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# Special Report on the Impact on Fertilizers from the Conflict in Ukraine

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## Introduction

On 24th February 2022 Russian forces invaded Ukraine, an action which has brought widespread criticism from world leaders, and has led to punitive and escalating sanctions against the Russian State and institutions, and individuals close to the Kremlin. At the time of writing peace talks have been instigated, but it seems highly likely that the situation may escalate further before it improves. This document is intended to be a source of basic information, data and analysis to help our many clients navigate through this significant crisis. In it we:

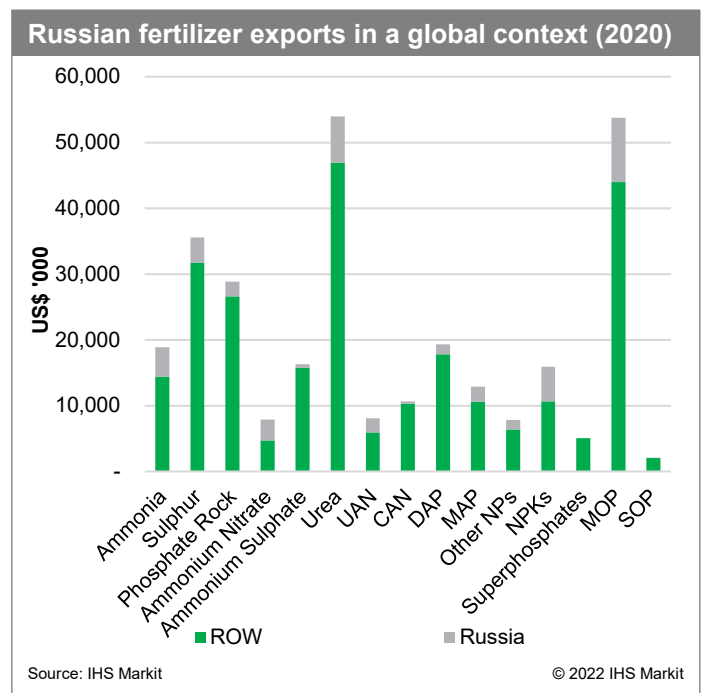
- Contextualise the Russian fertilizer industry in terms of its exports.
- Provide a detailed focus on key elements of the fertilizer sector.
- Highlight major areas of uncertainty.

A key challenge for all analysts at this time is the speed of change – documents can be overtaken by events almost as they are uploaded. For that reason we will be endeavouring both to update the narrative as events unfold, and we will be clear about when the document is published so readers can be clear that events that take place after publication will clearly not have been included in the analysis. This document was published on **9 March 2022**.

## Context

Russia is a primary producer of all three of the main commercial fertilizer nutrients, which are essential for plant growth, – nitrogen (N), phosphate (P<sub>2</sub>O<sub>5</sub>) and potassium (K<sub>2</sub>O). It has globally significant phosphate rock reserves in the Kola peninsula, potash reserves around Perm, and is a major oil and gas producer, with hydrocarbons being the key raw material for nitrogen fertilizers and the by-product sulphur from oil and gas refining a key intermediate for phosphate processing. From this core resource base Russia has developed a large down-stream fertilizer production sector, is self-sufficient for fertilizers and is an important global exporter.

Based on data from IHS Markit’s Maritime and Trade team, fertilizer exports from Russia in 2020 were



valued at around \$7.0B, and with higher fertilizer prices, for 2021 this rose to \$12.5B. Relatively therefore the fertilizer sector accounts for around 2.1% of total 2020 exports from Russia in value terms (and likely to be a little higher in 2021) – neither of huge significance, nor an irrelevance.

In broad terms, Russia accounts for almost 13% of global trade for key fertilizer intermediates (ammonia, phosphate rock, sulphur) and for almost 16% of global trade in the key finished fertilizers.



