



BRIEFING

Seeds of crisis

How higher global biofuel mandates squeeze food markets and fertiliser supply chains in times of geopolitical crisis

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Summary

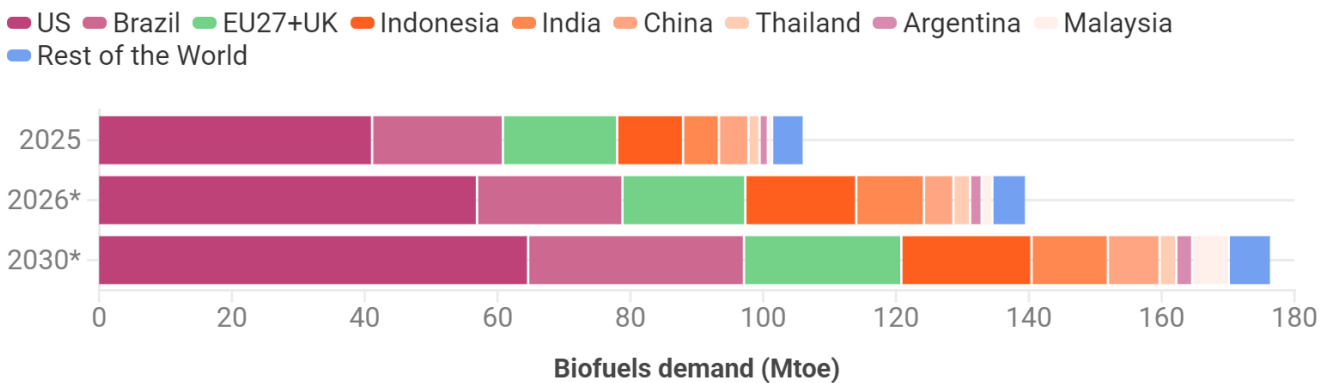
High oil prices resulting from the Middle East crisis are accelerating the global biofuels push. Yet, ever higher biofuel targets risk putting further strain on already tight global food and fertiliser markets.

The closure of the Strait of Hormuz triggered by the US-Israel war with Iran has severely disrupted global supply chains and destabilised energy, fertiliser, and food markets. Escalating demand for biofuels as alternative sources to increasingly expensive fossil fuels threatens to worsen the unfolding food crisis, as key food commodities like vegetable oils, sugar, and corn keep being diverted from food supplies.

In response to the crisis, countries, especially big agri-food powers like the US, Brazil, India or Indonesia, are ramping up their biofuel targets, at the risk of further increasing prices for agricultural commodities and redirecting resources from plates to fuel tanks. **If proposed mandates are fully implemented, we estimate that global biofuel demand could surge 70% by 2030.**

Global blending mandates rise in response to energy crisis

If all proposed targets are enacted, global biofuel demand could surge by 30% this year and up to 70% by 2030



Source: T&E analysis, based on USDA reports and Ceruly (2024). 2026 and 2030 projected demand based on announced targets reported by QCI and Argus until May 2026.



Such a rush towards crop biofuels would exacerbate the global food security “perfect storm” feared by international bodies like the United Nations Food and Agriculture Organization, on top of damaging environmental impacts and risks of intensifying greenhouse gas emissions. Ultimately, biofuels simply cannot replace fossil fuels: **meeting 20% of global fuel demand with crop-based biofuels would require a five-fold increase in consumption, potentially requiring agricultural land the size of South Africa.**

Additionally, further pressure is mounting on food production as geopolitical disruptions have led to a global shortage of key fertiliser feedstocks like nitrogen, exposing the fragile dependence of global farming, and biofuel production, on unstable regions. Our analysis of trade data shows that **the world's top biofuel-producing nations highlighted above source half of their finished fertiliser nutrient imports from Russia, the Middle East and China.**

Driven both by binding mandates and spiking crude oil costs, the biofuel rush is trapping agriculture in a growing need for chemical inputs, draining limited fertiliser supplies away from food production during supply chain shocks. We estimate that, today, global biofuels mandates require around 7 Mt of nitrogen, phosphate and potash nutrients combined. This is equivalent to **half of the Middle Eastern countries' fertiliser exports being "burned" for fuel.**

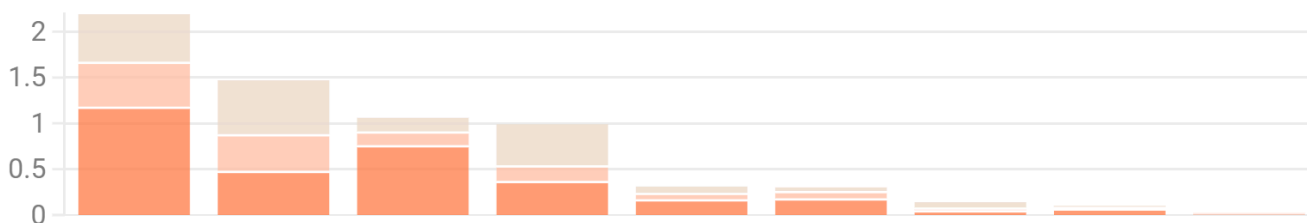
While this represents 5% of total global fertiliser nutrients diverted to fuel, the strain is particularly high in mandate-heavy nations: **Indonesia and the United States direct 17% and 11% of their respective fertiliser supplies solely to meet biofuel requirements.** Projected increases in blending mandates will further deplete global fertiliser volumes, potentially reaching 7% of today's consumption by 2030.

