



Global Fertilizer Supply Risk: The North American Input Advantage

Q4 2026

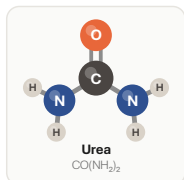
EXECUTIVE SUMMARY:

Fertilizer is one of the largest variable costs in crop production, and export supply of each of the three primary nutrients, nitrogen (N), phosphate (P) and potash (K), rests on a short list of countries. Events in 2026 have turned fertilizer supply into a front-line geopolitical issue.

WHY N, P AND K MATTER?

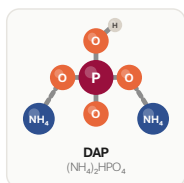
The three nutrients are not substitutes: a crop short of any one yields to that limit.

- **Nitrogen (N).** Plants use nitrogen to build proteins, enzymes and chlorophyll, so it drives leaf growth, yield and grain protein. Corn, wheat and canola are heavy users; soybeans and pulses fix much of their own. Almost all nitrogen fertilizer starts with the Haber-Bosch process,

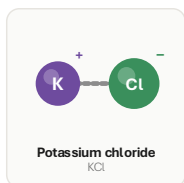


which reacts nitrogen from the air with hydrogen at high temperature and pressure over an iron catalyst to make ammonia (NH_3). The hydrogen comes mainly from natural gas, which is both feedstock and fuel, so exports concentrate where gas is cheap. Ammonia is then converted into urea ($\text{CO}(\text{NH}_2)_2$), ammonium nitrate, ammonium sulphate or UAN solutions. Estimates are that synthetic nitrogen sustains about 50% of the world's population. Nitrogen must be applied every season because it leaches and volatilizes rather than building up in the soil.

- **Phosphate (P).** Plants use phosphorus to store and move energy (as ATP) and to build DNA and cell membranes, so it drives early root growth, flowering and seed and grain formation, especially in cool soils where early uptake is limited. Phosphate fertilizers combine mined phosphate rock with sulfuric acid, made from sulfur, to produce phosphoric acid, which is then reacted with ammonia to make DAP ($(\text{NH}_4)_2\text{HPO}_4$, grade 18-46-0) or MAP. A DAP plant therefore depends on three supply chains at once: rock, sulfur and ammonia. Phosphorus binds tightly in soil and builds up over time, but most growers replace what each crop removes.



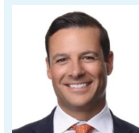
- **Potash (K).** Potash is mainly potassium chloride (KCl), sold as muriate of potash at about 60% K_2O . Plants use potassium to regulate water through their leaf pores, activate enzymes and move sugars, which improves drought and disease tolerance, stalk strength and crop quality; potatoes, fruit, vegetables, forages, corn and soybeans are heavy users. It is mined from ancient evaporite salt deposits found at scale in only a few places. The US Geological Survey estimates reserves of about 2.0 billion tonnes (K_2O equivalent) in Russia, 1.1 billion tonnes in Canada, all in Saskatchewan, and 750 million tonnes in Belarus.



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NITROGEN (UREA, AMMONIUM NITRATE AND AMMONIUM SULPHATE):

Russia led nitrogen exports in 2024 at \$4.95 billion, with Brazil (\$836 million), the United States (\$761 million) and India (\$537 million) its main buyers. China ranked second at \$3.33 billion, much of it by-product ammonium sulphate sold mainly to Brazil. Qatar, a low-cost gas producer, ranks third at about \$2.2 billion. In 2025 Russian urea exports rose about 11% and Chinese urea exports recovered to almost 5 million tonnes under quotas; in March 2026 Beijing restricted most fertilizer exports. Since Hormuz closed, urea exports from Hormuz-dependent economies fell 83% year on year in April, and urea passed \$850 per tonne, up 80% from February.

Chart 1: Top three nitrogen exporters and their largest buyer, 2024. Arrow width scales with export value.