Contextually therefore, Russia is an important global supplier of fertilizers. Disruption of the supply of fertilizers will have no impact at all on domestic Russian agriculture, as the modest levels of Russian fertilizer imports relate almost entirely to increasing levels of domestic competition – there would be no issue of structural shortages. The only impact sanctions might have on the inputs for crop production relate to crop protection products, where Russia imports the majority of its needs. Any trade disruption from potential sanctions on exports would have an impact on global fertilizer availability and the supply demand balance, and therefore would have impacts across global agriculture.

In contrast, Ukraine is not particularly significant as a global supplier of fertilizers. It has no primary phosphate or potash resources, and although it is an important nitrogen fertilizer producer, its production is almost entirely based on imported natural gas. Total exports in 2020 amounted to around \$377 million, and with rising prices this increased to \$622 million in 2021. Fertilizer production focuses on urea, which accounted for 1.5 million tonnes of the 1.8 million tonnes of Ukrainian fertilizer exports in 2020, and 1.1 million tonnes of the 1.6 million tonnes exported in 2021. In context Ukrainian urea exports account for only 2.7% of world trade, the absence of which, were production to be halted, would have only a very modest impact on global balances. The significance for Ukrainian agriculture from the current uncertainty relates therefore to the manufacturing of nitrogen fertilizer for domestic consumption, and to the extent that spring plantings can take place in the current chaos engulfing the country. An inability to produce fertilizer would mean that all inputs would need to be imported, which logistically is hugely challenging – deep sea imports into ports such as Odessa are now extremely difficult.

## What is the status with sanctions and other actions?

Governments across the world are generally reluctant to specifically sanction fertilizers. Such sanctions tend to be a blunt instrument, very prone to unexpected consequences which can frequently cause more problems for the group imposing the sanctions than the recipient. In recent years the western governments seem to have favored very targeted sanctions, including against named individuals and institutions

rather than against products or product classes.

Extensive sanctions are now being imposed on Russia, but thus far, they do not directly involve most of the fertilizer sector. The situation is changing almost daily and it remains possible that fertilizer companies will be targeted depending on the way the crisis evolves. This does not mean however that the fertilizer sector has not been impacted by sanctions. The current key impacts are as follows:

- **Finance and banking:** Extensive sanctions have been imposed on a number of Russian banks, including the central bank. This is beginning to make trading with all exporters challenging; many Russian banks are subject to sanctions and have had assets held outside Russia frozen. Paying for product is becoming more difficult.
- **High net-worth individuals:** As we publish, the EU has announced sanctions against Andrey Melnichenko (EuroChem), Dmitry Mazepin (Uralchem and Uralkali), Andrey Guryev (PhosAgro) and Dmitry Konov (Sibur). Minudobreniya JSC (Rossosh), a nitrogen fertilizer producer, was already sanctioned following the annexation of Crimea due to the close relationship its owner, Arkady Rotenberg, has maintained with the Russian Government. Of the major fertilizer producers only Vladimir Kantor at Acron seems not to have been sanctioned by the EU. Coupled with the announcement from the Russian Government (see below) regarding the restrictions on exports by (at press time) unnamed companies and products it is clear that Russian fertilizer will no longer be tradable with initially the EU but potentially extending to all countries imposing sanctions.
- **'Self-sanctioning':** There is increasing evidence of fertilizer buyers self-sanctioning, i.e. not buying from Russian suppliers due to uncertainties over payment, the ability to supply (i.e. concerns over whether their chosen supplier might indeed be subject to sanctions before the delivery is shipped), and concerns that using product from Russia might make the user liable to financial penalties as the conflict develops.

We maintain our view that the likelihood of fertilizer being specifically targeted is low. However, the potential for fertilizer supply to be impacted either due to financial sanctions or because of named high-

net worth owners and their assets being implicated in the sanctions is much higher, indeed there is now evidence that trade is beginning to be impacted.