Biofuels supply only 4% of global transport energy demand, yet require around 5% of the world's fertiliser needs

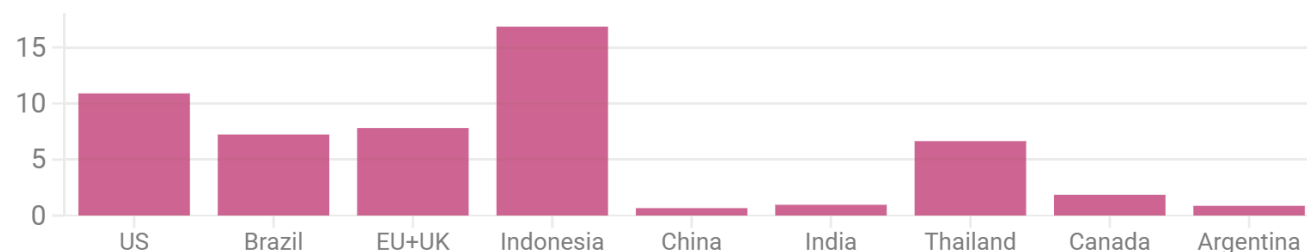
Intensively farmed biofuel sectors in Indonesia and the US utilise significantly higher shares of national nutrient inputs, at 17% and 11% respectively

■ Nitrogen
 ■ Phosphate
 ■ Potash
 ■ Share of total nutrient use (%)

Biofuels' nutrients use (Mt)



Share of total nutrient use (%)



Source: T&E, based on data from the International Fertilizer Association (2023) and Cerulogy (Diverted harvest, 2024)



As climate disasters like El Niño, droughts, and heatwaves intensify, they threaten to severely disrupt crop yields in key agricultural hubs and drive up food and biofuel costs. This weather volatility risks slashing farmers' incomes and heightening malnutrition, underscoring that long-term reliance on crop-based fuels is damaging.

Key recommendations

To prevent the energy crisis from triggering a systemic collapse in food security, policy interventions must be deployed to properly address the market distortions caused by rigid biofuel targets. The following recommendations offer a roadmap to decouple food production from energy market volatility, while tightening scrutiny on opaque biofuel supply chains.

- 01 **Prioritise food production over biofuels**, ensuring no rollbacks on existing crop-fuel exclusions and caps to avoid competition with food, as well as introducing limits where they are missing in national policies and international frameworks.
- 02 **Equip biofuel policies with an “emergency brake” mechanism** that cancels first generation biofuels’ contribution to mandates, to mitigate the direct inflationary impact that they have on food security.
- 03 **Ensure strict implementation of the cascading use of biomass principle**, and apply it to fertiliser use. This prioritises nutrients for food production, rather than for lowest value applications such as biofuels.
- 04 **Reallocate crop biofuel subsidies from energy and agricultural policies towards resilient food production**. Support for circular, domestic fertiliser supply chains and environmentally friendly practices would curtail fertilisers import dependency.
- 05 **Transition away from first generation biofuels by accelerating electrification** and increasing investments in renewable e-fuels to enhance energy resilience.

Fuelling inflation: how rising biofuel mandates strain global food security

While the Middle East crisis pushes food prices upward, escalating biofuel mandates risks further destabilising already tight food markets and triggering a new wave of inflation.

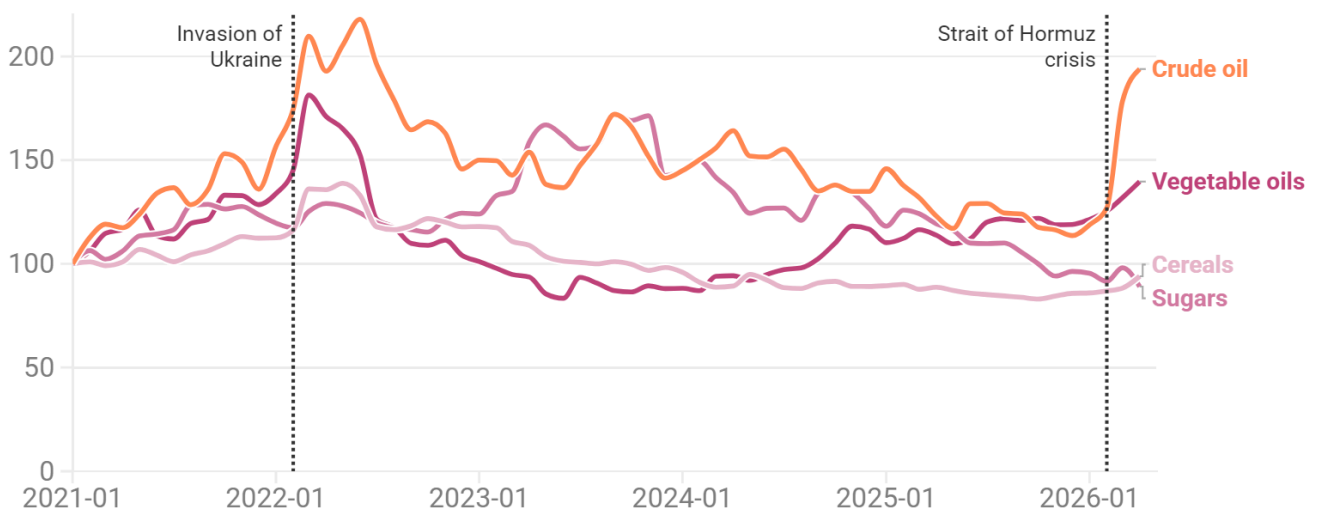
1.1 Food prices once again follow fossil fuels

According to the [Food and Agriculture Organization](#) (FAO), prices for most food commodity groups - especially vegetable oils - have increased for three consecutive months, mainly due to the energy crisis that is unfolding from the strait of Hormuz closure. This is a repeating pattern reminiscent of the Russian invasion of Ukraine back in 2022. Both higher crude oil prices inflate logistics costs and supply chain disruptions, make global movement of staples more expensive; while interest rates increase costs to plant crops and currency depreciation raises the local price of food imports for many nations.

