



U.S. Fertilizer Industry in Global Markets: Structure and Supply Risks

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The U.S. is a major player in agriculture and accounts for approximately 10-15% of total global fertilizer consumption. US fertilizer consumption needs are met through a mix of domestic production and imports, with the balance varying by nutrient type.

Previous articles in this series have examined trends in fertilizer use and efficiency and drivers of fertilizer application rates and farmer decision-making (see *farmdoc daily*, [May 29, 2025](#); [July 22, 2025](#)). This article shifts the focus to the structure of the global and U.S. fertilizer industries. We explore how supply chains, production dynamics, and trade dependencies impact supply risk, discussing implications for U.S. farmers.

Global fertilizer market

The global market for nitrogen (N), phosphorus (P), and potassium (K) fertilizers has grown steadily in the last 25 years, with world production growing at a compound annual growth rate (CAGR) of approximately 1.8%. In the U.S., production of nitrogen fertilizers has increased since 2000 but total fertilizer production has declined due to reductions in production of potassium and phosphorus fertilizers.

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Table 1. World Fertilizer Production (nutrient metric tons), 2000-2024*

Nutrient	World Production		
	2000	2024*	CAGR**
Nitrogen	108,000	150,000	1.38%
Phosphorus	41,500	74,620	2.47%
Potassium	27,000	48,000	2.43%
Total	176,500	272,620	1.83%

*projected; **Compound Annual Growth Rate

Source: USGS (2025)

China, Russia, the United States, India, and Canada collectively produce over 60% of the world's fertilizer nutrients. Among these, China alone contributes approximately 25%, while Russia and the United States each account for less than 10%. Table 2 summarizes average shares of global consumption, production, and trade (exports and imports) for the top countries by nutrient type.

Table 2. Top Consumers, Producers, Exporters, and Importers of Fertilizers by Nutrient Type, Averaged from 2019 to 2022

	Consumption		Production		Exports		Imports	
	Country	(%)	Country	(%)	Country	(%)	Country	(%)
Nitrogen	China	29.7%	China	29.2%	Trinidad and Tobago	21.3%	India	13.7%
	USA	10.0%	Russia	10.3%	Russia	19.9%	USA	13.0%
	India	9.9%	USA	8.9%	Saudi Arabia	9.8%	Morocco	9.6%
	Russia	8.3%	India	8.5%	Indonesia	9.4%	South Korea	7.1%
	Indonesia	3.0%	Indonesia	4.0%	Algeria	6.4%	Belgium	5.1%
	Rest of World	39.2%	Rest of World	39.1%	Rest of World	33.1%	Rest of World	51.5%
Phosphorus	China	36.2%	China	36.0%	Morocco	28.8%	India	28.1%
	Morocco	12.7%	Morocco	16.9%	Jordan	17.3%	USA	7.4%
	USA	11.3%	USA	10.0%	Peru	12.0%	Indonesia	7.2%
	Russia	7.4%	Russia	8.6%	Egypt	10.0%	Brazil	6.0%
	India	4.6%	Jordan	4.6%	Togo	4.9%	Mexico	5.2%
	Rest of World	27.8%	Rest of World	23.8%	Rest of World	27.1%	Rest of World	46.0%
Potassium	China	23.5%	Canada	33.3%	Canada	40.3%	Brazil	22.1%
	Brazil	17.8%	Russia	18.4%	Belarus	18.7%	USA	17.0%
	USA	13.6%	Belarus	15.8%	Russia	18.5%	China	15.9%
	India	5.9%	China	10.8%	Israel	7.5%	India	7.6%
	Indonesia	4.8%	Israel	6.5%	Germany	7.1%	Indonesia	6.1%
	Rest of World	34.4%	Rest of World	15.1%	Rest of World	7.9%	Rest of World	31.2%

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Source: International Fertilizer Association, TEAD Analysis

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Nitrogen fertilizers rely heavily on natural gas for production, particularly through the Haber-Bosch process (see *farmdoc daily* [February 17, 2021](#)), which limits production capabilities in countries with expensive or limited natural gas supplies.

In contrast, phosphorus and potassium are mined minerals with reserves concentrated in specific regions. More than one-third of global phosphorus fertilizer is produced in China, more than double that produced Morocco, the second largest global producer. Potassium production is particularly concentrated, with two-thirds of production and global reserves located in Canada, Russia, and Belarus.

The big agricultural powerhouses of China, India, U.S., Russia, and Brazil account for nearly half of the world's consumption. Total world consumption has been growing approximately 1.6% annually.

