



GLOBAL FERTILIZER MARKETS AND POLICIES: A JOINT FAO/WTO MAPPING EXERCISE

1 INTRODUCTION

1.1. In the last 10 years, the global economy faced multiple interconnected crises. The frequency and intensity of conflict, climate variability and weather extremes, and economic slowdowns and downturns have increased and are undermining food security and nutrition around the world. According to *The State of Food Security and Nutrition in the World 2022*¹, the number of people affected by hunger globally rose to as many as 828 million in 2021, an increase of about 46 million people since 2020 and 150 million since the outbreak of the COVID-19.

1.2. The uneven economic recovery in 2021 across countries, slowdown in the global growth in 2022 and inflation higher than seen in several decades are further exacerbating existing inequalities and worsening the food security situation. Looking at regional patterns, Africa bears the heaviest burden. One in five people in Africa (20.2% of the population) faced chronic hunger in 2021, compared to 9.1% in Asia, 8.6% in Latin America and the Caribbean, 5.8% in Oceania, and less than 2.5% in Northern America and Europe.

1.3. The war in Ukraine has dealt a severe blow to the global economic outlook in the midst of the post-pandemic recovery, aggravating supply chain problems, impacting trade flows, raising trade costs, as well as inflationary pressures on the prices of energy, agricultural products and fertilizers.² The Russian Federation and Ukraine are among the most important producers of agricultural commodities. Both countries are net exporters of agricultural products, and they both play leading supply roles in global markets of foodstuffs. Furthermore, the Russian Federation is a key player in the energy sector and the world's largest fertilizer exporter, ranking in 2021 as the top exporter of nitrogen (N) fertilizers, the second leading supplier of potassium (K) fertilizers (with Belarus being the third) and the third for phosphorous (P) fertilizers. With prices of fertilizers and other energy-intensive products being exacerbated by the conflict, overall input prices are experiencing a considerable boost.³

1.4. Agricultural production is energy intensive. It uses high amounts of energy directly through on-farm fuel, natural gas and electricity, or indirectly by using agrichemicals such as pesticides, lubricants and fertilizers (for instance, natural gas plays a primary role in the production of N-fertilizer). The recent surge in agricultural input prices is raising concerns about rising costs of food production, since changes in production costs readily translate into changes in food prices.⁴

1.5. In this context, rapidly increasing input prices, especially for fertilizers and energy derived from fossil fuels, have put additional upward pressure on world food prices, with negative consequences for global food security. The surge in world food prices is reflected in the rising FAO Food Price Index (FFPI), which reached its highest level on record in March 2022 since 1990, although it has declined in the subsequent months.⁵

1.6. The increase in fertilizer prices, which tends to be more rapid than the increase in the prices received by farmers, is also squeezing producer margins. This could imply, in turn, a lower affordability and input use by farmers, leading to additional issues of food availability and compounding the food access problem.

¹ FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022*. Repurposing food and agricultural policies to make healthy diets more affordable. Rome, FAO.

² See WTO, document WT/TPR/OV/W/16 dated 13 July 2022.

³ FAO 2022, Information Note. The importance of Ukraine and the Russian Federation for global agricultural markets and the risks associated with the current conflict 25 March 2022 Update. Rome, FAO.

⁴ OECD/FAO 2022. *OECD-FAO Agricultural Outlook 2022-2031*. Paris, OECD.

⁵ FAO 2022, FAO Food Price Index drops for the sixth consecutive month. Rome, FAO.

1.7. The situation is particularly severe in Africa, where countries are heavily dependent on imported agricultural inputs and smallholders account for a large share of agricultural production, many of whom are food insecure themselves. For many consumers, high input prices may mean lower quantities and/or quality of consumed food, and hence growing hunger and malnutrition, as well as less financial means for other necessities such as health and schooling. Curtailing such important expenditures could send communities into a vicious cycle of deepening food insecurity and poverty, with potentially irreversible effects.⁶

1.8. With only eight years left under the Sustainable Development Goals to end hunger, food insecurity and all forms of malnutrition, the world is moving in the wrong direction. It is estimated that nearly 670 million people would still be undernourished in 2030 – 8% of the world population, which is the same percentage as in 2015 when the 2030 Agenda was adopted.

1.9. Undoubtedly, the use of mineral fertilizers has played a key and historical role in raising agricultural productivity, thus contributing to food security globally. While such fertilizers have come under increasing scrutiny because of their harmful environmental impacts, and despite efforts to reduce their use through innovative agroecological practices, today only a few alternatives are both commercially viable and widely available. As such, amid the ongoing crisis, countries prone to food insecurity have no other short-term options than to support their use.

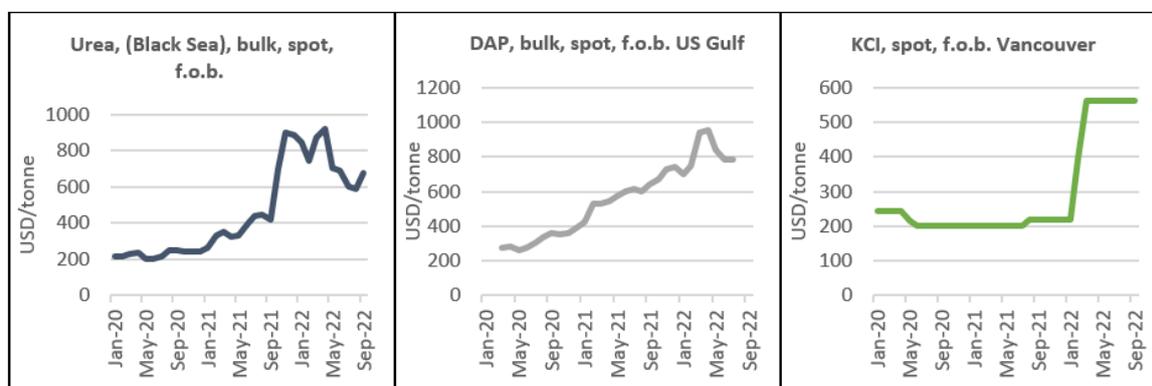
1.10. These pressing challenges must be addressed collectively. Consequently, G20 governments are urged to deploy all available tools and mechanisms to lay the foundation for further progress towards ending hunger and malnutrition. To this end, a number of actionable recommendations are outlined in Section 4.

2 FERTILIZER MARKET OUTLOOK

2.1 Setting the scene: soaring global fertilizer prices in 2021/2022 for N-nitrogen, P-phosphorous and K-potassium

2.1. International fertilizer benchmark prices began gathering momentum in 2020 and then soared in mid-2021 with many quotations reaching all-time highs month after month. The most notable increases have been registered for nitrogen (N) fertilizer, with nominal prices of N-urea having risen more than threefold since the beginning of 2020 – Black Sea spot prices (bulk) were quoted at USD 215/tonne in January 2020 and then at USD 678/tonne in September 2022 (Figure 1 - left panel). Prices for phosphorous fertilizer (P) have risen in tandem. Those for diammonium phosphate, or DAP, a key composite P-fertilizer, have almost trebled, from USD 265/tonne to USD 752/tonne over the same period (Figure 1 – centre panel). While the price increase for DAP fertilizer reflects higher prices for its N-component, there was also an equal effect from higher P-fertilizer prices. By contrast, prices of potash (K-fertilizer) remained less affected until the beginning of 2022, with the benchmark spot price of Potassium Chloride (KCI) even decreasing slightly from USD 245/tonne in January 2020 to USD 221/tonne in January 2022. But, in March 2022 the benchmark price surged to USD 563/tonne (Figure 1 – right panel) and has remained at this level ever since.

Figure 1: Spot price trends for key N, P and K fertilizers, Jan 2020 to Sep 2022



Source: Index Mundi.

⁶ Josef Schmidhuber and Bing Qiao, 2022. Rising input prices add unwanted pressure on the already fragile global food economy. Food Outlook – Biannual Report on Global Food Markets, November 2021. Rome.

