



Food not fuel

As global wheat prices soar, Europe burns the equivalent of 15 million loaves of bread every day to power our cars.

24 March 2022

Summary

In the immediate aftermath of Russia's invasion of Ukraine, global grain and vegetable oil prices reached record highs. The ongoing uncertainty caused by the war has kept prices high and is causing serious concern for food security across the world. Despite the looming risk of food shortages that could push hundreds of millions of people into food poverty, **Europe continues to turn 10,000 tonnes of wheat - the equivalent of 15 million loaves of bread (750gr) - into ethanol for use in cars every day.**

Reducing the share of wheat in EU's biofuels by less than a third would compensate for failing supplies from Ukraine, shielding EU livestock farmers as well as consumers from supply shortages. **Reducing the use of wheat in EU biofuels to zero would compensate for over 20% of the total wheat exports of Ukraine** and support food security in other countries depending on Ukrainian wheat supplies.

While some countries struggle to secure sufficient food supplies for their people, the biofuels industry is stepping up its lobbying effort to even increase the use of food crops in biofuels. The land demand for this endeavour will be immense. **Europe's biofuels consumption already requires an area equivalent to 5% of its total cropland. This would need to be doubled to replace only 6.5% the EU's imports of crude oil, gasoline and diesel from Russia** with biofuels grown in Europe. If all these imports should be replaced with domestic biofuels, this would result in at least 70% of all cropland being dedicated to powering our cars and trucks.

Options to rely more on waste & residue based biofuels are very limited and would make Europe dependent on imports. **We are calling on national governments to immediately halt the use of food and feed crop based feedstocks in biofuels. We are calling on the European Commission to strongly encourage its member states to halt the use of food and feed crops in biofuels, and refrain from pushing for opening up biodiversity set aside areas for food production, until all other options have been exhausted.**

Introduction

While the catastrophic humanitarian crisis caused by Russia's unprovoked war against Ukraine and its people continues to horrify the world, the war has shone a light on the far reaching global impact the conflict can have on global food and energy security. While we have addressed the EU's dependence on imported oil, and in particular those imports from Russia¹, the attention of many has turned to food security, food prices, and how that fits into upcoming EU strategies for energy and agriculture².

Ukraine and Russia are large exporters of food commodities, such as grains and vegetable oils. Some countries are highly dependent on these exports, which are at a very high risk of not being made this year. These countries tend to be highly susceptible to food shortages and starvation. The uncertainty has led to large price hikes in recent weeks; it is not only the grains and oils that Ukraine and Russia export, but also other grains and oils that are now in stronger demand to substitute those supplies. For example Spain, Europe's second largest importer of Ukrainian sunflower oil, has seen prices rise for its substitutes - olive and rapeseed oil. The substitution effects that are being seen in food markets are also amplified by the EU's use of food crops for biofuels. There have been a growing number of voices worried about the growing impact of the conflict on food. Spanish³ and German⁴ farmers have voiced their concern about access to feed for their livestock, the Spanish industrial bakers association⁵ about supplies of sunflower oil for their products and – most alarmingly - the UN Secretary General António Guterres has warned the world of a 'hurricane of hunger' resulting from the war in Ukraine.⁶

Recently, Europe's biofuel lobby groups, namely the European Biodiesel Board (EBB) and European Renewable Ethanol (ePure) claim that increasing the use of food based biofuels will improve food and energy security⁷. Farmers are now gearing up to make land set aside for rewilding available for farming

¹ Transport & Environment (2022) How Russian oil flows to Europe. Available:

<https://www.transportenvironment.org/discover/how-russian-oil-flows-to-europe/>

² See for example: Pe'er, G. and Candel, J. Letter to the European Commission (11 March 2022) Ukraine-Crisis impacts on food security: tackling the short-term shock must be done with a vision in mind of the larger-scale and longer-term threats of the Climate- and Biodiversity-Crises. Available:

<https://slakner.wordpress.com/2022/03/12/tackling-the-short-term-food-crisis-in-developing-countries-open-letter-to-the-eu-commission/>

³ Unknown author (10 March 2022) Los ganaderos piden ya "cualquier" decisión que permita llegar cereal. COPE. Available:

https://www.cope.es/actualidad/noticias/los-ganaderos-piden-cualquier-decision-que-permita-llegar-cereal-20220310_1961782

⁴ Unknown author (8 March 2022) No wheat for biofuel. Available:

<https://www.agrarzeitung.de/feedmagazine/feedmagazine-news/ukraine-war-no-wheat-for-biofuel-100051>

⁵ Gutierrez, H., (10 March 2022) Golpe a los dulces industriales por la guerra de Ucrania: el sector avisa de que solo tiene aceite para producir entre dos y cuatro semanas más. Available:

<https://elpais.com/economia/2022-03-10/golpe-a-los-dulces-industriales-por-la-guerra-de-ucrania-el-sector-a-visa-de-que-solo-tiene-aceite-para-producir-entre-dos-y-cuatro-semanas-mas.html>

⁶ Unknown author (14 March 2022) Ukraine: 'We need peace now' declares Guterres, warning of global hunger meltdown. United Nations - UN News. Available: <https://news.un.org/en/story/2022/03/1113882>

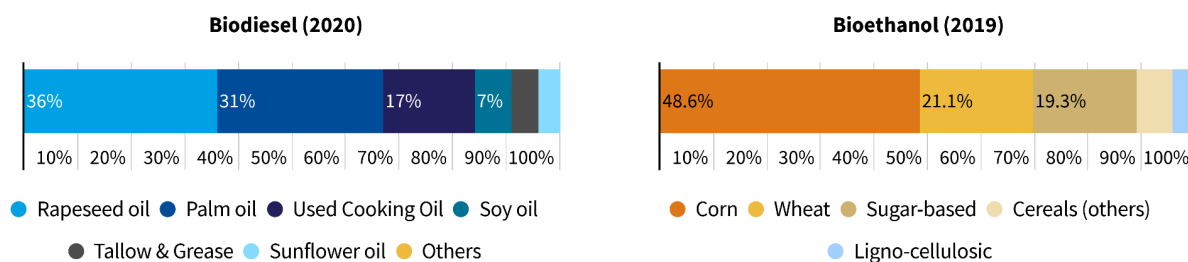
⁷ Vackeová, S., (ePURE) and Noyon, X. (EBB) (2022) RePowerEU: Biofuels play a strategic role in boosting Europe's energy independence. Available:

again, supported by some MEPs who have been pushing to stop rewilding. For many years, T&E has been highlighting the environmental impacts of biofuel use driven by high targets in the Renewable Energy Directive (RED). In the context of soaring food prices and a looming ‘hurricane of hunger’, with this paper, we will highlight how much food based crops end up in fuel tanks, rather than as food on people’s plates, how much land is required to produce these fuels and how much would be needed to fill the gap from a drop in Russian oil imports, and how interconnected the EU’s biofuel policies are putting pressure on feedstocks and food. We briefly discuss biogas and its role in transport and energy.

