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Energy



# Fertilizer

Modern agriculture owes its success to synthetic fertilizers, which have lifted crop yields to meet the demands of a growing population.

This is part of the updated Atlas of Food report examining the field-to-fork links between agriculture and protein markets.

October 2025

## I Credits

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# Key properties

Three primary nutrients — nitrogen, phosphorus, and potassium — are vital for various physiological processes in plants.

Nitrogen, often supplied through urea, promotes plant growth and enhances photosynthesis; phosphates are key for root development and energy transfer; and potassium contributes to overall plant health, drought resistance, and disease tolerance.

The effective use of fertilizers not only increases crop yields but also supports food security for a growing global population.

Nutrient application has long been appreciated by farmers: manure application, for example, has featured in agrarian societies, providing a natural source of primary nutrients. However, it wasn't until the early 20th century that more concentrated chemical products started to be manufactured and traded globally, eventually leading to the “green revolution” of the 1970s.

One key component, nitrogen, is often extracted from nitrogen via the Haber-Bosch process, which transformed fertilizer

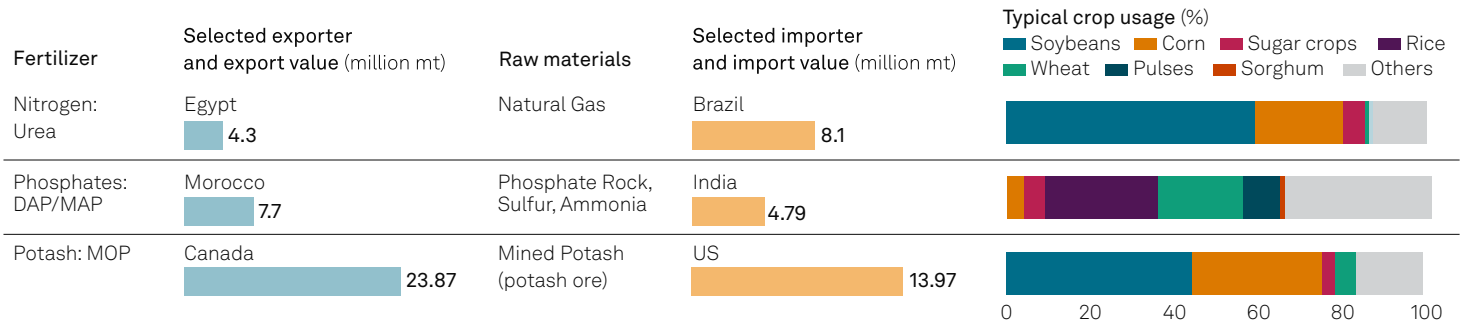
production into a true industry. This process involves the reaction of nitrogen gas from the atmosphere with hydrogen, typically derived from natural gas, under high temperatures and pressures to produce ammonia, which is used in the production of urea, nitrates, and most complex fertilizers such as ammoniated phosphates, NPKs, ammonium sulfate, or potassium nitrate.

Phosphates are produced through the mining and processing of phosphate rock, often through reacting it with a strong industrial acid (typically sulfuric acid) to obtain phosphoric acid, which is then further processed into various downstream products such as diammonium phosphate (DAP), monoammonium phosphate (MAP), or triple superphosphate (TSP).

Potash, primarily consisting of potassium, is obtained from ancient sea and lake beds that formed millions of years ago. The extraction process involves mining and refining these deposits, mostly producing potassium chloride, from which a variety of further downstream products are made.

The absence of any of the essential nutrients — nitrogen (N), phosphorus (P), or potassium (K) — can lead to deficiencies in plants, resulting in stunted growth, diminished crop quality, and reduced resilience against drought and diseases.

## Key properties: fertilizer distribution



Source: S&P Global Energy

## Global production

Urea is one of the most widely produced fertilizers worldwide, with production concentrated in regions rich in natural gas. Coal remains an essential feedstock, especially due to the significant growth of coal-based urea production in China. The competitiveness of urea facilities globally is mainly driven by feedstock and logistics costs – with environmental regulations increasingly influencing regions like Europe. Major producers are based in the Middle East, North Africa, Russia, China, and Southeast Asia. European countries, where natural gas prices are generally higher, have traditionally imported urea from cheaper regions. However, rising tariffs on Russian producers and regulatory costs linked to the carbon border adjustment mechanism could make domestic suppliers more competitive.