Global trade in fertilizers is significant, accounting for 10-15% of total production of nitrogen and phosphorus, and 75% for potassium. Brazil, India and the U.S. rank in the top 5 in terms of imports for each nutrient type, reflecting the large demand in those markets. Canada is a major potassium fertilizer producer and exporter, due to its large reserves. Russia and Belarus also play major roles as potassium

producers and exporters. For phosphorus, Morocco, Jordan, Peru and Egypt account for roughly two-thirds of world exports.

U.S. Domestic Fertilizer Industry

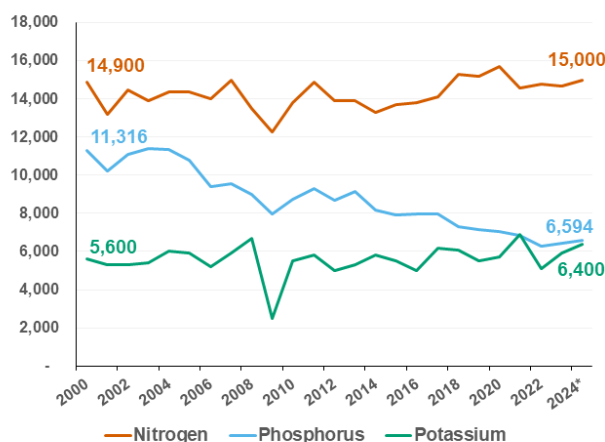
As discussed above, the U.S. is a major fertilizer producer, consumer, and importer. The U.S. has been steadily increasing its fertilizer consumption, primarily due to increasing crop production, particularly for crops like corn and wheat. As illustrated in Figure 1 (Panel A), total estimated consumption of N, P, and K in 2024 was 15,000, 6,594 and 6,400 metric tons of nutrient equivalent, respectively.

The U.S. is a major producer of nitrogen, and its production has increased 0.71% annually from 2000 to 2024, reaching a projected 14,000 metric tons in 2024. In contrast, U.S. production of phosphorus and potassium has trended down since 2000 as illustrated in Figure 1 (Panel B).

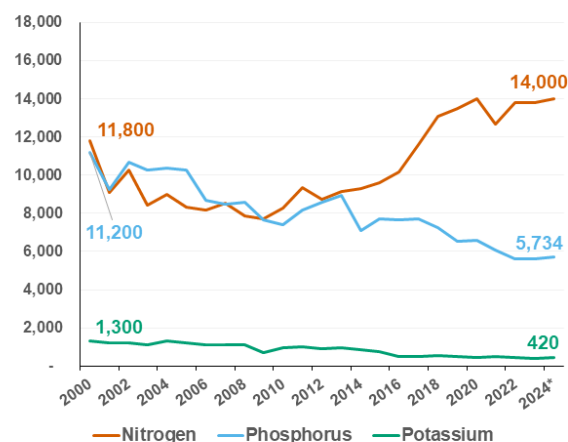
Figure 1. U.S. Consumption and Production of N, P and K, 2000-2024*

Note: Measured in nutrient equivalent metric tons

Panel A: Consumption



Panel B: Production



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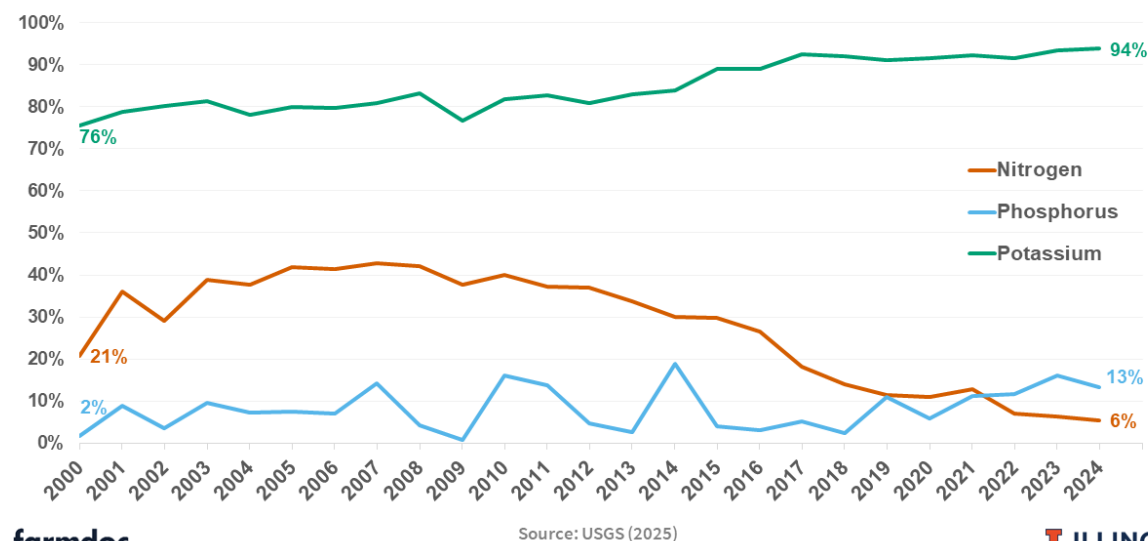
Source: USGS (2025)

