 million ha) and Mangrove Forest (0.1 million ha).

Malaysia recently started implementing the 'Central Forest Spine' (CFS) master plan with the objective of establishing a contiguous forest network linked through ecological corridors covering around 5 million ha in the peninsula. The CFS, which is composed of four main forest complexes, is an important natural landscape of Malaysia, supplying 90% of the population's water supply and harbouring the remaining population of Malayan tigers.

As forests often extend across borders, an important aspect of Malaysia's forest management relates to cross-border cooperation. Peninsular Malaysia shares a border with Thailand; in Borneo, Malaysia shares borders with Indonesia and Brunei. Therefore, the federal government supports the establishment 'transboundary protected areas' on a bilateral basis and through the Association of Southeast Asian Nations.

At the regional level, Malaysia is implementing the 'Heart of Borneo Initiative'. This aims at conserving 20 million ha of forest within Malaysia, Indonesia and Brunei. It is a unique government-led and NGO-supported programme and was initiated on the basis of a joint Declaration by the three governments in 2007.

The Initiative aims at conserving the biodiversity of the 'Heart of Borneo' for the benefit of the people who rely on it.

The project has established a network of protected areas, sustainable management of forests and sustainable land uses.

In October 2017, as part of the Initiative, the World Wide Fund for Nature (WWF) signed an agreement with the Sabah Forestry Department and the Sabah Wildlife Department to secure and protect key elephant habitats in the transboundary areas. This has found support among local businesses; in 2013, for instance, the plantation company Sabah Softwoods agreed to set aside about 1,050 ha of its land to establish a wildlife corridor to promote connectivity between fragmented forest areas.

Another project is the Bukit Piton Forest Reserve in northern Borneo. From the 1980s to 2007, the forest had been logged and harvested. Additionally, in 1983 and from 1997-98, the area was affected by fires fuelled by drought conditions. This resulted in a degraded forest that might have been converted to agricultural land.

Instead, from 2007, the Sabah Forestry Department, in cooperation with the WWF, began an important reforestation programme. In 2012, the area was reclassified by the Sabah government as a Class I Protection Forest Reserve. This means that the forest is protected by law from any form of land conversion, timber exploitation or extraction of forest products. By now, too, wildlife species like the *orang utan* have reclaimed the area.

A misinformed debate

There has been increasing global debate on the issue of forest management and deforestation, often triggered by EU stakeholders and held within the European Parliament, and often with a strongly negative and misinformed stance against palm oil.

On April 4, 2017, the European Parliament had adopted a 'Resolution on Palm Oil and Deforestation of Rainforests'. It states that '73% of global deforestation arises from the clearing of land for agricultural commodities, with 40% of global deforestation caused by conversion to large-scale monocultural oil palm plantations'. However, the claim about oil palm is grossly inaccurate.

In 2017, researchers from the French agricultural research and international cooperation organisation CIRAD found that oil palm was not responsible for 40%, but for a mere 2.3% of global deforestation. Its findings highlight where the distortion of facts originated and how it then contributed to the continued use of inaccurate information.

It appears that the figure of 40% originates in a Technical Report published by the European Commission in 2013, entitled 'The Impact of EU Consumption on Deforestation: Comprehensive analysis of the impact of EU consumption on deforestation'.

The report analysed data from 1990-2008 and stated that, in Indonesia, 25 million ha of forest were lost. Of this 7.5 million ha were used for agricultural production, with 2.9 million ha converted to oil palm plantations. The data, therefore, is clearly restricted to a particular time-period and a single country.

On a global scale, the research notes that 239 million ha of forests were logged from 1990-2008, corresponding to 91 million ha in Latin America, 73 million ha in sub-Saharan Africa, 44 million ha in Southeast Asia and 31 million ha in other parts of the world.

Agriculture was the main cause, with 24% of the land used for livestock breeding and 29% for crop production. Of the total land used for crop production, 19% was attributed to soybean production, 11% to maize, 8% to oil palm, 6% to rice and 5% to sugarcane.

Thus, oil palm cultivation accounted only for 8% of the 29% of global deforestation attributed to crops, corresponding to 2.3% or 5.6 million ha of the 239 million ha of forest lost. Yet the narrative of most commentators still singles out oil palm as the sole 'culprit'.

Most importantly though, the European Parliament's Resolution 'recalls that Malaysia and Indonesia are the main producers of palm oil, with an estimated 85-90% of global production, and welcomes the fact that Malaysian primary forest levels have increased since 1990, but remains concerned that current deforestation levels in Indonesia are running at a rate of -0.5% total loss every five years'.

While the Resolution is mindful of the situation on the ground, public perception is often more general and does not distinguish between individual instances, only thinking along the simplistic line that all palm oil is 'bad for forests'.

The debate on deforestation must return to the facts and to a more objective foundation. At the same time, it is essential to talk with the countries involved, and not just about them. Often, as is the case for Malaysia, success stories can be told and perhaps serve as a model for other countries.

An open dialogue should ensure that all perspectives are represented. The debate should not be limited to developments in Southeast Asia, but also take account of deforestation in other parts of the world. For instance, forests are still being cleared in central Europe to allow for the extraction of lignite (brown coal) in open-cast mines and to make way for infrastructural development.

Discussion of the fate of global forests must be informed by verified evidence and be conducted in a balanced way. Increased dialogue with global trading partners is essential to set Malaysia's record straight.

MPOC Brussels

Uzbekistan's Economic Reforms

Benefits for palm oil imports

Uzbekistan is Central Asia's biggest economy and a trade hub for the region. The country has a land border stretching over 6,893km, which is shared with Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan.

Uzbekistan is home to more than 32 million people, with about 40% of them based in urban areas in Tashkent, Navoi and Samarkand. Population growth has been steady at an annual average of 1.5%. At this rate, the population could exceed 35 million in 2025 and 41 million in 2050.

From Independence in 1991, the government led by President Islam Karimov had controlled the economy, especially sectors like banking services and the production of oil and gas, minerals and food products. Despite entry and operational barriers, the economy grew respectably. However, it failed to inspire the confidence of foreign investors and big corporations.

Many feared that, after the death of President Karimov in September 2016, the country would descend into chaos. But the new president, Shavkat Mirziyaev, who had been the Prime Minister for 13 years, adopted a balanced policy on both the foreign and domestic fronts. He has introduced a wide range of economic reforms since 2017:

- A conducive environment has been established within which small businesses and private entrepreneurs can operate, especially in the field of industrial manufacturing.

- Effective Jan 1, 2017, the government stopped all unscheduled inspections for two years, except in the event of cancellation of a business activity or if a crime is committed.

- A Business Ombudsperson has been appointed to protect the interests of local and foreign investors.

- Effective Sept 5, 2017, a floating foreign exchange rate has been introduced and it is regulated by market forces. Prior to this, the difference between the official and open market exchange rate was approximately 100% and only

a few select business entities had access to foreign currency at the official rate. The liberalisation of foreign currency and the banking system has been one of the most significant economic measures undertaken.

- Seven special Free Economic Zones have been established, offering a wide range of tax breaks for investors. These include exemptions from income tax and VAT, as well as customs duties and taxes on goods imported for production and manufacturing needs for 3-10 years, depending on the amount of the investment.

- Effective Feb 1, 2018, all specific tax and customs privileges and advantages provided to select companies for import of consumer goods have been nullified. This levels the playing field for all business entities and creates a fair business environment.

- About 42 different licences and approvals were previously required to operate a business. Effective June 1, 2018, the process has been simplified and companies are able to obtain registration within 48 hours.

- Tax reforms have helped ease the burden on businesses. These include reduced import duties, lower VAT and unification of different taxes.