Biofuels and Energy Sovereignty

Biofuel feedstocks and imports

The vast majority of biofuels used in the EU come from food crops. While biofuels that are derived from potentially sustainable feedstocks such as wastes and residues may feature prominently in the mindset, they make up a small part in biofuels production. For biodiesel, oils derived from rapeseed, palm, soy, and sunflower crops make up 78% of total feedstocks. For bioethanol, corn, wheat, sugar based crops (such as sugar beet), and other cereals (such as barley and rye) make up 96% of the feedstocks (Fig. 1).



Source: Oilworld, ePure, Stratas Advisors. Note: Biodiesel data are EU27, bioethanol data are EU27 and UK

Figure 1: Feedstocks used in the production of EU biofuels, 2020⁸

For many of the feedstocks shown in Fig. 1, the EU is a net importer - in particular for palm and soy oil for biodiesel, where the EU has no significant domestic primary production. While grown domestically, imports of sunflower oil and rapeseed are significant. From 2016 to 2021, on average, EU rapeseed imports amounted to 22% of its own domestic consumption, for sunflower oil to 39% - the main supplier being Ukraine.⁹ The other significant feedstock for biodiesel, used cooking oil (UCO), is decreasingly

<https://www.euractiv.com/section/biofuels/opinion/repowereu-biofuels-play-a-strategic-role-in-boosting-eu-opes-energy-independence/>

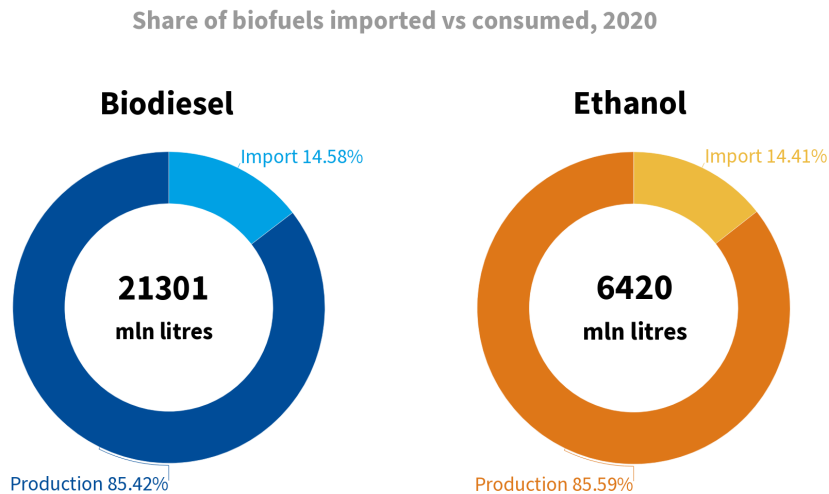
⁸ Transport & Environment (2021) 10 years of EU’s failed biofuels policy has wiped out forests the size of the Netherlands - study. Available:

<https://www.transportenvironment.org/discover/10-years-of-eus-failed-biofuels-policy-has-wiped-out-forests-the-size-of-the-netherlands-study/>

⁹ USDA (2022) PSD online database, accessed March 22, 2022. Available:

<https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

sourced domestically. In 2019, over half of the UCO used in the EU for biodiesel had been imported¹⁰. For bioethanol that is blended into petrol, starch or sugar rich crops are used, mainly corn, wheat and sugar beet.¹¹ While the EU imports corn amounting to 22% of its own domestic consumption, for wheat this is only 5%.¹² Domestic consumption refers to the sum of domestic production, net imports/exports, and net changes in stocks.



Sources: USDA.

Figure 2: EU and UK share of imports of refined biofuels versus domestic consumption, 2020

In addition to the dependency on imported feedstocks for the EU’s own production of biofuels, it also imports finished biofuels, accounting for 14.6% of biodiesel and 14.4% of ethanol in 2020 (Fig. 2). In recent years, the EU’s main suppliers of biodiesel are Argentina, China, Indonesia and Malaysia. For ethanol in gasoline, these have been mainly the US and Brazil¹³.

¹⁰ Transport & Environment (2021) Used Cooking oil demand likely to double, and EU can’t fully ensure sustainability. Available: www.transportenvironment.org/discover/europes-surg-ing-demand-used-cooking-oil-could-fuel-deforestation/

¹¹ Flach, B., Lieberz, S., Bolla, S. (2021) Biofuels Annual (Country: European Union). United States Department for Agriculture (USDA) and Global Agriculture Information Network (GAIN). Available: https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Biofuels%20Annual_The%20Hague_European%20Union_06-18-2021.pdf

¹² USDA (2022) PSD online database, accessed March 22, 2022. Available: <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

¹³ Transport & Environment (2021) 10 years of EU’s failed biofuels policy has wiped out forests the size of the Netherlands - study. Available: <https://www.transportenvironment.org/discover/10-years-of-eus-failed-biofuels-policy-has-wiped-out-forests-the-size-of-the-netherlands-study/>

Most biofuel feedstocks require enormous amounts of land

Contrary to common belief, biofuels are not primarily made from waste and residues, like used cooking oil (even though its increased use has raised sustainability issues itself¹⁴), but from crops that could also be used for human consumption. Globally, the top three feedstocks used for biodiesel in 2019 were palm, soy and rapeseed oil, together accounting for 78% of total consumption¹⁵. For ethanol that is blended into petrol, the most common global feedstocks are sugarcane in Brazil¹⁶, whereas wheat, corn and sugar beet predominate in Europe, and corn predominates in the US¹⁷.

Infobox - co-products of crops for energy

When producing crop based biofuels, aside from the final product (the refined fuel), there are co-products or residues from both the farming and processing phase. One example of co-products for ethanol is distillers grains, often referred to as dried distillers grains with solubles (DDGS). For biodiesel made from vegetable oils, co-products include glycerol and cake (or meal). The most common use for these co-products is for animal feed. This is what is meant when the biofuel industry claims that every kilo of crop-produced biodiesel generat[es] two kilos of vegetable proteins.¹⁸

When calculating the amount of land required to grow a certain crop for biofuel production, a simple approach would be to compute the yield of the crop per hectare of land, where the crop is used directly for biofuel production, and multiply it by the amount of crop used to produce the fuel. Because stopping biofuel production would only remove the demand for one part of the crop, only part of the land currently used for biofuels would be freed up to grow crops for direct human consumption. When presenting land use numbers in this study, we take into account co-product adjusted factors, unless otherwise specified (for example for the amount of bread from wheat). In order to consider the land that would be needed for the co-products we allocate the land requirement between products (biofuels) and co-products on an energy basis. The land required to grow the feedstock for biofuels is reduced by the amount of land allocated to the co-products.

