



Written Remarks of

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Senate Agriculture Committee

Hearing on

***“Perspectives on the Fertilizer Industry: Ensuring a Stable and
Affordable Supply for American Producers.”***

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Chairman Boozman, Ranking Member Klobuchar, and members of the Committee:

Thank you for holding this hearing. Thank you also for the opportunity to testify on behalf of The Fertilizer Institute (TFI), the trade association which represents the companies that supply the plant nutrients essential to American agriculture. We come before you not just as fertilizer producers and agribusiness retailers, but as partners to the nation's farmers who power the world's finest food production system.

The key thing to take away from this testimony is that the U.S. fertilizer industry supports market transparency. As an example of this ongoing support, TFI Stats offers members and subscribers access to historical aggregated datasets and insights, helping users understand the fertilizer industry; for more information, visit the TFI Stats web page. Similarly, TFI seeks to establish a federal means of accessing, aggregating, and reporting data on fertilizer industry trends to aid farmers, policymakers, and the public on a timely and consistent basis.

Importantly, that analysis must be global in scope. As the ongoing events in the Middle East make clear, disruptions to the global market directly impact American farmers. We believe that establishing this function would aid farmers in their planning and budgeting, while serving as an impartial resource for Congress and the public.

For several years, the U.S. fertilizer industry has pushed legislatively in both chambers and administratively at the U.S. Department of Agriculture (USDA) for the establishment of an economist position within the USDA's Office of the Chief Economist. The position will study and report on crop inputs, particularly fertilizer, across the complex global market in which these inputs are produced, traded, and applied.

Fertilizers sit at the center of a global system, and the past few years – especially the last few months - have exposed both just how interconnected and interdependent that system is. All market participants would benefit from knowing more about the market itself and the factors that impact it. Given the global complexities of the fertilizer market, better understanding will

further supply chain resiliency, limiting vulnerabilities by empowering market participants to make informed decisions.

Who We Are

TFI represents more than 250 companies throughout the entire fertilizer supply chain. This spans the fertilizer manufacturers and producers to retailers that serve farmers to ensure that precise nutrient prescriptions are delivered and applied in a timely manner. It additionally includes importers, wholesalers, technology developers, and others. In the United States, fertilizer production occurs in 30 states – Alabama, Arizona, Arkansas, California, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Mississippi, Nebraska, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wyoming.

TFI's members support more than 100,000 direct jobs and more than 450,000 indirect jobs across the country.¹ Each year our members pay \$36.5 billion dollars in wages to U.S. workers who are often among the most highly paid individuals in rural communities.²

The U.S. fertilizer industry operates in a highly competitive global market where the United States is a major producer, consumer, and trader. The U. S. is one of only three nations with 20 or more unique companies that produce fertilizer. With robust domestic production, the U.S. is the fourth largest ammonia producer (9% of global production) and fifth largest processed phosphate producer in the world (8% of global production). At the same time, our country operates as a major importer and consumer of fertilizer products with one of the world's most sophisticated logistics systems – integrating rail, barge, pipeline (ammonia), and trucking – to enable large-scale delivery to all key agriculture consuming regions. These conditions support strong competition and have helped ensure that the U.S. has experienced less severe physical

¹ "2024 Fertilizer Industry Economic Impact Study," The Fertilizer Institute, December 12, 2024. <https://www.tfi.org/insights/economic-impact>.

² "2024 Fertilizer Industry Economic Impact Study."

supply disruption than have regions that lack domestic production capacity, significant trade flexibility, or logistical scale.

What are Fertilizers?

Fertilizer is food for plants. It provides the nutrients necessary to nourish crops, increasing crop yields for farmers while also sustaining the soil for future crop production.

Plants need 17 elements, or nutrients, to complete their life cycle; 14 come from the soil, and the remaining three come from air and water. The nutrients most commonly needed as fertilizer to supplement soil supply are nitrogen (N), phosphorus (P), and potassium (K), which are referred to as primary macronutrients. N, P, and K are frequently combined into individual fertilizer products to suit specific crop and soil needs. For example, it is common practice to combine nitrogen (as ammonium) and phosphorus (as phosphate) into monoammonium phosphate (MAP) or diammonium phosphate (DAP). However, there are also distinct differences in production, supply, use, and other conditions of competition between the primary nutrient fertilizers:

- Nitrogen fertilizers are manufactured products, reliant on natural gas as the primary feedstock. The various nitrogen fertilizers are produced in more than 60 countries by more than 100 producers. Due to the advantage of today's reliable and abundant supply of domestic natural gas, the U.S. is the fourth largest nitrogen producing nation.
- The United States is also a large producer of phosphate, which is mined from geologic deposits of phosphate rock. Thirty countries around the world produce phosphate fertilizers (MAP, DAP, or triple super phosphate, commonly called TSP), but the top five countries account for over 80% of production: China (43%), Morocco (13%), Russia (9%), Saudi Arabia (8%), and the United States (8%).
- While the United States has some domestic production of potash (potassium deposits), it imported most of its domestic potash supply in 2025, as it has for decades. Only 15 countries produce potash, which is mined from geologic deposits. Canada (33%), Russia (19%), and Belarus (15%) are the dominant producers. Unlike the nitrogen and

processed phosphate markets, the top exporting nations closely follow the shares of global production.

TFI has provided additional information on these three essential plant nutrients at the end of this testimony in Addendum A. All three of these elements play essential roles in allowing plants to access the free energy of the sun through photosynthesis, and all three must be present in adequate amounts to ensure healthy crop growth and farmer productivity.

Today, it would be impossible to feed the planet without fertilizers.³ Indeed, about half of all food, fiber, and fuel from crops grown around the world is only made possible through the responsible use of fertilizers.

Supporting Farmers

Without farmers, there would be no fertilizer industry. Every day, farmers face mounting pressures— unpredictable weather, labor shortages, and global market disruptions. For many, those challenges seem to increase every year, despite the essential nature of farms and agriculture to our nation’s way of life and the economic vitality of rural America.

Fertilizer is one of a farmer’s most critical tools to promote plant growth and improve crop yield and productivity and to ensure farm profitability. When reliable supply of fertilizers is threatened, the ripple effects are felt in every corner of rural America. For that reason, we believe that a resilient and growing U.S. fertilizer industry is vital to support the American farmer. We live in these rural communities and share in the success and challenges that America’s growers experience.

Fertilizer is a Global Market, and it is Extremely Competitive

³ The nitrogen produced by the Haber-Bosch synthesis process for mineral fertilizers is vital for producing large crop yields. Scientific research published in 2008 estimated that the lives of nearly half of the world’s population (48%) are only made possible by Haber–Bosch produced nitrogen. ([Erisman et al., 2008](#)).

As explained by the USDA’s Economic Research Service last year, “U.S. fertilizer production and consumption—crucial for the productivity of U.S. agriculture—take place within a global fertilizer market.”⁴ Additionally, as stated in a 2022 Iowa State University study entitled *An Examination of Recent Fertilizer Price Changes*, “in the case of a homogeneous product, such as fertilizer where branding and product differentiation is not strong, firms compete more fiercely than in the case where customers show loyalty to one brand or another.”⁵ This highly competitive market with global supply and demand factors has been long been acknowledged through USDA research⁶ and multiple academic studies.⁷

The U.S. relies on a mix of domestic production and imported product to supply U.S. growers, with the relative share dependent on the product and the year. Currently, 65% of overall U.S. farmers’ fertilizer needs for nitrogen, phosphate, and potash are met by domestic fertilizer

⁴ See, e.g., Williams, Angelica, Collins, LaPorchia A., and Boline, Amy, “Drivers of Fertilizer Markets: Supply, Demand, and Prices,” U.S. Department of Agriculture (USDA) Economic Research Report Number 354 (Sept. 2025), accessed at https://ers.usda.gov/sites/default/files/_laserfiche/publications/113324/ERR-354.pdf?v=42889.

