

## SECTION 1 FACT CHECK COCONUT OIL

With a market share of 36%, palm oil is the most widely cultivated vegetable oil in the world, ahead of soybean oil. As a cheap fat component, palm oil is used in 50% of our food. Indonesia and Malaysia are the main palm oil producing countries, and large areas of virgin forest are cleared for palm oil plantations. Farmers' associations and environmental groups are sounding the alarm. Would switching to coconut oil be a sustainable alternative?

### Fact-Check COCONUT OIL



The coconut palm is a relative of the oil palm and, like it, grows in tropical warm climates and on nutrient-rich soil. It grows to a height of 25 m. From the age of 6, coconut palms produce fruit in the axils of their leaves. The yield is between 30-40 coconuts per year. Coconut palms can live for 100 years, but in plantations they are only cultivated for about 25 years and then replaced by younger, more productive trees.



Like the coconut palm, the fruits are drupes. For harvesting, they have to be removed from the palms either by humans, who have to climb the palms. This task is often also performed by trained macaques. Inside the hollow nut is a fatty and fibrous pulp that is extracted and dried - it is called copra.



Copra is used as a raw material for obtaining coconut oil, coconut fat, margarine, dried coconut flakes and a paste used for cooking. Rasped copra is used in the confectionery industry. But mainly coconut oil is obtained by pressing the copra. The press residue, full of sugar, protein and minerals, is a valuable animal feed.

Environmental groups and regional farmers' associations deplore the clearing of virgin forests. In addition to the necessary fertilizers, insecticides and fungicides must be used in the monocultures to curb the palms' increased susceptibility to plant pests.

As far as the ecological balance is concerned, the experts agree. Palm oil, but also coconut oil from huge plantations, is a major reason for the decline in biodiversity in tropical rainforests.

- 3 times more land is needed to produce 1 litre of coconut oil than 1 litre of palm oil.
- The water demand is very high with about 2500 L per m<sup>2</sup>, it must be irrigated artificially.

### TASKS:

**A) Compare the tables in the DATA SHEET (SECTION 2) and also the INFO SHEET (SECTION 3).** These values are derived from studies by the Water Footprint Network, the Öko-Institut and Statista. Further sources are the works of the authors Mekonnen & Hoekstra (2010) and Poore & Nemecek (2018).

**B)** Gather more information about the coconut palm crop to complete Tasks 1-5.

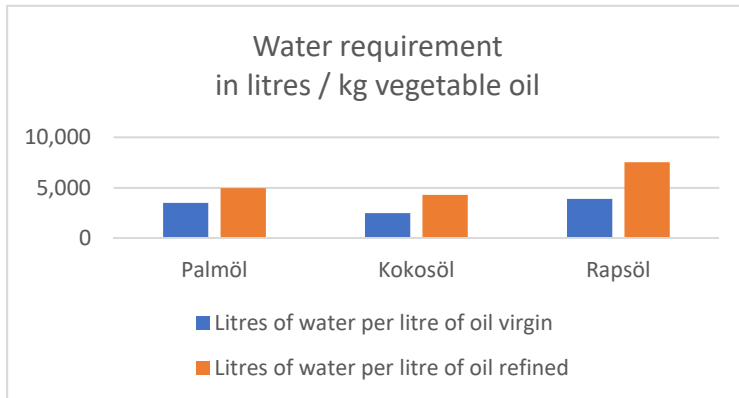
1. In which countries are coconut palms grown? What is the production volume in tons?
2. Who exports coconut oil to where? Describes the world trade.
3. Describes the growing conditions. Are fertilisers and/or plant protection products used?
4. How is coconut oil made from the coconuts? Outline the technical process.
5. Finds foods that contain coconut oil.