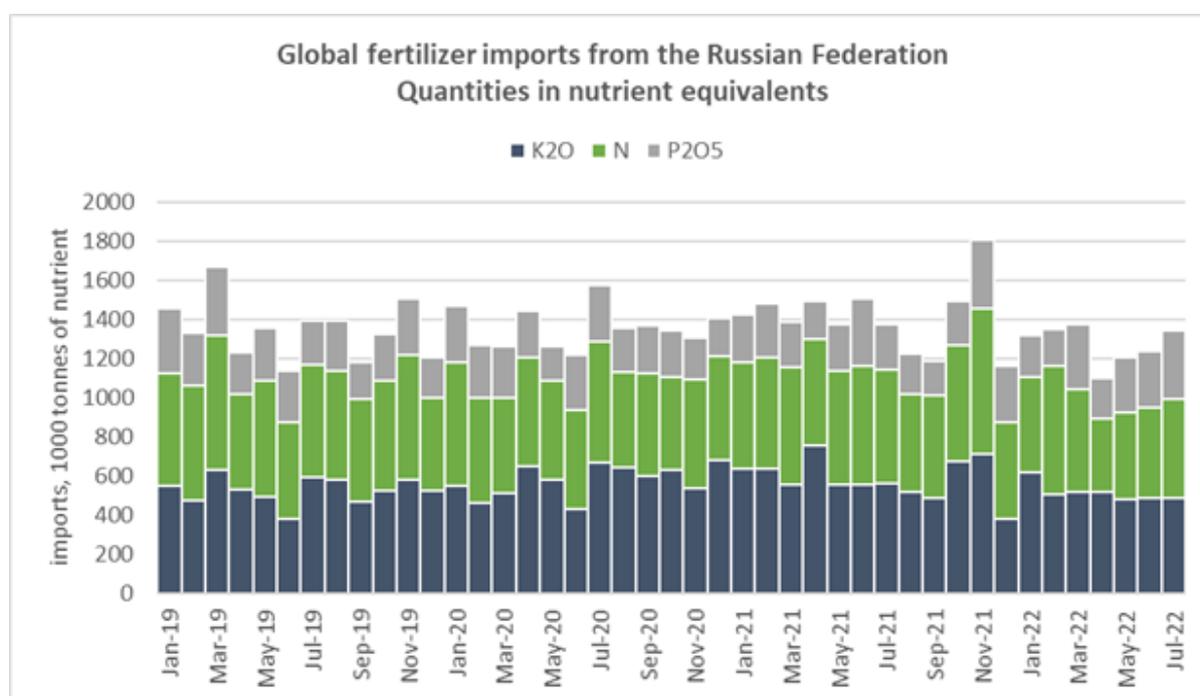
2.2 Supply and demand situation in 2022-23

2.2. Overall, international fertilizer supplies are likely to remain restricted in 2022/23 since stocks are low and geopolitical tensions have led to additional supply restrictions, giving rise to concerns about both reduced fertilizer availability and access, as well as adverse effects on food production and food security. Overall market tightness and pressure on quotations could conceivably extend into several crop seasons ahead; that said, on-farm demand in major importing countries has been easing over the third and fourth quarter of 2022⁷, resulting in rising stocks and downward pressure on prices for practically all major nutrients.

2.2.1 Current situation

2.3. With the war in Ukraine still ongoing, there is a widespread perception that exports from the Russian Federation might decline. However, based on mirror statistics⁸, at least during the first seven months of 2022, fertilizer exports from the Russian Federation showed no significant reduction in *volumes* (Figure 2). Due to higher international prices in the first half (H1) of 2022, the *value* of Russian fertilizer exports has even increased.

Figure 2: Global fertilizer imports from the Russian Federation, volumes disaggregated by nutrient (N – nitrogen; P2O5 – phosphate; K2O – potash)



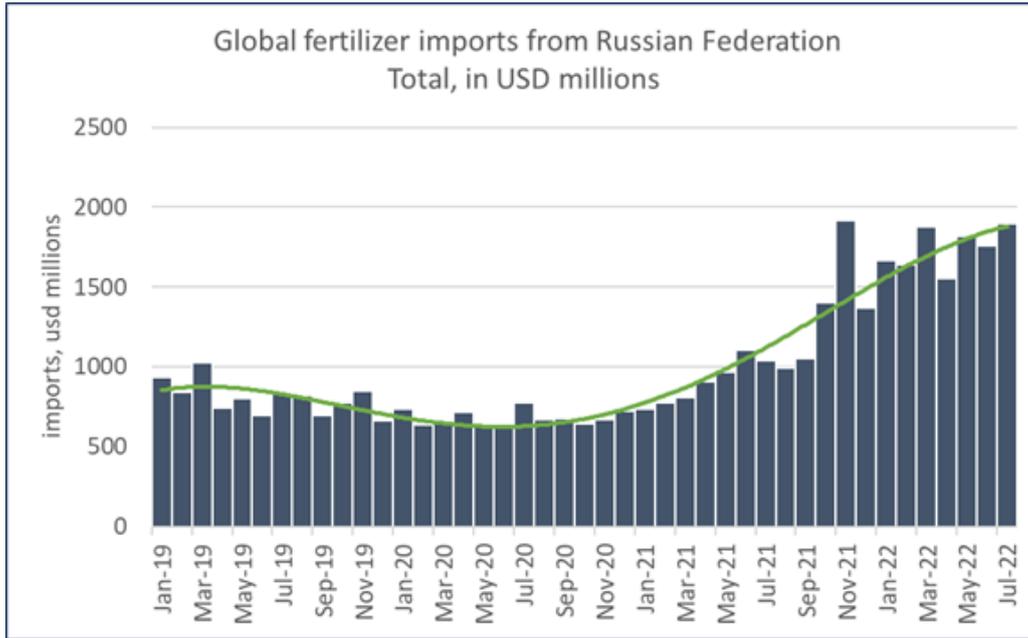
Note: Exports from the Russian Federation are the sum of the imports reported by all of its trading partners since no export data are available for the Russian Federation since January 2022.

Source: FAO calculations based on Trade Data Monitor (TDM) data.

⁷ See <https://www.bnnbloomberg.ca/fertilizer-prices-fall-as-gluts-emerge-after-farmers-pull-back-1.1834374>.

⁸ Russia's fertilizer exports are depicted by all other countries' imports from the Russian Federation. Recourse to mirror statistics is necessary given the delay of export notifications by the Russian Federation. Figures 2 and 3 may therefore underestimate the actual exports by the Russian Federation in recent months as imports by some of its trading partners, notably those of Belarus, are also not available.

Figure 3: Global fertilizer imports from the Russian Federation, total value, in US Dollars

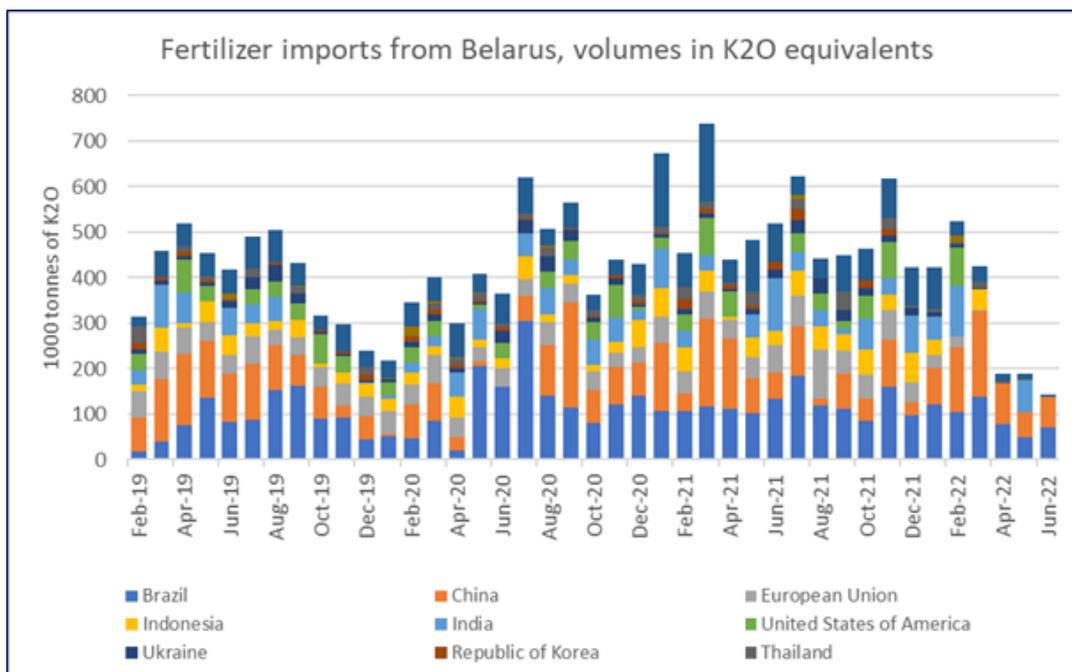


Note: Exports from the Russian Federation are the sum of the imports reported by all of its trading partners since no export data are available for the Russian Federation since January 2022.