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Crespi, John, et al. “An Examination of Recent Fertilizer Price Changes”, Staff Report 22-SR 117 June 2022 Center for Agricultural and Rural Development Iowa State University Ames, Iowa 50011-1070 www.card.iastate.edu, <https://www.card.iastate.edu/files/publications/pdf/22SR117.pdf>, p. 15.

⁶ See, e.g., Huang, Wen-yuan, USDA Outlook Report from Economic Research Service, “Factors Contributing to the Recent Increase in U.S. Fertilizer Prices, 2002-2008,” (Feb. 2009), accessed at https://www.ers.usda.gov/webdocs/outlooks/35824/10935_ar33.pdf?v=9996 (“In an increasingly globalized market, changes in global supply and demand of fertilizer can lead directly to the rise and fall of U.S. fertilizer prices.”); Nti, Frank, “Impacts and Repercussions of Price Increases on the Global Fertilizer Market,” USDA Foreign Agricultural Service (June 2022), accessed at <https://www.fas.usda.gov/data/impacts-and-repercussions-price-increases-global-fertilizer-market> (“Russia and Belarus play critical roles in the global fertilizer market, accounting for nearly 20 percent of global exports.”).

⁷ See, e.g., Monaco, Henrique, Schnitkey, Gary, and Paulson, Nick, “U.S. Fertilizer Industry in Global Markets: Structure and Supply Risks” Department of Agricultural and Consumer Economics University of Illinois, accessed at <https://farmdocdaily.illinois.edu/2025/07/us-fertilizer-industry-in-global-markets-structure-and-supply-risks.html> (“Global trade in fertilizers is significant, accounting for 10-15% of total production of nitrogen and phosphorus ... as a global commodity, U.S. farmers still face significant price volatility. Price spikes—like those in 2022 []— remain possible since production and global trade can be impacted by policy uncertainty.”); Monaco, Henrique, Schnitkey, Gary, and Paulson, Nick, and Zulauf, Carl, “Fertilizer Prices Continue Decline and May Impact Farmers’ Nitrogen Decisions,” Department of Agricultural and Consumer Economics University of Illinois and Department of Agricultural, Environmental and Development Economics Ohio State University (Aug. 2023) accessed at <https://farmdocdaily.illinois.edu/2023/08/fertilizer-prices-continue-decline-and-may-impact-farmers-nitrogen-decisions.html> (“Much of the narrowing in premiums on urea and liquid relative to anhydrous in the first half of 2022 is linked to the Russia-Ukraine conflict, as there were significant disruptions and displacement of global fertilizer trade flows.”).

production. Additionally, the operating rates of U.S. fertilizer plants exceed global averages, meaning U.S. producers are supplying more fertilizer than if they operated at the lower rates of our global peers. Fertilizer demand is highly seasonal, while production is continuous, necessitating year-round trade. But on a net basis, the United States is an overall fertilizer importer. The U.S. is presently the fourth largest consumer and the fifth largest producer of fertilizer in the world.

American fertilizer companies compete fiercely with each other and with hundreds of global players in a robust, worldwide fertilizer market, which is dominated by countries such as China, India, and Russia. According to the International Fertilizer Association, in 2024, these countries accounted for 50 percent of global ammonia production (and 54 percent of urea production); China, Morocco and Russia combined for 65 percent of global processed phosphate (MAP, DAP & TSP) production; and, Canada, Russia, and Belarus combined for 67 percent of global potash production. Supply-side analysis is further complicated by the fact that major fertilizer producers are not always current major exporters, since countries with large agricultural sectors absorb more of their domestic output, but could export if conditions warrant. As the world's two largest consumers, China and India combine for 40% of global fertilizer use. This dynamic strongly influences trade volumes and global export shares, especially in nitrogen and phosphate markets. Even where major producers overseas are not exporting, their substantial production, starting with China and Russia with respect to ammonia and phosphate fertilizers, creates a chill on investments in new U.S. production.

Many foreign producers are state-owned, and foreign fertilizer production and consumption in many countries is shown to have received government subsidies and policies that challenge the market-based operations of the U.S. fertilizer industry.

When one looks at this graphic of fertilizer shipping routes, it's not hard to see the complexity of the global fertilizer market:



(source: IFA)

Fertilizer is a commodity sold in bulk, so farmers are largely unaware of its geographic source once it reaches their field. The nitrogen, phosphate, and potash made in the United States are physically indistinguishable from fertilizer that comes from Qatar, Russia or elsewhere in the world. As the previously mentioned 2022 Iowa State University study noted, buyers do not possess brand loyalty where nitrogen fertilizer is perceived simply as nitrogen fertilizer or phosphate fertilizer is perceived simply as phosphate fertilizer.⁸

Fertilizers and related plant nutrients are typically sold by domestic or foreign manufacturers to traders, wholesalers, co-operatives and independent fertilizer retailers, other fertilizer manufacturers, and industrial users. Wholesalers are firms that take large positions, *i.e.*, hundreds of thousands of short tons, and buy and sell fertilizers to other wholesalers, to retailers and sometimes to fertilizer producers. Retailers are firms that sell fertilizers primarily to farmers as end users. Retailers may be co-operatives or independent retail outlets and sell a host of products including fertilizer, seed, soil amendments, and crop protection chemicals.

⁸ Crespi, "An Examination of Recent Fertilizer Price Changes", <https://www.card.iastate.edu/files/publications/pdf/22SR117.pdf>, p.15

Current Geopolitical Impacts on the Global Fertilizer Market

While fertilizer is a global commodity, there are distinct differences in production, supply, use, and trade between the primary fertilizer products. Meanwhile, supply shocks have impacted global supply and demand for fertilizers over the last several years. Described below are a range of geopolitical events such as ongoing global conflicts across the Middle East and in Europe, government controls and/or subsidies, and other government policies affecting production, exports, and consumption along with the evolving nature of global trade policy.

Geopolitical events have been the biggest cause of disruption to the global fertilizer market in recent years.

- In addition to serving as another important fertilizer, sulfur is key for blending with phosphate rock to make phosphoric acid, which is the primary ingredient in all phosphorus fertilizers. Roughly 90% of global sulfur is used to produce sulfuric acid, of which, 60% is used for production of phosphate fertilizers. Ultimately, without sulfur, you don't have phosphorus fertilizer. Sulfur is also an important additive for combining with nitrogen to develop specialized fertilizers such as ammonium sulfate. However, costs to fertilizer companies for sulfur and sulfuric acid have risen more than 1,000% since early 2025. At the outset of 2026, the global sulfur market was already foreseeably suffering from constraints related to bullish global phosphate fertilizer production demand from China, Morocco, the United States, Brazil, and India. A growing factor was spiking demand from Indonesia where it is used to support the nickel and cobalt extraction industries. Compounding this constraint was limited supply growth in Russia and North America (U.S. & Canada), as major production and export areas. Going into this year, the exception was the Middle East. Now, in the second quarter of 2026, the ongoing ban on exports from Russia coupled with transportation-limited exports of sulfur from the Middle East have crippled the global sulfur market; these two areas combine to account for approximately 80% of global sulfur exports.