History repeats as energy shocks trigger food inflation again

Driven by biofuels mandates, vegetable oil prices continue rising since January 2026 (+15%) as markets prioritised fuel production over global food security

Change in global average prices (Jan 2021 = 100)



Source: T&E, based on FAO Food Prices Index and the World Bank (Apr 2026)



When fossil fuel prices skyrocket following trade disruptions, biofuels alternatives become [more economically attractive](#). This triggers direct competition for agricultural feedstocks, as both the energy and food sectors rush to secure these resources, resulting in higher costs for vegetable oils and other commodities. Consequently, investors are betting on higher vegetable oil and maize prices as demand for biofuel sources rises, including a [renewed speculation](#) on higher wheat prices not seen since the start of the Russo-Ukrainian war four years ago.

The reduction of the price gap between crude oil and biofuel alternatives allows [refiners to outbid food processors](#) for essential crops, capturing increased margins from the high demand for alternative fuels. This scramble for crop biofuels leads to a cascading effect in the food sector: to cope with higher commodity prices, food processors have to pass on extra-costs to final consumers to stay in business, turning an energy supply shock into a wave of food inflation.

1.2 Biofuels worsen the global squeeze on food stocks

In agricultural economics, end-of-year stocks are the total volume of a crop left over before the next harvest. Rather than just government emergency reserves, these stocks represent the market's total commercial safety cushion against supply shocks and crop failures. Under a stable market environment, high prices naturally lower demand, allowing stocks to recover. However, basic food needs and biofuel mandates break this cycle. Because daily calorie needs and legislative fuel targets are highly inelastic, they create a rigid floor for demand, even during severe crop shortages. With fossil energy and fertiliser costs surging alongside mandated biofuel targets, this inflexible demand threatens to aggressively eat away the global food stock safety buffer.

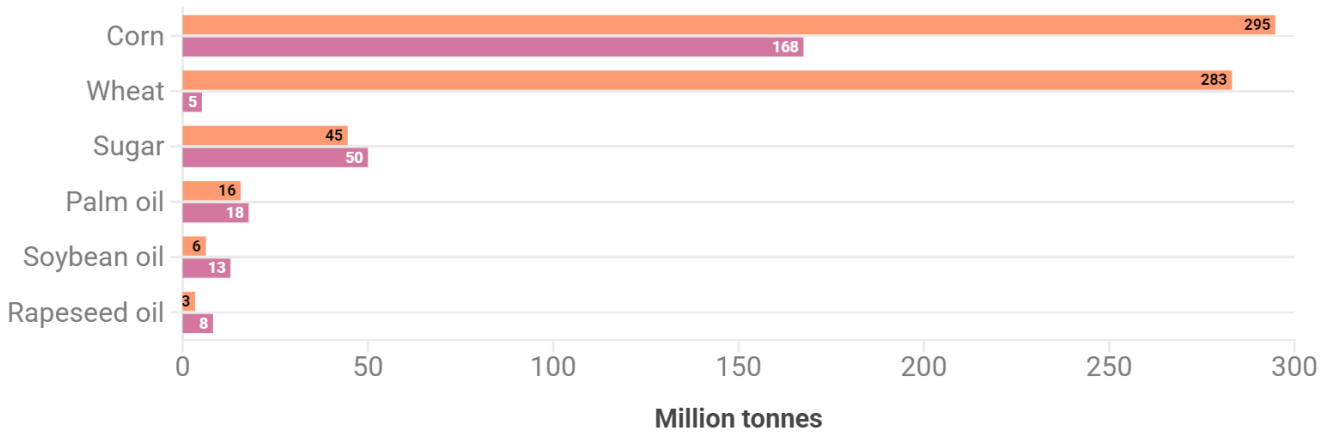
Our analysis shows that the volumes of biofuel consumed to fulfil blending mandates correspond to roughly 40% of ending stocks for main staple commodities. Coupled with potential production losses, current policies incentivising biofuels demand risk preventing global reserves from fully replenishing.

Additionally, major exporters of agricultural feedstocks like [Brazil](#) and [Indonesia](#) are limiting their exports, as they are diverting part of the feedstock volumes to meet increased domestic demand for biofuels. This trade distortion creates an artificial scarcity in global markets. Combined, these factors could leave the global system unprotected in front of a [looming agrifood catastrophe](#). The threat to feedstock reserves is particularly evident for vegetable oils and sugar, whose global demand for biodiesel and ethanol was already outpacing global rolling stocks before the crisis.

Biofuel mandates now consume the equivalent of ~40% of key crop stocks

As demand for sugars and oils exceeds total rolling reserves, any energy or fertiliser supply shock is rapidly amplified into a food security crisis

■ 2025 ending food stocks ■ Current use in biofuels (2023)



Source: T&E, based on stock data from the USDA FAS (2025) and biofuel feedstock data from Cerulogy (2024)



1.3 The global biofuel race: the hidden impacts of increasing blending mandates

As already [observed](#) during COP30, we are witnessing a global push to hasten biofuel production, touted as the golden solution to achieve energy resilience. This global push is now gaining even more momentum, in part due to the Middle East crisis. For instance, the US Environmental Protection Agency recently [enforced](#) strong renewable fuel requirements for 2026 and 2027, but is also considering [raising its ethanol blend limit](#) to 15%, potentially increasing its total biofuel demand pool by 40% in a very short timeframe.