While the biofuel industry produces fuel and feed for animals, the final food available for human consumption is of course less than if the biofuels weren't being produced. If we were to simply make food from the crops, there would also be co-products (especially in the case of vegetable oils) for use as animal feed. Grains can be fed to animals directly - this does not need prior extraction of biofuels. Finally, we would need a lot less land to feed ourselves, by reducing the high level of meat & dairy consumption observed in most high income countries, due to the highly inefficient conversion of plant biomass into animal protein.

¹⁴ Transport & Environment (2021) Europe's imports of dubious 'used' cooking oil set to rise, fuelling deforestation. Available:

<https://www.transportenvironment.org/discover/europes-imports-dubious-used-cooking-oil-set-rise-fuelling-deforestation/>

¹⁵ Report on global market supply 2020/2021. Union for the Promotion of Oil and Protein Plants. Available:

https://www.ufop.de/files/7215/7953/0161/WEB_UFOP_Global_Supply_Report_A5_EN_19_20.pdf

¹⁶ Barros, S. (2021) Biofuels Annual (Country: Brazil). United States Department for Agriculture (USDA) and

Global Agriculture Information Network.

¹⁷ U.S. Energy Information Administration (2021) Form EIA-819 "Monthly Report of Biofuels, Fuels from Non-Biogenic Wastes, Fuel Oxygenates, Isooctane, and Isooctene". Available: www.eia.gov/biofuels/update/table2.pdf

¹⁸ European Biodiesel board. Why use biodiesel? Available: <https://ebb-eu.org/about-biodiesel/>

According to a new analysis by T&E, the EU's current biofuels consumption is estimated to require between 5.1 Mha and 8.9 Mha of land inside and outside the EU (accounting or not for co-products, respectively). This equals between 4% and 7.5% of the EU and UK's total combined cropland.¹⁹

Replacing only about 6.5% of the EU's crude oil, gasoline and diesel imports from Russia with biofuels made from EU grown feedstocks (rapeseed, corn, wheat) would require doubling this land area. If Europe would replace all Russian crude oil, diesel and gasoline imports with such biofuels, it would need to dedicate between 68% and 117 % of its crop land to this purpose, and between 71% to 124% in total, adding the land used for biofuels already (again accounting or not for co-products).

Waste and residue based biofuels are very limited in supply

Under its Renewable Energy Directive (RED), the EU provides special incentives for the use of waste and residues for the production of biofuels. The most common feedstocks in 2020 were used cooking oils (UCO), biomass in industrial waste and animal fats (Fig. 3)

As a result, in particular the consumption of used cooking oils in EU biofuels has increased over recent years. Up to a point, where Europe is no longer able to keep up with demand. The collection of UCO in Europe is largely developed particularly in Western Europe and based on the professional sector. Only a few EU countries have well set-up household collection schemes, namely Belgium, the Netherlands and Austria. A stagnant domestic collection in the EU led to UCO imports more than tripling between 2015 and 2019²⁰ when more than half the UCO in the European biofuels market had travelled all the way from China, the US, Malaysia and Indonesia and other countries²¹.

Animal fats account for only a minor and stagnant fraction of the EU's biodiesel production²². Part of the supply (category III animal fat) is also highly sought after by other sectors, in particular the pet food industry. Increasing its use in biofuels, would force this sector to fill the gap with vegetable oils, aggravating the impact on the food sector.

Under the RED, the EU has tried to push the production and use of more 'advanced' biofuels, requiring new technologies. Amongst the feedstocks that are the most used in this category we find POME (palm oil mill effluent). POME is fully imported from palm producing countries like Malaysia or Indonesia. As for

¹⁹ 118 Mha in 2019 (Eurostat)

²⁰ van Grinsven, A., van den Toorn, E., van der Veen, R., Kampman, B. (2020) Used Cooking Oil (UCO) as biofuel feedstock in the EU, CE Delft. Available:

<https://www.transportenvironment.org/discover/europes-surg-ing-demand-used-cooking-oil-could-fuel-defore-station/>

²¹ Transport & Environment (2021) Used Cooking oil demand likely to double, and EU can't fully ensure sustainability. Available:

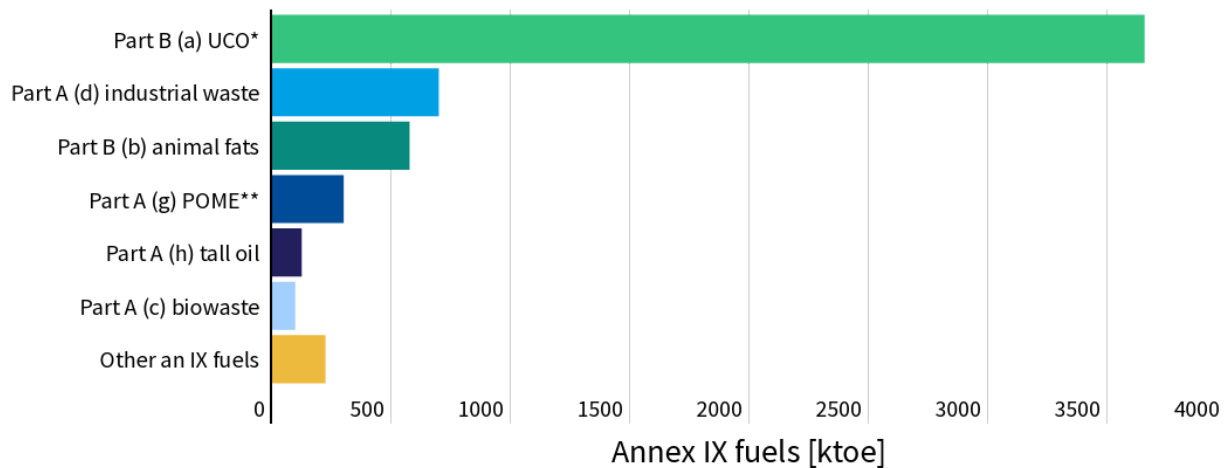
<https://www.transportenvironment.org/discover/europes-surg-ing-demand-used-cooking-oil-could-fuel-defore-station/>

²² Transport & Environment (2021) Used Cooking oil demand likely to double, and EU can't fully ensure sustainability. Available:

<https://www.transportenvironment.org/discover/europes-surg-ing-demand-used-cooking-oil-could-fuel-defore-station/>

used cooking oil, it makes no sense to ship waste materials around the world for then being used in biofuels. Waste materials need to be processed and consumed locally, wherever possible.