- The conflict in Iran has led to the nearly entire closure of the Strait of Hormuz, a narrow shipping channel through which approximately one-third of the world's exported fertilizers pass. The impact is especially felt on ammonia, urea, and processed phosphates. According to the International Fertilizer Association, in 2024, the share of exports from countries in the region that are either directly involved in the conflict or depend on the Strait as their primary shipping route accounted for 23% of global ammonia exports, 34% of global urea exports, 12% of global MAP exports, 14% of global TSP exports and 23% of global DAP exports. Further, about half of the world's sulfur supply passes through the Strait of Hormuz, which as noted above already faced significant supply pressures.
- Closure of the Strait of Hormuz has also impeded an estimated 20%⁹ of the world's supply of liquefied natural gas (LNG), the critical fuel and feedstock for nitrogen fertilizer production. This has important implications for fertilizer development in countries such as Pakistan, India, and Bangladesh. More than 40 ammonia plants in these countries have curtailed production by 10-30% over the last two months due to limited gas supplies, and another four have shut down altogether. The resulting inability to develop their own products forces those countries to further strain global availability of nitrogen fertilizers as they look elsewhere. Likewise, Iranian retaliatory missile strikes against neighboring countries have damaged natural gas transmission infrastructure and nitrogen fertilizer manufacturing facilities in countries such as Qatar.
- The war in Gaza has similarly limited sale of Israeli natural gas to Egypt that had gone into production of nitrogen fertilizers.
- China is the world's largest producer of fertilizers, producing 31% of the world's ammonia, 32% of the world's urea and 43% of the world's processed phosphates. China's growth as a fertilizer producer has developed over decades through a combination of factors, including resource advantages, high fertilizer tariffs, and government support. Prior to 2021, China was the world's largest exporter of MAP and

⁹ [The Iran war's impacts on global fertilizer markets and food production | IFPRI](#)

DAP and had been among the top three exporters of nitrogen globally.¹⁰ In 2021, however, China began imposing export restrictions on its fertilizer products. China's state-supported, non-market driven buildup of substantial capacity and their subsequent government mandated export restraints have been highly disruptive to the global market, while chilling the growth of market-based capacity expansions elsewhere. These disruptions continue in 2026. In December 2025, China announced that it would not export MAP, DAP and TSP fertilizers until at least August 2026. In mid-May, as a major exporter of sulfuric acid, China announced that it would halt exports through the end of 2026.

- India subsidizes its farmers, procuring fertilizer through a centralized government buying tender and then making it available to Indian farmers. The government issues a tender for a specific volume of product, on behalf of major phosphate and potash fertilizer companies of India under a consortium-based approach to imports. Suppliers, who must be manufacturers or traders/suppliers holding a mandate from manufacturers, then supply quotes to supply that tender at specific volumes. On April 21st, the government booked 2.5 million tons of urea via a tender issued on April 15th. On April 24th, India announced an import tender for 1.2 million tons of DAP and 0.4 million tons of TSP. Similarly, India now also has an outstanding tender for 0.3 million tons of Ammonium Sulfate. The scale of these orders dramatically exceeds the buying power of individuals throughout the rest of the world.
- The Russian war in Ukraine has also been highly disruptive. Russia is the largest global supplier of fertilizers (about 16% of global supply), and that supply chain was significantly impacted at the onset of the war due to sanctions many nations imposed on Russia. Russia retaliated by restricting Europe's natural gas supply, which Europeans relied upon for their fertilizer production. This resulted in approximately 70% of Eastern and Central European nitrogen fertilizer production shutting down in 2022 due to high natural gas costs. As described earlier where the decline in natural gas availability has

¹⁰ For example, Chinese nitrogen exports represented nearly 30% of all nitrogen trade in 2014-2015 (reaching 14 MMT out of 47 MMT). Further, Chinese phosphate exports represented 30% of all phosphate trade in 2014-2015 (reaching 8 MMT of 26 MMT).

caused growers in Pakistan, India, and Bangladesh to look to the global market for fertilizer purchasing, Europe similarly has been forced to do so. More recently, since September of last year, Ukraine has damaged Russian fertilizer production facilities in the Krasnodar, Smolensk, and Volgoda regions.

- Natural gas prices in Europe, shipping challenges, and natural gas shortages in Trinidad and Tobago are among other factors impacting the supply of fertilizers globally and in the United States.

Going forward in a very complex and ever-changing market situation as U.S. farmers complete their Spring fertilizer applications, TFI foresees that continued global conflicts, geopolitics, and government interventions are likely to impact the fill and application periods this Fall. TFI maintains this further demonstrates the benefits of establishing a Crop Inputs Economist at the USDA to provide transparency.

Fertilizer Supply and Demand Dynamics

Both imported and domestically produced fertilizer are subject to global market dynamics. American farmers utilize a mix of domestic production and imported fertilizer where the relative share is dependent on the product and the year. Currently, 65% of overall U.S. farmers' nitrogen, phosphate, and potash needs are met by domestic fertilizer production. The rest comes from imports. Especially due to the peak demand of fertilizer application seasons, the U.S. is a net importer of fertilizers.

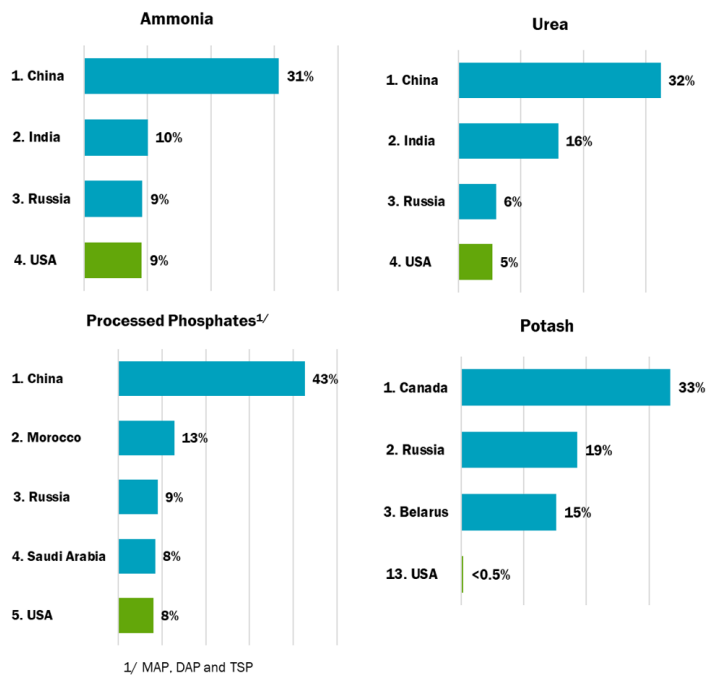
For two of the three macronutrients, nitrogen and phosphorus, the U.S. has significant resources and abundant production capacity. While U.S. reserves of the third macronutrient – potassium, supplied as potash – are limited, Canada has reserves that are the largest in the world. Nitrogen fertilizer in the form of ammonia was produced by 18 companies at 38 plants in 19 states across the U.S. during 2025.¹¹ In 2025, phosphate rock ore was mined by five

¹¹ <https://pubs.usgs.gov/periodicals/mcs2025/mcs2025-nitrogen.pdf>

companies at 10 mines in four states. In 2025, potash products were produced by three companies at five sites in two states.

Top Global Fertilizer Producers, 2024

Data Source:
International Fertilizer Association



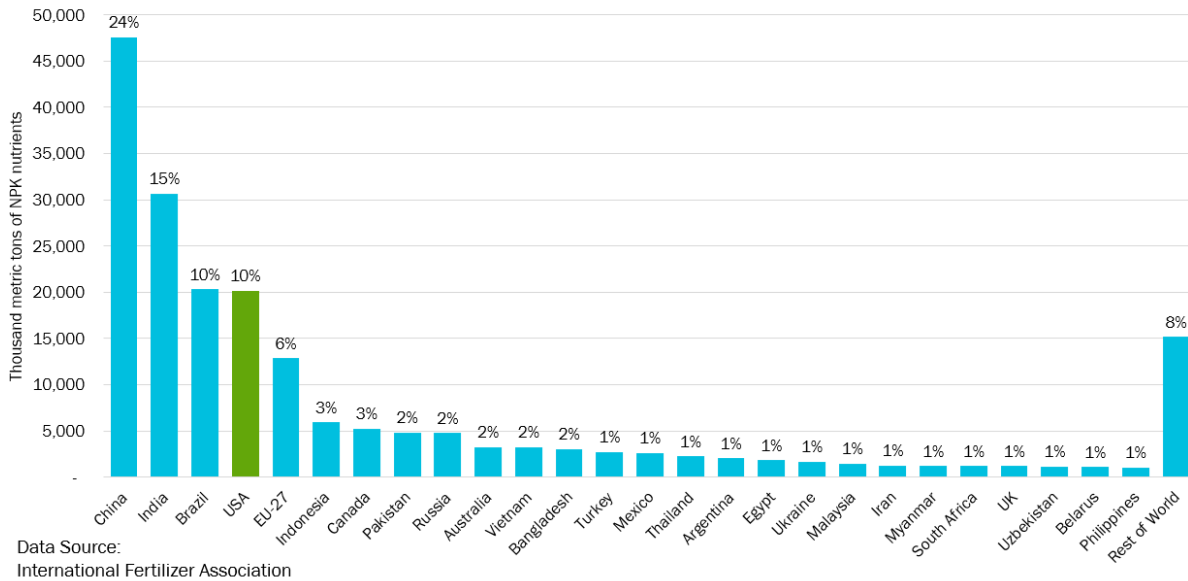
Since different crops require different nutrients in differing amounts, shifts in U.S. acreage between individual crops year-over-year can alter overall U.S. fertilizer demand, as well as relative demand between nutrients and specific fertilizer products. Sizable shifts towards crops with higher average nutrient demand per acre, like corn, and away from crops with lower average nutrient demand per acre like soybeans, have led to significant increases in U.S. fertilizer demand. Corn (~50%), soybeans (~11%), wheat (~10%) and cotton (4%) combined account for approximately 75% of U.S. fertilizer use.