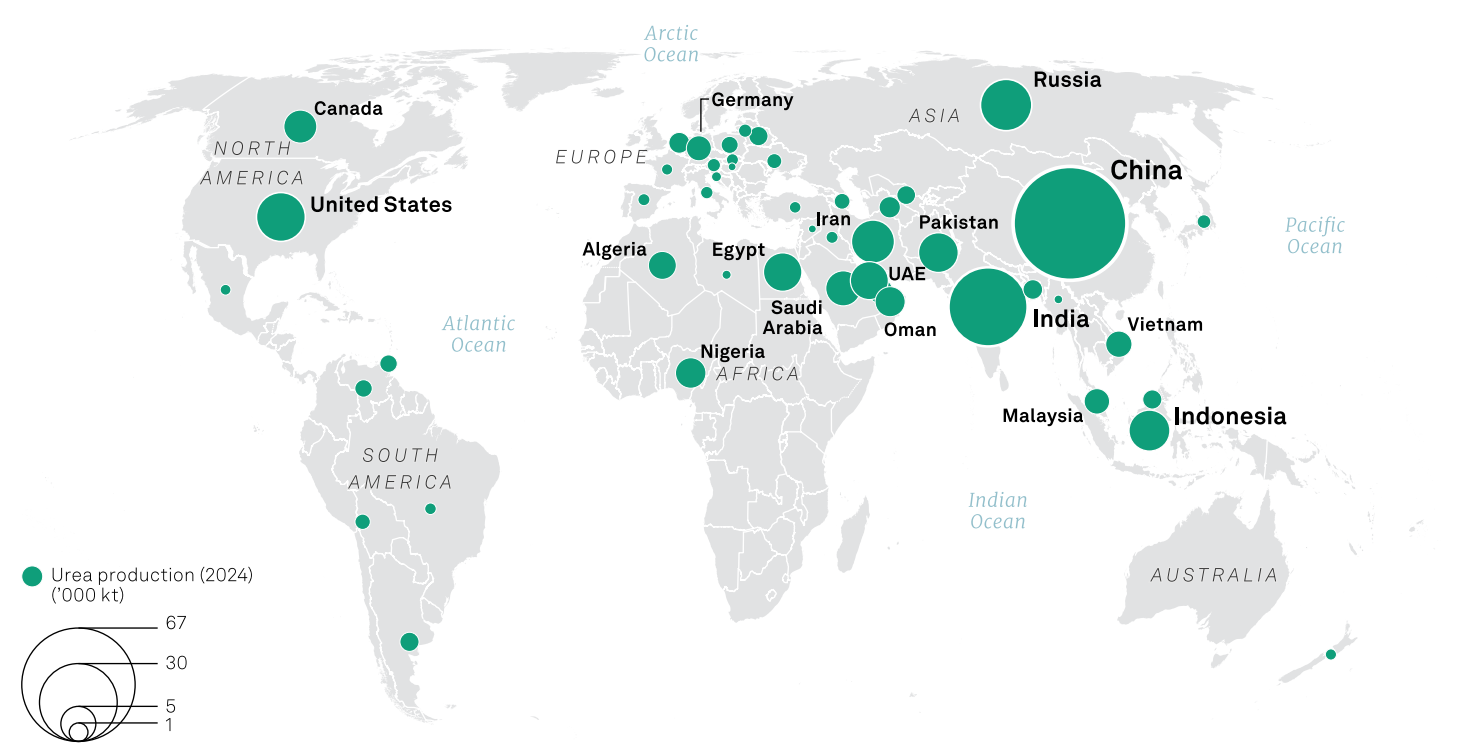
The production of phosphatic and potassic fertilizers is concentrated in regions with access to mineral deposits, which

significantly influence their cost and availability. Phosphate production is primarily dominated by Morocco, the US, Saudi Arabia, Russia, and China, with Morocco holding the largest known reserves of phosphate rock. Mining and processing costs, along with transportation logistics, are key factors affecting the competitiveness of phosphate fertilizers in global markets.

Potash production is highly concentrated in Canada, Russia, and Belarus, with Canada being the largest producer, thanks to its extensive underground potash mines. The extraction process is capital-intensive and requires significant investment in infrastructure.