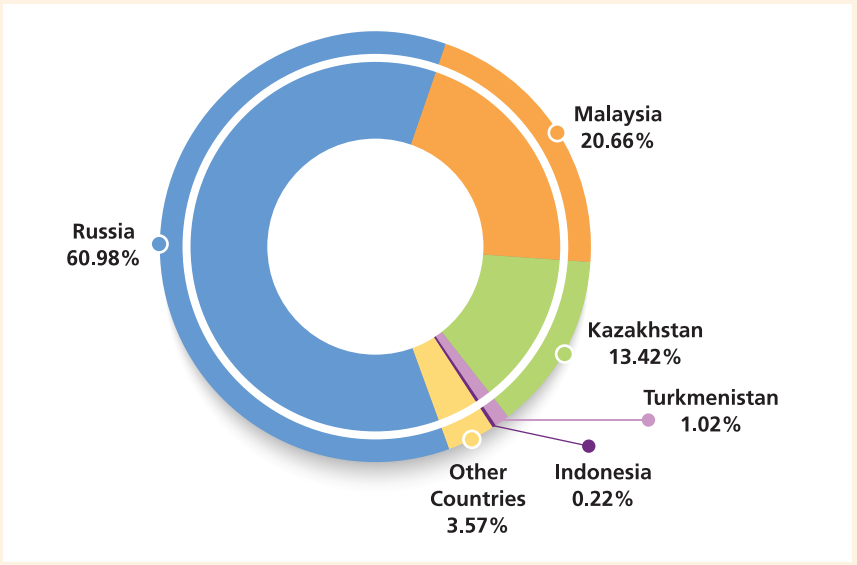
Overall, the improvements have had a positive effect on the economy and restored investor confidence. Since January 2017, more than 32,000 new small and medium business entities have been registered; of these, about 27% are engaged in industrial production and

Table 1: Uzbekistan – Oils and Fats Imports (tonnes)

	2017	2016	Difference (Vol)
Sunflower oil	120,000	122,000	(2,000)
Palm oil	60,287	62,397	(2,110)
Margarine	31,000	25,000	6,000
Soybean oil	21,000	17,000	4,000
Cotton seed oil	3,900	16,000	(12,100)
Coconut oil	3,600	2,000	1,600
Soap stock	3,300	2,200	1,100
Rapeseed oil	1,500	2,000	(500)
Olive oil	270	200	70
Corn oil	120	19,600	(19,480)
Others	3,800	350	3,450
Total	**248,777**	**268,747**	**(19,970)**

Source: The State Committee of the Republic of Uzbekistan on Statistics

Figure 1: Uzbekistan – oils and fats imports by country, 2017



Source: The State Committee of the Republic of Uzbekistan on Statistics

Table 2: Uzbekistan – Palm Oil Imports by Country (tonnes)

	2017	2016	Difference (Vol)
Malaysia	50,817	51,487	(670)
Kazakhstan	4,500	3,680	820
Russia	2,200	3,420	(1,220)
Ukraine	900	2,190	(1,290)
Indonesia	500	1,160	(660)
Sweden	-	430	(430)
Latvia (EU)	120	-	120
Others	1,250	30	1,220
Total	**60,287**	**62,397**	**(2,110)**

Source: The State Committee of the Republic of Uzbekistan on Statistics

manufacturing. Uzbekistan's overall trade showed an increase of 7.7% in 2017, compared to 2016.

Oils and fats market

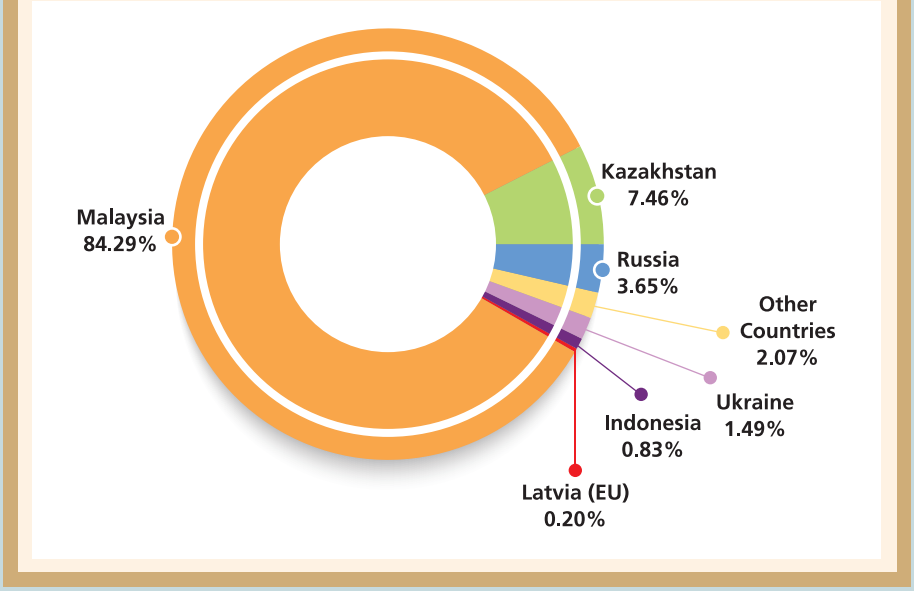
Uzbekistan is emerging as the leading consumer of oils and fats in the Central Asian Region. Total consumption currently stands at about 556,000 tonnes, of which 52% is met by locally produced oils and fats.

The edible oils industry is dominated by domestic cotton seed oil and imported sunflower oil from Russia and neighbouring countries. Cotton seed is the largest oilseed crop in Uzbekistan, with a share of about 50% of total consumption of oils and fats. However, production is declining due to a government policy to shift the focus away from the textile industry. The reduction in the supply of cotton seed oil and increase in overall consumption will widen the gap between supply and demand – this will have to be bridged by imports.

Edible oil imports in 2017 registered 248,777 tonnes (Table 1), or 7.5% lower compared to 2016. The decline was mainly due to the currency rate adjustment in September 2017, which resulted in devaluation of more than 90%. This increased the cost of imports out of proportion and many contracts were cancelled. After the initial shock, the import market settled in the following months and picked up from January 2018.

Imports are dominated by sunflower oil which accounts for 48% of the total volume. Primarily used as a premium cooking oil, it is imported from Russia, Kazakhstan and other CIS countries. Palm oil is the second-largest import and is fast becoming a key ingredient in the confectionery and food industries.

Figure 2: Uzbekistan – Market share of palm oil imports by country, 2017



Source: The State Committee of the Republic of Uzbekistan on Statistics

Uzbekistan imports most of its oils and fats from the neighbouring CIS countries as they have open borders and a preferred duty structure. Malaysia is the only country which has managed to secure a sizeable market share in this double landlocked country. In 2017, Malaysia held a market share of 84.3% in palm oil imports (Figure 2), and 21% of total oils and fats imports.

Prospects for palm oil

Palm oil has become an important ingredient in Uzbekistan's food industry, with its use and consumption having risen consistently. The food industry has registered double-digit growth over the past three years and this is expected to continue. Margarine, confectionery and ice cream are the main industries that use palm oil and its various fractions.

Palm oil distribution has been controlled by several importers who obtain supply from Malaysia, Ukraine and Russia, and then distribute it locally. Most industries have not bought palm oil directly, mainly due to foreign currency restrictions up to 2017. However, there is now keen interest in buying direct from suppliers in order to obtain a better price, consistent quality and after-sales support.

Until recently, the import duty on palm oil had been higher if supply was obtained from Malaysia and Indonesia, compared to the CIS countries. A significant volume of imports had therefore shifted to suppliers from Ukraine and Russia.

Oils and fats have been subjected to very high import duty and taxes. The total tariff on oils and fats imported from CIS countries came up to 26%, compared to 31% from Malaysia and Indonesia and other countries with Most Favoured

Nations status. Under the reforms, however, the government pledged to reduce the import duty and VAT on imports including palm oil, and to provide a level playing field for all countries.

The government's decision to reduce the duty and tariffs from 31% to 18% has been applauded, as this will not only bring down retail prices but will also enable industries to step up their production capacity.

This duty structure is due to take effect from January 2019, and is expected to boost palm oil supply from Malaysia, while encouraging industry members to import directly. The potential for growth in the import of palm oil has never been better.