Due to improvements in standards of living, worldwide crop production has dramatically increased significantly over the course of several decades.¹² Ninety percent of global fertilizer consumption now occurs outside of the United States. As noted earlier the two largest consumers, China and India, combine for nearly 40% of global use. High prices for globally

¹² Crespi, "An Examination of Recent Fertilizer Price Changes", <https://www.card.iastate.edu/files/publications/pdf/22SR117.pdf>, p. 2

traded agricultural commodities not grown at scale in the United States are giving farmers in other parts of the world significant purchasing power in the global fertilizer market.

Global Fertilizer Consumption, 2023



Building Production: What the Fertilizer Industry is Doing

TFI’s members have a deep commitment to meeting the needs of America’s farmers and America’s food supply that can be seen in our investments in fertilizer production and distribution throughout the United States. Just as U.S. farmers are among the most efficient and innovative in the world, so is the U.S. fertilizer sector.

Fertilizer production is highly capital-intensive. Every year, U.S. fertilizer producers are investing billions of dollars to maintain and upgrade their facilities; that investment has helped foster the reliability and strong capacity utilization of the U.S. industry and has, in many cases, expanded U.S. production over nameplate capacity, all of which is making more fertilizer available to America’s farmers. Over the past decade, billions of dollars have also been invested to expand U.S. production capacity of fertilizers and beneficial plant nutrients, including in states

represented on the Agriculture Committee such as Arkansas, Minnesota, Alabama, California, Georgia, Illinois, Iowa, Kansas, Kentucky, Michigan, Mississippi, North Dakota, Pennsylvania, and West Virginia.

Even just since the beginning of 2025, billions of dollars of fertilizer industry investment in new U.S. greenfield production have also been announced with additional production capacity coming online by 2029. Further production expansions are in earlier stages of development although several may face legal challenges as they move through the painstaking permitting process.

These major investments are made for the long term, with U.S. production sites operating for decades due to significant capital spending on maintenance and improvements. The fertilizer industry's investment and commitment to strong and safe operations means that U.S. farmers have access to more critical crop nutrients in a timely manner.

Beyond Production: Our Ongoing Partnership, American Farmers, and the 4Rs

The U.S. fertilizer industry has a long history of problem solving, and we're regularly innovating to build and improve systems that help farmers get the most out of every dollar they spend on fertilizer and to promote the commercial and environmental sustainability of our products and the broader agricultural sector. TFI and its members invest in agronomic research aimed at helping to identify and fine-tune the products and field practices that maximize farmers' investment in our products, while also reducing environmental impacts.

Farmers work closely with their agricultural retailer's advisors to determine the source, rate, timing, and placement of fertilizers. These decisions have real financial impacts for growers, and as such, the relationships between farmer and advisor are deeply rooted in trust. These ties define our presence in thousands of rural communities, and our identity as an industry.

Our commitment to scientific research has benefited American farmers’ agricultural productivity and environmental stewardship. Decades of scientific investment, supported by industry, led to the development of the “4R Nutrient Stewardship Framework”—applying the right nutrient source, at the right rate, at the right time, and in the right place. During the span of 2013 to 2020, TFI members invested \$13 million in the 4R Fund for public research.

This approach, rigorously validated through research, is now widely accepted by farmers, industry, policymakers, and federal agencies (including USDA-NRCS) as an effective conservation practice. The tangible outcomes of 4R research are clear: these principles help farmers increase crop yields, use resources more efficiently, reduce costs, and lower environmental impacts. Nearly 65 million acres of U.S. farmland are currently under active management using 4R Nutrient Stewardship practices, and the fertilizer industry and farmers are hard at work continuing to build on this number.¹³

Washington has a Role through Policies to Grow the Industry

Recent supply chain disruptions to fertilizers underscore the need for transparent, timely, independent, and authoritative analysis to better inform farmers, policymakers, and other stakeholders about conditions in the fertilizer market. Accordingly, as noted throughout this testimony, TFI seeks establishment of a full-time Crop Inputs Economist position within the Office of the Chief Economist at the USDA. The position will serve as a liaison to growers, Congress, and other relevant federal agencies and stakeholders. The economist will be able to analyze fertilizer and fertilizer product supply, demand, and price data to provide farmers and market participants with timely, accurate, and reliable market information. Additionally, the economist will develop and schedule market reports addressing supply and demand trends, pricing indicators, and related market research to facilitate more informed decision-making across agriculture stakeholders. Through this work, USDA can promote resilience across the fertilizer supply chains.

¹³ “Sustainable Farming Surging as Growers Drive 4R Adoption,” The Fertilizer Institute,” June 18, 2025, <https://www.tfi.org/media-center/2025/06/18/sustainable-farming-surging-as-growers-drive-4r-adoption/>.

USDA has long played a critical role in collecting and disseminating fertilizer supply and demand data and should serve as a critical resource for agricultural trends in this critical input. However, over time there has been a significant change in the nature of the data collected, a reduction in the level of detail collected, and a slackening pace of release. These changes have dramatically reduced the usefulness of fertilizer data disseminated by USDA to all users.

Prior to the mid-1980s, USDA collected and published a wealth of information about the fertilizer sector. This information was not provided in one single fertilizer report, but instead fertilizer information was produced across several recurring publications and statistical survey reports. In 1985, USDA began cutting back on its collection and reporting of fertilizer data and a shift toward integration of fertilizer data into general farm input and economic reporting. This began with dropping the Commercial Fertilizer Report, then dropping dedicated outlook/situation reports on fertilizer and finally with eliminating monthly price reporting for 30 different fertilizer products in the Agricultural Prices report. In place of the surveys that collected aggregate data, USDA introduced farm-level reports. These do provide useful metrics. Unfortunately, however, those reports have become increasingly sporadic over time. The result is a significant gap in fertilizer market information that has not been adequately filled elsewhere.

What we are left with is less data released less frequently, leading to less information for all market participants. A return to more dedicated, focused, timely and detailed reporting on the fertilizer market would substantially aid in this effort of increasing transparency. As TFI outlined recently in comments to a USDA Request for Information, this could be achieved through targeted revisions to its existing data products, as well as the development of new tools and datasets designed to better inform stakeholders and improve market visibility.

In addition to our support for enhancing market transparency, TFI has long called for government policies that enable and support the expansion of domestic fertilizer production to

grow our industry, strengthen our domestic supply chains, and support American farmers. TFI has identified a range of policy actions that can be taken in the near term to ease fertilizer supply challenges and constraints. Doing so will help support farmers' access to these critical crop inputs, both as we continue through spring application and planting season and look to the fall application and fall seasons.