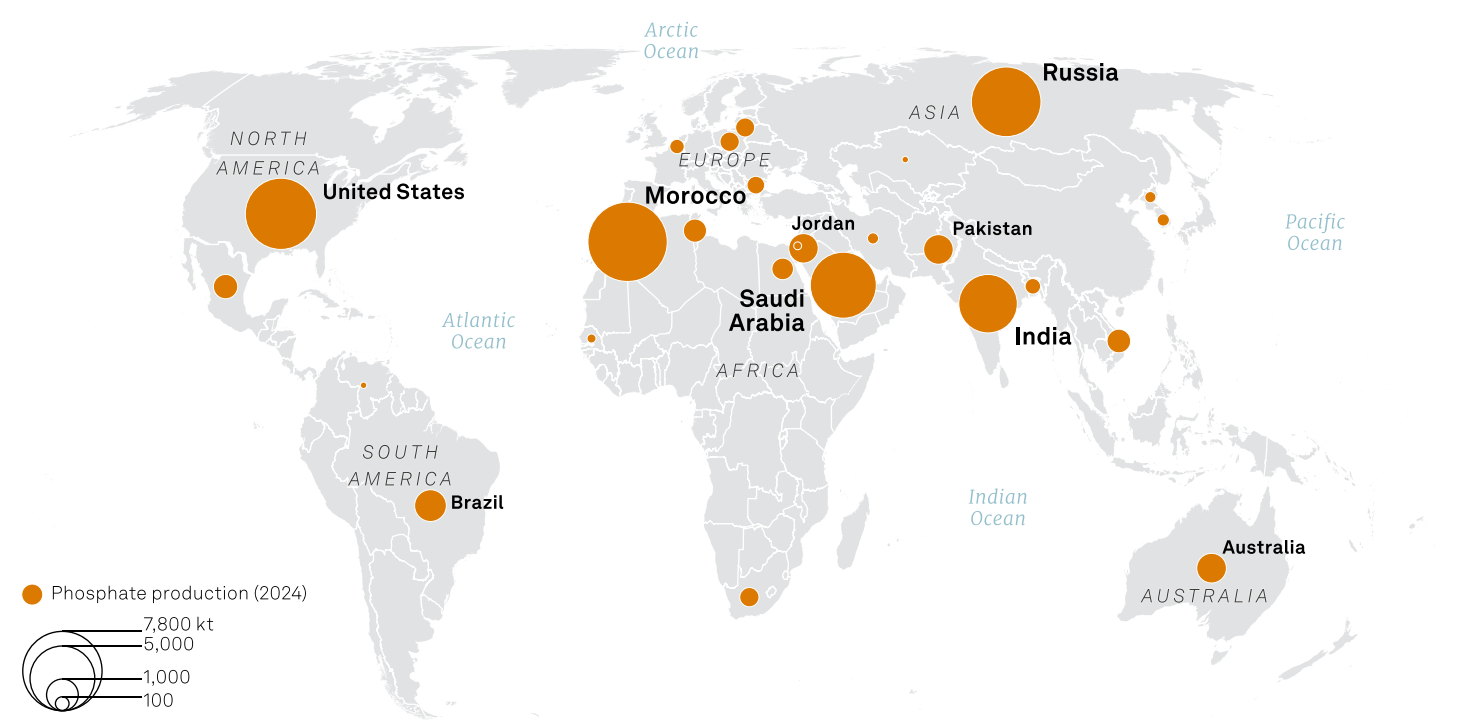
Fertilizer markets are influenced by global demand fluctuations, agricultural trends, food security concerns, and government policies. Increasing tariffs on imports from major producing countries can shift market dynamics, potentially making domestic production more competitive.