Annex IX biofuels use, EU27+UK



Source: SHARES (Eurostat). Fuel use refers to 2020, for UK to 2019. *UCO: used cooking oil; **POME: Palm oil mill effluent & empty palm fruit, bunches



Figure 3: Quantities of Annex IX biofuels of the RED, EU and UK

The Imperial College London was commissioned by Fuels Europe, representing the oil refining industry, to undertake a study on the technical availability of biofuel feedstocks in the EU²³. However, this assessment has been criticised as overly optimistic, particularly in its use of feedstocks such as stem wood (i.e trees). Overall, the amount of sustainable feedstocks available for the production of advanced biofuels is extremely limited.²⁴ There are only very limited biomass feedstocks that have no other uses and could hence be used for biofuels production without any significant impact on existing markets, on the environment or the climate. T&E estimated that only 5,8 Mtoe of advanced biofuels could be available for use in transport in 2030²⁵.

²³ Panoutsou, C., and Maniatis, K. (2021) Sustainable biomass availability in the EU, to 2050. Available: <https://www.fuelseurope.eu/publication/sustainable-biomass-availability-in-the-eu-to-2050/>

²⁴ O'Malley, J. (2021) The paradox of sustainable biomass. Available: <https://theicct.org/the-paradox-of-sustainable-biomass/>

²⁵ Transport & Environment (2021) Advanced renewable fuels in EU transport. Available: <https://www.transportenvironment.org/discover/advanced-renewable-fuels-eu-transport/>

Biofuels and Food Security

Biofuels driven food price inflation

In 2021, long before the war on Ukraine started, prices for many crop commodities had been soaring, driving food prices high, with demand from biofuels being one major driver, in particular for vegetable oils²⁶. High increases in prices for cooking oil in 2021 forced India to reduce import taxes, to impose stockpile limits and to suspend futures trading in edible oils and oilseeds.²⁷ These measures by the Indian government received a fatal blow in February 2022 through the announcement of Indonesia to restrict exports of palm oil, as consumer prices for cooking oil also in this country became unaffordable for low income families.²⁸ Aiming at bringing local prices down, this lifted palm oil prices on the global market to records, making the once cheapest vegetable oil the most priciest amongst its peers.

The prices for all types of vegetable oils are highly connected globally. The increase in one invariably leads to an increase in prices across all vegetable oil types²⁹. More expensive vegetable oils and dairy products have been identified by the Food and Agriculture Organisation of the United Nations (FAO) to be the main drivers of global food prices jumping towards new records.^{30,31} The FAO Food Price index for vegetable oils reached an all time high in 2021, increasing by over 70%, compared to the previous 5 years. For many vegetable oils the price hikes are strongly linked to the demand for 'biofuels',³² which is entirely driven by flawed policies based on the belief that biofuels can help bring greenhouse gas emissions down in the transport sector - which they don't. In particular Indonesia, using palm oil, Argentina, Brazil and the US using soy oil and Europe, using mainly rapeseed & palm oil, fell for this.

²⁶ Transport & Environment (2017) Biofuels policies drive up food prices, say over 100 studies. Available:

<https://www.transportenvironment.org/discover/biofuels-policies-drive-food-prices-say-over-100-studies/>

²⁷ Unknown author (9 Feb 2022) India struggles to contain vegoil prices as Indonesia restricts exports. Available:

<https://timesofindia.indiatimes.com/business/india-business/india-struggles-to-contain-vegoil-prices-as-indonesia-restricts-exports/articleshow/89438098.cms>

²⁸ Jadhav, R. (28 Jan 2022) Indonesia's palm oil export curbs upend global edible oil markets. Available:

<https://www.reuters.com/article/indonesia-palmoil-prices-idUSL1N2U80K4>

²⁹ Searle, S. (2017) How rapeseed and soy biodiesel drive oil palm expansion. ICCT. Available:

<https://theicct.org/publication/how-rapeseed-and-soy-biodiesel-drive-oil-palm-expansion/>

³⁰ World Food Situation. Accessed 18 March 2022. Available:

<https://www.fao.org/worldfoodsituation/foodpricesindex/en/>

³¹ Megan Durisin (3 Feb 2022) World food prices jumped toward a record last month. Available:

<https://www.aljazeera.com/economy/2022/2/3/world-food-prices-jumped-toward-a-record-last-month>

³² Gro Intelligence. „Biodiesel Demand Drives Up Soy Oil Prices and Stokes Food Inflation“. Zugegriffen 20. September 2021.

<https://gro-intelligence.com/insights/articles/biodiesel-demand-drives-up-soy-oil-prices-and-stokes-food-inflation>. ; Maltais, Kirk. „Renewable-Fuel Push Drives Soyoil Prices to Record High“. *Wall Street Journal*, 6. Juni 2021, Abschn. Markets. <https://www.wsj.com/articles/renewable-fuel-push-drives-soyoil-prices-to-record-high-11622980800>.

India, Press Trust of. „Edible oil prices to begin softening from December: Food secretary“. *Business Standard India*, 3. September 2021.

https://www.business-standard.com/article/economy-policy/edible-oil-prices-to-begin-softening-from-december-food-secretary-121090301008_1.html

The global cereals market has also seen a massive price increase, nearly reaching the levels of the riot stirring food crisis in 2008.³³ The FAO Cereal Price index increased by over a third in 2021 compared to the previous 5 years.³⁴ This was mainly driven by increasing prices for wheat and corn³⁵. Wheat and corn are the main feedstocks for ethanol production in Europe (and also the US), with 80% of ethanol being used in gasoline.³⁶

Ukraine and Russia as global food suppliers

If supplies from Ukraine, Russia or even both would be completely disrupted, the world would face a ‘hurricane of famine’, states UN Secretary-General António Guterres.³⁷ Ukraine and Russia are key suppliers of staple foods to the world. Together they provide about a quarter of all wheat and barley, 15% of corn and over 60% of sunflower oil traded globally (Fig. 4). The war has massive impacts on those supplies already, and those are likely to extend into the future. Ukrainian ports are shut down. Inland routes are long and not practicable. Ships trying to pick up grain from Russia are reported to have been shot at, getting such shipments insured is becoming increasingly difficult.³⁸ Failing supplies from one or even both of these countries to the global market will inevitably drive prices even higher than they had been already before the war, and will even cause supply shortages, in particular for wheat.