Earlier this year, TFI wrote President Trump outlining seven actions the Administration could take to help reduce disruptions to the fertilizer supply chain, both for American farmers and globally:

1. Preferential, safe passage of vessels carrying all kinds of fertilizers through the Strait of Hormuz regardless of vessel flag, vessel ownership, or destination.
2. Use the U.S. International Development Finance Corporation and the Export-Import Bank as appropriate to provide cargo and hull insurance for all vessels carrying fertilizer, as well as, for fertilizer insurance and financing.
3. Collaborate with industry to ensure adequate supplies through reliable import channels of phosphoric acid; ammonia, urea, sulfur, and sulfuric acid products from Venezuela and elsewhere; and, of granular boron and boric acid from countries such as Turkey.
4. Temporarily support movement of LNG exports to Europe, India, Pakistan, Egypt, and Bangladesh from other destinations to limit shutdowns due to gas prices; doing so will enable nitrogen fertilizer producers to continue to produce while limiting supply shocks to large global fertilizer consumers.
5. Temporarily suspend the Jones Act for fertilizer transportation.
6. Provide temporary regulatory flexibility where legally permissible to facilitate U.S. production and transportation of fertilizer, including to allow hours of service exemptions and prioritization of fertilizer shipments on railways and barges during peak weeks.
7. Maintain continued seamless trade between the U.S. and Canada to prevent any fertilizer supply bottlenecks.

TFI appreciates the actions already taken by the Administration, including the now extended waiver of the Jones Act. With the extension in place, more companies can utilize an expanded pool of vessels to move fertilizer and fertilizer inputs between domestic locations.

Other ongoing actions across the Administration can streamline the permitting process for fertilizer projects, all while maintaining important environmental protections. Last year, the Trump administration designated both phosphate and potash as Critical Minerals, Key to establishing this designation was support led by Senators Ernst and Slotkin, and including Chairman Boozman along with Senators Hoeven, Marshall, Justice, Grassley, Moran, Fischer, Hyde-Smith, and many more bipartisan lawmakers from across the Senate and House. We are grateful for this important designation and the support it received across the Congress. Amending the outdated critical minerals list subject to the production tax credit under Section 45X of the Internal Revenue Code to include the new 2025 List of Critical Minerals will provide an important incentive to mining for these fertilizer minerals. With regard to nitrogen manufacturing, TFI supports additional actions, similar to the President's Executive Orders on *Unleashing American Energy* and *Declaring a National Energy Emergency*, to expedite permitting and increase domestic production of nitrogen fertilizers.

Over the longer term, Congressional and Administration efforts at permitting reform will be another important step forward. Enacting durable and broad-based reform this year will have a real impact on the advancement of domestic fertilizer projects and their related infrastructure, moving from plans on paper to producing crop nutrients. The current process to apply for, review, and obtain all the permits needed to begin construction of a phosphate mine took a TFI member more than a decade and cost approximately \$30 million. In other countries, the average time for a phosphate mine to move from concept through construction to production is four to five years. Similarly, the construction of a new nitrogen fertilizer plant can require as many as 30 federal and state permits and the process too often entails legal filings intended to obstruct progress. We are encouraged by legislative progress that has been made, both in the House with passage of the SPEED Act and the PERMIT Act and here in the Senate where

bipartisan negotiations continue across multiple committees. TFI also hopes to see actions to prioritize permits involving the U.S. Army Corps of Engineers and other agencies. Similarly, we seek regulatory certainty to issues such as a final definition of the Waters of the United States. We encourage the Administration to continue important progress in these areas.

Congress has additional opportunities to do more as the industry looks to continue to grow production here in the U.S. The Farm Bill presents an opportunity to modernize USDA programs to help farmers meet the up-front costs of new technologies or to incentivize adoption of nutrient management practices. TFI supports the work of many on this committee who are championing policies that accelerate adoption of 4R nutrient stewardship practices and innovations that help U.S. farmers maximize the value of their fertilizer investments. In this regard, TFI looks forward to continuing to work with the Committee to advance the Farm Bill effort going forward.

TFI also supports a broad range of additional policy actions across several other areas to strengthen the competitiveness and support the growth of the U.S. fertilizer industry.

- Infrastructure is vital to keep fertilizer moving and support fertilizer production, distribution and end-use by farmers. We urge action to accelerate the delivery of U.S. Army Corps lock modernization projects, channel deepening, and maintenance dredging. Our inland waterways are essential to the movement of nitrogen (urea & UAN) and MAP & DAP phosphate fertilizers, with some states seeing 100% of their purchased nitrogen fertilizers delivered by inland waterways. TFI has been a leading voice supporting the enactment of a long-term surface transportation reauthorization that includes investments in weight-limited and capacity-constrained first- and last-mile roads and bridges in farm country. The older infrastructure common in rural areas means delays, increased costs, and safety challenges for farmers, supply chains, and rural communities. We also urge effective action by the Surface Transportation Board to reduce systemic rail delays and provide competitive and affordable rates.

- Fertilizer producers also require access to specialized capital equipment to maintain, modernize, and construct new production facilities on a competitive basis with foreign producers. Fertilizer production—particularly ammonia—operates under extreme temperatures and pressures, and it relies on very large-scale equipment to achieve efficiency and reliability. As a result, many components must meet highly specific technical, safety, and performance standards. Some of the specialized equipment required for ammonia and other fertilizer facilities is not currently manufactured at commercial scale in the United States, nor can it be readily reshored within the timeframes needed to respond to U.S. supply requirements. In addition, technology licensors frequently require fabrication by approved manufacturers to support performance guarantees and warranties. Against that backdrop, section 232 tariffs on steel and aluminum, Section 122 tariffs, and the potential expansion of Section 301 tariffs can materially increase the cost of fertilizer manufacturing investments where domestic alternatives are not commercially available. Given the importance of expanding reliable U.S. fertilizer production, TFI looks forward to working with the Administration and Congress to reduce unnecessary cost burdens and improve the ability of the United States to attract new fertilizer production.

Review of Recent Senate Bills and Additional Suggestions

Several bills aimed at strengthening transparency across fertilizer markets and driving increased domestic production capacity have been introduced in the Senate. These proposals reflect a growing recognition that U.S. fertilizer supply chains face structural and geopolitical risks that require a coordinated policy response. Taken together, these measures represent meaningful efforts toward improving market visibility, reducing reliance on foreign sources, and ensuring long-term supply security for American agriculture. The following section outlines TFI’s review of these legislative proposals, along with additional policy options under consideration that could further reinforce domestic production and resilience. With regard to both *The Fertilizer Research Act* and *The Fertilizer Transparency Act*, TFI hopes further discussions can lead to the

establishment of the Crop Inputs Economist position that will enable the transparency and reporting that growers, Congress, and the fertilizer industry each seek.

1. *The Fertilizer Research Act* (S. 2808). As stated throughout this testimony, TFI supports transparency to aid growers, the public, and policymakers. Further, TFI supports efforts to restore USDA reporting, as noted above. Toward that end, TFI appreciates the efforts and the willingness to engage on these matters demonstrated by Senator Grassley and his staff, as well as those of the other cosponsors. Among other requirements, the bill would mandate an Economic Research Service study.

As we have communicated elsewhere, our views of the language involve at a minimum:

- a. TFI believes the focus of this legislation needs to be broadened, as the impact of global events in the Middle East makes clear.
- b. Under §2(a)(1) requirement for USDA reporting, TFI supports returning to increased USDA reporting as noted throughout this testimony, and TFI supports establishment of a USDA Crop Inputs Economist as the most administrable way to do so.
- c. §2(a)(4)(A-C) - Information called for under (A) is currently available from the U.S. Census Bureau; however, some of it under (B) is highly confidential business information (CBI) that would violate the Census Bureau's disclosure requirements. In fact, it would contradict the CBI exclusion clause appearing at the end of the bill. Information under (C) would also violate the current Census Bureau disclosure rules.
- d. §2(a)(5) – This information is currently available from the Census Bureau.
- e. §2(a)(6) – TFI notes the Iowa State University in 2022 that addressed industry concentration, pricing, et al., concluded that excessive concentration in the fertilizer sector was not occurring.
- f. §2(a)(7) – Emerging fertilizers and technologies exist in a nascent and currently fragmented market where field research is often ongoing. Fertilizer efficiency is also dependent on a range of other factors such as weather, soil type, and seed.