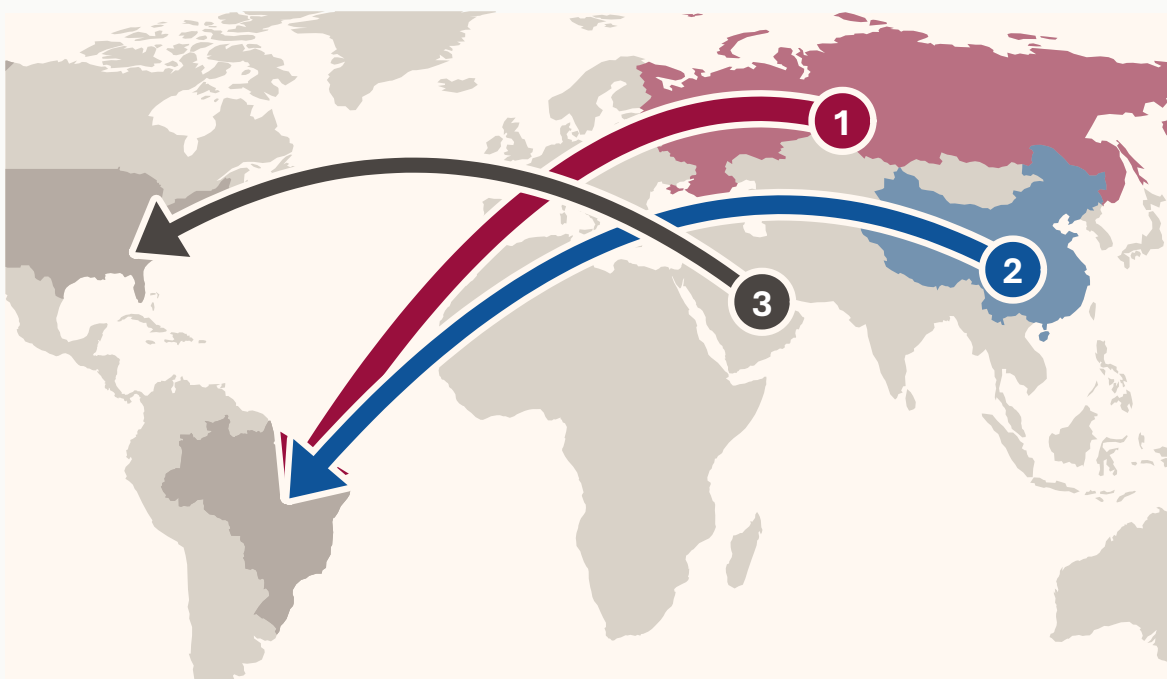


Table 1: Top three nitrogen exporters

Rank	Exporter	Exports, US\$bn	Largest buyer	2025-26 developments
1	Russia	5.0	Brazil	Fertilizer exports +7% to 45 Mt in 2025; EU duties on Russian nitrogen rising each July
2	China	3.3	Brazil	Urea exports almost 5 Mt in 2025; broad export restrictions from March 2026
3	Qatar*	~2.2	United States	Hormuz route effectively closed since late February 2026

Source: OEC (BACI), HS 3102; RAFF, Yara, Omnigence research.

PHOSPHATE (DIAMMONIUM PHOSPHATE, DAP):

Morocco led phosphate exports in 2024 with \$3.07 billion, followed by China (\$2.52 billion) and Saudi Arabia (\$2.25 billion); India, the largest DAP importer at \$2.8 billion, is the top buyer for all three. China’s DAP exports fell 24% in the first nine months of 2025, it suspended phosphate exports from December 2025, and they have been near zero since March 2026.

Chart 2: Top three DAP exporters and their largest buyer, 2024.