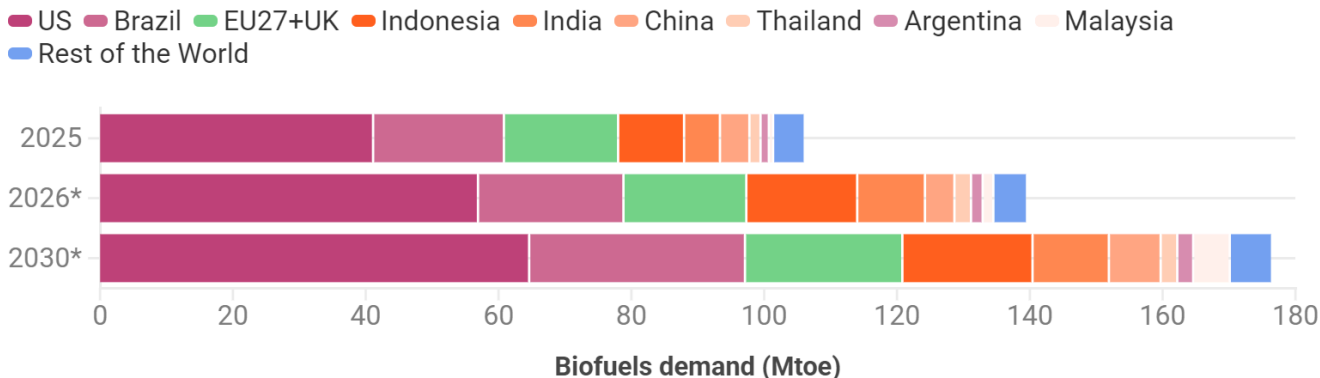
On the other hand, [India](#) and [Brazil](#) are accelerating their blending mandate plans, while ASEAN countries like Indonesia, Malaysia, and Thailand are also [sharply raising](#) their biofuel targets to decrease their fossil fuel import dependency. If all proposed blending targets are enacted and enforced, we estimate that biofuel demand could rise by 30% as early as 2026, potentially surging by 70% by 2030, considerably higher than the [40% previously expected](#), based on global mandates analysis.

Increasing biofuel mandates represent a short-sighted solution to current - and future - energy shocks. The energy crisis generates a temporary price divergence where demand competition precedes higher production costs in the agriculture sector. This creates a short-lived economic edge for biofuel over food, an advantage that will vanish when the price lag fades, making biofuel processing increasingly costly. A more efficient solution would be to amend policies and [require reduced biofuel uptake](#) during food price shocks. Immediately redirecting land to food production

would offset the potential loss of supply caused by geopolitical developments and decouple these events from cost increases.

Global blending mandates rise in response to energy crisis

If all proposed targets are enacted, global biofuel demand could surge by 30% this year and up to 70% by 2030



Source: T&E analysis, based on USDA reports and Ceruly (2024). 2026 and 2030 projected demand based on announced targets reported by QCI and Argus until May 2026.



Not only do they not represent an economically-sound alternative to fossil energy, but escalating biofuel mandates will also cause increasing environmental damage. In an illustrative scenario where biofuels mandates globally reach 20% of the diesel and petrol demand pool, as proposed in certain countries, we estimate that current volumes would need to grow five-fold. Such an increase in biofuel demand would require an additional 130 Mha of agricultural land, equivalent to the size of South Africa. The growing biofuel demand risks resulting in the encroachment of natural ecosystems, leading to [further deforestation and emissions](#) as well as additional ecological implications such as soil impoverishment, [water depletion](#), and [biodiversity loss](#).

Furthermore, increasing blending mandates leads to a rise in total liquid fuel use due to different energy density between conventional biofuels and their fossil counterparts. Ethanol, especially, provides approximately [30% less energy per unit](#) than fossil petrol, resulting in reduced mileage for the same amount of fuel purchased.

This is why accelerating electrification - especially for road transport - must be the preferred solution. Electric vehicles outperform those running on internal combustion engines with respect to energy efficiency as well as environmental impact: a land area used to power diesel cars with biofuels could power [up to 90 times more electric cars](#) with solar electricity.

5x more biofuels

Mandating a 20% global biofuel blend for petrol and diesel, as some countries propose, would require an unrealistically massive scale-up

130 Mha

Biofuel production would consume as much land as the size of South Africa, virtually becoming the world's third-largest agricultural nation.

Burning food for fuel worsens global fertiliser disruptions

With the current loss of critical nitrogen exports from the Middle East and record oil and gas prices, increasing biofuel mandates risk adding further pressure to already tight fertiliser supply chains.

2.1 Global biofuel markets increasingly depend on fossil fertilisers

Global biofuel production remains almost [exclusively tied to food and feed commodities](#) grown through large-scale monocultures. Whether it is corn and soy in the United States, sugarcane in Brazil, or palm oil in Indonesia, these industrial systems rely on intensive fertiliser inputs to maintain high output.

By cross-referencing crop-specific nutrient data from the [International Fertiliser Association](#) (IFA) with [global biofuel feedstock use](#), we estimate that biofuels currently consume approximately 3.2 Mt of nitrogen, 1.4 Mt of phosphate, and 2.0 Mt of potash. This represents roughly 5% of total global fertiliser nutrients diverted toward fuel production rather than food. This strain is disproportionately concentrated in mandate-heavy nations: Indonesia and the United States now direct 17% and 11% of their respective fertiliser supplies solely to meet biofuel requirements. More on our methodology and assumptions in the Annex.