It will be very difficult for USDA to provide meaningful reporting where no defined dataset presently exists.

- g. §2(a)(9) -- Requirement for USDA reporting. TFI supports returning to increased USDA reporting as noted throughout this testimony. A USDA Crop Inputs Economist would be the most effective way to address this provision.
2. *The Fertilizer Transparency Act* (S. 4152). TFI similarly thanks Senators Thune, Klobuchar, et al. and each of the respective committee and personal staffs for their efforts at improving market transparency as well as for providing opportunities to engage directly and to offer feedback. TFI reiterates once again its support for transparency and for reporting through the USDA. At the same time, as currently drafted, the bill creates a new mandatory reporting regime that would place differential burdens on the many parts of the fertilizer supply chain, potentially advantaging foreign producers over domestic production and supply, and would not provide accurate price transparency as sought.

Considerable portions of the bill are adapted directly from provisions set forth in the Livestock Mandatory Reporting (LMR) Act. TFI notes these provisions apply to an industry more focused on matters such as negotiated purchases on a spot market, forward contracts, and formula marketing arrangements than on international trade and availability of global supply as is the case in the domestic and global fertilizer markets.

By contrast, fertilizer markets operate across a global supply chain with materially different commercial practices (both across and within the major fertilizer products) and through multiple sales levels as described in detail on page 8. Sales are made both through advance contracting as well as spot sales, with seasonal delivery, and pricing that may be set months before physical movement of product and well before on-farm application. These timing relationships vary across fertilizer products and regions and are influenced by global supply, demand, trade and logistics considerations. For example, some fertilizers can be typically priced at the manufacturer level with a forward shipment date to a wholesaler or retailer that is six months in the future, when spot and retail prices may differ substantially. As drafted, the approach in *The Fertilizer*

Transparency Act would likely result in commingling of prices from different contractual periods, potentially overstating short-term price signals, and creating confusion rather than transparency for farmers.

To the extent industry consolidation is a significant concern, TFI notes that a 2019 Congressional Research Service Report concluded that 20 years after enactment of the LMR, “The LMR study found that the meatpacking industry *has become more concentrated and vertically integrated since LMR was established.*”¹⁴ Where TFI has heard congressional concerns with housing an economist within USDA’s Office of the Chief Economist related to cost and limited staffing availability, TFI notes that USDA’s AMS already issues a tremendous number of weekly LMR reports.¹⁵ Further, the employee count at this agency was significantly affected through the DOGE process. TFI’s research indicates that the LMR Program already consumes 15–20% of USDA’s AMS budget; meanwhile, *The Fertilizer Transparency Act* would establish a similarly complex reporting structure at AMS.

As we have communicated elsewhere, our views of the language involve at a minimum:

- a. Under §2(a), Definitions –
 - i. §2(a)(1) “Affiliate” carries a 5% threshold related to manufacturing. Not only is this standard much lower than exists elsewhere throughout much of federal law, it is lifted directly from the LMR. As noted, TFI is uncertain about the applicability of the LMR framework to crop inputs.
 - ii. §2(a)(3) “Marketed” is defined as “the sale or other disposition” of fertilizer within the U.S. This definition, including the “sale or other disposition” reference is lifted almost verbatim from 7 USC 1635a, which pertains to livestock subject to slaughter.
 1. “Sale or other disposition” is not defined.

¹⁴ [Livestock Mandatory Reporting Act: Overview for Reauthorization in the 116th Congress | Congress.gov | Library of Congress](#)

¹⁵ [Livestock Mandatory Reporting Background | Agricultural Marketing Service](#), (“AMS then issues over 300 market reports each week detailing livestock and meat price trends, contracting agreements, and supply and demand conditions.”)

2. “Fertilizer product” is not defined.
- iii. (4) “Retailer” is defined as “a person or entity that primarily sells fertilizer products at retail.”
 1. “Retail” itself is undefined.
 2. Later, in a provision that appears to contradict the definition, retailers not engaged in manufacturing are exempted. However, TFI notes that retailers engaged in blending are not addressed. This omission is significant because fertilizer blenders may be treated as manufacturers for reporting purposes under other laws and regulations. For example, under the Emergency Planning and Community Right to Know Act (EPCRA) where fertilizers intended for blending “are held for the purpose of producing a different fertilizer.”
 - iv. “Manufacturer” is not defined.
 - v. “Domestic manufacturer” and “foreign manufacturer” are not defined. It is unclear whether a fertilizer manufacturer that has both U.S. and non-U.S. headquarters qualifies as either domestic or as foreign.
- b. §(b)(1) -- The call for “reliable, timely, and transparent market information” is adapted directly from the provisions regarding livestock reporting in 7 USC 1635. TFI supports reliable, timely, and transparent market information even while raising concern for the applicability of the LMR template to crop inputs.
 - c. §d -- The weekly reporting requirement is modeled on the LMR. This framework is not well suited to a globally traded commodity that growers do not purchase on a weekly basis throughout the year.
 - d. §f -- As currently drafted, the weekly dashboard where farmers and market participants could view data reported to the Secretary contains no global pricing context. The dashboard would not provide market participants with the most accurate picture of the market.

3. *The Homegrown Fertilizer Act (S.4148)* --TFI welcomes the objectives of this legislation to expand fertilizer production and supply in the United States. Considering major new fertilizer production typically runs into the billions of dollars, TFI believes the current draft focuses on small dollar amounts that will not be sufficient to serve the intended purpose. The limited success of the Fertilizer Production Expansion Program also demonstrates that exclusion of existing major producers limits the growth of supply. As explained above, it is always necessary to account for global production, where all U.S. producers represent a small percentage. Some of our members have also indicated that given the liquidity of U.S. capital markets, it is not new grants and loans that are required to spur new fertilizer production in the United States, but more policy certainty and a level playing field when it comes to foreign producers. Finally, if the funding levels are to remain low, a possible solution would be to broaden eligibility to include funding for fertilizer storage and transportation infrastructure – such as rail-served ammonia storage hubs and terminal improvements – that directly impact the reliability and seasonal availability of fertilizer for U.S. farmers.
4. *The Plant Biostimulant Act (S. 1907)*. This legislation represents an important and necessary step toward modernizing the U.S. regulatory framework to support innovation, sustainability, and productivity in American agriculture. Plant biostimulants are an emerging and highly promising category of agricultural inputs. As defined in the bill, biostimulants are substances or microorganisms that enhance a plant's natural processes—improving nutrient uptake, increasing tolerance to abiotic stresses such as drought and extreme temperatures, and ultimately supporting plant growth and yield independent of their nutrient content. Their potential to improve nutrient use efficiency and reduce environmental losses makes them a promising tool as farmers face increasing pressure to produce more with fewer resources. However, despite their clear benefits, biostimulants currently lack a consistent federal definition and regulatory pathway in the United States. This ambiguity has created significant barriers to innovation, investment, and commercialization. Without clarity, product developers face uncertainty in bringing new technologies to market, and

growers lack confidence in product consistency and claims. *The Plant Biostimulant Act* directly addresses this gap by directing the U.S. Environmental Protection Agency to establish a uniform definition for plant biostimulants and clarify their regulatory status. Critically, the legislation also amends the Federal Insecticide, Fungicide, and Rodenticide Act to ensure that biostimulants are not inappropriately regulated as pesticides. Biostimulants are not intended to prevent, destroy, or mitigate pests; rather, they enhance natural plant processes. Misclassification under pesticide law imposes unnecessary regulatory burdens that stifle innovation and delay access to beneficial technologies for farmers.

Globally, other major agricultural economies—including Canada, the European Union, Brazil, and India—have already established clear regulatory frameworks for biostimulants under fertilizer or supplemental product laws. The United States risks falling behind in the development and adoption of these technologies if it does not act to provide similar clarity and certainty. The Plant Biostimulant Act ensures that U.S. policy keeps pace with international standards while maintaining strong safety and efficacy oversight.