Faisal Iqbal
MPOC Pakistan

Table 3: Uzbekistan – Duty Structure on Palm Oil from CIS Countries

Commodity	Customs Charges	Import Duty	Excise	VAT
Palm oil and fractions in different packings	0.2%, but not exceeding US$3,000	Nil	5%, but not less than 0.1 US$/kg	20%

Table 4: Uzbekistan – Duty Structure for Palm Oil from Most Favoured Nations

Commodity	Customs Charges	Import Duty	Excise	VAT
Palm oil and fractions in different packings	0.2%, but not exceeding US$3,000	5%, but not less than 0.1 US$/kg	5%, but not less than 0.1 US$/kg	20%

Table 5: Uzbekistan – Proposed Duty Structure for Palm Oil Imports

Commodity	Customs Charges	Import Duty	Excise	VAT
Palm oil and fractions in different packings	0.2%, but not exceeding US$3,000	5%, but not less than 0.05 US$/kg	0	12%

Ecosystem of Trust in Palm Oil Sector

Critical next steps

The future of the palm oil industry has become uncertain in Europe. Last year, the European Parliament came close to a ban on palm oil imports in the region. The vote in favour of the revised Renewable Energy Directive (RED II) proposed to remove biofuels made from palm oil from the list of biofuels that counts towards the EU's renewables target for 2021. The ramifications would have been significant, not only for palm methyl ester imports, but also for future hydro-treated vegetable oil (which uses palm oil as feedstock).

I have attended several biofuels conferences where the RED II and its potential impact on the industry were discussed in depth. As an objective external observer, I've found that the discussions tended to be emotionally charged, and based on perceived environmental and human rights violations by the industry.

Today, the dissemination of inaccurate information or 'fake news' is a challenge faced by many industries. Distorted information is able to directly shape public perception and even impact the direction of policy development across regions. As such, building an ecosystem of trust between palm oil producers, regulators, companies, environmentalists and end consumers will be pivotal in ensuring that the industry continues to thrive, particularly in the European market.

Social media and digital marketing channels have proven to be powerful and efficient tools for disseminating information and shaping public opinions. Over 50% of the European population actively uses social media channels. By launching strong promotions and campaigns focused on countering inaccurate information with facts on these channels, Malaysian palm oil could create a direct line of communication with the end consumer.

In addition, the application of blockchain technology could have a transformative impact on the palm oil industry by creating an auditable and traceable end-to-end supply chain. Imagine a customer in a store looking to buy a bottle of shampoo that has a 'deforestation-free' label on it. With a simple mobile app, the customer is able to see where the palm oil used in the shampoo originates, including a video that shows the plantation where the fresh fruit bunches and oil palm tree were grown, and how exactly the palm oil ended up in the shampoo production. These palm kernels have been tracked across the globe with blockchain technology.

Blockchain is essentially a distributed digital ledger system. It was originally developed to record transactions for bitcoin, a well-known digital currency. Although digital currencies face scepticism in the global market, the underlying blockchain technology has grown in terms of credibility as more potential applications across various industries are developed.

Supply chain management has emerged as a legitimate use case for blockchain technology, tracking raw materials through production and allowing everyone in the supply chain to know where a shipment is located.

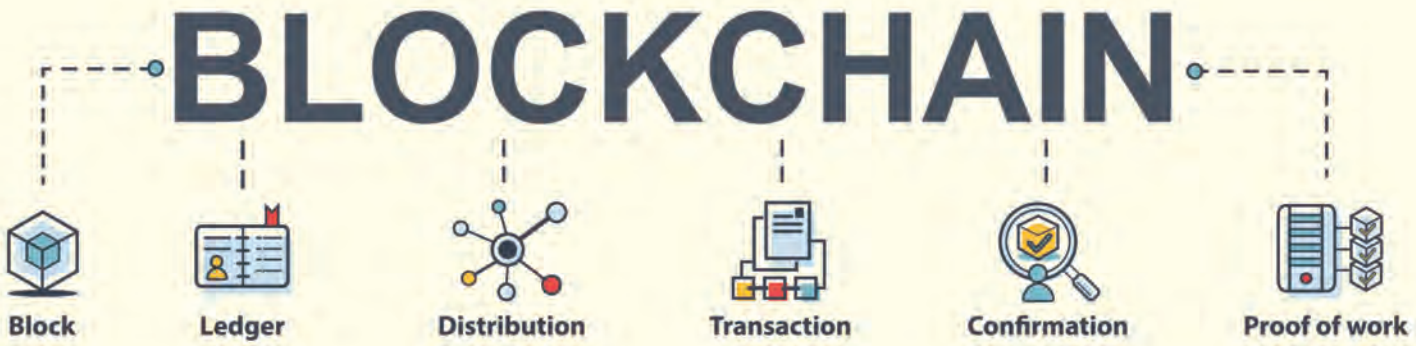
decentralised structure means that no single person or group has full control over the data.

Blockchain technology is applicable in any business or industry, to record transactions of almost anything of value. Emerging applications for blockchain technology are geared to improve business operations in numerous ways, including supply chain transparency and credibility for all kinds of products.

Last year, for example, shipping conglomerate Maersk deployed a blockchain-based electronic shipping system to digitise supply chains and track

Malaysia is currently working to certify the sustainability of its palm oil through a mandatory programme for the entire production and supply chain by Jan 1, 2020. The Malaysian Sustainable Palm Oil standard is aimed at offsetting negative perceptions about the industry and 'fake news' that has been misleading consumers, particularly in Europe.

At its core, existing certification schemes still depend on some form of manual Chain of Custody systems. In other words, doubts about the validity of the certification schemes may be related to the dependency on human



So, what makes blockchain unique? The digital ledger records transactions in a series of blocks, and exists as multiple copies spread over multiple computers. The ledger is secure because each new block of transaction is linked back to the previous block in a way that makes tampering practically impossible.

Each time new data is added, all copies of the ledger are updated and validated simultaneously, while previous data records cannot be altered. This

international cargo in real time. The advantage of blockchain technology is the immutable records of data and the trust people can have in it.

Infallible validation system

In the palm oil industry, the use of blockchain technology combined with mobile apps and other related technology, such as QR Codes, RFID tags and Internet-connected sensors, could result in near-perfect sustainability records.

intervention and paper-based processes that may be subject to errors or malicious activities.

The application of blockchain technology in the Malaysian palm oil industry has the potential to alleviate any doubts, by creating greater transparency and auditability across the entire supply chain. Instead of having to trust the elements of a certification process where doubt may be cast due to paper-based or human error, blockchain technology offers an

infallible validation system that secures trust.

This not only provides an unprecedented level of transparency, but also contributes to protecting the working conditions and legal employment of field workers, and gives plantations rich data on crop harvesting.

With the use of geolocation features, farmers, governments, certification authorities and producers can maintain digital inventories of the plantations, and implement sustainable land usage planning policy. Additionally, use of sensor technology could minimise spoilage by monitoring temperature and humidity during processing, storage and transport, and integrating this data on the blockchain.

The oil palm industry in Southeast Asia is a saving grace for many small farming families. In addition, growing oil palm requires less land and results in higher yield than other vegetable oil crops. In May 2018, a study by researchers at Imperial College London revealed some of the challenges faced by companies in guaranteeing products labelled as 'deforestation-free'.

The lead author of the study, Joss Lyons-White of the Grantham Institute – Climate Change and the Environment and the Department of Life Sciences at Imperial said: 'Deforestation-free palm oil is possible, but our study found it is very challenging for companies to guarantee at present.

'For example, supply chains are so complex that tracing palm oil back to source is very difficult – lots of trade may occur between different parties before manufacturing, where the palm oil is used in many different products for different purposes. This makes it hard to know exactly where the original oil was from – and whether it was linked to deforestation or not. However, simply banning palm oil is unlikely to be the answer. Instead, we need to find ways to ensure commitments can be implemented more effectively.'