Source: FAO calculations based on Trade Data Monitor (TDM) data.

2.4. While trade volumes from the Russian Federation remained largely unaffected in the first half of 2022 (H1-2022), those from Belarus, a major supplier of potassic fertilizer, have shrunk notably. According to import statistics by its trading partners, Belarus' exports of potassic fertilizers declined from 3.62 million tonnes in H1-2021 to 1.95 million tonnes in H1-2022. Import statistics for the most recent months suggest that the decline in supplies from Belarus has accelerated, with only Brazil and China buying significant quantities of potassic fertilizer from that country (Figure 4).

Figure 4: Global potash imports from Belarus, volumes in K2O equivalents



Source: FAO calculations based on Trade Data Monitor (TDM) data.

2.5. Some immediate effects of current fertilizer shortages have become manifest. Importantly, the market for nitrogenous fertilizer is increasingly supply-constrained, as numerous production plants faced with soaring prices for the key input of natural gas, have ceased or reduced output in view of lower margins. Current estimates by the International Fertilizer Association (IFA) suggest that 50-70% of European nitrogen fertilizer plants produce at curtailed capacity. Not only are gas prices too high to profitably operate N-fertilizer plants, but they are also too high to operate heating in greenhouses, particularly in Northern Europe⁹, which could weigh on fruit and vegetable supplies in the winter season of 2022/23. Prices of these products are expected to remain high or even rise further, compounding inflationary pressures from food prices. The situation has recently led the European Commission to propose to the Council a temporary suspension of the customs tariffs for two key intermediate goods used in the production of nitrogen fertilizers, namely ammonia and urea, until the end of 2024.

2.2.2 Prospects for the remainder of 2022/23

2.6. Higher prices and overall lower fertilizer affordability in 2021/22 suggest likely lower global fertilizer applications in 2022/23. The International Fertilizer Industry Association (IFA), for instance, expects reductions in the use of all three main nutrients in 2022/23.¹⁰ The application of N-fertilizer is expected to fall by 1.8% in the IFA baseline scenario and could even worsen to 4.8% in the pessimistic scenario or remain unchanged at best. The use of P-fertilizer is expected to decline by 3.5% in the IFA base case but could fall by as much as 6.5% in the pessimistic scenario. The application of K-fertilizer is expected to lessen by nearly 10% in the base case, and to decrease by as much as 13.0% in the pessimistic scenario and would still be down by 1% in the optimistic scenario. For the fertilizer year 2023, the IFA expects only a moderate recovery from the depressed use levels of 2022. Past crises show that such reductions in fertilizer applications are not uncommon. For instance, when P-fertilizer prices rose steeply in 2008/09, global average P-fertilizer application declined by 8% relative to 2007, and those for K-potash by 16%.¹¹

2.7. The impacts of such reductions on production are difficult to gauge. Unlike for N-fertilizer, a reduction in P- and K-fertilizer usage, if limited to one season, may not necessarily result in major yield declines. Lower levels of N-fertilizer applications, however, would reduce output and the quality of food production in 2023 and beyond. That said, farmers in developed regions are more likely than those in other regions to maintain high levels of fertilizer use, even when prices soar. Farmers' demand is particularly inelastic for N-fertilizer. In 2008, for instance, global N-fertilizer applications declined by less than 1% relative to those prevailing in 2007. In poorer countries, overall fertilizer use could decline faster, including the all-important N-fertilizer. While farmers in developed regions are rather unresponsive to increases in N-fertilizer prices, those in developing regions would face lower availabilities and be forced to reduce applications. This occurred in 2009, for instance, when the use of N-fertilizer in Africa declined by 13% relative to 2008. With much of the continent at the forefront of multiple and interrelated crises, especially climate change and food insecurity, Africa can ill-afford to undergo any cutbacks to fertilizer use.

2.2.3 Safeguarding access to fertilizer needs in Africa

2.8. Undoubtedly, the use of mineral fertilizers has played a pivotal and historical role in raising agricultural productivity, and hence contributing to food security worldwide. While such fertilizers have come under increasing scrutiny because of their harmful environmental impacts, developing countries have few alternatives that are commercially viable and available on a sufficiently large scale. Amid the ongoing crisis, they have no short-term options other than to continue supporting their use.

2.9. Africa is a case in point. The continent only accounts for 3-4% of global fertilizer use, of which approximately 50% of its fertilizer supplies nutrify Africa's all-important cash crops. Consequently, contractions in fertilizer use would have severe ramifications, including undermining the food security of some agrarian-based communities, where food insecurity challenges are particularly

⁹ See <https://www.bloomberg.com/news/articles/2021-09-30/your-tomatoes-may-cost-more-as-gas-prices-hit-dutch-greenhouses>.

¹⁰ See <https://api.ifastat.org/reports/download/13707>.

¹¹ In terms of nutrients, based on FAOSTAT.

pronounced as measured by their high Prevalence of Undernourishment (PoU)¹² and high Food Insecurity Experience Scale (FIES)¹³ levels.

2.10. With prohibitive international prices, fast depreciation of currencies against the US Dollar (the currency of trade), appreciation of the Russian ruble (which makes Russian exports more costly), high levels of indebtedness as well as inefficient transportation and marketing infrastructure, there are rising concerns that many African countries will not be able to access international fertilizer markets without external support.

2.11. These concerns have given rise to international initiatives that aim to ensure that African countries are able to access international fertilizer markets, either through the provision of financing facilities to purchase fertilizers at subsidized prices or through outright donations.¹⁴ To inform, support and prioritise this allocation process, FAO has developed a "neediness index". This index considers a number of criteria, including a country's balance of payment situation, the severity of food insecurity as well as other factors that shape the ability to purchase fertilizer at market conditions.

2.12. Three scenarios distinguish different levels of import needs.¹⁵ They are based on:

- (i) Contractions in N, P and K imports in 2021 compared to a historical average,
- (ii) Estimated import needs until mid-2022, and
- (iii) Projected import needs until the end of the calendar year of 2022.

2.13. To summarise, countries in sub-Saharan Africa top the rankings in needs under the three scenarios. These are especially low-income countries situated in both Western Africa (e.g., Guinea, Gambia, Guinea-Bissau and Equatorial Guinea) and Eastern Africa (e.g., Somalia, South Sudan, Eritrea and Ethiopia).

2.14. It must be noted that while such support to these countries can be justified on the grounds to avert deepening food insecurity at the local level, extending such access schemes to the global level could be counterproductive to food security. The reason being that the global fertilizer market is currently supply-constrained, and it is practically impossible to mobilize large additional supplies. Consequently, support to one group of fertilizer users will come at the expense of supplies to other users. Farmers who can access the market and profitably produce even with high fertilizer prices are, by implication, more efficient producers. However, in the event of widespread subsidy programmes, fertilizer quotations would be lifted for all while lowering fertilizer availability for efficient users. This could lead to lower global food production and higher global food prices.

2.15. Added upward price pressure could arise from the growing need of N- and P-ingredients in non-agricultural use. For example, concerning N, industrial grade ammonia is used in large quantities as coolants in refrigeration, and importantly in catalytic converters of diesel engines.¹⁶ The rise in N-ammonia prices has already resulted in a near ubiquitous shortage of the required additive ("AdBlue"). Similarly, the use of P to manufacture lithium-ion batteries could mean that an increasing amount of the ingredient will be siphoned off from the fertilizer market.

2.3 Understanding the drivers

2.16. As in all commodity markets, fertilizer prices are determined by the interplay of supply and demand. On the supply side, (i) high and volatile energy prices, (ii) disruptions in trade and high transportation costs, and (iii) export restrictions; while on the demand side, (iv) subsidies and (v) high crop prices and hence high affordability.

¹² FAO, IFAD, UNICEF, WFP and WHO. 2022. The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable. Rome, FAO.