The benefits of biostimulants extend beyond productivity gains. These products play a vital role in advancing climate-smart and sustainable agriculture practices. They support soil health, enhance microbial activity, and improve plants' ability to utilize nutrients efficiently. This aligns directly with the principles of 4R Nutrient Stewardship—using the right fertilizer source, at the right rate, at the right time, and in the right place—which is widely recognized as a cornerstone of resilient and environmentally responsible farming systems.

Moreover, as growers contend with increasingly volatile weather patterns and environmental stressors, biostimulants provide a practical tool to improve crop resilience and maintain yields under challenging conditions. Their adoption can help stabilize farm productivity while contributing to a reduced environmental footprint of agricultural production—an outcome that benefits farmers, consumers, and the broader ecosystem alike.

The *Plant Biostimulant Act* provides a clear, science-based framework that will unlock innovation, reduce regulatory uncertainty, and accelerate the adoption of sustainable agricultural technologies. By establishing a uniform definition and appropriate regulatory pathway, Congress can ensure that American farmers have access to the tools they need to remain competitive, productive, and environmentally responsible.

5. *Phosphogypsum Reuse*. TFI urges the committee to approve language both authorizing the use of phosphogypsum (PG) in government road construction projects and directing further scientific evaluation of its additional beneficial uses. This kind of legislation represents a commonsense, science-based approach to advancing sustainability, improving resource efficiency, and supporting American agriculture.

Phosphogypsum is an unavoidable byproduct of the phosphate fertilizer production process. For every ton of phosphoric acid produced approximately five tons of PG are generated, making it the highest-volume byproduct of the fertilizer industry. As demand for fertilizer continues to grow alongside global food needs, the volume of PG will likewise increase, making responsible, beneficial reuse not only an environmental opportunity but an operational necessity. In 2020, the U.S. Environmental Protection Agency approved a petition submitted by industry for the use of PG as a road base material, based on a comprehensive and rigorous risk assessment. That assessment was determined by EPA career staff to be highly accurate and demonstrated that the risks associated with using PG in road construction are no greater than those posed by existing management practices, such as stacking or mine placement. Importantly, the subsequent withdrawal of that approval in 2021 was based solely on procedural considerations—not on any new scientific findings or concerns with the underlying risk assessment.

TFI recommends language that would direct the EPA Administrator to reinstate that original approval, consistent with the findings published in the Federal Register (85 Fed. Reg. 66550, October 20, 2020). This action would restore a science-based decision, provide regulatory certainty, and enable the safe and productive reuse of a material that would otherwise remain underutilized.

Beyond its application in road construction, phosphogypsum holds significant promise for agricultural use—particularly as a soil amendment. Farmers across the United States could benefit from access to PG as a tool to improve water retention, address soil acidity, and provide a valuable source of sulfur, an essential nutrient for crop production. These benefits are especially important as growers face increasing pressure to improve soil health, enhance nutrient efficiency, and adapt to more variable weather conditions. However, additional clarity and scientific evaluation are needed to fully unlock these opportunities. That is why the second provision of this legislation—directing EPA to conduct a risk assessment for additional uses, including as a soil amendment—is both prudent and necessary. A thorough, science-driven review will ensure that any expanded uses meet appropriate safety standards while allowing farmers and producers to benefit from innovative, sustainable practices.

This kind of legislation would strike the right balance restoring a previously validated, low-risk use of phosphogypsum in infrastructure while laying the groundwork for future applications that could deliver meaningful environmental and agricultural benefits. It reduces waste, promotes circular resource use, and supports both domestic fertilizer production and farm productivity.

Conclusion

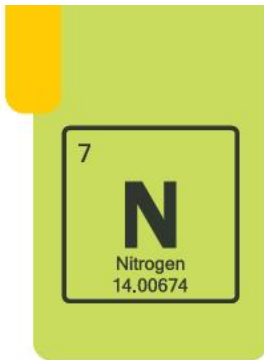
Just like the crops that fertilizers feed, fertilizer is produced, bought, and sold a highly competitive global market as is long recognized by the U.S. Department of Agriculture, international competition bureaus, and leading academic researchers.

TFI appreciates this hearing to spotlight issues that are critical to the American farmer, and we want to be part of the solution. We believe that smart policy can strengthen domestic production and ensure that American farmers have access to the fertilizer necessary for crop production and, ultimately, farm profitability.

If this testimony leaves you with only one final thought, TFI hopes it will be that the U.S. fertilizer industry supports transparency. Through TFI Stats, TFI currently makes data and insights available to market participants. For several years, we have also pushed legislatively in both chambers and administratively at USDA for the establishment of an economist position, within the Office of the Chief Economist, to study and report upon crop inputs, and fertilizer in particular. This position would monitor global trends, engage in data aggregation and reporting, and provide foreseeability to aid farmers in their planning and budgeting, while serving as a resource for Congress and the public.

We appreciate the Committee's attention to these issues and look forward to working together to build greater transparency. I welcome your questions and thank you for the opportunity to speak on behalf of those who serve the backbone of our food system.

Addendum A



NPK: The Building Blocks of Plant Growth
The Three Essential Nutrients Every Plant Needs

NITROGEN (N)

THE GROWTH DRIVER

Core Components of Fertilizer

To grow, stay healthy, and produce food, plants need 17 essential nutrients. Three of those elements—carbon, hydrogen and oxygen—are obtained through the air and water. The remaining 14 have to come from the soil through the plant's roots. Three primary nutrients — Nitrogen (N), Phosphorus (P), and Potassium (K) — often called "macronutrients", are needed in larger amounts than other nutrients and make up the bulk of all fertilizer produced. Together they form the foundation of plant nutrition.

What is Nitrogen (N)?

Nitrogen-based fertilizers are primarily manufactured through the Haber-Bosch process, a method developed over 100 years ago to create ammonia by heating and pressurizing nitrogen from the air over a hydrogen source (typically from natural gas). The resultant ammonia is further processed to create nitrogen fertilizers in solid and liquid forms. (source: IFA)

Why Nitrogen Matters

Nitrogen is a fundamental element in proteins, which make up all plant and animal tissues.

- ☑ Drives leaf and stem growth
- ☑ Fuels plant development
- ☑ Builds proteins and chlorophyll (the green pigment that captures sunlight)
- ☑ Encourages fast, healthy growth and high yields

The nutritional quality of food — from grains to vegetables — depends heavily on an adequate nitrogen supply.



Nitrogen Market Intelligence

Nitrogen is necessary for plant growth, and it helps crops manufacture proteins and boosts crop yields. The U.S. is a large producer of nitrogen, the fourth largest ammonia producer of the 63 countries that produce ammonia, the building block of all nitrogen fertilizers. Most ammonia production is heavily dependent on natural gas as the primary feedstock. Because ammonia is produced in so many countries and regions, the average global import reliance for nitrogen is the lowest of the three major macronutrients, though there is a significant range across countries.

For example, Brazil imports nearly all its nitrogen fertilizer, while China supplies nearly all its nitrogen fertilizer domestically. Among specific nitrogen fertilizers there can be a significant difference between the countries that are top producers of nitrogen and those that are top exporters. Many products are utilized in the United States to deliver nitrogen, but three products account for about 90% of consumption, each roughly accounting for about 30% of consumption: anhydrous ammonia, urea and nitrogen solutions (UAN).

Anhydrous Ammonia (82% nitrogen and the principle building block for all nitrogen fertilizers):

TOP PRODUCERS

China (31%), India (10%), Russia (9%), and U.S. (9%)

TOP EXPORTERS

Trinidad and Tobago (18%), Saudi Arabia (14%), Indonesia (10%), Algeria (7%), and U.S. (6%)

US APPROXIMATE
IMPORT RELIANCE
SHARE:

11%

TOP U.S. IMPORT SOURCES:

Canada (52%) and Trinidad and Tobago (42%)



Remaining Top 4 Importers Import Reliance Share: China (1%), India (11%), and Brazil (74%)

Urea (45% nitrogen):

TOP PRODUCERS

China (32%), India (16%), Russia (6%), and US (5%)

TOP EXPORTERS

Russia (18%), Iran (11%), Qatar (11%), Saudi Arabia (8%), and Egypt (8%).
The U.S. is the 13th largest exporter

US APPROXIMATE
IMPORT RELIANCE
SHARE:

36%

TOP U.S. IMPORT SOURCES:

Russia (27%), Qatar (22%), Saudi Arabia (10%), Algeria (10%), and Canada (8%)



Remaining Top 4 Importers Import Reliance Share: China (1%), India (11%), and Brazil (74%)

UAN (between 28% and 32% nitrogen):

TOP PRODUCERS & EXPORTERS

Global data is unavailable for UAN.