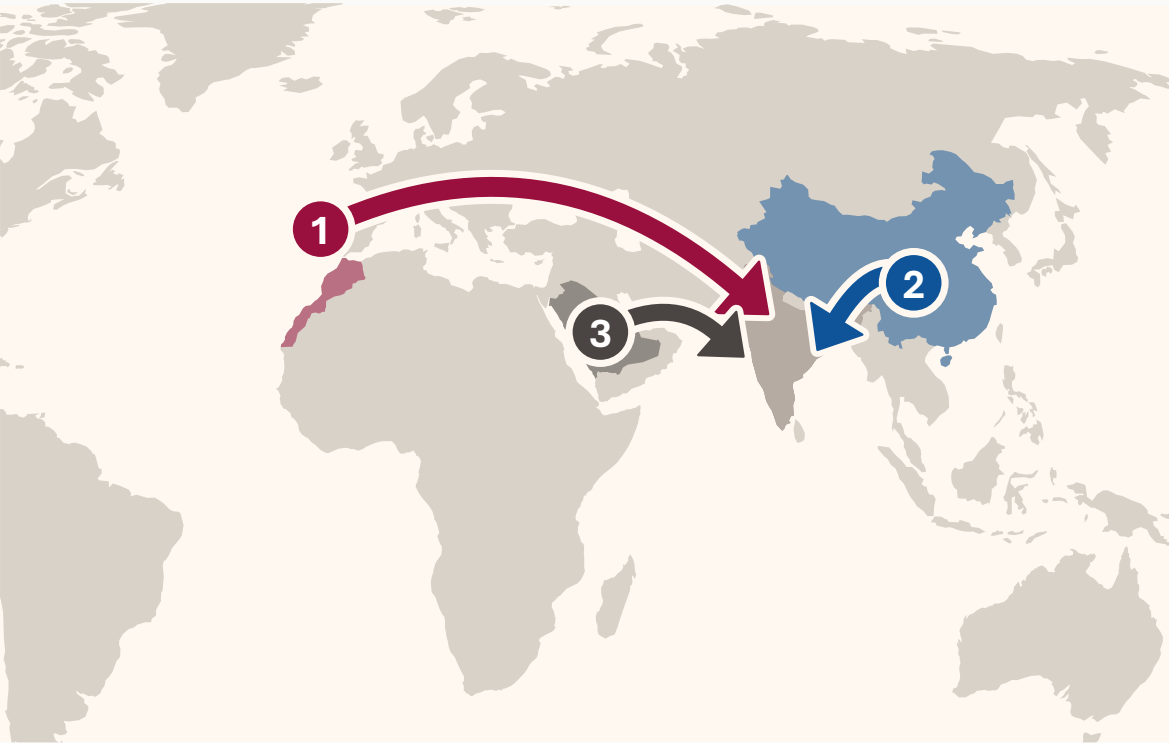


Table 2: Top three DAP exporters

Rank	Exporter	Exports, US\$bn	Largest buyer	2025-26 developments
1	Morocco	3.1	India	OCP revenue +17% in 2025; supply agreements with Indian importers
2	China	2.5	India	DAP exports -24% Jan-Sep 2025; near zero since March 2026
3	Saudi Arabia	2.3	India	3.1 Mt a year deal with India; rerouting overland since March 2026

Source: OEC (BACI), HS 310530 (DAP only; excludes MAP and other phosphates); OCP, S&P Global, Argus.

POTASH (POTASSIUM CHLORIDE, KCl):

Canada is the largest exporter of potash: \$6.81 billion in 2024, or 33.8% of global exports, all from Saskatchewan, with the United States (\$3.03 billion) and Brazil (\$1.09 billion) its main buyers. Russia ranked second at \$4.73 billion, led by Brazil and China; Russian potash shipments to China rose 9% to 4.6 million tonnes in 2025. Belarus, third, shipped 11.6 million tonnes through Russian ports in 2025 because EU sanctions still close Lithuania's Klaipeda route, even though the US lifted its sanctions on Belaruskali in March 2026.

Chart 3: Top three potash exporters and their largest buyer, 2024.