Global urea production



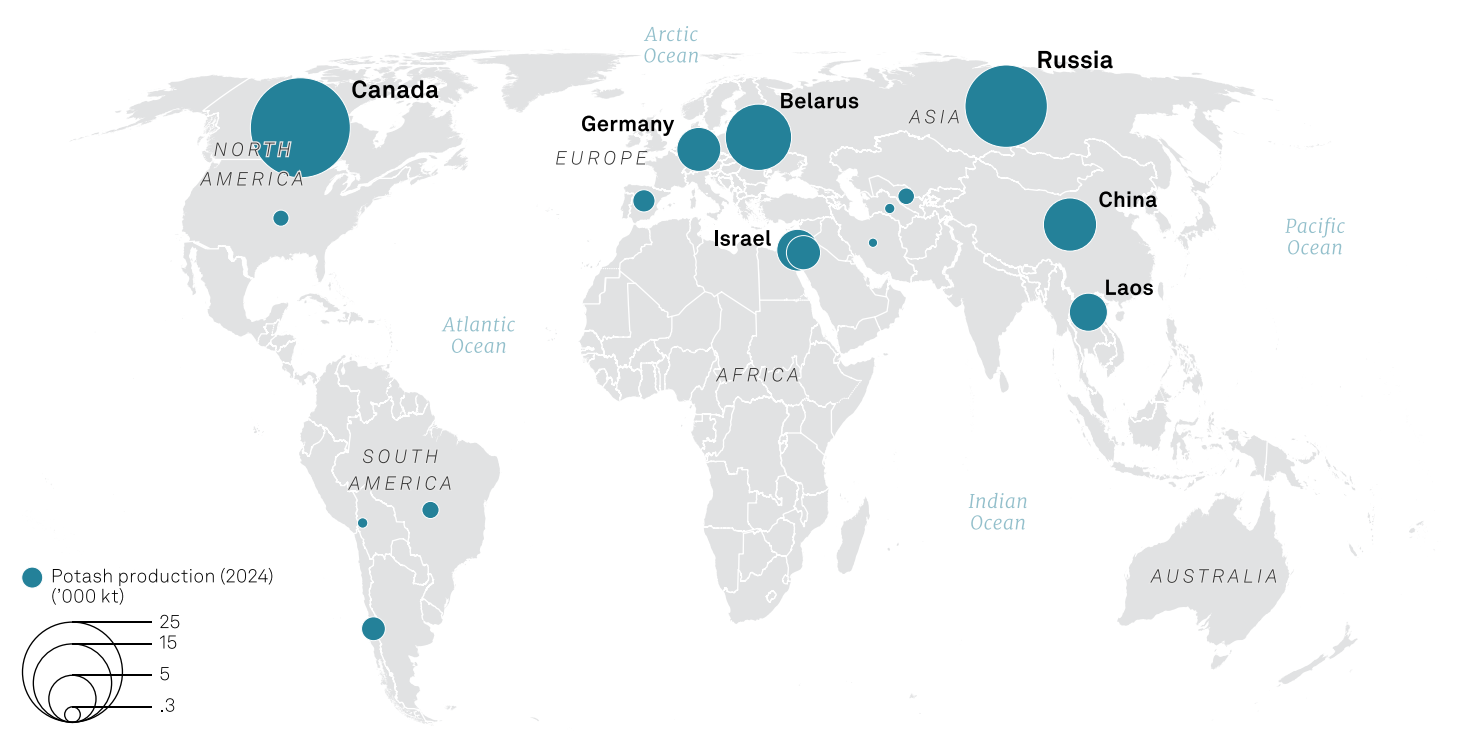
Credit: Content Design  
Source: S&P Global Energy

Global phosphate production



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Global potash production



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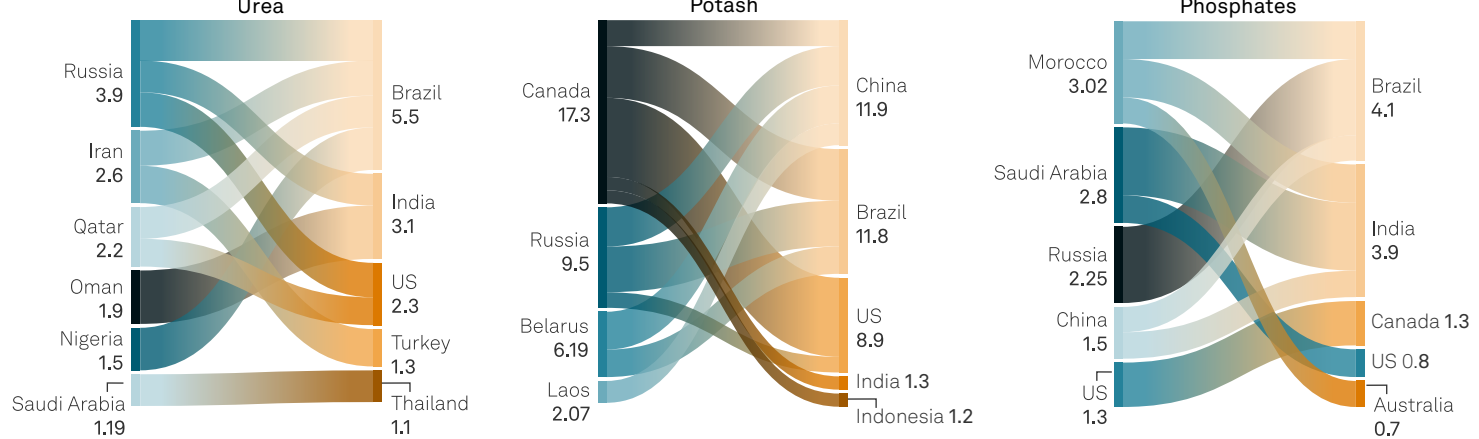
Trade flows