³³ Unknown author (14 April 2008) Riots, instability spread as food prices skyrocket, CNN, <https://edition.cnn.com/2008/WORLD/americas/04/14/world.food.crisis/>

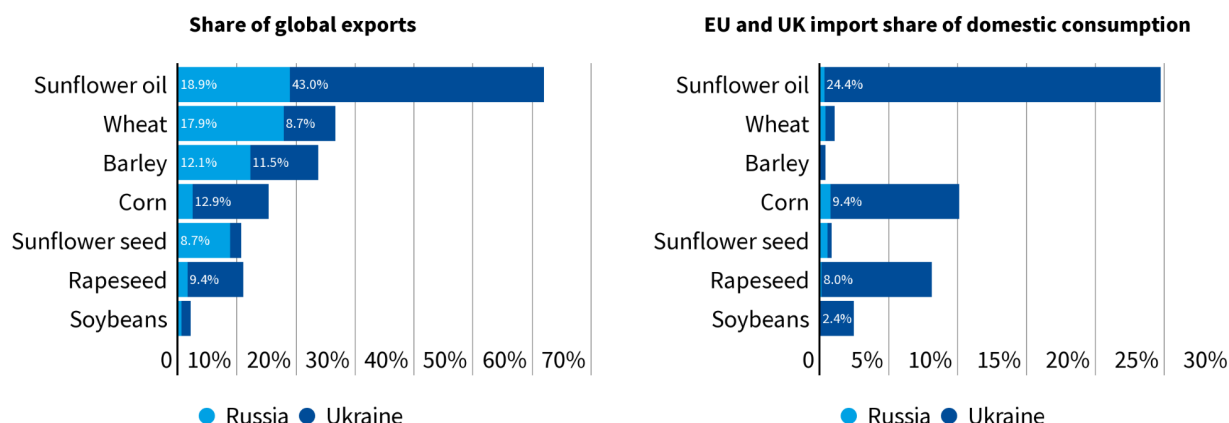
³⁴ FAO (2022) FAO Food Price Index, last updated March 4, 2022. <https://www.fao.org/worldfoodsituation/foodpricesindex/en/>

³⁵ Unknown author (6 January 2022) Global food prices rose ‘sharply’ during 2021, UN News, <https://news.un.org/en/story/2022/01/1109212>

³⁶ ePure (2021) European Renewable ethanol - key figures 2020, <https://www.epure.org/wp-content/uploads/2021/09/210823-DEF-PR-European-renewable-ethanol-Key-figures-2020-web.pdf>

³⁷ Unknown author (14 March 2022) Ukraine: ‘We need peace now’ declares Guterres, warning of global hunger meltdown, UN News, <https://news.un.org/en/story/2022/03/1113882>

³⁸ Unknown author (12 March 2022) War in Ukraine will cripple global food markets, The Economist, <https://www.economist.com/finance-and-economics/2022/03/12/war-in-ukraine-will-cripple-global-food-markets>



Source: FAOSTAT. Note: Average over period 2016 to 2020, shares are by quantities

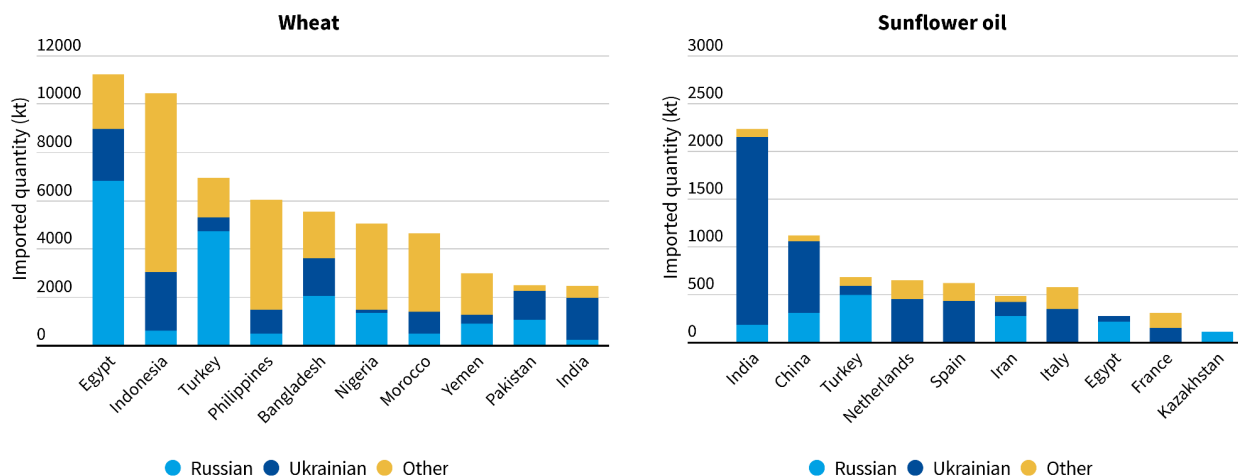
Figure 4: Ukrainian and Russian share of global food commodity trades (left); EU and UK imports (right)

Rising prices will put a huge burden on low income households in wealthier countries. In low income countries the effects could be disastrous. Europe sources nearly a quarter of its domestic sunflower oil consumption from Ukraine (Fig. 4). Current stocks are reported to run dry in a few weeks.³⁹ Spain had been the first country where the industry started to raise the alarm bell about dwindling supplies⁴⁰ and where supermarkets started to ration sunflower oil.⁴¹ Rapeseed oil, as the main alternative for cooking will also be less available, with Ukraine being a major supplier also here (supplying rapeseeds for milling in Europe). Corn imports from Ukraine are also substantial (Fig. 4)

³⁹ Trompiz, G. & Neely, J. (4 March 2022) EU facing shortfall in sunflower oil due to Ukraine war -producers <https://www.reuters.com/article/ukraine-crisis-europe-sunflower-idUSKBN2L118T>

⁴⁰ Gutiérrez, H. (10 March 2022) Golpe a los dulces industriales por la guerra de Ucrania: el sector avisa de que solo tiene aceite para producir entre dos y cuatro semanas más, El País, <https://elpais.com/economia/2022-03-10/golpe-a-los-dulces-industriales-por-la-guerra-de-ucrania-el-sector-a-visa-de-que-solo-tiene-aceite-para-producir-entre-dos-y-cuatro-semanas-mas.html>

⁴¹ Brown, T. (5 March 2022) Mercadona and other Spanish supermarkets ration sunflower oil because of Ukraine conflict, EuroWeekly, <https://euroweeklynews.com/2022/03/05/mercadona-and-other-spanish-supermarkets-ration-sunflower-oil-because-of-ukraine-conflict/>



Source: FAOSTAT. Note: Average over period 2016 to 2020, shares are by quantities. Data labelled "unofficial" not considered in the analysis