**SECTION 2 DATA SET** (data from 2019 on water use, CO<sub>2</sub> footprint and land use).

**Water consumption for the production of 1 litre virgin vegetable oil**

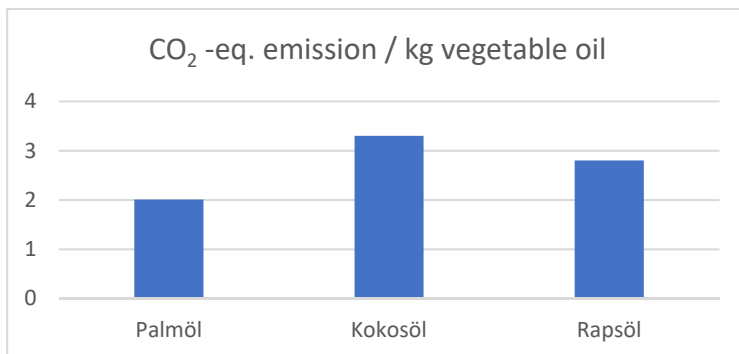
The oil plants thrive only in tropical humid climate. To obtain 1 litre of freshly pressed vegetable oil (in virgin quality), between 2,500 - 4,000 litres of water (blue, green & grey) are required. If the oil is refined, i.e. neutralised, bleached and deodorised, the water requirement increases considerably. However, domestic rapeseed is also very thirsty and is only intended here as an orientation to the cultivation conditions in a temperate climate.



Water-Footprint	Litre Water per Litre Oil	Litre Water per Litre Oil
	virgin	refined
<b>Palm Oil</b>	3,500	4,970
<b>Coconut Oil</b>	2,500	4,300
<b>Rapeseed Oil</b>	3,900	7,530

**CO<sub>2</sub> - for the production of 1 litre virgin vegetable oil (2019)**

By comparison, the production of 1 litre of cow's milk releases 3.2 kg of CO<sub>2</sub> eq.

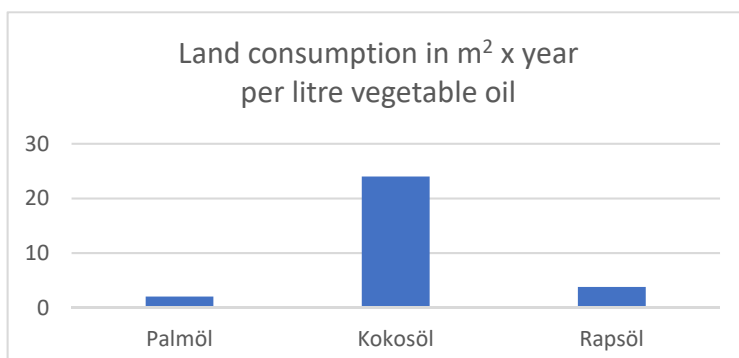


CO <sub>2</sub> -Footprint	kg CO <sub>2</sub> -Eq. / kg Plant Oil*
<b>Palm Oil</b>	2.01
<b>Coconut Oil</b>	3.3
<b>Rapeseed Oil</b>	2.8

\* under the simplifying assumption that density is 1!! 1 Litre of Plant oil weight 1 kg

**Land consumption in m<sup>2</sup> and year for the production of 1 litre virgin vegetable oil**

Compared to the coconut palm, the oil palm's land consumption is considerably lower due to its 3 times higher yield per m<sup>2</sup>



Land Consumption	m <sup>2</sup> x year per Litre
<b>Palm Oil</b>	2.05
<b>Coconut Oil</b>	24
<b>Rapeseed Oil</b>	3.8

TASK: Create an overview chart for the 3 products and discuss their life cycle assessments. The reference value should be one litre of vegetable oil.