Establishing sustainable practices in the palm oil industry needs to strike a balance between several aspects – human rights, environmental impact and economic contributions. The application of blockchain technology could be a solution that would enable Malaysia to utilise the existing palm oil infrastructure and guarantee that sustainable practices are implemented and continuously tracked.

Kamales Lardi
Digital Transformation Strategist
Lardi & Partner Consulting GmbH
Switzerland

Growing oil palm requires less land and results in higher yield than other vegetable oil crops.

Transformation to a Circular Economy

By applying blockchain technology

Each year, mobile phone brands hold launch events to unveil the latest version of their products and related features. These flashy events are designed to entice users into replacing their devices prematurely. Globally, on average, smartphone owners upgrade their devices within two years. Today, 69% of the world's population uses smartphones and annual spending on new hardware exceeds US$370 billion.

We are increasingly being propelled into a digital world where new technologies are adopted almost as quickly as these hit the market. However, this situation accelerates the take-make-dispose cycle of the linear economy that has been dominant since the existence of the Industrial Age.

In the linear economy, raw materials are used to make products and discarded as waste after use, without much regard for Nature or the depleting supply of natural raw materials. For example, a company producing light bulbs takes raw materials such as glass or metal to manufacture its products. Light bulbs are sold to customers, who use it until these burn out. After that, the bulbs are disposed as waste.

In order to be profitable, such companies need to produce goods at the lowest cost possible or sell large quantities of the goods. The linear economy does not take into consideration the limited amount of resources available or the output of waste products through creation and use of the goods.

In contrast, the circular economy treats resources as if these are finite, and focuses on building sustainable economic health. The inherent restorative and regenerative design of the circular economy minimises or even eliminates waste, shifting towards the cradle-to-cradle production cycles. This means that product lifetimes are extended by offering options for used items to be returned and component parts repurposed into new products.

Beyond addressing the negative impacts of the linear economic models, the circular economy represents a shift towards a sustainable, resilient business and economic landscape that benefits the environment and society in its entirety. In reference to

light bulbs, Phillips now offers the opportunity for companies to lease, rather than acquire, light bulbs over a longer period of time. This creates an incentive for Phillips to produce energy efficient lights, while companies save money on fixed office lighting costs and maintenance.

Traditional companies are attempting to move towards the circular economy. H&M, one of the world's largest clothing retailers, is working on a strategy to become 100% circular by collecting old clothing in stores for recycling. Since 2013, H&M reports to have gathered more than 55,000 tonnes of fabric.

Disruptive technologies also support the transition to a circular economy by radically increasing virtualisation, de-materialisation, transparency and feedback-driven intelligence. In addition, the shift to a circular economy requires innovative business models that either replace existing ones or seize new opportunities.

The increasing popularity of access-over-ownership business models has been accelerated by the capabilities offered by disruptive technologies. A new generation of consumers places less emphasis on owning and more on sharing, bartering and renting goods. This shift in consumer behaviour, coupled with the capabilities of emerging technologies, has propelled an entirely new range of businesses – from shared car rides offered by companies like BlaBlaCar, to sharing accommodation on holiday via the likes of Airbnb.

Advancements in 3D printing technology are similarly paving the way for innovative manufacturing and production approaches. This enables the circular economy by disrupting the existing materials value chain and increasing the efficiency of the production process.

With the gradual reduction in price and improvements in quality, 3D printers could become commonplace in each home, similar to other household electronics. The option to acquire designs online and print our own products, from clothing to electronic parts and even food, could become routine. This sort of on-demand, hyper-personalised production could mean significant reductions in waste and increased efficiencies.

Governments and regulators are actively trying to support the circular economy. The European Parliament recently backed several laws that support the shift in EU policy towards a circular economy. According to the laws, by 2025, at least 55% of municipal waste should be recycled and 65% of packaging material will have to be recycled. In addition, the European Parliament has overwhelmingly backed a wide-ranging ban on single-use plastics. The benefits of a circular economy to the environment, climate and human health are widely recognised and accepted.

However, a majority of the regulatory environment, as well as economic incentives, still favour linear business practices. The current inability of supply

This shift in consumer behaviour, coupled with the capabilities of emerging technologies, has propelled an entirely new range of businesses – from shared car rides offered by companies like BlaBlaCar, to sharing accommodation on holiday via the likes of Airbnb.

chain stakeholders to track the provenance of materials, components and products throughout the value chain prevents assertion of their circularity – from extraction or creation, all the way through the many life cycle stages. In this respect, application of blockchain technology will have a transformative impact and enable a circular economy.

Essentially a distributed digital ledger system, blockchain was originally developed to record transactions for bitcoin, a well-known digital currency. Although digital currencies face scepticism and volatility in the global market, the underlying blockchain technology has grown in terms of credibility as more potential applications are developed across various industries.

Uses of blockchaintechnolgy

Supply chain management has emerged as one of the major use cases for blockchain technology, offering an efficient and almost fully tamper-proof way of tracking the cradle-to-cradle life cycle of goods. The blockchain translates chain of custody across the value chain into a distributed, immutable, digital trail that asserts the circularity of products.

For example, Bext360 combines several disruptive technologies, such as the Internet of Things, blockchain and artificial intelligence (AI), to create a fair and transparent coffee supply chain:

- Harvested coffee beans are placed into a BextMachine, which analyses the beans and quality based on an AI system.
- This information is recorded instantly on the blockchain to track source farms and payments to specific farmers. The farmers receive payment digitally via a mobile app.
- The beans are then continuously tracked and traced across the entire value chain, from the farm to roasters to retailers and finally consumers.
- Each of these transactions is recorded in near real-time on the blockchain and made available to all parties, optimising efficiencies across the entire chain, increasing compensation to farmers, and enabling consumers to understand the origin of the products they use.

Since the Industrial Age, supply chains have followed a competitive business model that limits opportunities to create and leverage synergies. In addition, intermediaries continue to benefit from the lack of trust between supply chain stakeholders who are reluctant to share information and compete on costs.

In order to enable and engage in a circular economy, stakeholders need to be able to collect, process and share data within a trustworthy and secure

environment. Blockchain technology, in combination with AI systems and the Internet of Things, could help establish a trust economy that lowers collusion between centralised parties, while also making them accountable.

Blockchain technology enables stakeholders to gather more knowledge on material cycles and processes throughout the value chain and to share data securely.

For instance, the startup Provenance intends to design a blockchain system that is able to track all used materials, including the dimensions of quality, quantity and ownership, over the whole supply chain in real-time. Basically, Provenance is trying to achieve a digital passport for any product, which enables consumers and producers to track the whole production process.

Foundation for success

Based on the current development trajectory of blockchain technology, it would be possible to establish a macro-economic incentive system that promotes transformation to a circular economy.

Within the linear economic system, raw materials are extracted from Nature, transformed into products and, finally, disposed back to Nature. Although the linear model could incorporate recycling, most of the components within this system have not been designed for reuse or regeneration, resulting in significant material degradation and accumulation of waste in the environment.

For example, the world today generates around 40 million tonnes of electronic waste each year. Even when recycled, a significant amount of electronic materials cannot be recovered. Conversely, the circular model aims to achieve a waste-free system – an economy which functions in loops and maintains the ecological value of materials over time.

With the application of blockchain technology, it will become possible to unambiguously identify a product's inputs, including the quantity, quality and origin of materials. In addition, information regarding a product's biological or technical components could be tracked on a blockchain. A blockchain-based system which is able to track product attributes would make it possible to adjust taxes according to the level of material degradation.

Ultimately, the application of blockchain technology could potentially enable transparency and traceability across end-to-end value chains, as well as crate a macro-economic incentive system that promotes the transformation to a circular economy.