Figure 5: Largest importers of food commodities from Ukraine and Russia (left) wheat, and (right) sunflower oil

Low income countries will be hit hardest

Europe will be able to handle failing supplies from Ukraine and Russia. Countries that are less economically strong might not. Major export destinations for wheat from Ukraine and Russia are Egypt, Turkey, Bangladesh, Pakistan, India and other low come countries. They all get a high share of their total wheat imports from these two countries, some over three quarters (Fig. 4). Most households in these countries can't handle higher prices for staple foods. Egypt, importing over 60% of its wheat consumption⁴², recently announced several measures⁴³ to reduce the impact of failing supplies from Ukraine, including a 3 months ban on exports of wheat and flour⁴³, which will hit other African countries, in particular Eritrea, Somalia and Yemen⁴⁴. It is countries like these that UN Secretary-General António Guterres had in mind when he warned of a 'hurricane of famine' to come.⁴⁵

Next to flour, also vegetable oils are essential for cooking and baking. India is the second largest consumer of vegetable oils in the world, relying over 60% on imports to satisfy its domestic demand. It will need to cover a substantial gap (~14%) in these external supplies with failing shipments from Ukraine,

⁴² USDA (2019) Egypt Grain and Feed Annual 2019, Available:

https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Grain%20and%20Feed%20Annual_Cairo_Egypt_3-14-2019.pdf

⁴³ Wardany, S.E. & Wahba, A.L. (10 March 2022) Egypt to Ban Exports of Staple Foods to Safeguard Reserves, Bloomberg,

<https://www.bloomberg.com/news/articles/2022-03-10/egypt-to-ban-exports-of-staple-foods-to-safeguard-reserves>

⁴⁴ FAO (2022) Flour export data for Egypt in 2020, Detailed Trade Matrix FAOStat. Downloaded March 21, 2022.

Available: <https://www.fao.org/faostat/en/#data/TM>

⁴⁵ UN News (14 March 2022) Ukraine: 'We need peace now' declares Guterres, warning of global hunger meltdown. Available: <https://news.un.org/en/story/2022/03/1113882>

its near exclusive supplier of sunflower oil (Fig. 5). Also China, having the largest domestic market for vegetable oils, sources most of its sunflower oil from Ukraine.

Cutting crops out of biofuels shields Europe, helps low income countries

Before compromising on ecosystem stability by opening up biodiversity set asides for farming, we need to do all we can to reduce demand. The EU and other countries are using enormous amounts of food crops for biofuels. Cutting those feedstocks out of the EU’s biofuels mix would shield the EU from major supply shortages and would also ease pressure on the world market.

Fuel	Feedstock	Feedstock used in EU biofuels (Mt) [A]	EU imports from Ukraine (Mt) [B]	Ratio EU use in biofuels to EU imports [A/B]**	Ukraine global exports (Mt) [C]	Ratio EU biofuel use to Ukraine global exports [A/C]**
Bioethanol	Wheat	3.6	1.1	3.2	17.4	0.21
	Corn/Maize	6.1	10.4	0.6	21.5	0.28
	Barley	0.4	0.3	1.5	4.6	0.09
Biodiesel	Sunflower oil*	0.5	1.7	0.3	5.8	0.09
	Rapeseed oil*	5.8	1.0	5.8	1.0	5.8

Table 1: The use of common Ukrainian food crops in Europe’s biofuels (EU27+UK)

All figures averaged over 2016-2020 (for UK biodiesel 2016-2019 average). See Annex for sources and methodology. Notes: *includes oil volumes calculated from seed imports. **This comparison does not account for by-products from the production of biofuels (see infobox).

Between 2016 and 2020, e.g., the EU imported 1.1 million tonnes of wheat per year from Ukraine, on average (Table 1). In the same period, it diverted more than three times as much wheat to the production of biofuels. Reducing this by a third would shield EU farmers and consumers from supply shortages. Reducing the use of wheat in EU biofuels to zero would compensate for 21% of the total wheat exports of Ukraine and help avoid food insecurity in other countries depending on Ukrainian wheat supplies. For corn, the amount turned into biofuels in the EU would be sufficient to balance out nearly 60% of the volume imported from Ukraine, or nearly a third of Ukraine’s exports to the world (Table 1). **If the EU would instead use the 3.6 Mt of wheat to make bread, this would be equivalent to 76 billion 750g loaves of bread every year, or 15 million per day.**

Cutting out sunflower oil from the Union’s biofuels mix, would reduce our import dependency for this key vegetable oil by a third, or could balance out nearly 9% of the sunflower oil supplied by Ukraine to the global market. **By cutting out food crops from its fuel mix, the EU can mitigate the impact on food**

price inflation for its own constituency, and can support food security in low income countries. The big elephant in the room, however, is the US where over 130 million tonnes of corn were used for the production of biofuels in 2021.⁴⁶ This is more than the entire grain harvest of Ukraine and Russia combined.

Biogas is no solution

In the light of the Ukraine war, several stakeholders have been presenting biomethane as a solution to reduce EU's dependence on Russian gas, but also a potential avenue for reducing transport's dependence on fossil fuels and imports⁴⁷. The European Commission in its new communication on energy released on March 8th recommends doubling the current EU ambition on biomethane⁴⁸. The Commission is aiming at 35 bcm of biomethane production by 2030, "from sustainable biomass sources, including in particular agricultural wastes and residues". This compares to the industry currently producing 23 TWh, or around 2.3 bcm, in 2020⁴⁹. The call for diversifying the EU's energy sources and the specific focus on biogas has been repeated in the Versailles Declaration adopted by heads of states a few days later⁵⁰. In both texts, there is no explicit exclusion of the use of energy crops for that increased biogas ambition.

The availability of sustainable feedstocks for biomethane production is limited

Nearly half of EU biogas production is based on crops, often corn, which production requires agricultural land that could be used for food production instead and which comes with negative impacts on biodiversity and soil health.⁵¹ As for all crop based feedstocks for bioenergy, the land use impacts, including carbon opportunity costs, largely, if not fully eliminate the GHG benefits compared to fossil gas.⁵² Other feedstocks for biomethane production, such as manure and sewage sludge can deliver

⁴⁶ Energy Information Administration, EIA (February 2022) Monthly Biofuels Capacity and Feedstocks Update, <https://www.eia.gov/biofuels/update/>

⁴⁷ Unknown author (7 March 2022) Ökostrombranche will russisches Gas durch Biogas ersetzen. Spiegel. Available: <https://www.spiegel.de/wirtschaft/unternehmen/ukraine-krieg-oekostrombranche-will-russisches-gas-durch-biogas-ersetzen-a-479a4cdf-1851-4c1c-bad9-edf5471e48cb>