**SECTION 3 INFORMATION** (production, ingredients and use)

**CULTIVATION & PRODUCTION**

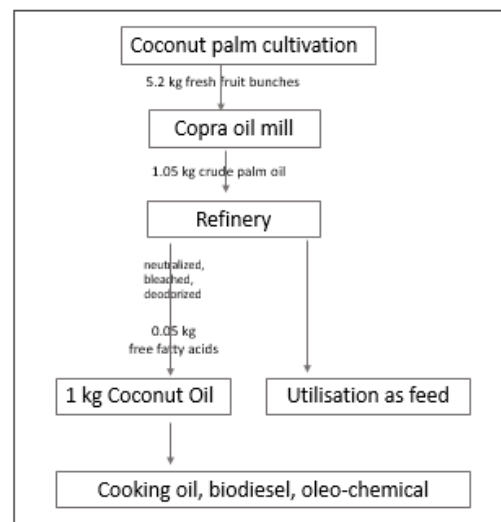
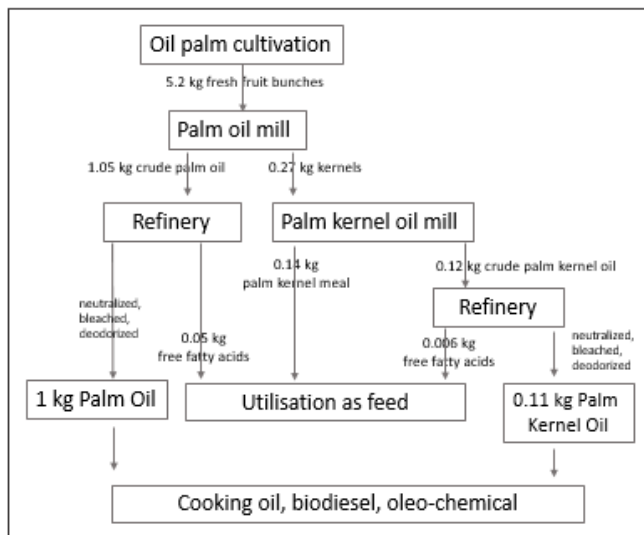
The two palm species are common in all tropical regions of the world. The world production of palm oil increased over 38% from 2010 to 2019. In 2019, 74.6 million tons of palm oil were produced worldwide. The **main oil palm growing countries** are Indonesia and Malaysia, together accounting for 84.1% of world production (approximately 63 million tonnes of palm oil in 2019). The cultivated areas in both countries have increased six-fold since 1990. Other producing countries such as Thailand (4.1%), Colombia (2.0%) and Nigeria (1.6%) hardly play a role.

The main **coconut palm growing countries** are Indonesia, India and the Philippines. The main producers for the oil are the Philippines (approximately 1.2 million tons of coconut oil in 2019) and Indonesia (0.9 million tons) followed by India, Vietnam and Mexico.

<https://de.statista.com/statistik/daten/studie/1176478/umfrage/ernteertrag-von-palmoelfrucht-nach-laendern/>

Production 2019	Palm Oil	Coconut Oil
	in tons	
Colombia	1527549	
India		351600
Indonesia	42869429	895000
Malaysia	1985367	
Mexico		130400
Nigeria	1220000	
Philippines		1193800
Thailand	3040000	
Vietnam		179014

The flow charts represent the steps in the extraction of palm oil and coconut oil.



**CONTENTS**

Both oils contain mainly saturated fatty acids. Especially the lauric acid is said to have positive properties.

Ingredients Content of fatty acids	Palm Oil	Coconut Oil	Rapeseed Oil
	in %		
Σ saturated fatty acids	49	96	83
Σ unsaturated fatty acids	39	2	15
Σ multiple unsaturated fatty acids	11	2	2

**USE**

Palm oil is mainly used for the production of biodiesel. In the cosmetics, detergent and food industries, many products would be inconceivable without palm and coconut oil. Due to their structure and consistency, they can be used in many ways. They can be found, for example, in chocolate (Nutella!), margarine, baked goods, instant soups and ice cream. For frying and baking, the natural red palm oil and coconut oil are very suitable.



**SECTION 4 TABLE OF FACTS** (for the group discussion and the expert panel)

While coconut oil is currently being treated as a true miracle cure, palm oil is more likely to make negative headlines. The deforestation of rainforests on a grand scale, huge monocultures and an associated decline in biodiversity seem to be the inevitable consequence of the cultivation of the oil palm. The ingredients are usually left out of the palm oil discussion. Coconut oil, on the other hand, which for a long time was regarded as an inferior fat due to its high content of saturated fatty acids, now belongs to the superfood category for some. The reason for this is the lauric acid it contains, to which many good properties are attributed.

We want to bring some light into the darkness and present the two vegetable oils from the fruits of the oil and coconut palms.

<b>Overview of arguments pro / contra palm oil and coconut oil as an alternative</b>	
<b>COCONUT OIL</b>	
<b>Environmental reasons</b>	
Land consumption	
Water consumption	
CO <sub>2</sub> emissions	
other	
<b>Health</b>	
Fatty acid content	
World population, hunger	
<b>Economic reasons</b>	
<b>Social reasons</b>	

**Other arguments:**

The industry uses only the highly processed, i.e. refined, deodorized and bleached variant. The production of palm oil has fallen into disrepute because of the associated deforestation of rainforests, especially in Indonesia, which is now the world's largest producer of palm oil. Producers of organic palm oil stand for sustainable cultivation of oil palms: primary or secondary forest must not be cleared, and the preservation of soil fertility is a central concern. Our tip: If you want to use palm oil, be critical and inform yourself about the origin.