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Palm Oil and the Circular Economy

Huge potential

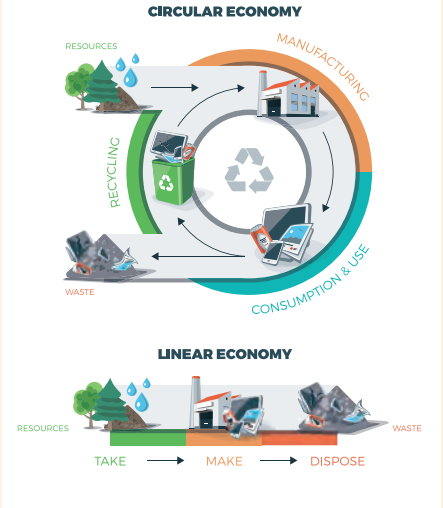
The circular economy (CE) – as opposed to a linear one – describes a regenerative system in which resource use and waste production, emissions and energy waste are minimised by slowing, reducing and closing the energy and material cycles.

This can be achieved through durable design, maintenance, repair, reuse, remanufacturing, refurbishing and recycling. In practice, recycling – i.e. bringing waste products back into the cycle as secondary raw materials – plays the key role in the CE. This is of particular importance to the palm oil industry.

The linear economy, also known as the 'throwaway economy', is the current dominant principle of industrial production. A large part of the raw materials used is deposited or burned according to the life cycle of the products. Only a small proportion is reused.

Expressed as a simple formula, the antagonism between the two concepts is described as take-make-dispose (linear model) vs reduce-reuse-recycle (circular model).

Figure 1: Comparison of concepts



Source: © petovarga/fotolia.com

However, it emerges that there are different schools of thought on the CE. They go by names like cradle-to-cradle, performance economy, biomimicry, industrial ecology or natural capitalism. What all of them have in common, though, is that they aim to:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

The CE concept has gained traction in recent years with policy makers and business operators alike. While some researchers caution that it may be just another passing fad, there is no mistaking that the underlying assumptions are here to stay.

The assumptions have been around since the beginning of human economic activity. For instance, traditional agriculture has always been circular. The production energy in the form of human or animal muscle power was fed directly from the cultivated area. Waste like excretions or kitchen litter, and production residues such as straw or ashes from clearing land with fire, were returned directly to production.

Business entities and governments are therefore well advised to take a closer look at the CE. Some countries have already done so. China has had a CE Promotion Law since 2009. The indicator system used to measure its CE is an altered version of the EU s material flow analysis, which the Chinese have studied extensively and adapted to their own needs.

The European Commission (EC), in its efforts to make Europe's economy more sustainable, adopted a new set of measures in January 2018, called the CE package. It includes actions on plastics, waste legislation, critical raw materials and a monitoring framework. The EC's work on the CE is influenced by the International Resource Panel established in 2007 by the United Nations Environment Programme.

In October 2018, the EC's Directorate General for the Environment organised a CE Mission to Indonesia. This was to 'build bridges between European institutions, NGOs and companies, as well as the relevant stakeholders in Indonesia interested in the opportunities that the transition to the circular economy brings'. With that, the CE reached the world's biggest producer of palm oil.

There is not only an environmental case to be made for the CE, but an economic one as well. As British weekly *The*

Economist writes: 'Environmental problems, such as biodiversity loss, water, air, and soil pollution, resource depletion and excessive land use are increasingly jeopardising the earth's life-support systems.'

The Economist also observes that more governments have come to realise that investing in sustainability and the CE, in fact, saves money. Take the example of public health: avoiding respiratory diseases by taking measures to improve air quality in cities may turn out cheaper than treating those affected.

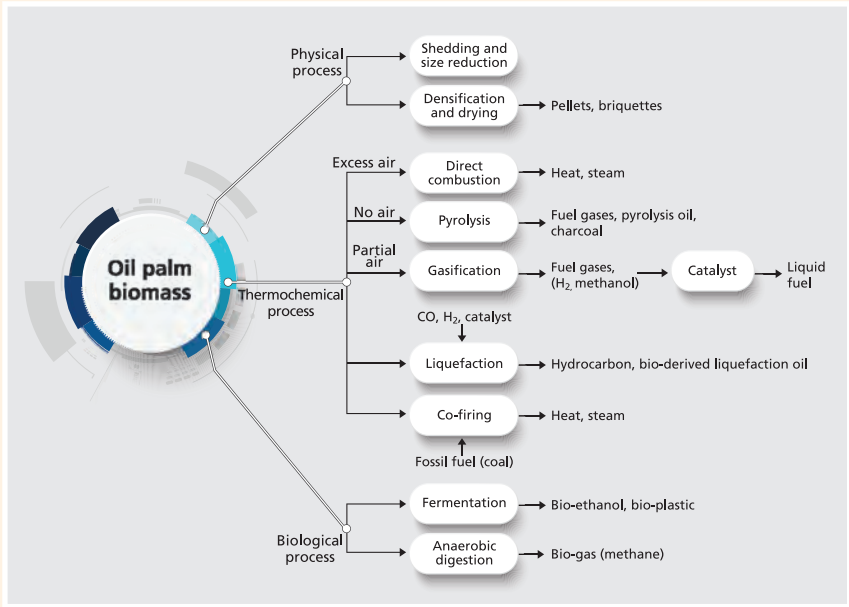
The same is true at the corporate level. An increasing number of companies, investment funds and banks, especially in Europe, now accepts that the CE is not a costly fad or simply a way to satisfy the green lobby. Rather, it will improve the bottom line in the long run.

Optimism for palm oil in the CE

The production of palm oil results in enormous quantities of secondary products – palm oil mill effluent (POME), empty fruit bunches (EFB), palm oil mill sludge, oil palm fronds, oil palm trunks, decanter cake, seed shells and palm pressed fibres. The biomass has massive economic potential:

- Biomass energy can supply a significant portion of on-site energy needs, increasing energy independence for mill operators and private housing.
- Motor engines could run on biofuels, thus reducing pollution.
- Rural economies can be vitalised because smallholders gain additional income.

Figure 2: Oil palm biomass conversion technologies



Source: Shuit, SH et al.; Oil palm biomass as a sustainable energy source: A Malaysian case study, in: Energy 34 (2009)

However, to make a financially feasible shift towards the CE is tricky. A vicious cycle must be overcome. Recycled materials must compete with virgin ones. A successful recycling industry must operate on scale. This would encourage investments in technology and efficiency to make recycling more competitive, and to provide a supply steady enough to create demand.

In a look at why businesses are trying to reduce, reuse and recycle, *The Economist* points out: 'Things such as glass, paper and many metals have broken out of this vicious circle, typically once economies spewed out enough of them to make it worthwhile to recycle. Reprocessing technology had often been around for a while – paper was being recycled in the 19th century – but greater availability of source materials encouraged efficiencies. That in turn spurred demand for these materials and itself encouraged further improvements in recovery. In other words, a vicious cycle turned virtuous.'

Given the abundance of recyclable biomass in the palm oil industry, plus the competitiveness of the resulting products, there is ample reason to be optimistic about the potential of the CE approach. There are many different use scenarios on the plantation and at the mill (Figure 2).

The expansion of palm oil production partly caused the tightening of environmental legislation screws in Europe. The next few years will show if this proves to be a happy coincidence for the palm oil industry after all.

Europe is decarbonising its economy. This means phasing out not only fossil fuels in the long run, but also moving away from first-generation biofuels. Electrical power will not be able to fill the gap, given the scarcity of the natural resources needed to build batteries and the environmental havoc caused by mining them.

Enter second-generation biofuels. European broker Greenea s vision for the immediate future of biofuels is this:

- Production of hydrogenated vegetable oils, also known as green diesel and not to be confused with biodiesel, will more than double by 2020; of this, 10% or 15% will have to be based on waste-based feedstock.

- The growth of second-generation biodiesel production in Europe will be limited due to a shortage of feedstock both in Europe and overseas.

- Importation of feedstock is of key importance for the industry, and Europe should become a leader in this field.

- The growth of the sector will be possible due to use of new types of feedstock such as POME, tall oil, etc.

Malaysia is in the midst of coming on board. Reports indicate that the Malaysian biogas market aims to equip all 447 palm oil mills in the country with biogas plants by 2020. That would be a momentous step forward. And who knows what other opportunities technological innovation might bring?