Seasonal factors play a crucial role in fertilizer trade, as demand typically peaks during planting seasons. The recurring north/south wave of seasonal spikes can lead to increased imports by countries preparing for their agricultural cycles, resulting in price

volatility during these periods.

Urea is one of the most traded fertilizers globally. Major exporters of urea include countries in the Middle East, such as Qatar and Saudi Arabia, where abundant natural gas supplies facilitate low production costs. Other key exporters include Russia, China and Egypt. On the import side, countries like Brazil, the US, and several Southeast Asian nations are significant consumers, driven by their large agricultural sectors.

Top 10 trade flows by nutrient type



Source: S&P Global Energy

Global trade in phosphates is marked by a high concentration of exports from a few key regions. Morocco is the top exporter of phosphate fertilizers, followed by China, Russia, and Saudi Arabia (2024 data). These countries produce various phosphate fertilizers, including monoammonium phosphate (MAP) and diammonium phosphate (DAP). Major importers include Brazil, India, Europe, and Southeast Asian countries, where agricultural demand is strong. Unlike nitrogen, excess phosphorus applied to soil can remain (to an extent) available for future crop seasons, although this largely depends on rainfall patterns and soil quality.

Potash trade flows are even more concentrated on the supply side, with Canada being the largest producer and exporter, followed by Russia and Belarus. These countries dominate the global market, supplying potash to various regions, including the US, Brazil, and India, which are among the largest importers.

## Price drivers

### 1. Policy

Government interventions, such as subsidies and export restrictions, can significantly impact supply dynamics and affordability for farmers. For instance, policies aimed at supporting domestic agriculture can enhance demand for fertilizers, while export regulations can create supply constraints that drive prices higher.

#### September 2021

**China restricts exports** In early 2021, China announced export restrictions on phosphate and urea to prioritize domestic supply, significantly constraining global availability and leading to increased prices in international markets.

**June 2025 China resumes exports** China lifts restrictions on fertilizers, allowing for increased availability in global markets

and contributing to price stabilization as importing countries replenished their stocks.

#### January 2026

#### EU to implement CBAM

The EU is set to implement its Carbon Border Adjustment Mechanism in 2026, forcing fertilizer importers to follow new documentation requirements and raising the costs of urea and NPK fertilizers.

#### Tariffs

Tariffs imposed on fertilizer imports can significantly alter market dynamics, affecting both supply and pricing. By increasing the cost of imported fertilizers, tariffs can lead to higher prices for domestic consumers, while also influencing trade relationships. The resulting changes in import patterns can create supply shortages or surpluses, further complicating price stability in the market.

#### October 2023 – present

**India maintains lower potash subsidy rates** Since 2023, India has maintained historically low subsidies for potash imports, affirming in its 2025 budget subsidy rates for potash fertilizers at Rupee 1,427/mt. This was an 85.1% drop from Rupee 9,547/mt India paid in Kharif 2023, driving up retail prices and lowering consumption.

