



**EVALUATING VEGETABLE OIL**

# **‘Palm oil’s image is very one-sided’**

**The world population consumes 205 million tons of vegetable oil per year, and that amount will increase by about 50 per cent by 2050. How are we going to produce such enormous quantities sustainably? Simply avoiding the much-criticized palm oil is not the solution, shows a review study. ‘We’ve really got to take a closer look at the impact of other oil crops.’**

**TEXT ARNO VAN 'T HOOG PHOTO GETTY INFOGRAPHIC STEFFIE PADMOS**



## ‘There are far more hectares of peanuts and soya than of oil palms’

In Europe we consume about 25 litres of vegetable oil per person per year, 80 per cent of which comes from three crops: oil palm, soya and oilseed rape. We consume most of this oil almost without noticing it in cookies, breakfast cereals, chocolate paste and margarine. The rest of the oil we consume, such as sunflower and olive oil in the kitchen, adds up to less than 20 per cent of the total.

Of all the vegetable oils in use today, one source has been subject to discussion for years: the oil palm, which is at the top of the consumption statistics. This palm variety, which originates from tropical Africa, is a relatively easy crop that grows well on poor soils where other plants require artificial fertilizer and irrigation. Since the 1980s, the oil palm has spread fast through the tropics, becoming the world’s biggest oil crop. Production has tripled since 1980, and 40 per cent of the world’s vegetable oil now comes from oil palm plantations. That expansion happened at the expense of tropical rainforest, especially in Borneo



**DOUGLAS SHEIL,**  
a professor of Forest Ecology  
and Forest Management in  
Wageningen

and Sumatra, where more than 90 per cent of the world’s oil palms are found: 19.5 million hectares, approximately five times the land surface of the Netherlands. Publicity and campaigns by nature and environmental organizations drawing attention to the problems this has caused have given palm oil an extremely negative image. In particular, the link between the planting of plantations, deforestation, and the disappearance of the endangered orangutan has inspired calls to avoid palm oil altogether or to boycott palm oil that is not sustainably produced. That social pressure has prompted No Deforestation declarations by a growing number of palm oil producers.

### ILLEGAL DEFORESTATION

‘At some point, oil palm production was growing so fast that it became one of the main drivers of large-scale illegal deforestation, especially in Borneo,’ says Douglas Sheil, who became professor of Forest Ecology and Forest Management at Wageningen on 1 January. ‘That was a very harmful development, but not all producers or all countries are guilty of it. There are good guys and bad guys. If you boycott palm oil, you also affect the group that is operating legally, doesn’t cause any deforestation, and gives local communities opportunities for development.’

Research into compromises between nature conservation and human use is the theme running through Sheil’s scientific work. He was doing research 20 years ago on the preservation of biodiversity after selective felling of trees, as a strategy for protecting forests against clearcutting. ‘Tree felling and nature conservation was seen at the time as absolutely incompatible, whereas well-organized, selective felling is a much better option than deforestation.’

There is a similar polarization now around

palm oil, says Sheil. ‘There is real cause for concern about tropical rainforests, but the image of palm oil in Europe is extremely one-sided. You get a different perspective on palm oil production if you do research locally, to the one you get from Europe if you are fed exclusively on pictures of clearcutting and orphaned baby orangutans.’

In December last year, Sheil and a team of 25 fellow researchers published a review in *Nature Plants* of the environmental impact of palm oil production. Dozens of previous studies were collated and analysed, and a comparison was made with what is known about the impact of other oil crops. The paper shows that between 1972 and 2015, 46 per cent of the new palm oil plantations were carved out of forest areas, while existing fields, meadows or previously cleared woodland were used for the rest. There is also a big difference between the large-scale creation of plantations by companies and that of small plantations managed by local farmers, which account for about 30 per cent of the entire surface.

Tropical rainforest is extremely rich in species, and it is logical that creating plantations causes a big drop in biodiversity. The number of plant species on plantations is 99 per cent lower on average, while the number of animal species falls by between 47 and 90 per cent. But there are big differences between countries, which depend largely on the presence of leftover patches of forest near plantations, and the amount of undergrowth under the palms. Some palm oil regions are still home to dozens of bird and animal species.

### HABITAT FOR ORANGUTANS

‘Oil palm plantations are not a good habitat for orangutans, but they can live in the little patches of forest between the plantations,’ says Erik Meijaard of the University of Kent, >

## VEGETABLE OIL

### Consumption

205 million tons of vegetable oil are consumed per year.

That is expected to increase by 50% by 2050, to **310** million tons.