¹³ See, for example, <https://www.fao.org/in-action/voices-of-the-hungry>.

¹⁴ See, for example, <https://www.ocpgroup.ma/press-release-article/ocp-group-dedicates-4-million-tonnes-fertilizers-strengthen-food-security>.

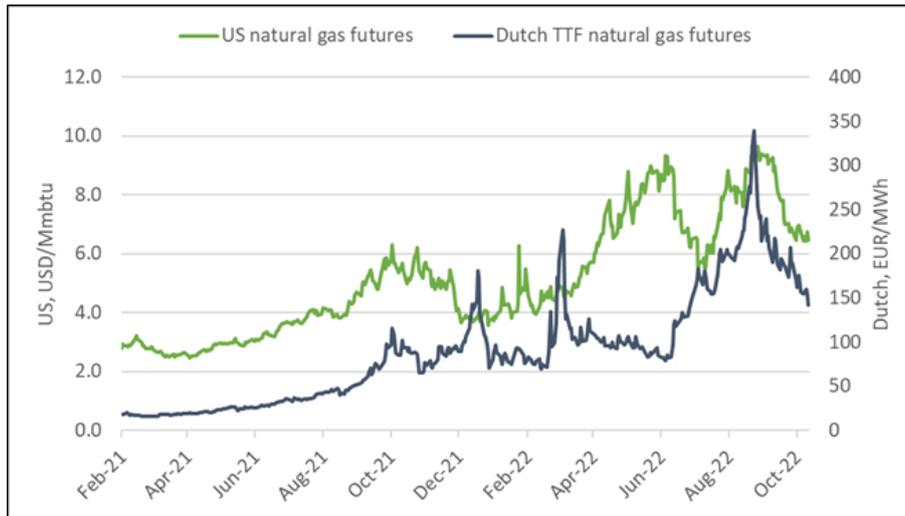
¹⁵ The results and rankings from the scenarios are provided here: <https://www.fao.org/3/cc2803en/cc2803en.pdf> and the underlying methodology is described in <https://www.fao.org/3/cc2802en/cc2802en.pdf>.

¹⁶ See, for example, <https://www.ft.com/content/c2dd5b8a-2e65-40bd-a09f-218037cff528>.

2.3.1 High and volatile energy prices

2.17. Natural gas plays a primary role in the production of N-fertilizer. Prices for natural gas underwent a sharp increase in 2021, which continued into 2022, reflecting a host of reasons. For instance, over this period, adverse weather conditions around the world hampered renewable energy production, leading to higher gas demand and hence prices. To compensate for a fall in gas supplies from the Russian Federation, Europe has begun importing large quantities of Liquefied Natural Gas (LNG) from the United States¹⁷ easing supply tightness in natural gas markets and contributing to a drop in gas prices during the months of December 2021, January 2022, March 2022 and August 2022 (Figure 5).

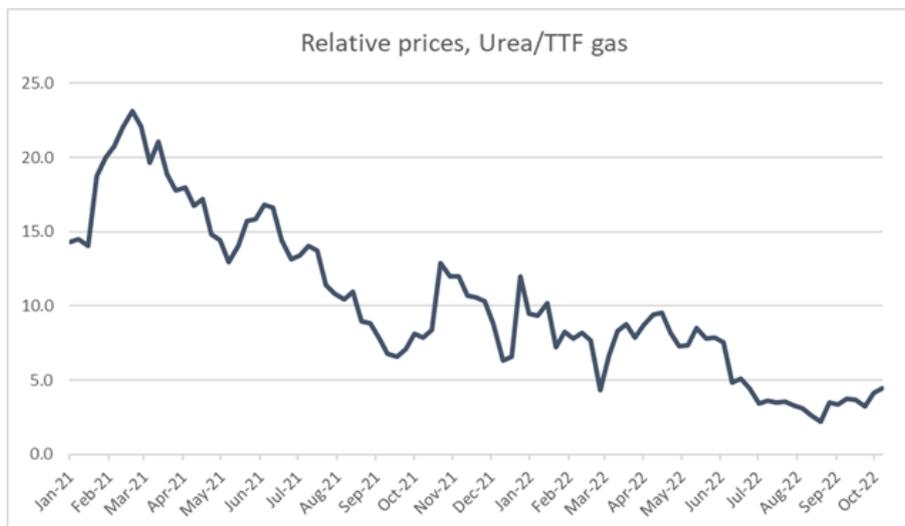
Figure 5: Daily natural gas futures in US and Europe¹⁸



Source: Investing.com.

2.18. Recent declines in prices for natural gas in Europe (TTF) have given rise to the prospect of increasing margins for fertilizer producers and a possible resumption in N-fertilizer production. However, with prices for nitrogenous fertilizers falling in parallel with gas prices, improvements in margins remained limited. This is borne out by the near unchanged price relationship between prices for natural gas (TTF) and prices for urea, a key nitrogenous fertilizer in this most recent period (Figure 6).

Figure 6: Price ratio of urea to TTF gas



Source: Investing.com.

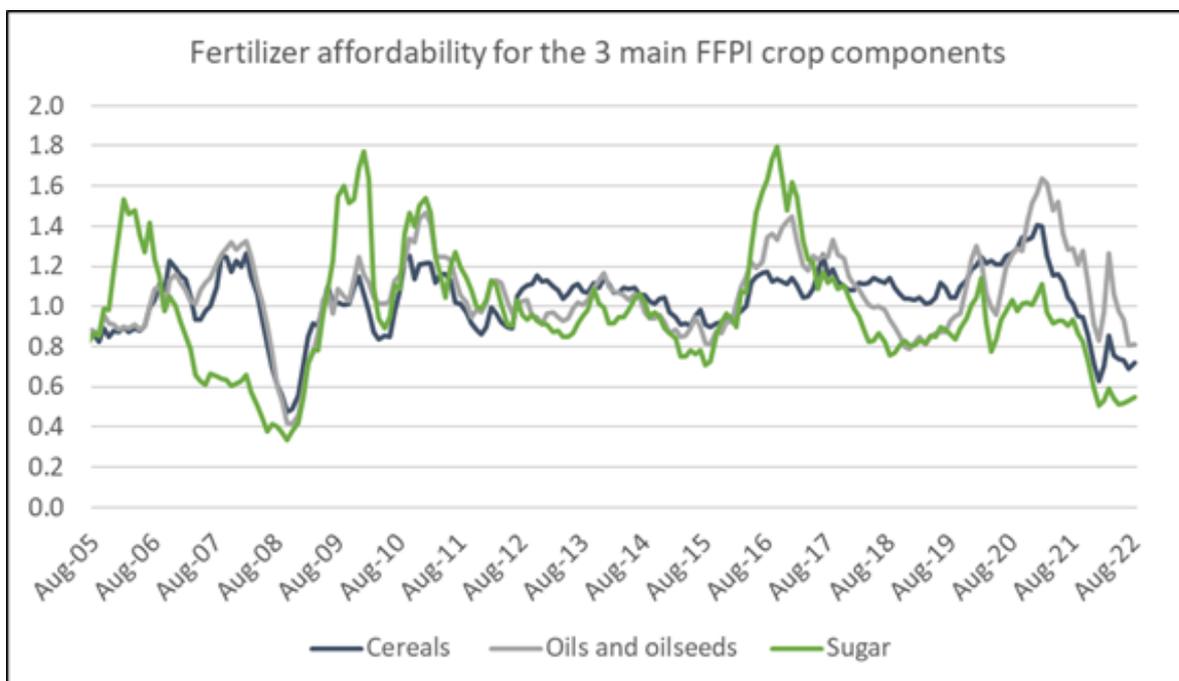
¹⁷ See <https://www.bruegel.org/publications/datasets/european-natural-gas-imports/>.

¹⁸ See <https://investing.com>.

2.3.2 High crop prices and high initial affordability¹⁹

2.19. Output prices of food also reached all-time highs in March 2022. According to the FAO Food Price Index (FFPI), international food commodity prices rose from 113.5 to 134.1 index points between January and December 2021, and then in 2022, to 159.3, its highest level since the inception of the index in 1990. In 2021, the rapid rise in fertilizer prices lowered affordability at different speeds and extents. Commodity-wise, while affordability of fertilizers for cereals and sugar production declined to levels seen in 2020, it remained higher for oils and oilseeds. The latest release of the FFPI, shows that the Index has dropped significantly from its all-time high level of 159.3 in March 2022 to 136.3 points in September 2022, which is below the (pre-war) level in February of the year. With high fertilizer prices, a considerable decrease in affordability is observed for most food products, particularly vegetable oils (Figure 7 and Figure 8). Further research is needed to better assess how such decrease in fertilizers affordability along with the energy price increase translates into total cost of production increase in different regions of the world and ultimately reduction of inputs and/or shift in production or farm practices.