US APPROXIMATE
IMPORT RELIANCE
SHARE:

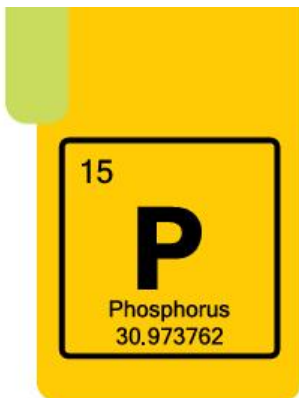
20%

TOP U.S. IMPORT SOURCES:

Russia (46%), Trinidad and Tobago (28%), and Canada (22%)



Learn More - The Fertilizer Institute (TFI) - #MadePossibleByFertilizer



NPK: The Building Blocks of Plant Growth
The Three Essential Nutrients Every Plant Needs

PHOSPHORUS (P)

ESSENTIAL FOR PLANT ENERGY AND GROWTH

Core Components of Fertilizer

To grow, stay healthy, and produce food, plants need 17 essential nutrients. Three of those elements—carbon, hydrogen and oxygen—are obtained through the air and water. The remaining 14 have to come from the soil through the plant's roots. Three primary nutrients — Nitrogen (N), Phosphorus (P), and Potassium (K) — often called “macronutrients”, are needed in larger amounts than other nutrients and make up the bulk of all fertilizer produced. Together they form the foundation of plant nutrition.

What is Phosphorus (P)?

Phosphorus-based fertilizers come from phosphate rock, a naturally occurring mineral mined from geologic deposits. The rock is treated with sulfuric acid to release phosphorus and produce phosphoric acid — a key ingredient that can be combined with ammonia and sulfur to create various fertilizer products, including monoammonium phosphate (MAP), diammonium phosphate (DAP), and triple superphosphate (TSP).

Why Phosphate Matters

Phosphate plays a vital role in how plants convert sunlight into energy and supports:

- ☛ Photosynthesis and energy transfer
- ☛ Root development and seed formation
- ☛ Cell division, cell enlargement, and the transfer of genetic information



Phosphorus Market Intelligence

The U.S. is also a large producer of phosphate, which is mined from geologic deposits. There are 30 countries that produce phosphate fertilizers (MAP, DAP, TSP), but the top five producers account for over 80% of production. The top phosphate producers are China (44%), Morocco (14%), Russia (9%), Saudi Arabia (9%), and the United States (8%). There are 22 countries that export phosphate fertilizers with the leading exporters being Morocco (30%), China (21%), Saudi Arabia (16%), Russia (15%), and the United States (4%).

Since 2021 there has been a significant shift in the global phosphate market when leading producer and exporters, China and Morocco, began delivering fewer nutrient tons of processed phosphates to the global market than in recent years. In 2024, China and Morocco exported 1.9 million fewer metric tons of MAP and DAP to the world than in 2021. Other significant global exporters like Saudi Arabia and Russia have increased exports but have been unable to replace lost exports from China and Morocco.

There have been fewer nutrient tons of processed phosphates exported to the world every year since 2021. More specifically, 2024 exports were 7% below the 2021 level, 2023 exports were 10% below the 2021 level and 2022 exports were 18% below 2021 exports. This is despite the fact that global production in 2024 exceeded 2021 levels by 4%.

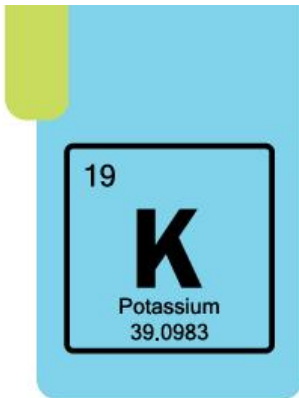
In the U.S. growers predominantly use MAP and DAP, though TSP usage is growing. This is relevant because phosphate fertilizer production in some major producing and exporting countries, like Morocco, has increasingly shifted towards TSP. For example, in 2020, 11% of Morocco's processed phosphate exports were TSP. By 2024, that share had grown to 24%. Although the TSP market remains smaller than the market for DAP and MAP, a noticeable shift in production towards TSP is occurring.

In 2024, the U.S. accounted for approximately 8% of global imports of P₂O₅. Most of the 2024 imports have come from Saudi Arabia (38%), Israel (13%), Mexico (12%), Jordan (9%), and Egypt (6%).

Imports accounted for 41% of the U.S. phosphate supply in 2024.

In Summary

Phosphate fertilizers are essential to modern agriculture — fueling root development, photosynthesis, and energy transfer in plants. But because production is geographically concentrated and global trade is shifting, access and affordability can fluctuate, influencing fertilizer prices worldwide.



NPK: The Building Blocks of Plant Growth The Three Essential Nutrients Every Plant Needs

POTASSIUM/POTASH (K)

THE PROTECTOR

Core Components of Fertilizer

To grow, stay healthy, and produce food, plants need 17 essential nutrients. Three of those elements—carbon, hydrogen and oxygen—are obtained through the air and water. The remaining 14 have to come from the soil through the plant's roots. Three primary nutrients — Nitrogen (N), Phosphorus (P), and Potassium (K) — often called "macronutrients", are needed in larger amounts than other nutrients and make up the bulk of all fertilizer produced. Together they form the foundation of plant nutrition.

What is Potash?

Potassium-based fertilizers originate from potassium chloride, also known as **potash**. Potash is mined from geological deposits of evaporite minerals, which were formed when ancient seas and saltwater lakes evaporated millions of years ago — leaving behind layers rich in potassium salts (mainly potassium chloride). After potash is mined, it's refined into different fertilizer products and shaped into small, uniform granules so farmers can apply it easily and plants can absorb the nutrients more efficiently.

Plants Need Potash to:

- ☞ Grow stronger
- ☞ Withstand drought stress
- ☞ Fend off insects and disease
- ☞ Use water more efficiently
- ☞ Improve yield and quality

When plants have adequate potash, they are healthier, more resilient, and more productive.



Potash Market Intelligence

While the United States has some domestic production of potash, it imported most of its domestic potash supply in 2024, as it has for decades. Only 16 countries produce potash, which is mined from geologic deposits, but Canada (33%), Russia (22%) and Belarus (15%) are the dominant producers. Unlike the nitrogen and processed phosphate markets, the top exporting nations closely follow the shares of global production.

THE TOP EXPORTERS OF POTASH IN 2024 WERE:

Canada (39%), Russia (19%), Belarus (18%)



The United States accounted for about 15% of all potash imports globally in 2024, making the U.S. the third largest importer of potash after Brazil (23%) and China (22%). Most U.S. potash imports come from Canada (86%), Russia (11%), and Israel (2%). Globally, reliance on imports as a source of total supply is the highest in potash of the three major macronutrients (NPK). In 2024, the global reliance on imports as a source of total potash consumption was 80%.

For example, potash is the only macronutrient that China, the world's largest fertilizer consuming country, imported as a significant share of supply. To contrast with the other macronutrients, China imported 67% of the nation's total potash supply, but less than 1% of its nitrogen and processed phosphate supplies.

In Summary

Potash ensures **food security and crop resilience** — but global supply concentration makes trade stability essential. Strong partnerships and open markets help keep nutrients available and affordable for farmers everywhere.

[Learn More - The Fertilizer Institute \(TFI\) – #MadePossibleByFertilizer](#)