Just to give an example, the Malaysian Palm Oil Board has been experimenting with microwaves to sterilise fresh fruit bunches instead of using steam. On the one hand, this would eliminate POME (and the chance to capture methane); on the other, it would reduce the water content in empty fruit bunches, thus improving their suitability for use as fuel.

Prospects for palm oil in the energy sector seem promising. Rating agency Fitch has noted that incentives for advanced biofuels under the 2021-30 phase of the EU Renewable Energy Directive would boost demand for recycled palm oil and palm oil waste products, including mill effluent and EFB.

Other opportunities like the collection of used cooking oil (UCO) have not reached the mainstream of the palm oil industry. The European Union already imports UCO at scale. For the first eight months of 2018 alone, industry analyst Argus Media reports imports of more than 235,000 tonnes, four times the 2017 total. Similar developments are observable for biodiesel made from UCO.

Against this backdrop, the time has come for the Malaysian palm oil industry to think harder about the products it could sell. Investment in efficient processes will pay off not only in the production of palm oil, but also in processing the associated biomass.

MPOC Brussels

Life as a Plantation Manager

A multi-faceted job

A university graduate today has many choices in selecting a career. One of the best would be to work in the plantations industry, which offers a variety of jobs. A long time ago, estates in Malaysia mainly grew rubber, but have since replaced this with oil palm. Most of the plantations are now operated by government investment agencies or family holdings.

To date, oil palm has been planted on about 5.8 million ha in Malaysia, and produces about 20 million tonnes of crude palm oil (CPO) and about 5 million tonnes of palm kernel a year. CPO fetches an average price of RM2,400-2,500 per tonne, while palm kernel has an average price of RM1,800 per tonne. This generates total revenue of about RM60 billion per year. In a good year, the revenue and profit will be higher, as the price can exceed RM3,000 per tonne for CPO and more than RM2,000 per tonne for palm kernel. The kernel is crushed to get oil and cake.

In Malaysia, the yield of the oil palm tree is high, helped by high rainfall of over 2,000mm per year and fertile soils. When mature at about three years old, the oil palm gives an average of one fresh fruit bunch a month, valued at about RM8 per bunch. An efficient management team will try to get the trees to double the number of bunches; this adds to income, while sharply reducing the costs of production per tonne.

At the mill, the palm fruit is cooked and pressed for oil. Again, an efficient management team and workforce will try to increase the extraction rate. The CPO and palm kernel oil are then processed in a refinery and sold to manufacturers of edible and non-edible products.

Buyers use palm oil products in the manufacture of foods, oleochemicals, medicine and cosmetics. Scientists are constantly finding new uses for palm oil in biscuits, chocolate, margarine, medicine, food supplements and detergents, as well as in biofuels.

Manager's duties

Let's take a look at the manager's duties on an oil palm estate of, say, 3,000 ha.

Typically, his day starts before dawn, when a driver takes him to the muster ground. The manager stands behind the three assistants and six supervisors, while the 20 *mandors* read out the workers' names to take attendance.

The manager looks at the workers in several lines to see if they have turned out with the right shoes and equipment. After receiving quick instructions, they spread out to their areas of work. In the silence of the muster ground, now empty, the manager has a chat with the remaining assistants and supervisors, so all know what they have to do. He always tries to strengthen his team.

As the sun begins to rise, he goes to see the new plantings where the dew is still on the low fronds of young oil palm trees. The rows stretch to the far end and he takes a walk, checking on the circle-weeding done some days ago. Then he is off to see the harvesting. The manager must ensure that harvesting gangs achieve the estimated daily production; he checks for absenteeism, but it is usually low.

He watches a harvester with a sickle at the end of a long aluminum pole, raising it to reach a ripe fruit bunch over six meters above the ground. The harvester slips the blade to the bunch stalk; he steps back, yanks twice and the bunch detaches from the trunk, crashing to the ground. It weighs about 20kg and is worth about RM10. That harvester will cut about 120 bunches a day. That is skilled work.

The manager also inspects other activities around the estate. It could be the manual

application of fertiliser. There is a technique to this – the container is swung from waist level towards the back, so that the fertiliser granules spread out in an arc. However, more areas are now being converted to mechanised application using tractors and spreaders. They work faster and help to reduce the need for labour.

Feeder roots take up the nutrients to speed up the growth of the trunk, leaves, flowers and fruit bunches. Fertilisers help increase bunch production and weight. With correct nutrient applications, the trees bear more female flowers. These turn into bunches that are ready for harvest in five to six months.

Such matters are on the manager's mind as he goes home for breakfast. Yet it would only be 9am, with most of the day still ahead of him. He may again go to the harvesting area or meet the supervisors to hear what they have to say about raising the crop production.

Driving back to the field, he thinks of how the production costs can be reduced if he obtains a higher tonnage

of fruit. The figures work in his head, even as his eyes miss nothing. If, for instance, a bridge shows signs of erosion, he gets out of the vehicle and peers under the bridge to assess what it would take to repair it. There is nothing like attending to details.

Once a week, he calls a meeting with the assistants and the chief clerk to review the work done and to check on crop production for the rest of the month. Other matters discussed could be the progress of capital expenditure on new workers' quarters and the purchase of a road grader and a roller. They have to arrive in time to repair the roads before heavy rains set in. They discuss the date of the next payroll, but this must be kept confidential to ensure security of the cash delivery.

In the evening, the manager may attend a football match between divisions of his estate or against other estates. He may do the kick-off and then watch the game, looking for players who show fighting spirit or leadership qualities. He makes a mental note of their names. They will be on his shortlist for promotion.

By the time he heads home, it is nearly dusk. After a bath and dinner, he reads the newspapers or *The Planter* magazine published by the Incorporated Society of Planters. He may find scientific, technical and general articles of interest, as well as keep up with the movements of fellow-planters. Today, the news gets to him in many more ways. The fax and the telex have been replaced by the computer, handphone, email and WhatsApp messages.

He must work as a part of a team. For example, he works closely with research scientists as they choose areas for trial plots of new palm progenies and clones. They also look for ways to improve the yield and oil quality, in order to obtain a premium price.

In addition, the manager must know the requirements of sustainable practices as set by the rules of the Roundtable on Sustainable Palm Oil and the Malaysian Sustainable Palm Oil standard. Implementing these might be part of his Key Performance Indicators.

He has many more things to remember and must have updates ready for regular meetings at the head office, which provides support services in accountancy, marketing and sales, human resource management and research.

Before going to bed, he watches the late-night business news on TV. Palm oil prices are moving again. He checks his handphone one last time. There is a request from Marketing for his crop forecast, as well as a question about how much oil and kernel to sell. He notes the urgency, and will reply first thing in the morning. The manager's views are important for the business.

Mahbob Abdullah,
Director, IPC Services Sdn Bhd

This is an edited version of a paper written for university students.

'Made at Ulu Bernam'

Delivering on a slogan

By 1951, Borge Bek-Nielsen (Bek) had completed his engineering degree in Denmark and military service, and was reviewing job prospects. His application to United Plantations (UP) at Ulu Bernam Estate in Perak, caught the eye of Chief Engineer Axel Linquist.

UP had palm oil mills in Ulu Bernam and Jendarata Estate in Teluk Intan, Perak. These were two of 18 palm oil mills in then Malaya. All of them used machinery – and sometimes engineers – supplied by the marine engineering firm Gebr. Stork Apparatenfabriek of Amsterdam, Holland. After World War I, Stork had diversified into the design and manufacture of palm oil mills, many of which were sited along rivers for ease of transporting produce.

Stork's offshoot expanded rapidly to become a global monopoly. Its customer relations were handled by Jan Olie, a big, genial Dutchman with a great flair for salesmanship. There were no competitors. The world's big five plantation companies – United Fruit-Central America; Socfin-West Africa; Harrisons and Crosfield; Guthrie; and Barlows-Southeast Asia – were captured one by one.