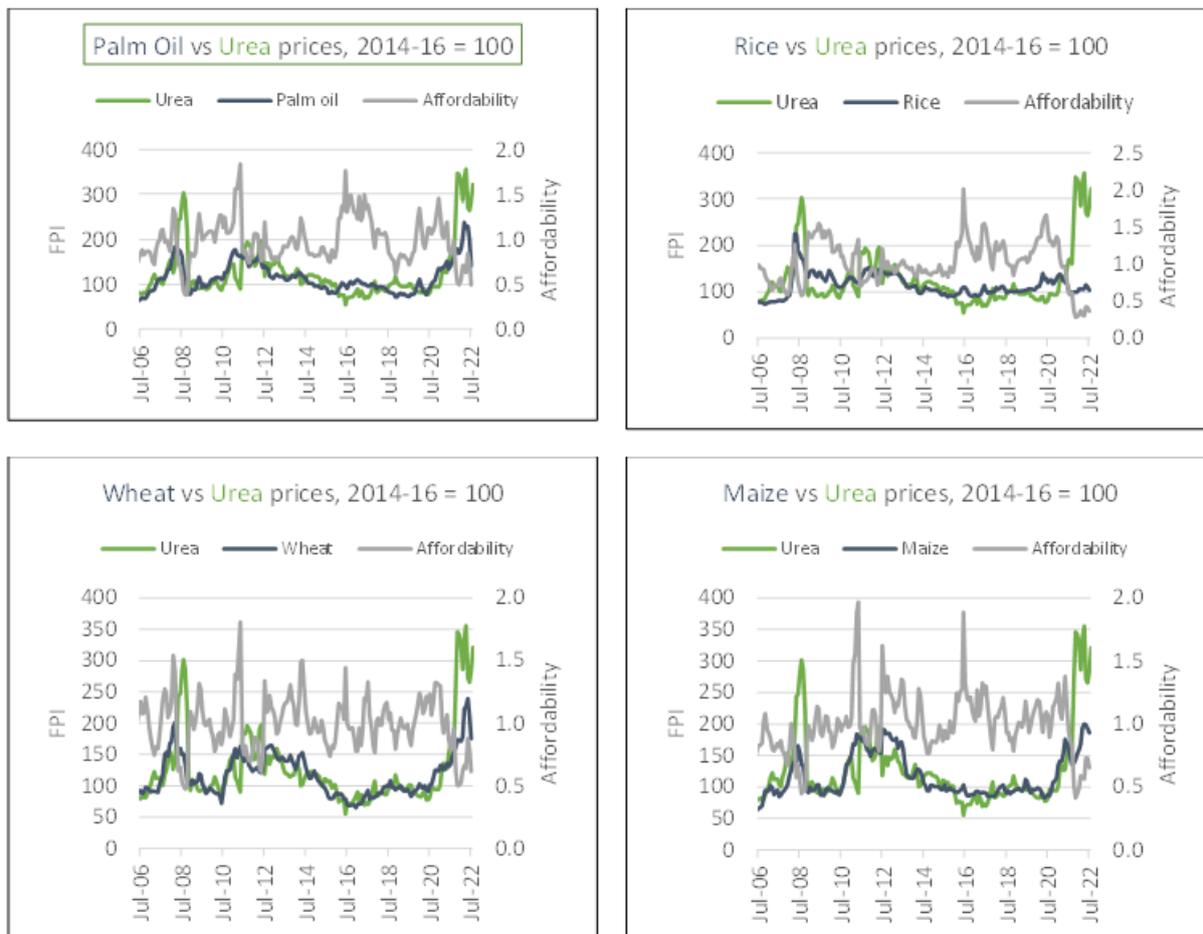
Figure 7: Overall fertilizer affordability and differences across groups of crops



Source: FAO and Investing.com.

¹⁹ Affordability here is simply defined as the ratio of outputs (i.e., the FFPI) to input prices (i.e., fertilizers).

Figure 8: Fertilizer affordability by crop



Source: Investing.com.

Box 2. A watch on international freight costs is needed

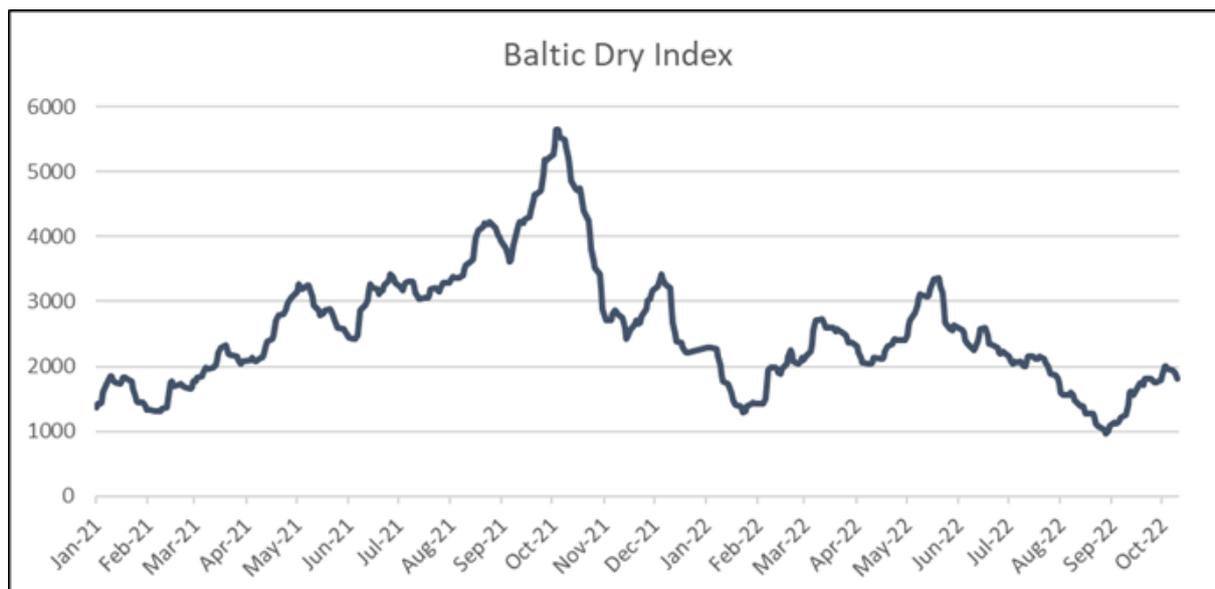
The sharp increase in transportation costs in 2021 prompted fears of even higher costs for importers and a lowered accessibility to international markets for fertilizers (and for other imported commodities).

As fertilizers are largely traded in bulk form, the Baltic Dry Index (BDI)²⁰, a measure for bulk freight quotations, provides a highly indicative gauge of actual shipment costs. Figure 9 shows that the BDI registered a remarkable increase of 300% in the first 9 months of 2021, augmenting landing prices for fertilizer importers. But from the September 2021 peak, the BDI has since precipitously declined, providing some respite for importers.

The decline reflected global recessionary pressures, particularly a fall in international demand by China – the world's largest importer of bulk commodities. However, as evidenced in the Figure, international freight prices are notoriously volatile. A demand shock when shipping capacities are low or overstretched can send freight costs skyrocketing. Accordingly, importers will need to keep a close watch on developments in the international freight market, since any benefit from lower export quotations (FOB prices) could be quickly eroded through higher shipping costs.

²⁰ A shipping freight-cost index issued daily by the Baltic Exchange: <https://www.balticexchange.com/>.

Figure 9: Baltic Dry Index, January 2021-September 2022



Source: Trading Economics.

2.20. This section showed how international fertilizer benchmark prices began soaring since mid-2021 and how the interplay between the main influencing factors underpinned these price increases. Since mid-October 2021, G20 economies gradually lifted some of the trade restrictions previously applied on merchandise trade in the context of the pandemic, the war in Ukraine and the food crisis.²¹ However, given the potential impacts of trade measures and behind-the-border measures on global fertilizer prices, and hence on global food production and prices, the remainder of this report sets out to take stock of the nature and prevalence of government measures on fertilizers since 2021.

