

VEGETABLE OILS AND BIODIVERSITY

- Oil crops **occupy roughly 37% of the world's agricultural land**, and oil demand is growing.
- By 2050, **expected demand for vegetable oils could require a 14% increase in production** – potentially threatening biodiversity if natural areas are cleared for vegetable oil crops.
- While vegetable oils are an important part of a healthy diet, **the production of oil crops has a range of environmental and social impacts**.
- **We can limit the impacts of vegetable oils on biodiversity** if sustainable production methods are used, the expansion of oil crops into natural ecosystems is prevented, current yields are increased, oil crops are primarily used in food rather than as animal feeds or biofuels, and if synthetic oils become available in much greater volumes.

What is the issue?

Oil crops – plant seeds and fruits ranging from soybean and sunflower to palm and coconuts – occupy around 543 million hectares of land across the globe, accounting for roughly 37% of the total land area dedicated to agricultural crops.

The land area used to produce vegetable oils is growing, and this is expected to continue. The expansion of land allocated to vegetable oil crops has outpaced that of other commodities. Depending on how and where oil crops are grown, this **will negatively impact biodiversity if natural ecosystems are cleared for new plantations**.

Assuming no more vegetable oil is redirected for non-food uses – currently, 28% of oil crops are used for biodiesel, animal feed, and industrial applications – **the production of vegetable oils would have to increase by 14% to feed the estimated global population of 9.7 billion people by 2050**.

The means by which vegetable crops are grown can have a critical impact on biodiversity. Expanding vegetable oil production can lead to deforestation, species displacement and loss, and even localised microclimate changes.

The biggest concerns for biodiversity are from expanding tropical crops, such as oil palm and soybean, into forest and savannah ecosystems. Conversion of natural grassland and grassland savannahs is also ongoing, while expansion of oil crops into boreal ecosystems is an additional concern.



More than one-third of all land dedicated to agriculture is used for vegetable oil crops, like coconuts pictured here. As demand grows, there is an increased possibility that natural areas will be cleared for more plantations – thus impacting biodiversity. (SJ Liew/Flickr)

Why is this important?

Humans need fats. In a healthy diet, fats constitute 25-35% of adult daily energy needs, and provide essential fatty acids and fat-soluble vitamins. Our modern intake of fat comes primarily from vegetable oils. Their production is a key component of our food system.

At the same time, the production of all vegetable oils can have severe environmental impacts – especially when produced industrially in large monocultures. For example, olive oil production has the highest water footprint at 14,500 m³ per ton, followed by linseed, groundnut, and sunflower oils. Cottonseed, soybean, rapeseed, coconut, and palm oil require amounts ranging from 3,800 to 5,000 m³ per ton.

Palm oil has the largest global production volume of any vegetable oil. It also has the highest yield, delivering the highest output of oil per area cultivated compared to all other oil crops, while olive oil is the least efficient, among major oil crops. However, greenhouse gas emissions associated with palm oil in general are high because its production has often been associated with tropical deforestation.

Overall, expanding agriculture is the principal cause of global biodiversity decline, a major contributor to nitrogen and phosphorus pollution, and is linked to land degradation and freshwater depletion. From 2003 to 2019, global cropland areas increased by 9%, primarily in Africa and South America, with around half (49%) of the new cropland area replacing natural vegetation. The scope for such land use changes through small- and large-scale agriculture is highest in Africa and South America.

What can be done?

Specific practices associated with how vegetable oils are grown and produced can be detrimental to biodiversity and the climate. Indeed, a consistent pattern emerges from scientific studies: The more intensive the land management – including monoculture practices, irrigation, and the absence of nearby natural vegetation – the lower the biodiversity. This pattern appears to hold true for all oil crops. In other words, **production practices determine much of the impact on biodiversity.**

While all oil crops take up land, they can also all be managed to reduce impacts on biodiversity. All stakeholders must balance how and where to best grow oil crops, who benefits from them, and how to minimise their impacts.

Practices matter: the impacts of vegetable oil crops on nature and on communities depend on how and where they are produced, financed, traded, speculated upon, and consumed. **To minimise harm, stakeholders must focus on good practices along the value chain.** Regenerative agriculture, agroforestry and agrochemical standards, as well as fair labour, are examples of good practices. In one case study in Indonesia, for example, leaving even a small number of natural trees among an oil palm plantation promoted biodiversity without significantly impacting overall oil yield.

Prevent expansion of oil crops into natural ecosystems: The increase in vegetable oil production needed to meet expected demand by 2050 may require millions of additional hectares of land. This demand can be met with less expansion into natural ecosystems, if:

- **New policies require** that no oil crop expansion results in the conversion of natural ecosystems.
- **Synthetic oil becomes available.** Synthetic oils can be a solution, but they will require a lot of feedstock (as the microbes need nutrients) and energy.
- **Investment is made to boost yield in smallholders' farms.** There are at least 270 million smallholder farmers in Africa, Asia, and Latin America, producing over 70-80% of the world's food supply. But due to their lack of economies of scale, low productivity, and limited know-how and means of production, the majority of those farmers live in poverty with low yields. Helping smallholders would also enhance diversified food systems, including more mixed cropping and agroforestry, for example, which present promising opportunities for vegetable oil production and biodiversity.
- **The right investments are made.** Investment is critical to meeting the growing need for vegetable oils, especially in Africa, where the fastest population growth and demand are projected. Banks and other stakeholders must start investing in well-managed, sustainably produced oil crops. At the same time, they must ensure that no oil crops are produced in natural ecosystems or are associated with human rights abuses.
- **Less oil crop production goes to meat production (5%) or biofuel (16%).** This would require alternative animal and energy feedstock as well as reduction in meat and energy consumption.

The right to know: Concerned consumers have the right to know about the impact of the oils they consume. Objective guidance for oil consumers and investors is, however, often lacking. **Improving traceability and transparency enables informed decision-making and helps hold producers, investors, and buyers accountable.**

Where can I get more information?

Meijaard, E. et al (2024). [Exploring the future of vegetable oils – Oil crop implications - Fats, forests, forecasts, and futures](#). Gland, Switzerland: IUCN and SNSB.

[IUCN Oil Palm Task Force](#)

[IUCN Issues Brief: Palm oil and biodiversity](#)