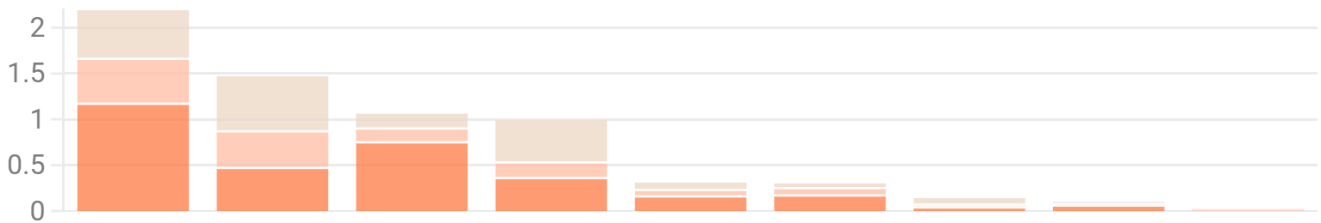
Furthermore, the global push for higher blending mandates risks a significant expansion of the biofuel-fertiliser footprint. If currently planned mandates are fully enforced, we project a 70% increase in biofuel-related nutrient requirements by 2030. Most critically, in a theoretical scenario where 20% bioethanol and biodiesel blending mandates would be adopted worldwide, biofuels alone would consume close to one-fifth of current global fertiliser volumes, creating a structural conflict with global food production needs.

Biofuels supply only 4% of global transport energy demand, yet require around 5% of the world's fertiliser needs

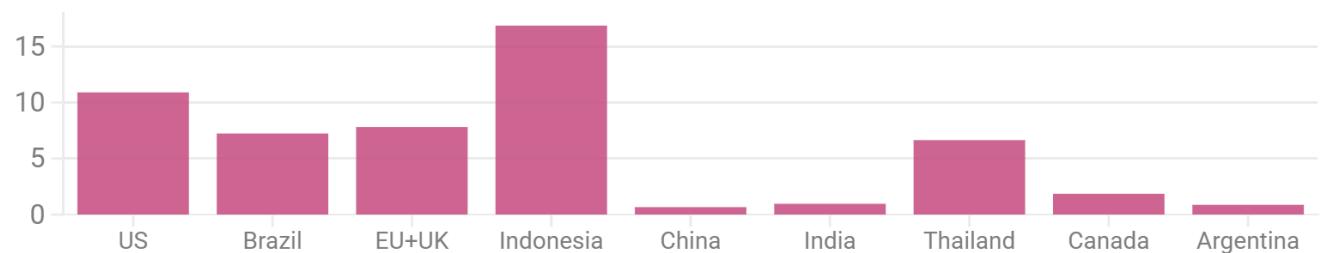
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■ Nitrogen
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Source: T&E, based on data from the International Fertilizer Association (2023) and Cerology (Diverted harvest, 2024)



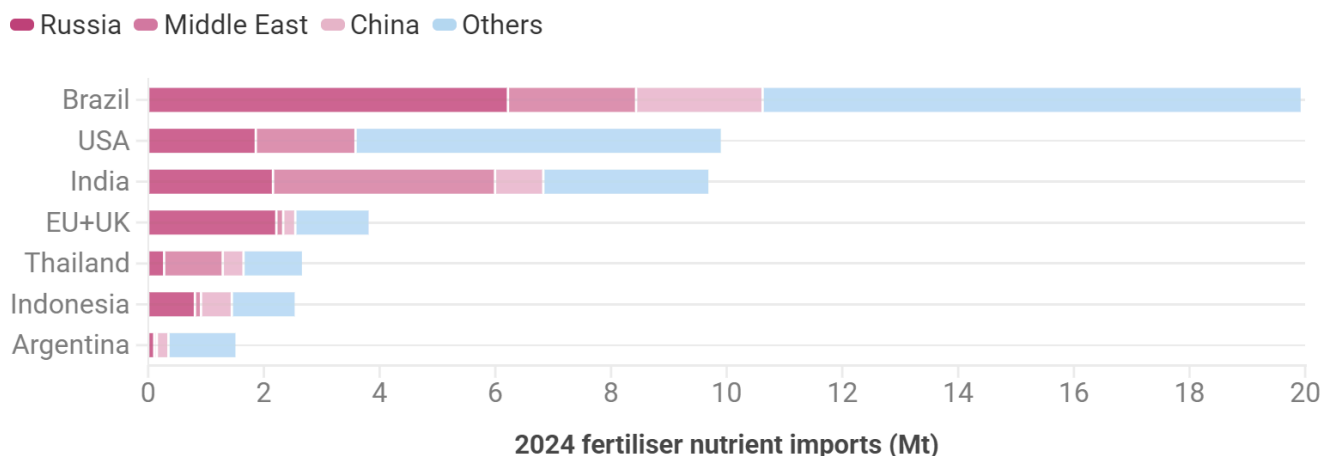
2.2 Biofuel superpowers rely heavily on imported fertilisers


While large-scale farming nations require tens of millions of tonnes of nutrients to sustain their crop production, supply remains geographically concentrated. Russia, China, and the Middle East dominate nitrogen and phosphate output, while Canada and Morocco remain the primary reserves for the world's potash and phosphate supply. In the Middle East, countries like Saudi Arabia, Qatar, and Oman act as key players for the global market, collectively accounting for [46% of the global urea trade](#), the world's most widely used nitrogen fertiliser. Around [one-third of global nitrogen fertiliser exports and 20% of liquefied natural gas \(LNG\)](#) - the primary feedstock for nitrogen production - transit through the Strait of Hormuz, which is currently restricted due to the regional conflict.