3 FERTILIZER MEASURES

3.1. Based on the trade monitoring carried out by the WTO Secretariat and by the Agriculture Market Information System (AMIS), the present section examines fertilizer measures introduced between 1 January 2021 and 15 October 2022 (thereafter, "the reference period"). To better assess the prevalence and operation of current fertilizer policies, the above sources of information have been supplemented by a detailed review of notifications submitted by Members that are pertinent to the sector, as well as the specific trade and non-trade concerns raised in the relevant WTO bodies during the same reference period.

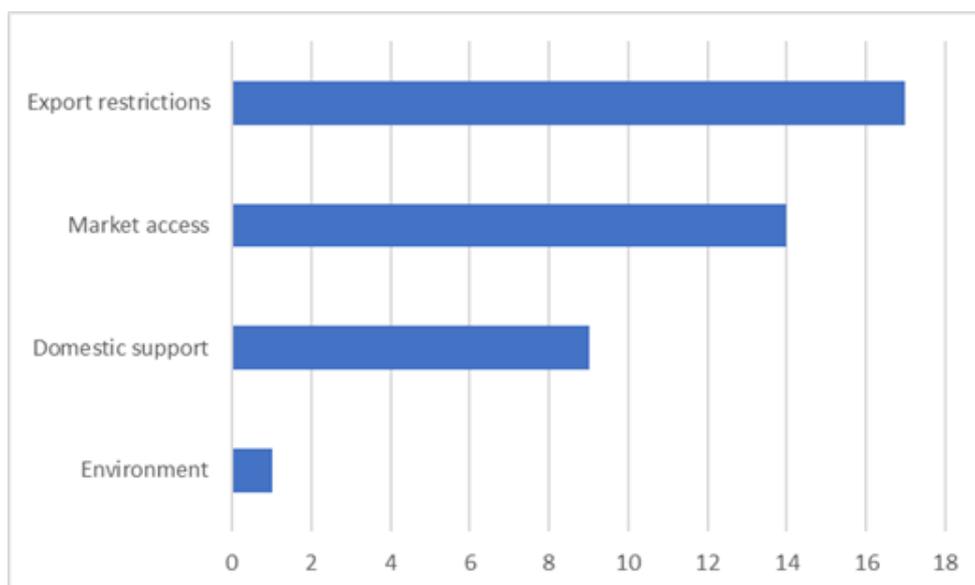
3.1 Overview of fertilizer measures by WTO Members

3.2. During the reference period specified above, 19 WTO Members introduced 41 fertilizer-related measures. Roughly 75% of these measures took the form of trade policy measures. The remainder concerned behind-the-border measures, including subsidies to domestic fertilizer industries, financial support in favour of agricultural producers, and in one instance, new marketing and distribution regulations to spur the use of organic and waste-based fertilizers.

3.3. Figure 10 below breaks down all 41 fertilizer-related measures across these broad policy categories.

²¹ WTO Trade Monitoring Report, November 2022.

Figure 10: Measures introduced by WTO Members on fertilizers between 1 January 2021 and 15 October 2022



Source: WTO and AMIS.

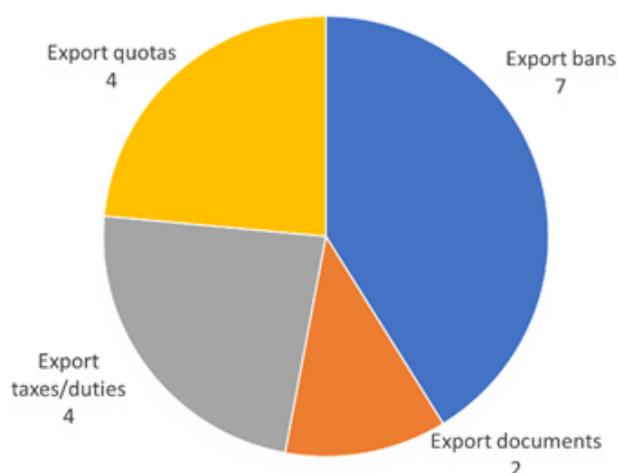
3.2 Mapping of export restrictions

3.4. In response to rising global demand for fertilizers and rising domestic prices, several key suppliers have introduced export restrictions, placing further upward pressure on international fertilizer prices, especially since late 2021.

3.5. As shown in Figure 10 above, export restrictions represented the largest category of fertilizer-related measures introduced between 1 January 2021 and 15 October 2022 (i.e., 41%).

3.6. Most export restriction measures implemented during the reference period took the form of bans, duties, taxes and quotas. By contrast, export licensing and export inspection or certification requirements were not widely used, thus playing a relatively minor role in constraining fertilizer exports. The distribution of export restrictions across these main policy categories is illustrated in Figure 11 below.

Figure 11: Mapping of export restrictions on fertilizers between January 2021 and 15 October 2022



Source: WTO and AMIS.

3.7. Taking into account the formal notification procedures established under the relevant WTO bodies as well as the direct verification process under WTO's wider trade monitoring, only half of the export restrictions applied on fertilizers (i.e., 53%) have been confirmed to the WTO Secretariat. As a result of the transparency deficit resulting from outstanding or incomplete notifications, the termination dates have only been indicated for 7 measures. While export restrictions can potentially exacerbate inflationary pressures as well as price volatility, the lack of transparency breeds uncertainty regarding the state of fertilizer supply availabilities with adverse knock-on effects on global food trade, prices and production. At the time of writing this report, and taking into account all available information, out of all the export restrictions implemented between January 2021 and 15 October 2022, 6 remain in place.

3.3 Mapping of other fertilizer measures

3.3.1 Overview of border measures

3.8. When assessing economic access to fertilizers (HS chapter 31), it is important to examine the levels of the applied most-favoured-nation (MFN) tariffs. Based on tariff information available in WTO Members' Schedules²², on average the applied MFN tariff rate on all fertilizer categories in 2021 was 1.9%. Furthermore, 40% of the membership does not levy any duties on fertilizer imports, while another 35% keeps applied tariffs on average below 2.5%. Only four WTO Members apply tariffs on average between 7.5 and 10%, namely China (9.6%), Zimbabwe (7.7%), Kazakhstan (7.5%) and India (7.5%). By contrast, the average bound MFN tariff on fertilizers across the entire membership is 22.4%.

3.9. When it comes to fertilizer sub-categories, on average, applied MFN tariffs are the highest on HS 3101 and HS 3103 for India (10% on average); on HS 3102 for Zimbabwe (11.5%); on HS 3104 for Jordan (11.1%); and for HS 3105 for China (15.5%), followed by Kazakhstan (10.2%).

Mapping of average applied MFN tariffs on fertilizers

(Number of Members per duty range of applied tariffs; and average MFN applied vs. bound tariffs in %)

Duty Range	HS 31 All fertilizers	HS 3101 Animal or vegetable fertilizers, in packs > 10kg	HS 3102 Mineral or chemical fertilizers, nitrogenous	HS 3103 Mineral or chemical fertilizers, phosphatic	HS 3104 Mineral or chemical fertilizers, potassic	HS 3105 fertilizers mixtures in packs of < 10kg
Duty Free	54	76	58	85	89	68
0 <= 2.5	44	7	43	8	16	10
2.5 <= 5.0	23	43	18	32	21	41
5.0 <= 7.5	11	8	12	8	7	14
7.5 <= 10.0	3	1	2	2	1	
>10.0			1		1	2
Average MFN tariff (%)	1.9	2.1	1.8	1.7	1.4	2.2
Average bound tariff (%)	22.4	22.0	22.6	23.3	21.4	22.6

Source: WTO Secretariat, based on World Tariff Profiles 2022.

3.10. When looking at different fertilizer categories (HS 3101 to HS 3105), average bound rates are more than 10 times the applied rates, suggesting that the tariff wedge might be substantial for most countries. Hence, significant reductions or elimination of applied tariffs would appear to be a suitable option to enhance access to fertilizers as well as affordability, without hinging on governments' policy space in terms WTO-bound tariff protection.²³ The tariff information published in the WTO World Tariff Profiles 2022 shows that this is certainly the case for the Democratic Republic of the Congo,

²² WTO Consolidated Tariff Schedules Database; and World Tariff Profiles 2022.