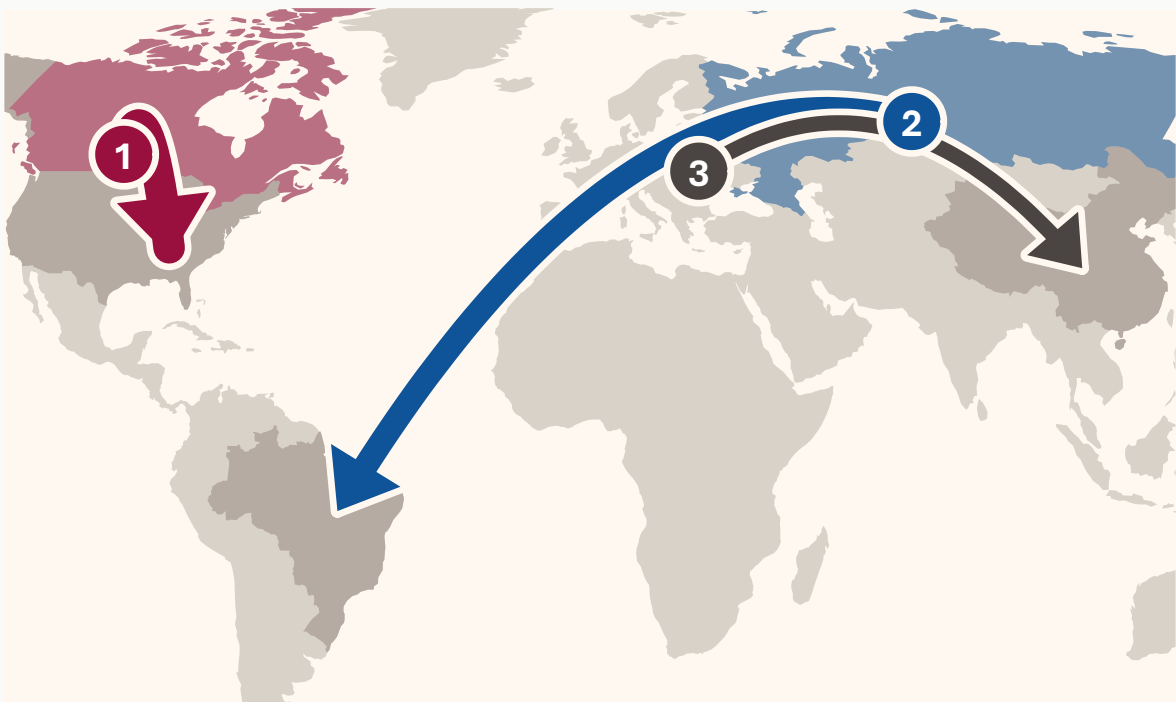


Table 3: Top three potash exporters

Rank	Exporter	Exports, US\$bn	Largest buyer	2025-26 developments
1	Canada	6.8	United States	Exports +13% to C\$9.0bn in 2025; exempt from August 2026 US tariffs
2	Russia	4.7	Brazil	Potash to China +9% to 4.6 Mt in 2025
3	Belarus*	~2.1	China	US sanctions lifted March 2026; EU sanctions and Klaipeda ban remain

Source: OEC (BACI), HS 3104; Natural Resources Canada, China customs, US Treasury.

GEOPOLITICAL RISKS:

The fertilizer markets have absorbed three major supply shocks in five years: Chinese export controls from 2021, Russia's invasion of Ukraine in 2022 and the closure of the Strait of Hormuz in 2026. Because export supply is so concentrated, a policy decision in one capital or the closure of a single shipping lane can move world prices within weeks. Chart 4 maps the four risks that matter most today, and Table 4 links each top-three exporter to the one most relevant to its supply.