In addition to sanctions, certain other actions have been taken which have impacts for the fertilizer sector. These include:

- On 4th March the London Stock Exchange (LSE) suspended trading in 27 Russian companies** with strong links to Russia. The companies trade financial instruments in London, including global depository receipts (GDR) and American depository receipts (ADR) but not ordinary shares, which are traded on Russian exchanges where the primary listings are held. The impact of this will be to make it more difficult for the companies to raise capital, as well as potentially unnerving investors. Included in the list of suspended companies is PhosAgro. Acron however was not included. In the meantime, Acron reported on 5th March that Fitch Ratings downgraded Acron's Long-term Issuer Default Rating (IDR) to 'B' from 'BB-' and placed ratings on Rating Watch Negative (RWN) following the agency's downgrade of Russia's sovereign ratings. Equally, PhosAgro reported on 5th of March that Fitch has changed PhosAgro's long-term foreign and local-currency issuer default rating from BBB- to B and placed it on Rating Watch Negative.
- On 4th March** the Interfax Agency in Russia put out a statement saying that the Russian Ministry of Industry and Trade recommended suspending the export of fertilizer from Russia. The statement concluded that *"Taking into account the current situation with the work of foreign logistics operators and the risks associated with it, the Ministry of Industry and Trade of Russia was forced to recommend to Russian producers to temporarily suspend the shipment of Russian fertilizers for export until carriers resume rhythmic work and provide guarantees for the implementation of export supplies of Russian fertilizers in full"*. Sources from Russia suggest that Russian exporters had reported to the Ministry that they had started to receive letters from their insurance and shipbroker partners about cancelling the services for exports (including for some cargoes already en-route), and that the press release was the Ministry's somewhat caustic response. There is nothing binding for exporters in the Ministry statement, and at the current time

we expect Russian exporters to continue to move product where they can secure the requisite vessels, insurance, transit routes to export terminals in neighboring countries, and customers.

- Based on the information from one Russian producer all fertilizer exports out of Russia are expected to cease from 8th March. This has subsequently been supported by a press release on 8 March by Interfax stating that *"Russian President Vladimir Putin has signed a decree introducing special economic measures in foreign trade for ensuring Russia's security... These include "a ban on exports outside of the Russian Federation's territory and (or) imports to the Russian Federation's territory of products and (or) raw materials according to lists determined by the Russian government."* The decree also restricts *"exports outside of the Russian Federation's territory and (or) imports to the Russian Federation's territory of products and (or) raw materials according to lists determined by the Russian government."* We understand that the list of products where trade will be impacted is expected to be announced in the next few days. Given the commentary noted above from the one fertilizer producer it seems likely that at least some restrictions on fertilizers are planned.
- The risk assessment by the international fertilizer partners:** On the 1st of March, one of the global leaders in the fertilizer markets, Yara International, has issued a public statement raising concerns regarding the "long-term consequences of the war on global food supply" and "pleading Norwegian and international governments to get together and protect the global food production and work together to decrease dependency on Russia." Yara International sources a considerable amount of essential raw materials from Russia, used for food production worldwide.

### Scenario expectations from country risk:

The Country Risk Team has three main short-term scenarios in Ukraine. These are:

- An escalation of the current conflict in Ukraine, with the destruction and casualties increasing. This is believed to be the most likely short-term outcome. For fertilizer production in Ukraine this risks both the damage and possible destruction of capacity

and infrastructure, as well as short-term cessation of production. It also risks significant disruption to the 2022 planting and crop production in Ukraine – we do not comment in this report on the impacts of that, but it will have an ongoing impact on cereal production and price.

- The current offensives becoming stuck where they are, with little further progress. This is believed to be unlikely. The impact on fertilizer infrastructure and production would be somewhat less pronounced, and the 2022 planting may be better than currently expected.
- Change to the government in Russia. This is seen to be the least likely short-term outcome. Its impact might be a quicker conclusion to the conflict. It might include a retreat by Russian forces to pre-conflict borders, and the elimination of sanctions, with efforts by Western governments to support both the rebuilding of Ukraine as well as Russia, if a new Russian administration was believed to be less hostile to the West.

## Russia’s position in the global fertilizer sector

### Ammonia

#### Key recent developments:

- Port of Yuzhnyy (alternative name Pivdenny, located approx. 13 nm NE of Odessa port) is closed.
- Pumping of ammonia from Russia to Ukraine has been suspended.
- No expectations of exports of ammonia resuming from Yuzhnyy in the near term.
- Fertecon has opted for ‘no market’ assessment of Black Sea ammonia price until further notice.