In Europe we eat about 25 litres of vegetable oil per person per year.

80%



of our oil comes from three crops: oil palm, soya and oilseed rape. We eat much of it without noticing it in cookies, breakfast cereals, chocolate paste and margarine.



Oil palm



Oilseed rape



Soya

Land required for 1 ton of oil: **0.26** hectares

Land surface in use: **22.5** million hectares

Annual production: **84.8** million tons

Land required for 1 ton of oil: **1.25** hectares

Land surface in use: **35.5** million hectares

Annual production: **27.4** million tons

Land required for 1 ton of oil: **2.0** hectares

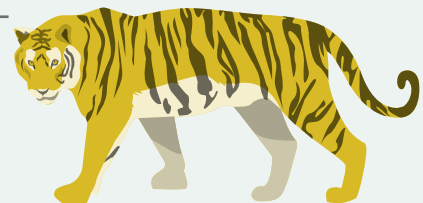
Land surface in use: **123.9** million hectares

Annual production: **57.2** million tons

### Biodiversity

Oil palm, with crop cycles of 25 years, is grown in areas with large numbers of plant and animal species, many of which are threatened with extinction.

Oil production with annual crops such as soya and oilseed rape takes place in regions with fewer endangered species.



### Wealth of species\*

Oil palm **472**

Oilseed rape **227**

Soya **278**

\* The number of species of amphibians, mammals and birds on the IUCN's Red List found in the area where the oil crop is grown

## ‘If you don’t know anything, making decisions is quite dangerous’

one of Sheil’s co-authors and a frequent research collaborator over the years. Meijaard has published 30 articles about the developments threatening the orangutan. In 1997, he discovered a new orangutan species (*Pongo tapanuliensis*) in the forests of North Sumatra, and has spent years campaigning against the construction of a dam there that is a threat to this rare species. ‘The population is in decline everywhere, and the main factor is hunting. The orangutan disappeared decades ago in many parts of Sumatra, and yet the forest is still standing. Felling and plantations have barely played a role there. In places like Malaysia where orangutans are not shot at, they can survive and raise their young in the remaining forested areas between the plantations, even if the conditions are less than ideal.’ After his studies in Wageningen, Meijaard left for Indonesia in the 1990s and has worked there almost continuously ever since, both in academia and for companies and nature conservation organizations.



**ERIK MEIJAARD,**  
Honorary professor of  
Conservation Science at the  
University of Kent and chair of  
the IUCN’s Oil Palm Task Force

Since 2017, he has chaired the Oil Palm Task Force of the International Union for Conservation of Nature (IUCN).

### BLIND SPOT

According to Meijaard, all the public interest in palm oil has stimulated research enormously. We know where oil palms grow, what lives there, the ecological consequences, and the impact on poverty and social inequality. At the same time, there exists quite a blind spot regarding other crops. Take peanut and soya farming, for example. Species diversity on these farms may well be lower than on an oil palm plantation, while pesticide use may be higher, says Meijaard. There have been studies of deforestation at the local level but we are far from having the full picture.

Meijaard: ‘There are far more hectares of peanuts and soya in the world than of oil palms, but you can’t find a single study that tells you about their global effects on deforestation. If you don’t know anything, and yet you start taking decisions, that is quite dangerous. Because you might have the wrong end of the stick. We simply must take a much closer look at the impact of other oil crops.’

In spite of palm oil’s 40 per cent share in our oil consumption, the total surface used for it is one fifth of the 100 million hectares used to grow soya. Oil palms produce the biggest yield per hectare of any oil crop. Soya, however, is mainly used for livestock feed, and soya oil is a by-product, says Meijaard. ‘That soya serves more than one purpose is often used to invalidate comparisons, but the fact is there is a rising demand for vegetable oil, and all the sources are fairly interchangeable. So if global demand increases, production needs to go up. And then you have to decide which crops that should come from.’ According to Meijaard, forecasts suggest an increase by 105 million tons of vegetable oil

to 310 million in 2050. ‘That oil has got to come from somewhere. Per hectare, palm oil produces a lot more oil than any other crop. You should take that into account. Because one of the scarce resources is agricultural land, which is needed for all crops. The question is where the balance lies, but the same goes for all food crops. People who worry about palm oil should actually stop drinking coffee and eating chocolate. They’re all in the same category so the question is how you can produce them in the best possible way. What we are actually saying in the review article is that we just don’t really know that yet.’