²³ It is also important to note that, in the case of Africa, only 89% of fertilizer tariff lines are bound in the WTO; followed by Asia (85%); the Middle East, and Europe (84%, respectively).

Kuwait and Rwanda, which maintain bindings on average at 100%; and Barbados, Saint Kitts and Nevis, Kenya, Angola and Lesotho, whose average bound tariffs are between 60 and 70%. The annexed graphs provide a more granular analysis of average applied vs. bound tariffs at the regional level.

3.11. Beyond the applied MFN tariff schedules notified annually to WTO, information available through AMIS and the WTO Trade Monitoring exercise shows that since 2021, 8 WTO Members applied a total of 14 border measures by way of *ad hoc* tariff interventions (50%), trade remedies (21%), import bans (21%) and customs inspection requirements (7%) on fertilizers. Nine out of these 14 border measures were trade facilitating. Although questions continue to linger over the application of countervailing duties on fertilizer exports by Morocco and the Russian Federation, a few provisionally applied trade remedies on fertilizer imports were terminated in mid-2021. Some long-standing anti-dumping and countervailing duties were also lifted in mid-2022. Finally, fertilizer products benefited from temporary or permanent tariff or VAT tax exemptions, tariff reductions or elimination, including on specific inputs used in nitrogen fertilizer production.

3.12. Once again, while the operation details pertaining to the imposition or suspension of tariffs and trade remedies captured in the present analysis are relatively well documented, very little information was notified to the relevant WTO body with respect to other measures, for example the Committee on Import Licensing, nor communicated as part of WTO's trade monitoring.

3.3.2 Behind-the-border support measures

3.13. In addition to the trade instruments described above, a few large fertilizer importing countries place added upward pressure on world prices by keeping domestic prices for domestic fertilizer processing/manufacturing at established target levels. Under such schemes, subsidy payments are made to fertilizer importers to offset the difference between (i) incurred import and distribution costs and (ii) a fixed and mandatory retail price cap. Characteristically, subsidized purchases are carried out through large import tenders that are operationalized by state agencies. Similar to the price effects caused by export restrictions, such large import tenders trigger lower prices in domestic markets at the expense of higher prices and higher price volatility on international fertilizer markets.

3.14. When looking at the support schemes specifically instituted during the reference period, input subsidies, direct payments and the provision of credit facilities have constituted the bulk of assistance channelled by seven WTO Members into domestic fertilizer manufacturing (for example, bio-fertilizer production) as well as agricultural production. Since mid-May 2021, countries have sought to mitigate inflationary impacts on domestic food prices by allocating fertilizer subsidies to farmers or by delivering nationally produced fertilizers free-of-charge to farming communities in cultivated areas predominantly dedicated to food security crops such as cereals, coarse grains and pulses. Since March 2022, new crisis reserve schemes were established to assist farmers cope with soaring energy, fertilizer and other input prices. Direct payments were introduced to encourage farmers to shift away from manufactured fertilizers that are linked to the price of gas. Amid soaring fertilizer prices in the first quarter of 2022, the scheduled entry into force of restrictions on the use of urea-based fertilizers and other sustainability criteria was postponed by one government to 2023.

3.15. Concerns raised in the WTO Committee on Agriculture since the beginning of 2021 are reflective of this trend. Demands have intensified to obtain additional details on the operation and expected duration of newly introduced subsidy schemes as well as their prospective notification to the relevant WTO bodies. Given the substantial subsidy increases observed, and the sheer magnitude of budgetary outlays allocated to offset the rise in agricultural inputs costs, particularly those of di-ammonium phosphate (DAP) and nitrogen, phosphorus and potassium fertilizers, Members also raised questions regarding the eligibility criteria applied to potential beneficiaries. The relevant provisions of the Agreement on Agriculture allow developing country Members to operate input subsidy schemes provided low-income and resource poor producers are the designated recipients.²⁴

²⁴ This section is based on a review of questions and answers raised in the Committee on Agriculture since 2021. During that period, specific questions in relation to fertilizer-related subsidy schemes were posed to China, European Union, India, Indonesia, Mexico, Nigeria, Paraguay, United Arab Emirates, Viet Nam. See WTO Agriculture Information Management System (AG-IMS) <https://agims.wto.org/> for additional details.

3.16. Likewise, support channelled to climate-smart policy, for example restricting fertilizer use, is not immune from scrutiny. While environment friendly agricultural practices positively contribute to fulfil wider climate objectives, it is difficult to gauge whether the direct payments involved are strictly limited to the additional costs incurred by farmers in complying with such objectives, as required by the WTO Agreement on Agriculture. In that sense, new concerns might still be raised should additional incentives or premia be applied in excess of farmers' expenditures to encourage adherence to organic farming methods or efficient fertilizer management.

3.17. The subsidy notifications submitted since 2020²⁵ bring added perspective to the typology of recent government interventions designed to achieve environmental efficiency and climate-friendly food and agriculture production, marketing, and distribution. Thus, government assistance may be channelled to the development of fertilizer and bio-fertilizer manufacturing industries by way of financial transfers to fixed capital investment. Support is also directly extended to the agriculture sector to encourage the uptake of sustainable farming techniques and spur soil preservation and restoration, and biological diversity. Finally, a few notifications from developing countries point to governments' efforts in offsetting soaring production costs for vitally important cash crops (e.g., tea, sugarcane) or food security crops through in-kind donations of bio-fertilizers, with fertilizer quantities based on the size of cultivated land. Alternatively, for a few consecutive crop cycles, farmers may also be granted direct payments or input subsidies equivalent to a fixed percentage of the purchase cost of bio-fertilizers and bio-pesticides.

3.18. Agri-environmental financial appropriations are gradually being finetuned, or repurposed. Such finetuning takes place to protect domestic access to affordable fertilizers and fertilizer components by farmers as well as domestic fertilizer industries. Pilot programmes are also being rolled out to substitute chemical fertilizers with organic compounds. Today, carbon sequestration and conservation, and reducing greenhouse gas and ammonia emissions are prioritized by many governments' agendas, often translating into specific regulatory requirements and standards.

4 ACTION POINTS – OVERCOMING THE CURRENT FOOD CRISIS

4.1. Considering the critical role of fertilizers in increasing agricultural productivity and hence in ensuring global food security, every effort should be made to keep international trade in fertilizers open to meet domestic and global demand. Other key priorities include increasing market transparency as well as promoting smart and precision farming practices and efficient fertilizers use to improve soil fertility through digital soil nutrition maps, research, innovation, training and extension services including in digital technologies, as well as better targeting of subsidies to the most vulnerable. The following actions could be taken by G20 members to promote access to, and more efficient use of fertilizers.

In the short-term

4.1 Minimizing disruptions to global trade in fertilizers

- G20 governments are called upon to keep food, feed, and fertilizer markets open, in line with WTO 12th Ministerial Declaration on Emergency Response for Food Insecurity. Specifically, G20 governments are urged to:
 - refrain from imposing new export restrictions and to the extent possible, withdraw any remaining export restrictions on fertilizers, in conformity with relevant WTO disciplines;
 - for the most vulnerable countries, consider reducing applied tariffs to relieve critical domestic fertilizer shortages, thus improving both access and affordability;
 - to the extent possible, consider introducing trade facilitation measures, including by streamlining customs procedures applicable to fertilizers and fertilizer inputs. This includes Aid for Trade initiatives involving imports of fertilizers and fertilizer inputs, and the submission of accurate and timely notifications of all relevant trade regulations, to allow fertilizers to move swiftly to countries in need.

²⁵ See WTO documents circulated since January 2020 in the G/SCM/N/-- series.

4.2 Ensuring access to fertilizers for the most vulnerable countries

- G20 governments are encouraged to:
 - consider fertilizer contract swaps as effective risk management tools to hedge against extreme price volatility, ensuring that vulnerable farmers are not stranded because their contracts are for future delivery. Expensive energy and fertilizers should not threaten future farm yields.
 - lead and support international initiatives that aim to ensure that the most vulnerable countries, particularly those facing sharply constrained fiscal spaces and at risk of experiencing contraction in production, can access international fertilizer markets.
- G20 governments should actively engage in the WTO Work Programme set up by the 12th Ministerial Conference to consider the food security needs of least-developed and net food-importing developing countries to enhance their resilience in responding to the current acute food instability and volatile food and fertilizer prices.
- Gas producing countries should consider taking steps to curb increases in gas prices by limiting export restrictions. This is essential to maintain global fertilizer production capacity and avoid further pressure on fertilizer prices.