Unilever Group in West Africa, the Belgian Congo and Malaya was the world's largest user of crude palm oil – mainly for its soap factories – and provided its own engineering services. But the times were ready for change. UP's decision to enter the palm oil machinery market was prompted by the retirement of Linquist. His successor as Chief Engineer was Bek, who promptly coined the slogan 'Made at Ulu Bernam'.

The first company to commission Bek to design and build a palm oil mill was in Kedah. If he left Ulu Bernam by 4pm in his two-seater Citabria plane, he could inspect progress on the ground and return before dark. He designed and erected his second mill near Port Klang with the help of Danish palm oil engineer Worm Sorensen.

Dick Walsh, Senior Assistant at Harrisons and Crosfield's Sungei Samak Estate, lived on the opposite side of the Bernam River from Bek's house. Dick resigned from Sungei Samak in 1961 to pioneer an oil palm plantation investment at Tomanggong Estate on Sabah's Segama River. He sought Bek's help to build a palm oil mill.

Access to Tomanggong Estate from Sandakan harbour was an overnight journey through the Trusan Duyong, by sea across the delta of the Kinabatangan River, and then up the Segama River. Alternatively, a daily afternoon flight by Borneo Airways Twin Pioneer via Jesselton-Sandakan-Lahad Datu, followed by a short drive to the upper Segama River, allowed one to go down the river for three hours before reaching Tomanggong Estate.

Mill designed in Malaysia

Bek needed to assess the proposed mill requirements through a personal site review. One morning in 1964, he arrived in Jesselton from Kuala Lumpur in time to catch the Borneo Airways' flight to Lahad Datu. The northeast monsoon was blowing hard down Sabah's east coast. The weather had somewhat delayed the airline's schedules, so it was almost dark before he set off downriver.

Tomanggong's best passenger canoe crew faced rain squalls sweeping up the river. At one point, the canoe rounded a bend to be confronted by a family of wild boar swimming across the river. A passenger grabbed a piglet's ear and dragged it aboard the canoe. The bowman's torch reflected continuously off driftwood in the river.

Bek's fingers grew numb from gripping the side of the canoe as it swerved on its way downstream. The rain didn't let up. From his seat, Bek periodically bailed the bilge of the canoe's centre section. He leaned forward out of the canopy to enquire "*Berapa jauh lagi, encik?*" to be told "*Tidak jauh lagi, tuan*" and the endless wet journey continued.

At the next bend of the river, the canoe was turned under a large fig tree to answer urgent requests for a relief stop. Everyone stretched stiff limbs. Shortly after, as if by the turn of a switch, the rain died away. Bek's watch registered almost 10pm. Its luminous paint had all but given up the struggle. The bowman shivered but ventured, "*Lima minute lagi, tuan*".

Ghostly shapes of riverside shacks, some with small lamps flickering, showed up in the light of the bowman's powerful torch. The boat performed a U-turn to tie up at a simple jetty. Passengers scrambled out with wet suitcases and words of thanks. The bowman shook the fuel tank – which swished reassuringly – saying "*Satu minute lagi, tuan*" before casting off again.

The canoe rounded a final bend, towards a Petromax pressure lamp lighting up a jetty. A figure stood there under an umbrella. The piglet woke up and squealed. "What have you got there, Bek?" called Dick. "Your dinner," replied Bek. "Next time, can you please make sure I arrive in daylight…"

The next morning, Bek toured Tomanggong's undulating site comprising fertile volcanic tuff. He collected data on the number of staff and workers' houses to be served by the mill's water supply; the electricity and workshop facilities to service the land and tugboat transport services; and the number of palm oil storage tanks required. The situation was not unlike that of a brand-new Ulu Bernam Estate.

Bek's Tomanggong mill layout would have allowed 5-a-side football to be played around the process floor. It is still there. Bek's next two factories, at Sabahpalm Estate on the Labuk River and Lai Fook Kim Estate at the Sandakan Peninsula Scheme, were built around modest floor areas.

The Segama mill was Malaysia's first to be built around two Usine de Wecker, Luxemburg winepresses. These were modified by Bek at Ulu Bernam to double the oil palm fruit throughput of the predecessors, Stork's 4.5-ton FFB/hour automatic press.

Vickers Hoskins of Perth, Western Australia, provided the smoke tube boilers at half the price of Stork. A Singapore foundry provided the cast steel steriliser dished ends; British factories the compound steam alternator by Belliss Morcom; Switzerland the three-phase gear-motors which powered every machine; Sweden the oil clarification and sludge centrifuges; and Germany the Demag hoists. The Malaysian designed and built palm oil mill had arrived.

The day that Tomanggong's mill entered service in 1969, Stork closed its Harrisons and Crosfield agency offices, never to sell another boiler, steriliser, automatic press or nutcracker in Malaysia.

In the early 1970s, Bek took over as General Manager of UP from fellow-Danes Ole and Mette Svenssen. He moved into Ole's newly-completed bungalow at Jendarata Estate, across the road from the UP corporate offices.

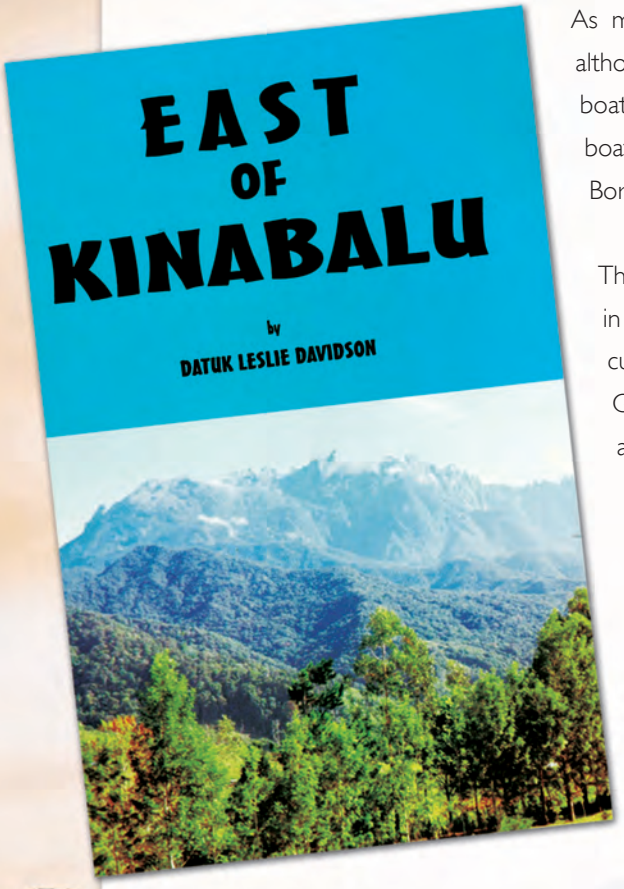
He devoted time over the next two decades to design and build another 30 palm oil mills. These included three for UP in Perak. The first was at Seri Pelangi, Bidor, and the final pair – twins, each with a capacity of 100 tons FFB/hour – at UIE, the former Gula Perak, in Tanjung Malim. A replacement unit, six times larger than the original, was built at Ladang Basir, the renamed Ulu Bernam Estate.

'Made at Ulu Bernam' – and Malaysia's first palm oil mill engineer – had come of age!

Moray K Graham
Retired Planter

Aftermath of the Flood, Part 1

A dismal time



As my house disappeared into the darkness I reflected sadly that although I had often stood on my verandah and waved goodbye to a boat going off down the river, it was the first time I had stood on a boat and waved goodbye to my house going down the river. Even for Borneo, it was an unusual experience.

There was no point in hanging around, however. We set off upstream in the moonlight. The *Puyoh* battled its way slowly back against the current to the hill site, where we got Mahid and his family settled in. George remained in the *Puyoh*'s cabin with Tundah and Lai in attendance.