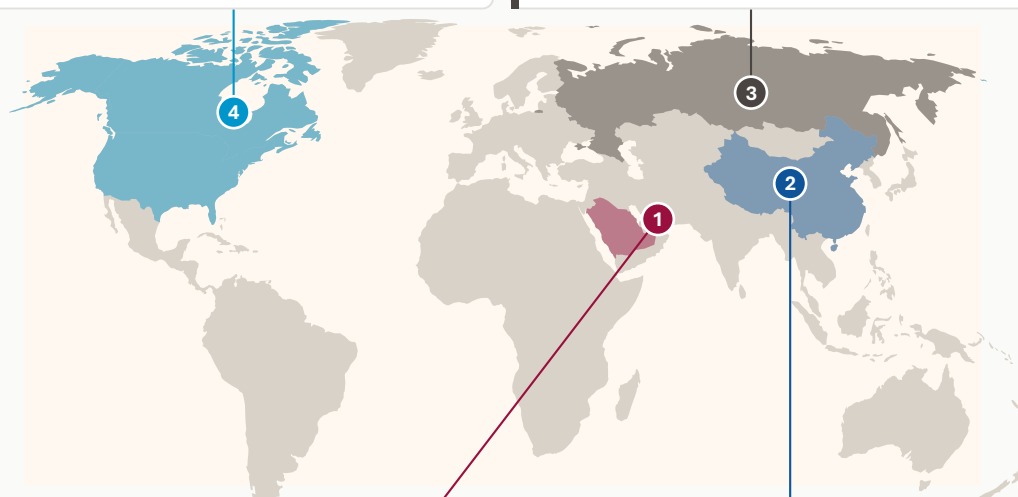
Chart 4: Four supply risks facing fertilizer markets, October 2026

4 North America and sulfur

The US imports about 90% of its potash, tariff-free from Canada, but USMCA reviews keep the risk alive. Sulfur is tight.

3 Russia and Belarus

EU nitrogen duties rise to €315 per tonne by 2028, while the US has eased Belarus potash sanctions. Trade is rerouted, not cut.



1 Strait of Hormuz

The Gulf shipped a third of world urea exports and 45% of sulfur before the war. Rerouting is slow and costly.

2 Chinese export controls

Exports follow domestic priorities, not world prices, so China is unreliable supply when markets tighten.

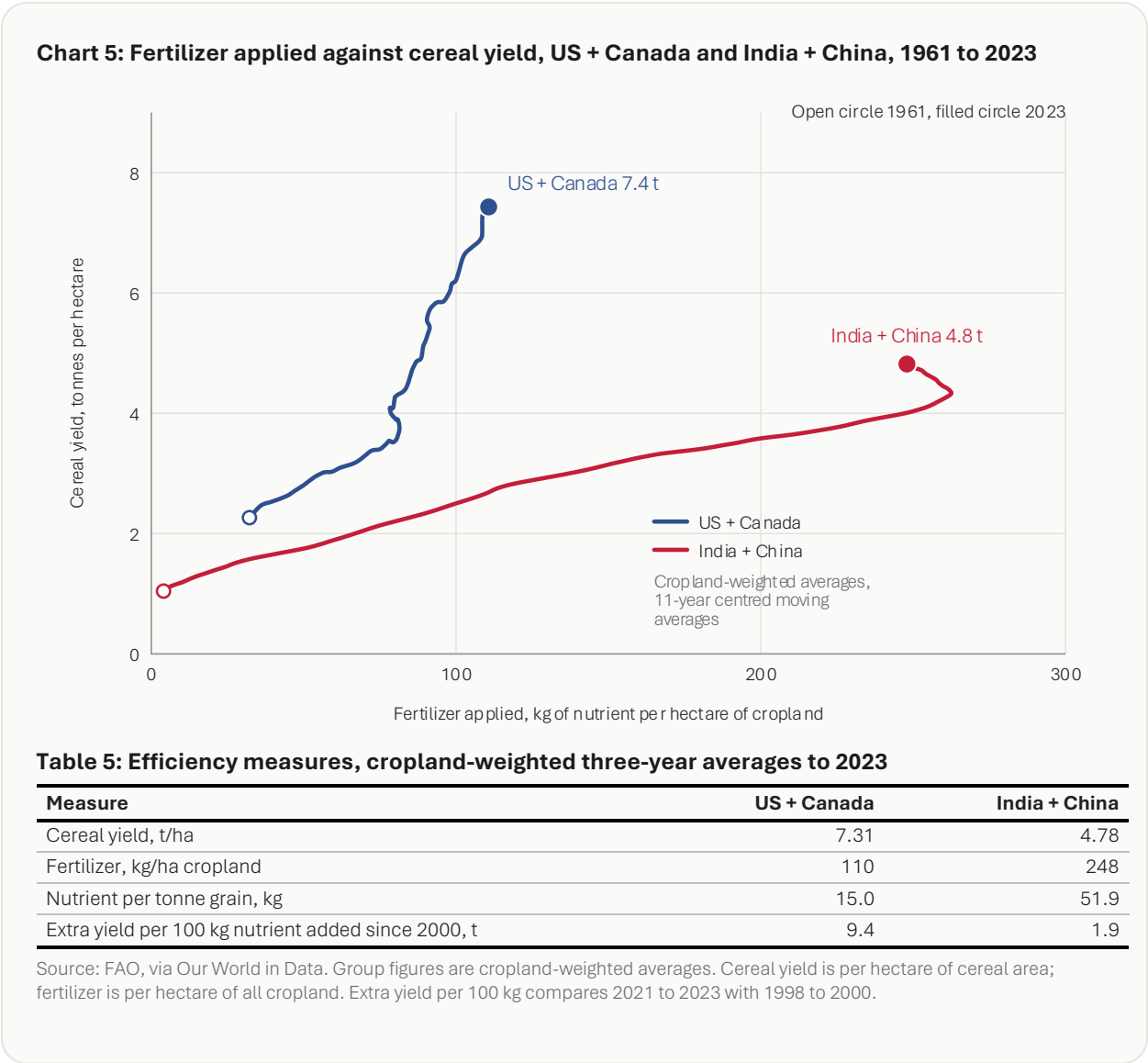
Table 4: Primary supply risk by exporter, October 2026