⁴⁸ European Commission (8 March 2022) REPowerEU: Joint European Action for more affordable, secure and sustainable energy. Strasbourg, OM(2022) 108 final. Available: eur-lex.europa.eu/resource.html?uri=cellar:71767319-9f0a-11ec-83e1-01aa75ed71a1.0001.02/DOC_1&format=PDF

⁴⁹ Pflüger, S. (2020) The 'European Biomethane Map 2020' shows a 51% increase of biomethane plants in Europe in two years. Quote. Available: <https://www.europeanbiogas.eu/the-european-biomethane-map-2020-shows-a-51-increase-of-biomethane-plants-in-europe-in-two-years/>

⁵⁰ Déclaration de Versailles, 11 March 2022. Réunion informelle des chefs d'État ou de gouvernement. Available: <https://www.consilium.europa.eu/media/54777/20220311-versailles-declaration-fr.pdf>

⁵¹ IEA (2020) Outlook for biogas and biomethane, World Energy Outlook Special Report <https://www.iea.org/reports/outlook-for-biogas-and-biomethane-prospects-for-organic-growth/an-introduction-to-biogas-and-biomethane>

⁵² Fehrenbach, H. (2022.). Neue Studie des ifeu im Auftrag der DUH: Biokraftstoffe aus Anbaubiomassee – noch viel schlechter als ihr bereits ramponierter Ruf. IFEU. Available: <https://www.ifeu.de/service/nachrichtenarchiv/neue-studie-des-ifeu-im-auftrag-der-duh-biokraftstoffe-aus-anbaubiomassee-noch-viel-schlechter-als-ihr-bereits-ramponierter-ruf/>; Lark et al (2022). Environmental outcomes of the US Renewable Fuel Standard. Proceedings of the National Academy of Sciences, 119(9). <https://doi.org/10.1073/pnas.2101084119>

significant GHG reductions compared to fossil gas, but are extremely limited in quantities. The ICCT showed that the total technical potential of biomethane, from livestock manure, sewage sludge and sustainably harvested agricultural and forestry residues in the EU-27 could only replace 8% of EU natural gas demand in 2030⁵³. There are serious impacts to be considered, though. Manure depends on industrial livestock farming and related excessive meat & dairy consumption - known to be a key driver of climate change. Forestry residues also depend on a non-sustainable forestry model, with negative impact on biodiversity and climate change. The use of such feedstocks rather need to be reduced in the energy sector, rather than relied on.

To replace 50% of Russian gas imports (amounting to around 77 bcm in 2020 for the EU and UK) with biogas from for example corn silage, Europe would require 12 Mha of land, equivalent to 10.4% of the EU and UK's total crop land. This would represent increasing current production by a factor of 34. This is no viable way to reduce our dependence on Russian gas.

Transport shouldn't become a new sector for gas and biomethane

When it comes to transport, T&E released a dedicated report on fossil gas and biogas.⁵⁴ In that report, we calculated that sustainable biomethane could only cover 6.2- 9.5% of transport's energy needs, assuming that the maximum sustainable potential was produced and all of it was allocated to transport, a scenario that is very unlikely to happen in practice. T&E has argued that gas is not a solution for both ships⁵⁵ and trucks⁵⁶ in particular, where there is some industry pressure here. This is why the sustainable potential for biomethane might be better used to help decarbonise sectors that currently depend on fossil gas, such as residential, industry, and power, and where no new infrastructure and new engines are needed. A wider shift to methane will almost certainly lead to a transport sector powered by fossil gas, not renewable methane.

⁵³ Searle, S., Baldino, C., Pavlenko, N. (2021) Biomethane potential and sustainability in Europe, 2030 and 2050. Available: <https://theicct.org/publication/biomethane-potential-and-sustainability-in-europe-2030-and-2050/>

⁵⁴ Sihvonen, J. (2018) CNG and LNG for vehicles and ships - the facts, Transport & Environment, https://www.transportenvironment.org/wp-content/uploads/2021/07/2018_10_TE_CNG_and_LNG_for_vehicles_and_ships_the_facts_EN.pdf

⁵⁵ Transport & Environment (2022) Now more than ever, powering ships with gas is a terrible idea. Available: <https://www.transportenvironment.org/discover/now-more-than-ever-powering-ships-with-gas-is-a-terrible-idea/>

⁵⁶ Transport & Environment (2021) Gas truck as bad for the climate as diesel in on-road tests. Available: <https://www.transportenvironment.org/discover/gas-truck-as-bad-for-the-climate-as-diesel-in-on-road-tests/>

Conclusions & Demands

Biofuels from crops never made sense. They are worse for the climate, worse for biodiversity and contribute to higher food prices.

To keep requiring the use of wheat, corn, vegetable oils and other food crops in biofuels to power our cars is irresponsible.

To even expand the use of crops for energy use would not help to reduce dependence on Russian fossil energies, but only aggravate the social and environmental impact from bioenergy.

We are calling on national governments to immediately halt the use of food and feed crop based feedstocks in biofuels.

We are calling on the European Commission to strongly encourage its member states to halt the use of food and feed crops in biofuels, and refrain from pushing for opening up biodiversity set aside areas for food production, until all other options have been exhausted.

Further information

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Annex - Methodology notes

Loaves equivalent estimate

Loaves equivalent to the land currently used for wheat biofuels is estimated to 15 million a day according to the data and assumptions presented in Table 2.

Wheat used in biofuels [kt/y]	Wheat used per day [t/day]	Loaf mass [kg]	Wheat per loaf [kg]	Loaves per day [Million/day]
3598	9858	0.75	0.64	15

Table 2: Data and assumptions to estimate loaves equivalent to wheat use in biofuels.

The amount of wheat used in biofuels⁵⁷ is estimated for the EU27+UK (referred to hereafter as Europe) as the 5 year average from 2016 to 2020. The wheat used for one 750g loaf is estimated assuming that 850g of wheat is needed per kg of bread⁵⁸.

Cropland requirement to substitute Russian oil imports

The hypothetical cropland required to substitute a percentage of crude oil, diesel and gasoline imported to Europe from Russia is estimated assuming that these products would be substituted by biofuels from crops produced in Europe. Only rapeseed, wheat and corn are considered as possible feedstock substitutes as these are crops that grow in Europe and, combined, currently represent 84% of the total cropland (in and outside Europe) used to produce biofuels consumed in Europe⁵⁹.

The amount of imported oil products is considered using Eurostat data for the year 2020 for the EU27 and 2019 for the UK (as no data is available for 2020). Data is available in kt and is converted to ktoe using corresponding LHV (low heating values). Results are presented in Table 3. Note, that for simplicity, not all oil and petroleum products imported from Russia are considered. Crude oil, motor gasoline and road diesel represent 81% on a mass basis of the oil products imported from Russia, and we focus on biofuels for transport in this analysis.