In the medium-term

4.3 Increasing market and policy transparency

- G20 governments are urged to enhance WTO notification, consultation, information exchange, and policy monitoring mechanisms with a view to foster transparency and predictability of trade in agricultural inputs and food. Well-functioning transparency frameworks are essential to enable governments, the private sector, producers, and consumers to mitigate supply chain and food security risks and swiftly adapt to changes.
- G20 governments can play a key role in enhancing market transparency by providing critical data and resources to enhance the transparency of agrifood markets, notably by stepping up support to the Agricultural Market Information System (AMIS); expanding its mandate to bring fertilizers into the present commodity coverage; thus allowing all market and policy developments to be closely monitored and publicly disseminated. Improved market and policy monitoring should be supplemented by tracking financing schemes and other support mechanisms introduced by the international community in response to disrupted fertilizer markets.
- G20 governments could support expansion of FAO's research, analysis and economic modelling capacity, notably to foster a better understanding of the linkages between fertilizer markets and agricultural output and productivity; provide a more granular analysis of production costs; and produce enhanced and detailed assessments of fertilizer supply and demand balances and related early warning indicators, such as stocks-to-use ratios or stocks-to-disappearance ratios.

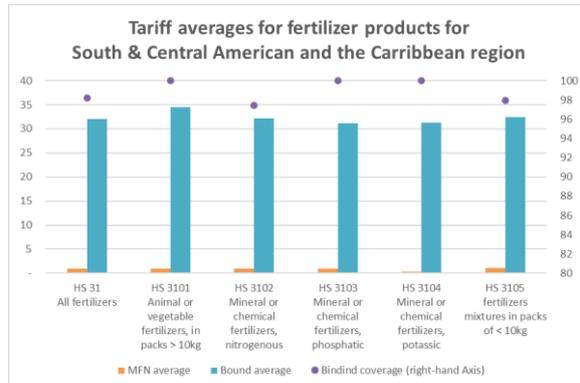
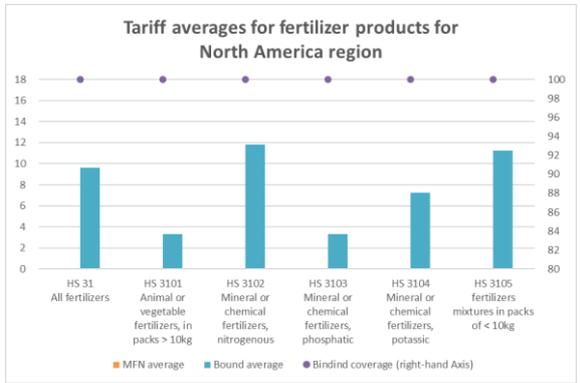
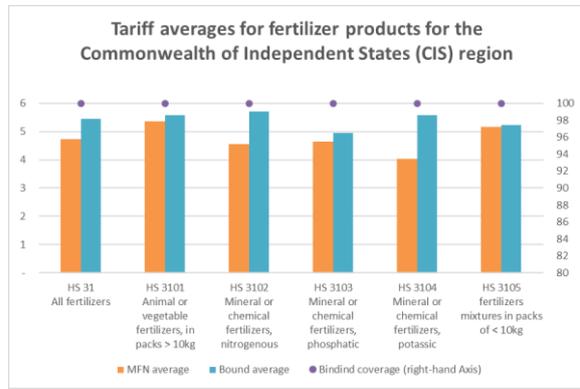
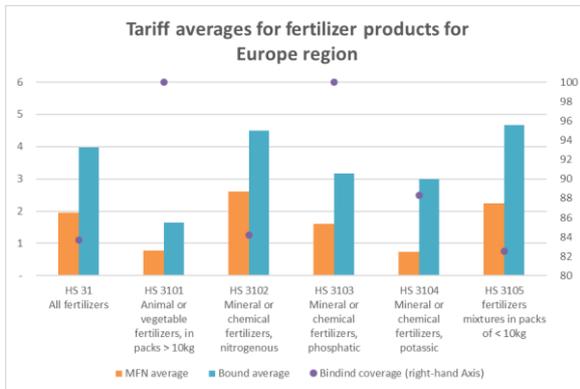
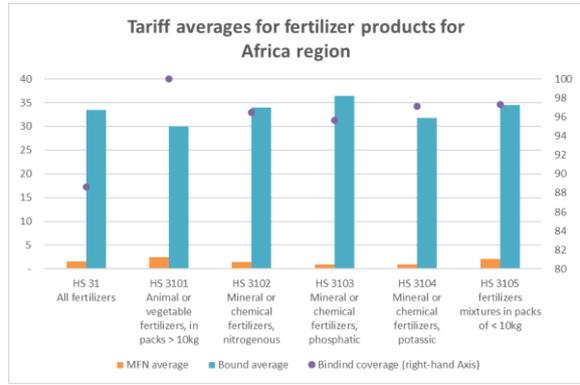
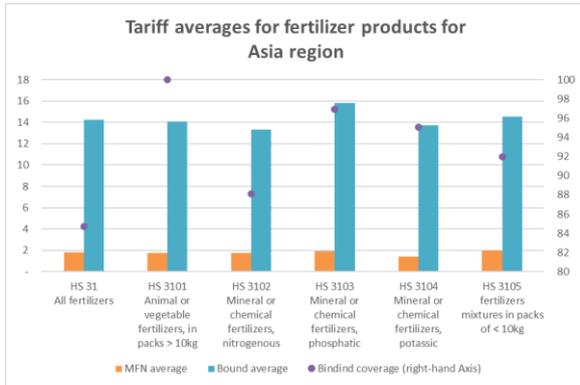
4.4 Improving soil fertility and accelerating innovation for more efficient use of fertilizers

- G20 governments can consider supporting international organizations to undertake soil nutrition analysis to inform fertilization programmes at farm level. In this context, financial support is needed for projects that enable countries to use soil nutrient maps to improve the efficiency of fertilizer use. This will help farmers face the rising prices of fertilizers while boosting productivity.
- G20 governments can consider supporting international organizations to put in place innovation systems to encourage practices that promote an increase in organic matter and greater soil biodiversity to improve its fertility and ability to supply nutrients to plants.
- G20 governments can consider expanding financial resources for global research partnerships to develop innovations in alternatives to chemical fertilizers, including through the greater use of biofertilizers.

- G20 governments can consider expanding financial resources for the adoption of precision farming for smallholders. This should include adoption of digital technologies, which can have a crucial role in improving agricultural productivity and reducing the use of inputs.
 - G20 governments should spearhead dialogue and information exchange to reform existing fertilizer subsidies. Agricultural support programmes should promote environmental sustainability, food systems resilience against future shocks, efficient fertilizer use, and improved access to inputs for smallholders, while minimizing unintended negative consequences on domestic or international markets.
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ATTACHMENT

Tariff information for fertilizer products by region



Binding coverage of WTO Members' Schedules (%)

Region	HS 31 All fertilizers	HS 3101 Animal or vegetable fertilizers, in packs > 10kg	HS 3102 Mineral or chemical fertilizers, nitrogenous	HS 3103 Mineral or chemical fertilizers, phosphatic	HS 3104 Mineral or chemical fertilizers, potassic	HS 3105 fertilizers mixtures in packs of < 10kg
Europe	83.66	100.00	84.22	100.00	88.33	82.50
Commonwealth of Independent States (CIS)	100.00	100.00	100.00	100.00	100.00	100.00
North America	100.00	100.00	100.00	100.00	100.00	100.00
South and Central America and the Caribbean	98.19	100.00	97.41	100.00	100.00	97.92
Africa	88.63	100.00	96.47	95.65	97.10	97.28
Middle East	84.26	100.00	88.89	100.00	100.00	100.00
Asia	84.69	100.00	88.10	96.91	95.06	91.96
Overall average	90.33	100.00	93.22	98.25	97.07	95.18

Source: WTO World Tariff Profiles 2022.