Based on the most recent complete trade data from [UN Comtrade](#) (2024), we mapped finished fertiliser nutrient flows and found that top biofuel producers source around half of their fertiliser imports from Russia, China and the Middle-East. India, Europe and Brazil, in particular, source close to two-thirds of their fertiliser nutrient from these regions. This creates a paradox: while these nations increase biofuel mandates to achieve energy independence, their ability to grow that fuel remains reliant on foreign chemical inputs. Geopolitical disruptions, from the ongoing

invasion of Ukraine to the closure of the Strait of Hormuz, demonstrate that these supply chains are fragile, and risk turning increasing biofuel mandates into a new form of import dependency.

The world's top biofuel producers rely on Russia, China, and the Middle East for over 50% of their essential fertiliser imports



Source: T&E, based on data from UN Comtrade (2024) • Based on finished fertiliser HS codes 3102 to 3105, converted to nitrogen, phosphate and potash nutrients following FAO guidelines. 

European [import reliance](#) for nitrogen fertilisers stands at 30%, while for potash and phosphatic fertilisers import reliance surges to 40% and 70% respectively. To reduce its dependency on high carbon fertiliser import, the EU launched its [Carbon Border Adjustment Mechanism](#) (CBAM), on January 1, 2026, encouraging cleaner production. While nitrogen fertiliser imports [dropped by 80%](#) in January 2026 as markets stockpiled before these new standards came into force, this transition was immediately complicated by the sudden Middle East crisis. This timing has left farmers facing record-high prices, especially for [nitrogen-based inputs](#) - which are 55% higher compared to the beginning of the year - just as supply chains were recalibrating from the CBAM phase in. To mitigate these risks, the new [EU Fertiliser Action Plan](#) is more critical than ever to reinforce domestic supply and bolster circular, environmentally-friendly alternatives for food production while preventing biofuel mandates from further straining the bloc's nutrient security.

2.3 Biofuels worsen the fertiliser supply chain shock

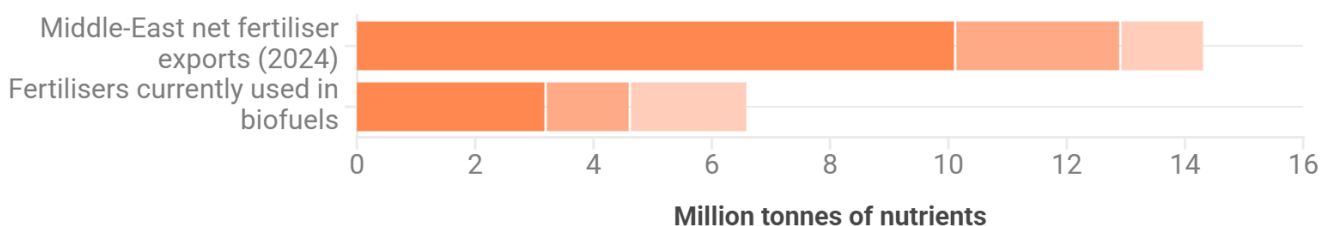
In the current context of the energy crisis and record-high oil prices, biofuels are increasingly proposed by some as a solution to lower import dependency and stabilise domestic fuel markets. Similarly to previous energy and food shocks, the 2026 crisis is also paralysing fertiliser supply chains. Because biofuel mandates create a rigid demand for feedstocks like corn, sugarcane, or palm, increasing mandates effectively "lock in" high demand for chemical inputs at the exact moment global supply is being disrupted. This creates a vicious circle: high energy prices drive nations to mandate more biofuels, which in turn spikes the demand for nitrogen, further depleting the limited fertiliser stocks available for global food production.

As an illustration, based on trade data we have calculated that global biofuel mandates currently require a fertiliser volume equivalent to half of the Middle East's total exports. This highlights a dangerous competition: while the Strait of Hormuz restrictions have already curtailed global supply, the world is effectively diverting a massive share of its remaining nutrients to meet transport mandates rather than food security.

Biofuel mandates currently 'burn' the equivalent of around half of Middle East fertiliser exports

Reassessing biofuel mandates could help bridge fertiliser supply shocks, particularly for fossil nitrogen

● Nitrogen ● Phosphate ● Potash



Source: T&E analysis based on IFA (2023), Cerulygy (2024), UN Comtrade, and FAO nutrient factors



Moreover, the current shock in fertiliser prices [has not yet fully translated](#) into biofuel costs. While the cost of fossil fuels and refining inputs spikes instantly, agricultural feedstocks costs initially rise at a slower pace because today's biofuel crops were grown using fertiliser and fuel inputs secured before the 2026 energy surge. This price lag makes biofuels momentarily more profitable. In many regions, government subsidies also act as a temporary buffer, masking the true increase in crop production costs. However, should fertiliser prices remain at record highs through the end of the year, this "price pass-through" will become inevitable.

Coupled with the [projected El Niño event](#), which threatens to disrupt crop yields in key biofuel hubs like Brazil and Southeast Asia, the overlap of input scarcity and climate volatility is creating a "perfect storm," as [warned](#) by the UN FAO. This alignment of high energy prices, sustained fertiliser shortages, and weather-driven crop failures risks triggering severe global food insecurity and soaring biofuel prices by late 2026. As [extreme climate hazards like heatwaves and droughts intensify](#), further worsened by reduced workforce productivity in intolerable weather, the resulting surge in food costs, slashed farmers' incomes, and heightened malnutrition risks making long-term reliance on crop-based fuels a short-sighted and economically damaging gamble.

Conclusion

While promoted as a path to energy independence, the global rush toward crop-based biofuels is ultimately deepening import reliance, fueling food inaccessibility, and accelerating environmental breakdown. In the face of the current crisis, this strategy is not a solution, but a dangerous intensification of the problem.