#### March 2025

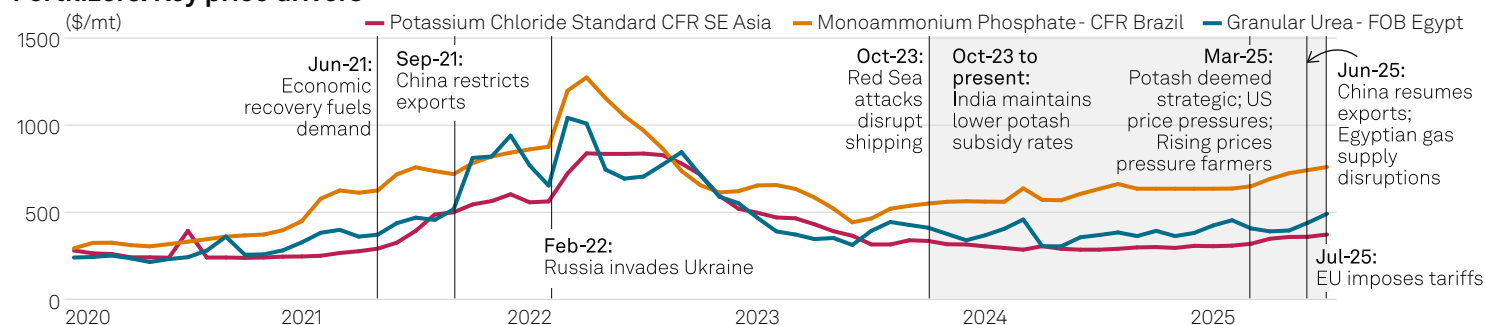
#### Potash deemed strategic

**US President Donald Trump signs an executive order** to designate potash as a “strategically important” mineral, protecting farmers from potential impacts of tariffs on higher potash fertilizer prices.

#### July 2025

**EU imposes tariffs** The EU announces additional tariffs on fertilizers from Russia and Belarus, restricting imports and leading to supply shortages that push European prices higher.

### Fertilizers: Key price drivers



Source: S&P Global Energy

Supply

Supply shocks from geopolitical events, natural disasters, or economic disruptions, can have immediate and significant effects on fertilizer pricing. These shocks can lead to production halts, transportation delays, or changes in trade flows, creating market volatility. Prices often jump when supply is constrained while demand remains steady or increases.

February 2022

Russia invades Ukraine Following Russia’s invasion of Ukraine, key export terminals in the Black Sea halt operations (on top of sanctions and trade restrictions), which immediately disrupts fertilizer supply chains and causes prices to skyrocket as countries seek alternative sources.

October 2023

Red Sea attacks disrupt shipping Attacks in the Red Sea disrupt critical shipping routes for fertilizers, leading to delays and increased transportation costs, contributing to rising global prices.

March 2025

US price pressures Rising natural gas prices, coupled with US tariffs on imports, significantly increase fertilizer production costs, leading to higher prices for agricultural inputs as producers pass on the costs to consumers.

June 2025

Egyptian gas supply disruptions Disruptions in Egypt’s gas supply lead to temporary halts in urea production, creating immediate supply shortages and driving prices higher as demand remains steady.

Demand

Demand for fertilizers is heavily influenced by external variables such as weather events and farmers’ decisions around affordability. Economic factors, such as income levels and input costs, directly impact farmers’ ability to buy fertilizers. Government policies aimed at supporting agricultural inputs can enhance affordability, while external factors like geopolitical tensions and supply chain disruptions can create volatility, further complicating the demand landscape.

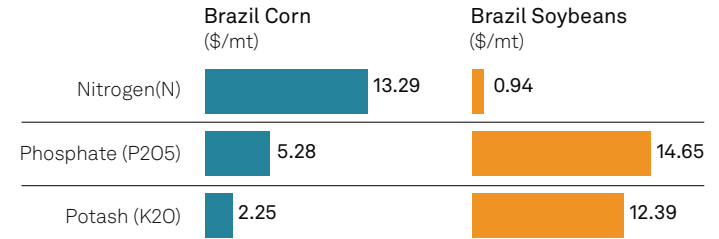
June 2021

Economic recovery fuels demand As economies began recovering from the pandemic, a surge in fertilizer demand coincides with lingering supply constraints, resulting in significant price increases and impacting affordability for farmers.

March 2025

Rising prices pressure farmers Escalating fertilizer prices due to supply chain disruptions and geopolitical tensions raise concerns about affordability among farmers, prompting calls for government intervention to stabilize prices.

Average cost per mt in 2025



Note: This shows how much was spent on each type of fertilizer in 2025 on average. It takes total spending on each and then divides by total mt of the crop produced. Source: S&P Global Energy

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