According to Meijaard, we have a general idea of where oil crops grow, but there has been hardly any research on the expansion of the area devoted to them over the past 20 to 30 years, and the local impact on nature. Meijaard divides his time between Brunei and Crete, a Greek island with a lot of olive trees. Olives are another oil crop that we don’t know much about, he says.

### BIRDS KILLED

In 2019, Spanish researchers came out with the shocking estimate that the night-time harvesting of olives in Andalusia costs 2.6 million birds their lives every year. The birds are vacuumed up out of the trees in the dark while they rest there. ‘Spain is currently the biggest olive producer. Olive cultivation and processing on that large scale only developed after Spain joined the EU in 1986. The expansion is relatively modest compared with the palm oil industry, but there are parallels. There is very little undergrowth in olive plantations, the ground between the trees is ploughed, and there is very little space for nature. But all this has hardly been studied.’

The coconut palm is another oil crop with an unproblematic image, whereas the crea-

tion of plantations on some tropical islands has put pressure on various rare endemic species. But just like olive oil, coconut oil evokes green associations. 'Some of that is justified, and some of it is marketing,' says Meijaard. 'The same as with palm oil, but there the marketing is mainly negative. In all these discussions we'd like to see more nuance, more data and ultimately, a policy that benefits sustainability.'

## NO POVERTY

Which source of oil to prioritize is not an easy question to answer at the moment. More research is needed on other sources of oil. The choice is complicated by the fact that it's not just about biodiversity and the environment, but also about the United Nations Sustainable Development Goals. No poverty, no hunger and good health are the top three on that list.

Meijaard: 'I once did ecological research in Papua. I had never seen such poverty, and I was shocked. People live in the forest, there are no roads, no electricity, nothing. The children have swollen bellies from malnutrition, and people are sick. That is not a pretty picture. What is to be done? I'm not saying: just put an oil palm plantation there and everything will be alright. We know it doesn't work like that, because there is social injustice around large oil palm plantations as well. But it does provide incomes and economic development, so you do need to look at that bigger picture.'

'People in Indonesia do have a right to have a say in things, just as they have a right to development,' says Sheil. 'It's not fair for them to stay poor and pay the whole price of the choices we impose on them. The costs of protecting biodiversity simply must be more fairly distributed. Otherwise it turns into a kind of colonial diktat. What is more, we've almost completely destroyed our own for-

ests. And then we go and tell them how they should behave?'

Nature conservation doesn't always have to be about irreconcilable conflicts, says Sheil. There are labels that stimulate more sustainably produced palm oil, such as the Roundtable on Sustainable Palm Oil (RSPO), which sets standards for the creation and management of plantations, such as the conservation of a considerable percentage of the original forest. About 20 per cent of the palm oil produced has the RSPO label.

Sheil: 'We won't stop deforestation by making ourselves feel good by organizing a boycott. If Europe stops buying the oil,

China and India will buy it. The crop itself is not the problem; the question is what it replaces and how it is produced. There are bad olive and coconut producers too. With research, you can identify good and bad developments, and then you can stimulate good practice. I believe consumers do want to make that distinction - just look at the success of fair-trade coffee. Most importantly, we should stick to the same standards for all oil crops, and not be too quick to make black-and-white judgements about how things are done far away.' ■

[www.wur.eu/palmoil](http://www.wur.eu/palmoil)

## OIL FROM THE LAB

Certain microorganisms store oil and fat in times of plenty so that they are prepared for an unpredictable future. Such organisms can be an interesting alternative source of oil. The idea is simple: breed one of these organisms in a large fermenter, harvest the cells, isolate the lipids, and you will be less dependent on agricultural crops and a long growing season.

Dozens of fat-producing species of yeast have already been described. The job now is to find the right combination of organism, breeding method and purification system for practical application, says Matthijs van Lint, business development manager for Specialty Chemicals at Wageningen Food & Biobased Research. 'First you need to choose a feedstock on which the organism can grow. That could be acetic acid from sewerage purification. Then you need to develop a large-scale fermentation process. Things like the breeding temperature influence the fatty acid composition of the oil. Lastly, there is the purification: the separation of the fats from the rest of the cell.'

Van Lint sees producing oil with microbes as not unlike the fermentation processes that are already used on a large scale to produce lactic acid, amino acids and vitamins. 'Adding oils and fats just expands that repertoire.' Wageningen is currently looking for partners for projects to research various questions that arise for practical applications. Replacing vegetable oil in food is not the primary goal. The low cost of vegetable oil means that yeast oil is not a competitive option at this point, says Van Lint. 'In the first instance, you should think in terms of the raw materials for making soap, washing powders, cosmetics or paint.'