Since crop-based biofuels are plagued with plentiful shortcomings and are competing with a basic human need like food, real answers to energy resilience must be searched elsewhere. This is where the acceleration of electrification plays a critical role. Unlike crop-based biofuels, which require vast tracts of arable land, strategic electrification decouples energy security from agriculture. By transitioning transport to grids powered by scalable renewables like solar and wind, we can drastically cut emissions and increase efficiency without compromising food systems.

To truly address biofuel pitfalls and unlock the potential of better alternatives, policy interventions must actively limit their detrimental impacts and prevent their further scale-up.

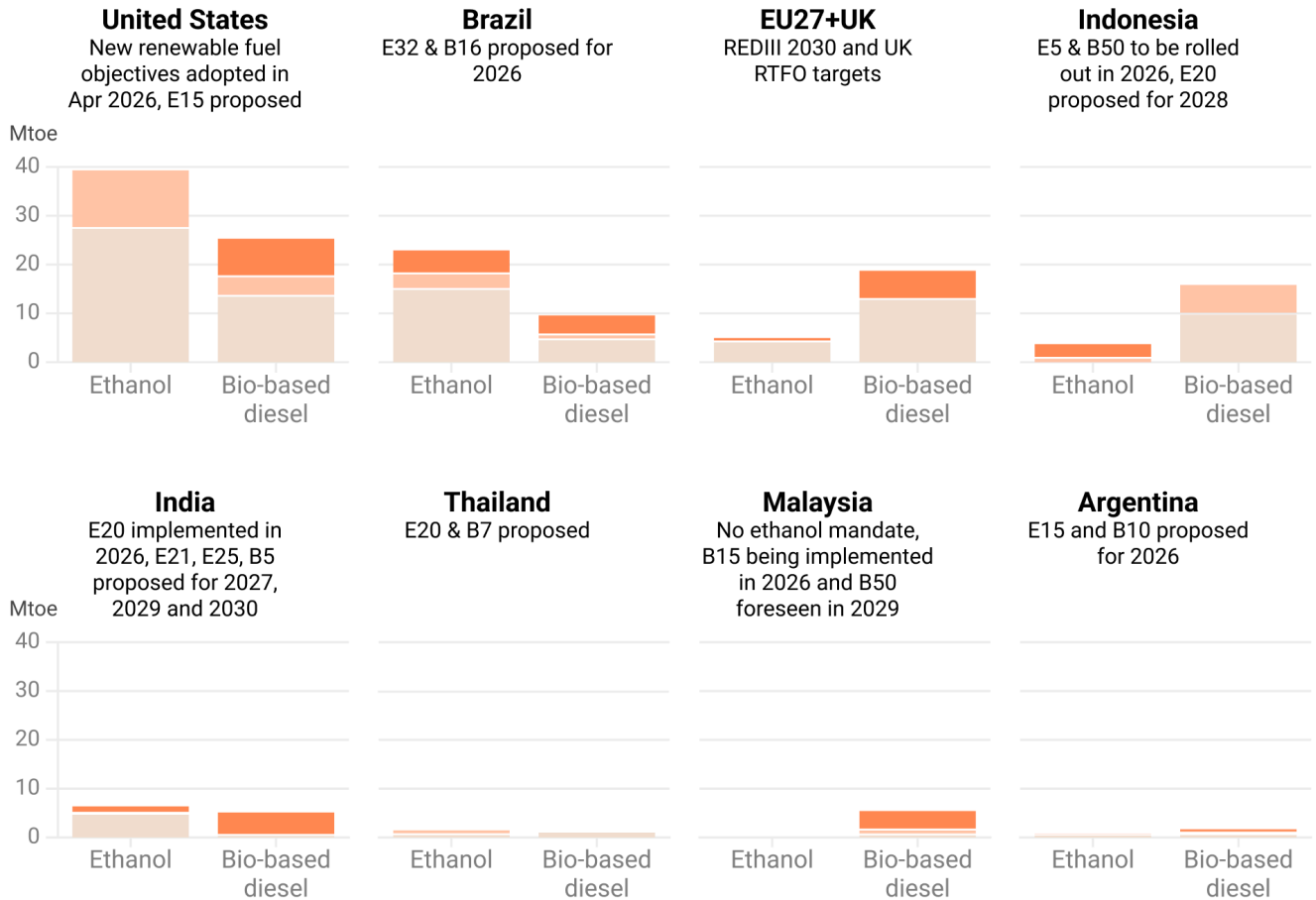
Methodology

Detailed national biofuel mandates

Global blending mandates rise in response to energy crisis

If all proposed targets are enacted, global biofuel demand could surge by 40% this year and up to 70% by 2030

- Current consumption
- Additional volumes needed to meet 2026 targets
- Additional volumes expected up to 2030



Source: T&E analysis, based on market announcements from QCI and Argus announced until May 2026 as well as data from the USDA. When no recent announcement was made, projected 2030 demand is taken from Cerulogy's Diverted Harvest report from 2024.




