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Report Name: Brazil Agriculture Seeks Remedies for Potential Fertilizer Disruptions

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Report Highlights:

Brazil is a powerhouse agricultural producer, ranking among the top three global exporters for a host of commodities. To support its massive agribusiness sector, Brazil relies on imported inputs, including fertilizers. Annually, Brazil imports over 80 percent of its total fertilizer needs. The Russian invasion of Ukraine has substantially elevated the risk of disruption to the global fertilizer trade. In Brazil, there is rising concern that growers may not be able to expand the crop planted area in the 2022/23 season. Without critical nutrients such as potash, Brazil will also see lower crop yields. In recent months, Brazil has engaged in international diplomacy, striking deals with Iran and Russia to maintain fertilizer flows. To reduce the sector's dependence on imports, the government has also developed a National Fertilizer Plan, though the implementation is expected to take decades.

Brazil is a powerhouse agricultural producer, ranking among the top three global exporters for such crops as soybeans, corn, and sugar, as well as beef, chicken, and pork meat. To support its massive agribusiness sector, Brazil relies on imported inputs from machinery to agricultural chemicals. The dependence on imported inputs is most acute for fertilizers. Annually, Brazil imports 85 percent of its total fertilizer needs. More than 70 percent of all fertilizers are used in the cultivation of three crops: soybeans (44 percent), corn (17 percent), and sugar cane (11 percent).

Over the last several months there has been increasing concern not only about the rising fertilizer prices but also potential disruption to the global fertilizer trade. The disruption in global fertilizer supply is associated with a host of reasons: production bottlenecks owing to the COVID 19 pandemic, protectionist trade measures by important producers, as well as geopolitical tensions. The potential risk of fertilizer disruption to Brazil rose substantially with the Russian invasion of Ukraine in February 2022. Russia is a leading global supplier of fertilizers, and Brazil sources about a quarter of its fertilizers from Russia.

Brazil's Fertilizer Requirements & Strategy

The main commercial fertilizers are derived from the so-called “big 3” primary nutrients: nitrogen (N), phosphorous (P), and potassium (K). Taken together, they are known as NPK formulas. The modern agricultural practice uses these primary nutrients in large amounts plus secondary macronutrients: Calcium (Ca), Magnesium (Mg) and Sulfur (S); and micronutrients: Boron (B), Chlorine (Cl), Copper (Cu), Iron (Fe), Manganese (Mn), Molybdenum (Mo), Zinc (Zn), Cobalt (Co), Silicon (Si) and other elements to ensure plant health and proper maturation. Brazil imports almost 96 percent of its nitrogen, 55 percent of its phosphorus, and 97 percent of its potassium. In the event of disruption to trade, the Brazilian growers point to potassium as being the most problematic to source.

In March 2022, the Government of Brazil (GoB) is expected to unveil the National Fertilizer Strategy, designed to decrease the country's dependency on NPK imports. The Geological Survey of Brazil (SGB-CPRM) prepared several scenarios to reduce the national dependency on imports to 60 percent by 2050. The main thrust of the strategy is to attract private investment into the sector. The local media indicate that Brazil intends to bring the strategy to the Organization for Economic Cooperation and Development (OECD) to discuss ways of attracting international and national investors to Brazil's domestic fertilizer market.

Recognizing that import needs will remain substantial even in the long term, the GoB has cultivated partnerships with key suppliers of fertilizers: Canada, China, Morocco, Russia, and Belarus among others. In February 2022, high-placed Brazilian officials visited Russia and Iran, striking deals to keep fertilizer supplies flowing. However, the risk of force majeure to these contracts remains. According to Brazilian press sources, Minister Tereza Cristina stated on March 3 that fertilizer trade with Russia was suspended as Brazil “has no way to pay for products, nor ships to load. As long as there is war, the possibility of receiving fertilizers is totally ruled out.”

Nitrogen (N): Essential for the formation of protein, nitrogen is considered the most crucial of the big 3 nutrients.

Raw Materials and Production: Natural gas is the main ingredient required to make nitrogen fertilizer. In several transformation steps, hydrogen from natural gas is mixed with nitrogen from the air to form ammonia, an intermediate product. Ammonia is then further processed into two main end products - ammonium nitrate and urea. Different fertilizer types can be manufactured by further mixing nitrogen-derived substances with other nutrients.

Trade: Brazil imports 96 percent of its nitrogen fertilizer needs. Brazil sources almost 100 percent of its nitrogen fertilizer from Russia. Brazil sources both the intermediate product ammonia, as well as end products ammonium nitrates and urea.

Ammonia: At roughly 4.5 million tons shipped, Russia accounts for around 24 percent of global ammonia exports as of 2020. Many other countries produce ammonia, and market analysts generally anticipate that any disruption to shipments of ammonia from Russia will be easily substituted by other markets.