Exporter	Nutrient	Primary risk	Status, October 2026
Russia	N, K	EU tariffs; export quotas; sanctions frictions	Exports redirected to BRICS
China	N, P	Domestic-priority export controls	DAP/MAP exports near zero
Qatar	N	Strait of Hormuz	Sea route effectively closed
Morocco	P	Imported sulfur and ammonia costs	Exporting; key supplier to India
Saudi Arabia	P	Hormuz; Red Sea security	Rerouting at higher cost
Canada	K	US trade policy; USMCA review	Exempt from 2026 US tariffs
Belarus	K	EU sanctions; transit via Russia	US sanctions lifted; EU route closed

Sources: Yara; World Bank; IMF PortWatch; European Union; US Treasury; USGS; Omnigence research.

FERTILIZER EFFICIENCY IN NORTH AMERICA:

Concentrated supply matters less to a farm that needs less of it. Our companion paper, Fertilizer Efficiency in Four Grain Systems, uses 63 years of FAO data to compare large grain systems. In Chart 5 the North American line climbs steeply, while China runs sideways, adding nutrient much faster than grain.



A kilogram of applied nutrient yields about four times as much grain in the United States as in China. A tonne of grain carries 13 kg of nutrient in the US and 32 kg in Canada, against 53 kg in China. The US applies the least nitrogen per hectare, 59 kg against 73 kg in Canada and 192 kg in China, yet harvests the most grain, and since 1980 its cereal yield has doubled on a 14% rise in application. That efficiency is also a hedge against the supply risks above. North American growers apply nitrogen and phosphate, the nutrients most exposed to Hormuz and Chinese export controls, at a fraction of Chinese rates and sit next to the world’s largest potash supply, so a move in urea or DAP reaches their margins with far less force.

CONCLUSION:

The world's fertilizer supply rests on a handful of countries, mines and gas fields, and 2026 has shown how quickly that concentration can become a price shock. The Hormuz closure and Chinese export controls took a large share of traded urea and phosphate off the market within weeks, while sanctions and tariffs keep redrawing trade routes for Russian and Belarusian product. Supply in this market is set as much by policy and geography as by price.

For farmland investors, input efficiency is another important consideration alongside soil, productivity, yield volatility and trend, climate and land price. Growers in the North America have raised yields for two decades without a matching rise in fertilizer use, through precision application, better genetics and rotations with nitrogen-fixing crops. In much of the emerging world, subsidized fertilizer has encouraged heavy, inefficient application, and China and India are among the least efficient users of nitrogen. A farm that produces more grain per tonne of nutrient is less exposed when nutrient prices spike, a comparison our companion papers on fertilizer efficiency, and land price sensitivity to fertilizer input prices examine in more detail.



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