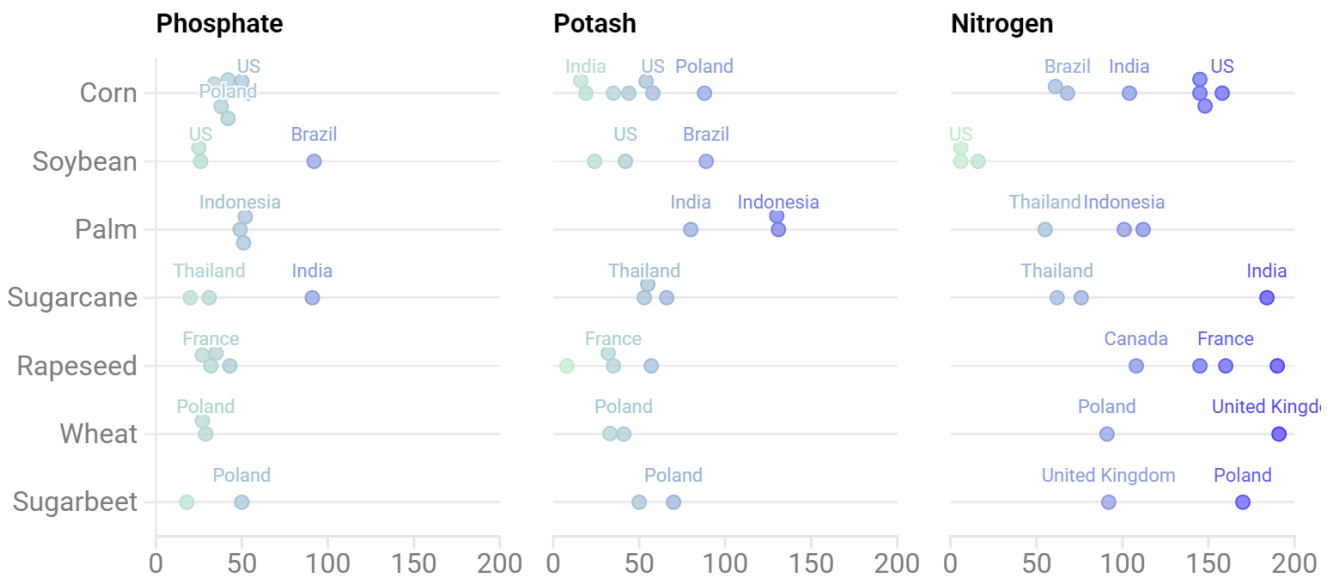
Biofuel fertilisers use

Current and projected biofuel fertiliser use was estimated by integrating Cerulogy's [national biofuel feedstock breakdown](#) with the International Fertilizer Association's (IFA) latest [global data on fertiliser use by crop and by country](#). While the Cerulogy study presents estimates of the net area allocated to biofuel crop production (excluding co-products), the IFA dataset provides the national average N, P₂O₅ and K₂O nutrient inputs per area, as detailed below.

The fertiliser footprint of major biofuel crop production

Visualising how fossil nutrient intensity varies by crop and geography to meet biofuel mandates

Nutrient input (kg/ha per year) 6  191



Source: T&E, based on data from the International Fertilizer Association (2023)



Where feedstock categories lacked specificity, an average of the most common biofuel feedstocks within that category was applied. For instance, 'other grains' in Europe was calculated as an average of wheat and corn nutrient inputs. France was used as a representative European country, as it accounts for the largest share of food- and feed crop-based biofuel consumption in the EU, representing close to [one third](#) of the bloc's total volume use.

Finally, estimates for biofuel fertiliser use across largest producing countries were compared to total national fertiliser consumption from the [IFA's statistics](#).

Fertiliser trade analysis

Finished fertiliser import and export data was extracted from [UN Comtrade public data](#), using 6-digits HS codes under headings 3102 (straight nitrogen fertilisers), 3103 (straight phosphatic fertilisers), 3104 (straight potash fertilisers) and 3105 (compound fertilisers). Such trade data was then converted to nutrient volumes interpreting HS codes from the [UN FAO guidelines](#), as detailed below. Where specific FAO conversion factors were unavailable, industry-standard nutrient coefficients were applied as proxies. Finally, net trade flows were determined by subtracting exports from imports. Mirrored import statistics were used as a proxy for export volumes to harmonise data and resolve reporting gaps.

Trade flows from other fertiliser compounds such as natural gas or anhydrous ammonia (HS code 281410) were not considered in the main analysis here, as our focus was on finished

fertiliser trade flows. However, including ammonia imports in particular would show a slightly different picture. Middle East nitrogen export volumes would appear larger, since the region exports their nitrogen production as urea but also partly as ammonia. On the other hand, Indonesia's net nutrient imports would appear lower as the country is significantly dependent on finished fertiliser imports but does produce and export a lot of ammonia from its domestic natural gas resources, mostly for neighboring countries.

Fertiliser type	HS code	N, P ₂ O ₅ and K ₂ O balance
Urea	310210	46-0-0
Ammonium sulphate	310221	21-0-0
Other double salts (Ammonium chloride/nitrate mix)	310229	26-0-0
Ammonium nitrate	310230	33.6-0-0
Calcium ammonium nitrate (CAN)	310240	26-0-0
Sodium nitrate	310250	16-0-0
Double salts & mixtures of Calcium/Magnesium Nitrate	310260	15.5-0-0
Calcium cyanamide	310270	20-0-0
Urea and ammonium nitrate solutions (UAN)	310280	32-0-0
Other nitrogenous fertilisers, n.e.c.	310290	20-0-0
Superphosphates above 35% (TSP)	310311	0-46-0
Superphosphates, other (SSP)	310319	0-20-0
Basic slag	310320	0-15-0
Other phosphatic fertilisers	310390	0-20-0
Carnallite, sylvite (Crude natural potassium salts)	310410	0-15-0
Potassium chloride (MOP)	310420	0-0-60

Fertiliser type	HS code	N, P ₂ O ₅ and K ₂ O balance
Potassium sulphate (SOP)	310430	0-0-50
Other potassic fertilisers	310490	0-0-20
Fertilisers in small packs	310510	15-15-15
NPK fertilisers	310520	15-15-15
Diammonium phosphate (DAP)	310530	18-46-0
Monoammonium phosphate (MAP)	310540	11-52-0
Other NP compounds	310551 310559	20-20-20
Other PK compounds	310560	0-20-20
Other mineral/chemical fertilisers n.e.c.	310590	15-15-15

Further information

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