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The result is that the U.S. relies on a mix of production and imports to supply its fertilizer demand. Figure 2 shows the average net import reliance (measured as imports minus exports plus/minus stock adjustments, shown as a percent of consumption) for U.S. fertilizer consumption by nutrient from 2000 to 2024.

Figure 2. U.S. Fertilizer Net Import Reliance, 2000-2024*

Net import reliance = imports – exports ± stock adjustments
Reported as % of consumption



The import reliance for potash is large, growing from 75.6% in 2000, to 93.8% in 2024. While import reliance for phosphorus is much lower, it has increased from 1.7% in 2000 to 13.3% in 2024. Nitrogen is the only major nutrient for which net import reliance has declined, in relative terms, over time from over 20% in 2000 to a projected 5.5% for 2024.

For phosphorus and potash imports, the U.S. relies heavily on Peru and Canada, respectively. For nitrogen the U.S. mainly relies on a balanced mix between Trinidad and Tobago and Canada, as shown in Table 3.

Table 3. U.S Fertilizer Import Sources (2020-2023)

Ammonia (N)		Phosphorus (P)		Potash (K)	
Trinidad and Tobago	51%	Peru	98%	Canada	79%
Canada	47%	Morocco	2%	Russia	11%
Other	2%			Belarus	4%
				Israel	3%
				Other	6%

Source: USGS (2025)

Discussion

Over the past 25 years, the global fertilizer market has steadily expanded. China, the U.S., Brazil, and India have emerged as major consumers, while China, Russia, the U.S., and Canada are key producers. However, despite their production capacity, countries like China, the U.S., Brazil and India continue to rely on imports to meet their fertilizer needs.

In the U.S., nitrogen and potash consumption has remained relatively flat, while phosphorus usage has declined. Crop production in the U.S. has continued to increase, mainly through productivity improvements (higher crop yields) as cropland acreage has been relatively stable. This implies increased fertilizer efficiency for U.S. crop production (see *farmdoc daily* [May 29, 2025](#)).

To meet domestic demand, the U.S. relies on a mix of production and imports. Notably, ammonia production has increased over the past 25 years, significantly reducing relative net import reliance. That places the U.S. in a better position in terms of exposure to global conflicts and disruptions that might affect farmers' access to nitrogen fertilizers.

However, as a global commodity, U.S. farmers still face significant price volatility. Price spikes—like those in 2022 (see *farmdoc daily* [April 5, 2022](#) and [September 12, 2023](#))—remain possible since production and global trade can be impacted by policy uncertainty (see *farmdoc daily*, [February 4, 2025](#)). Moreover, disruptions in large competitors such as Brazil, India and China can greatly impact global fertilizer prices.

In contrast, both domestic production and consumption of phosphorus have declined over time. Imports now account for more than 13% of the U.S. consumption (compared with less than 2% in 2000), with significant reliance on imports from Peru (98%). This heavy concentration on a single foreign supplier could present future supply risks.

The U.S. relies heavily on imports to meet its potassium demand. Canada supplies nearly 80% of U.S. imports, with another 15% being sourced from Russia and Belarus. The U.S. could face future supply risks with these partners. Examples include the Russia-Ukraine conflict (see *farmdoc daily* [April 5, 2022](#)) and ongoing tariff threats and uncertainty (see *farmdoc daily*, [February 4, 2025](#)). With net imports representing 94% of phosphorus consumption, trade disruptions could result in immediate and large impacts on supply and prices.

In 2025, fertilizer costs are projected to be 40% and 28% of total direct costs for corn and soybeans, respectively, in Central Illinois (see *farmdoc daily* [June 3, 2025](#)). While fertilizer prices are not the only factor influencing fertilizer use decisions (see *farmdoc daily* [July 22, 2025](#)), understanding the structure and risks of the U.S. fertilizer industry is essential. While farmers do not have direct control over the risks surrounding global fertilizer markets, understanding those markets can help to better manage those risks (see *farmdoc daily* [August 15, 2023](#)).

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