I made my way to the bathroom, which was to become our temporary HQ. Donald Pettit was asleep in one corner. I found a blanket and managed to get an hour's sleep in the bath which I commandeered as my sleeping quarters until we got some other accommodation fixed up. Before I dozed off, I suddenly remembered that it was now Jan 26. What a way to spend my 32nd birthday!

When daylight emerged, a watery blink of sunshine appeared. Although the planted area was still a lake as far as the eye could see, the flood-water on the Tungud side had dropped another foot or two.

I went down to see George. Although he was having a lucid spell once again, it was clear that he was urgently in need of psychiatric help. I decided to leave Donald in charge of operations for a couple of days, and take George down to Sandakan. We sailed off in the *Puyoh* across the tops of our palm trees. At the office the water was still halfway up the windows. The torrent from the Labuk continued on unabated.

When we sailed over the place where my house had been, there was not the slightest sign that there had ever been anything there. It had disappeared, as also had the accountant's house, without trace. The only thing visible between us and Donald's house far downstream, was the roof of the Rest House which, surprisingly, was still standing. We were to discover later that the reason for this was that it was held down by the heavy billiard table and the solid concrete pillars which Kong Miew had built under each of its legs.

We stopped briefly at Klagan. The government buildings, which had been built at ground level, were deeply submerged and were badly devastated. The Chinese shophouses, on higher ground and built on solid eight foot-high stilts, had not suffered much. Being that much nearer the sea, Klagan was more affected by the tide and the flood was beginning to subside.

With the force of the current behind us, we had a very swift journey to Sandakan. I dropped George off, with much relief, at Sandakan Hospital. The doctors there were very concerned about him. They had him heavily sedated, and they put him on the first plane to Singapore in the care of a medical orderly.

Sadly, I have never heard any news about George to this day and I wonder what became of him. He certainly never returned to Sabah. The doctor told me that George had been confirmed as having a severe case of schizophrenic-paranoia, whatever that was.

"You were very lucky, you know," he told me. "In that state he really could have been quite dangerous." He should, I thought, have seen George with the carving knife that night in my bedroom.

While in Sandakan, I took the opportunity to make two phone calls to UK. Olive fortunately had not heard the *BBC News* programme about the floods. She told me that Catriona had settled well into the boarding school after the Christmas holidays, and she and Fiona were booked to fly back to Borneo in a couple of weeks.

Olive was of course perturbed to learn that our house had been swept away along with many of our belongings. She agreed, however. that she would still come out as planned and stay in the Sandakan flat until our new house was completed.

I also spoke to David Martin and Colin Black. They had of course heard about the floods in the news programme and were very worried. They were relieved to learn that there had been no loss of life. David said that, based on his experience of flooding on Ndian Estate, a few days of inundation would do the palms no harm. Colin was worried about the repercussions on the Unilever Board.

The floods never again reached the intensity that they had on my birthday when the house was washed away, and fortunately, we did not have to evacuate the workers from their houses again. However, we were not finished with the flooding by a long way. The rains continued on and off, week after week.

Each time we tried to get into the fields to start clearing operations, there would be another downpour and the flood-water would rise a foot or two again. It was an immensely frustrating period.

It was not until March 20 that the monsoon blew itself out. The rain ceased suddenly on that day and was immediately followed by a drought. It was not until the silt started to firm up that we were able for the first time to make a full survey of the damage.

Devastation all round

As the water level dropped, the riverbank in places now started to erode away like sugar cubes in a cup of tea. The most dramatic effect was seen at Klagan. The shophouses had not been badly inundated. However, as the water level dropped, the high bank in front of the shophouses slipped away into the water, and one by one the shops collapsed into the river.

The government compound also disappeared. The island was evacuated permanently. All that was left

of what had been, for a hundred years or more a thriving trading village, was a low-lying patch of swamp-land. Even the grass, which I had taken such an interest in, ever since the episode of the Seven Sods, had disappeared and was eventually replaced by rank sedges.

The riverbank in front of Donald's house also fell away into the river, taking the house with it. We had thus lost all three of our first management houses. They had served us well for the first two pioneering years, and their disappearance marked the end of an era for us.

The estate was not a pretty sight for the next few weeks. It was a sea of semi-liquid mud. Movement around the cleared area was almost impossible. Every step you took, you sank up to your thighs in mud.

Our roads had of course disappeared and were impassable until the sun started to dry them out. All the drains we had dug were filled to the brim with silt and our drainage system was no more. The Labuk flood had brought down with it millions of tons of silt and deposited it in deep drifts, which changed the contours of the low-lying areas.

Not one leaf of the thick leguminous cover crop which we had been so proud of, was to be seen. The rich green colour had been replaced by a layer of brown mud. The palms in the areas away from the river were coated with mud and we were able to wash them down Most of them were saved.

In the low areas, however, all we could see of our palms were the tips of the fronds sticking out of the silt. We attempted to dig them out, but it was impossible to save them. They could not survive being submerged in silt for a month or more. When we were able to carry out a census we found that, in all, 92 acres of palms were dead.

There were some good moments. My driver found a corner of the roof of our Land Rover sticking out of the mud. We dug it out, cleaned it up, got the engine serviced, and it was as good as new.

We even found the debris of my house on the riverbank a mile or two down the river, but there was nothing to be salvaged except for our refrigerator which was found half-buried in silt a hundred yards further on. Kong Miew had it cleaned and serviced, and back in working order the following afternoon.

It was a dismal time, but I told myself that the really important thing was that we had survived the very worst monsoon in the history of the Labuk, without the death of a single man woman or child. The workers were in good heart and there was now plenty work for them to get on with.

I shared Colin's worry however that the loss of our first two years' work might give Lord Cole's opponents on the Unilever Board the excuse they had been looking for to scrap the project, and get back to selling their groceries. Was the first oil palm project in the Labuk going to follow the earlier tobacco and rubber estates into oblivion, I wondered?

Datuk Leslie Davidson
Author, *East of Kinabalu*
Former Chairman, Unilever Plantations International

The second part will be published in the next issue. This is an edited chapter from the book published in 2007. It can be purchased from the Incorporated Society of Planters; email: isph@tm.net.my

facts on Malaysian Palm Oil

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PALM VITAMIN E TOCOTRIENOLS

CARDIOPROTECTIVE AND PROTECT AGAINST HEART DISEASES.

Malaysian palm oil

MALAYSIAN PALM OIL IS USED IN CONFECTIONERY FATS AS:

- Toffees & Caramels
- Coatings
- Fillings
- Ice Cream

MALAYSIAN RED PALM OIL

BOOSTS THE HUMAN IMMUNE SYSTEM WITH ITS POWERFUL ANTIOXIDANTS, CAROTENES & TOCOTRIENOLS.

PALM-BASED SHORTENING

is vegetable-based

FREE OF TRANS FAT

COMPETITIVELY-PRICED

LOVE MY PALM OIL

A 5★ Malaysian Product

Fats are important for our body!

Malaysian palm oil helps in the absorption of vitamins A, D, E, and K, which are required for our optimum health.

Malaysian Palm Oil

is perfect for all your baking needs

FREE FROM TRANS FATTY ACIDS FREE FROM

BAKERY PRODUCT MANUFACTURERS CHOOSE PALM-BASED MARGARINE

GOOD PLASTICITY

NON GREASY SURFACE

Malaysian Palm Oil

is versatile and well suited for use in various food applications.

Palm-based fats

allow excellent gloss retention, sharp meltdown, and crispness in confectionery products

MALAYSIAN RED PALM OLEIN

A SOURCE OF BETA CAROTENE

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MALAYSIAN PALM OIL
THE PRIDE OF THE NATION

The Malaysian palm oil industry has always been committed to providing a high-quality edible oil for the global population, while upholding the three important pillars of sustainable development which are people, planet, and profit.

Love MY Palm Oil campaign, is a year long initiative to instil pride and greater appreciation of the benefits of Malaysian palm oil. It encompasses a variety of activities that incorporate educational elements to engage and enlighten consumers on the health, social and economic benefits of palm oil.

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