	Crude oil [ktoe]	Motor gasoline [ktoe]	Road diesel [ktoe]
EU27+UK	141,605	1124	21,742

Table 3: Products imported from Russia.

⁵⁷ USDA GAIN, Biofuels Annual 2021 - European Union, June 22, 2021

⁵⁸ Bundesinformationszentrum Landwirtschaft (no date) Wie viel Getreide benötigt man für ein Brot? Available: <https://www.landwirtschaft.de/landwirtschaft-verstehen/haetten-sies-gewusst/pflanzenbau/wie-viel-getreide-benoetigt-man-fuer-ein-brot/>

⁵⁹ European Commission (2020) Renewable Energy Progress Report. COM(2020) 952 final. Available: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0952&from=GA>

The land required is calculated by estimating the yields in terms of biofuels obtained per cropland area, that is, energy yields adjusted or not for co-products (see the infobox for more detail). The data for this estimate are obtained from FAOSTAT⁶⁰ for the average yields of the main crops and the BioGrace excel tool⁶¹ for the fuel and co-products yields of the biofuel production processes. The energy yields are finally expressed in ktoe/ha considering the corresponding LHV of the products. Yields adjusted for the co-products are calculated according to the equation below.

$$EnergyYield_{adj} = \frac{EnergyYield}{1 - \sum EnergyShare_{co-prod}}$$

Both data and results are summarised in Table 4.

	Land [%]	Crop yield [t/ha*a]	Fuel yield [l/t]	En. yield [ktoe/ha]	Meal / DDGS* [ktoe/ktoe feestock]	Glycerol [ktoe/ktoe feestock]	En. yield adj. [ktoe/ha]
Rapeseed	26	3.0	414	1.00E-03	0.387 (Meal)	0.027	1.71E-03
Corn	24	7.8	376	1.48E-03	0.454 (DDGS)		2.71E-03
Wheat	34	5.5	368	1.02E-03	0.405 (DDGS)		1.72E-03

Table 4: Feedstock to biofuels conversion data.

Biodiesel from rapeseed is considered as the only substitute for diesel imports, whereas bioethanol from wheat and corn is considered as substitute for gasoline. Crude oil is converted into a *refined oil* equivalent, assuming a refinery loss of 7%⁶². The refined oil is substituted by a biofuels mixture of both biodiesel and bioethanol. The average yield in terms of biofuels per cropland area for bioethanol and biofuels are calculated as the weighted average on the cropland area currently used by the corresponding feedstocks for biofuels production⁶³ as reported in Table 4. Results are reported in Table 5.

⁶⁰ FAOSTAT (2022) Food and Agriculture Organization of the United Nations (FAO). FAOSTAT Database. <http://faostat.fao.org>

⁶¹ BioGrace excel tool, version 4d, Institute for Energy and Environmental Research (IFEU)

⁶² Intermediate value for complex refineries from Bourgeois, L. et al. (2012). EU refinery energy systems and efficiency (Concawe)

⁶³ European Commission (2020) Renewable Energy Progress Report. COM(2020) 952 final. Available: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0952&from=GA>

	Energy yield [ktoe/ha]	Energy yield adj. [ktoe/ha]	Product substituted
Biodiesel (rapeseed)	1.00E-03	1.71E-03	diesel
Bioethanol (wheat, corn)	1.21E-03	2.13E-03	gasoline
Biofuels (wheat, corn, rapeseed)	1.15E-03	2.00E-03	<i>refined oil</i>

Table 5: Energy yields with and without co-products adjustment per product.

This simplified approach allows for an order of magnitude estimate of the hypothetical land that would be required to substitute part (or all) of the crude oil, diesel and gasoline products imported from Russia. Substituting about 6.5% of the crude oil, diesel and gasoline would require between 5 Mha and 9 Mha (considering or not co-products adjustment).

Cropland requirement for European biofuel production

A preliminary analysis of the cropland required to grow the feedstocks used to produce biofuels is carried out for comparison with the hypothetical cropland that would be required to substitute Russian crude oil, diesel and gasoline imports. The estimate starts from the feedstock amounts used in biofuels in Europe averaged over the 2016-2020 period as reported by OilWorld⁶⁴ and the USDA GAIN⁶⁵ report. Land use is calculated using the yields of the corresponding feedstock as estimated through FAOSTAT or the BioGrace tool⁶⁶. The energy adjusted land use is calculated by subtracting to the cropland requirement the fraction of land allocated to the co-products on an energy basis, using the values from the Biograce tool. Table 6 summarises data and results for bioethanol and Table 7 for biodiesel.

⁶⁴ Mielke (2021) Oil World Annual 2021, ISTA Mielke GmbH, June 11 2021

⁶⁵ USDA GAIN, Biofuels Annual 2021 - European Union, June 22, 2021

⁶⁶ BioGrace excel tool, version 4d, Institute for Energy and Environmental Research (IFEU)

		Biofuel feedstock use [Mt]	Crop Yield [Mt/ha]	co-products [ktoe/ktoe feedstock]	Land use [Mha]	Land use en. adj. [Mha]
Bioethanol	Wheat Kernels	3.60	5.48	0.405	0.66	0.39
	Corn Kernels	6.08	7.75	0.454	0.78	0.43
	Sugar Beets	8.00	68.86	0.287	0.12	0.08
	Barley, Rye, Triticale	1.83				
	Cellulosic Biomass	0.11				
	Total	19.62			1.56	0.90

Table 6: Bioethanol cropland requirement estimate.

Biodiesel	Rapeseed oil	5.76	1.25	0.41	4.62	2.71
	Palm oil	4.27	4.22	0.,09	1.01	0.92
	Soybean oil	0.87	0.52	0.67	1.66	0.55
	Sunflower oil	0.49				
	Tallow & Grease	0.62				
	UCO	2.56				
	Others	0.05				
	Total	14.62			7.30	4.18

Table 7: Biodiesel cropland requirement estimate.

The analysis takes into account about 90% of the feedstocks for both bioethanol and biodiesel excluding used cooking oil (UCO). The combined cropland use for the bioethanol and biodiesel feedstock amounts to 5.08 Mha and 8.85 Mha with and without considering the adjustment for co-products. These values should be considered as a preliminary estimate used here only for first comparison purposes. Results will be further refined in the future. They compare to 7.4 Mha cropland use for the production of feedstock used for biofuels consumed in Europe reported by the European Commission⁶⁷. To note, only 46% of this cropland requirement is in Europe.

⁶⁷ European Commission (2020), Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0952&from=GA>