Ammonium Nitrates: Russian exports various grades of ammonium nitrate and accounts for around 40 percent of all global nitrate trade as of 2020. Of that volume, roughly half was shipped to Brazil. Russia is Brazil's only supplier of ammonium nitrate. However, nitrates are also produced in Europe, the United States, and China. As Brazil is in Southern Hemisphere, the different seasonality from Europe and the United States may allow it to take advantage of the global nitrate capacity outside peak application timeframes of the Northern Hemisphere.

Urea: Russia supplies 21 percent of Brazil's urea imports. However, Brazil does have alternative suppliers. Urea is commonly produced and exported by various countries in Africa, the United States, as well as by Russia. In its National Fertilizer Strategy, Brazil identified the United States as a potential source for ammonia and urea imports.

Domestic Capacity: According to the Brazilian press coverage of the 2022 National Fertilizer Plan, operating at full installed capacity, Brazil's local nitrogen fertilizer production could meet 17.6 percent of the country's current consumption needs. The actual production is much lower. In 2020, Brazil produced 224,000 tons of nitrogen fertilizers, an amount that could meet just over 4 percent of the country's demand in the same year. Brazil currently has three operational nitrogen units:

- Unigel's Camacari unit, in Bahia state, has an installed capacity of 475,000 tons per year of ammonia and another 475,000 tons per year of urea.
- Unigel's Laranjeiras unit, in Sergipe state, has an installed capacity of 650,000 t tons per year of urea, 450,000 tons per year of ammonia, and 320,000 tons per year of ammonium sulfate.
- Yara has an installed capacity of 211,000 tons per year of ammonia and another 416,000 tons per year of ammonium nitrate.

National Fertilizer Plan: Natural gas prices are a major factor in enabling the production of ammonia and urea. Brazil will also need upfront investment to expand the number of nitrogen-producing plants and their capacity. Brazil intends to increase nitrogen installed capacity up to 2.8 million tons by 2050. To reach that volume, the GoB plans to attract at least two more nitrogen producers to Brazil by 2030, and another four by 2050. The government seeks to attract at least \$10 billion to increase nitrogen production and output of raw materials by 2030, and the same amount each decade by 2050.

PHOSPHORUS (P): Facilitates photosynthesis, which enables the plant to use and store energy.

Raw Materials and Production: Phosphorus-based fertilizers are produced from mined ores. Phosphate rock is primarily treated with sulfuric acid to produce phosphoric acid, which is either concentrated or mixed with ammonia to make a range of phosphate (P₂O₅) fertilizers.

Trade: Along with Morocco and China, Russia is a key global provider of phosphates. Russia accounts for around 17 percent of the total global trade in finished phosphate fertilizers. Russia is also the largest global producer and supplier of high-grade igneous phosphate rock. Brazil is the single largest buyer of phosphate fertilizers from Russia. Any interruption of the exports of phosphate rock from Russia would have an immediate and significant impact on especially European fertilizer production. The result would drive up global scarcity and prices of phosphate fertilizers.

Domestic Capacity: Currently Brazil has five phosphate fertilizer producers.

National Fertilizer Plan: By 2030, the government envisions at least five auctions of mining areas for phosphate fertilizers. The National Strategy also outlines plans for an addition of two phosphate fertilizers and raw materials producers in new mining areas by 2030, totaling seven producers and increasing that number to 10 by 2040. The goal is to increase phosphate rock exploration by three percent each year through 2030, and by two percent each year until 2050. Brazil intends to enhance its phosphate rock production to reach 27 million tons per year by 2050.

POTASSIUM (K): Strengthens root systems, helping plants resist disease, cold, and dry weather; potassium increases crops' quality and yields.

Raw Materials and Production: As is the case with phosphorous, potassium-based fertilizers are produced from mined ores. Several chemical processes can be used to convert the potassium rock into plant food, potassium chloride, sulfate, and nitrate. Potash is sourced from various mined and manufactured salts that contain potassium in water-soluble form.

Trade: Brazil imports over 11 million tons of potash annually, of which 5.5 million tons come from Belarus and Russia. Post contacts note that disruption to potash imports would be the most problematic, as the top suppliers account for the majority of the global market.

Global trade in potash is very concentrated; Canada is the world's leading exporter of potash, with a roughly 20 percent market share. Together, Russia and Belarus account for about a third of global potash exports. Notably, Belarus is already subjected to sanctions on its potash exports. Thus, any disruption to

Russian potash shipments would have a significant effect on the global availability of potash. Market estimates that global shortfall would be on the order of 30 percent and would not be made up for from other sources.

Domestic Capacity: Brazil's main potash deposits with exploration potential mapped so far are located in Sergipe and Amazonas states and account for around three percent of global deposits. Brazil has only one potash producing unit, in Sergipe state, owned by Mosaic Fertilizantes; its production reached around 9.5 million tons in 2020.

National Fertilizer Plan: By 2030, the government wants to enable at least five auctions of mining areas of potassium fertilizers. Brazil aims to raise national production gradually through 2050 to six million tons of installed capacity. To reach that volume, the goal is to double to 10 the amount of potash and raw materials producers by 2030, adding another 10 producers by 2040.

Attachments:

No Attachments.