There is the prospect of the severe damage or complete destruction of ammonia supply infrastructure, including the Togliatti-Yuzhnyy ammonia pipeline, the terminal and ammonia storage facilities in



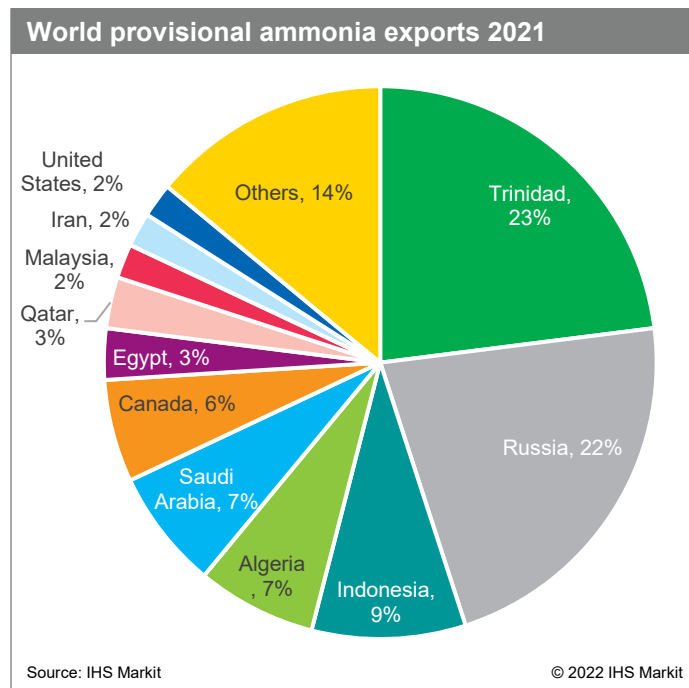
Ukraine including the Odessa Port Plant (OPZ), Azot Cherkassy and Dniproazot. Another Osthem plant, Sevdon (Severodonetsk Azot), is already in the area of active hostilities.

The port of Yuzhnyy is closed, although there reportedly was enough ammonia in the storage facilities as of 24 February to load one or two ships. Togliatti and Rossosh in Russia are forced to reduce production due to the closure of the pipeline. Uralchem, which has controlled Togliatti since the end of last year, can transfer ammonia exports to the Baltic by rail, to the port of Ventspils in Latvia. How long this might remain an option is open to question. Russian ammonia shipments via export terminals in the EU states in the Baltics (Estonia and Latvia) are reportedly not affected so far.

## World's exposure to Russian ammonia

Provisional analysis suggests Russia exported 4.4 million tonnes of ammonia in 2021, almost identical to the volumes exported in 2020 (4.46 million tonnes). Total Russian exports should account for 22% of 2021 international trade, a marginal decline from the 23.6% of 2020 exports. Russia is the world's second largest exporter of ammonia behind Trinidad, with a global trade comprising a total of 9 nations exporting more than 500,000 tonnes in 2021, and a total of 42 nations exporting some ammonia volumes.

Russia's main markets are typically Morocco, Turkey, Belgium, Finland and Norway (markets that in 2020 exceeded 300,000 tonnes). Turkey (a member of NATO), Belgium, Finland and Norway are all likely to



act on any sanctions put forward by the EU and USA, and Morocco may also act, although that is less clear at present.

Overall, we would expect around 3.0 million tonnes of Russian exports to be impacted by sanctions if imposed (around 66%), with a further 1.4 million tonnes potentially impacted (around 31%), with less than 200,000 tonnes unlikely to be impacted (around 4%), based on the pattern of exports in 2020.

It is clear from the table that Russia is frequently the dominant supplier for those countries buying from it. Of the countries that purchased more than 100,000 t from Russia in 2020, 10 of the 13 brought

## Russian exports of ammonia, 2020 (qualification: cut off = 100kt)

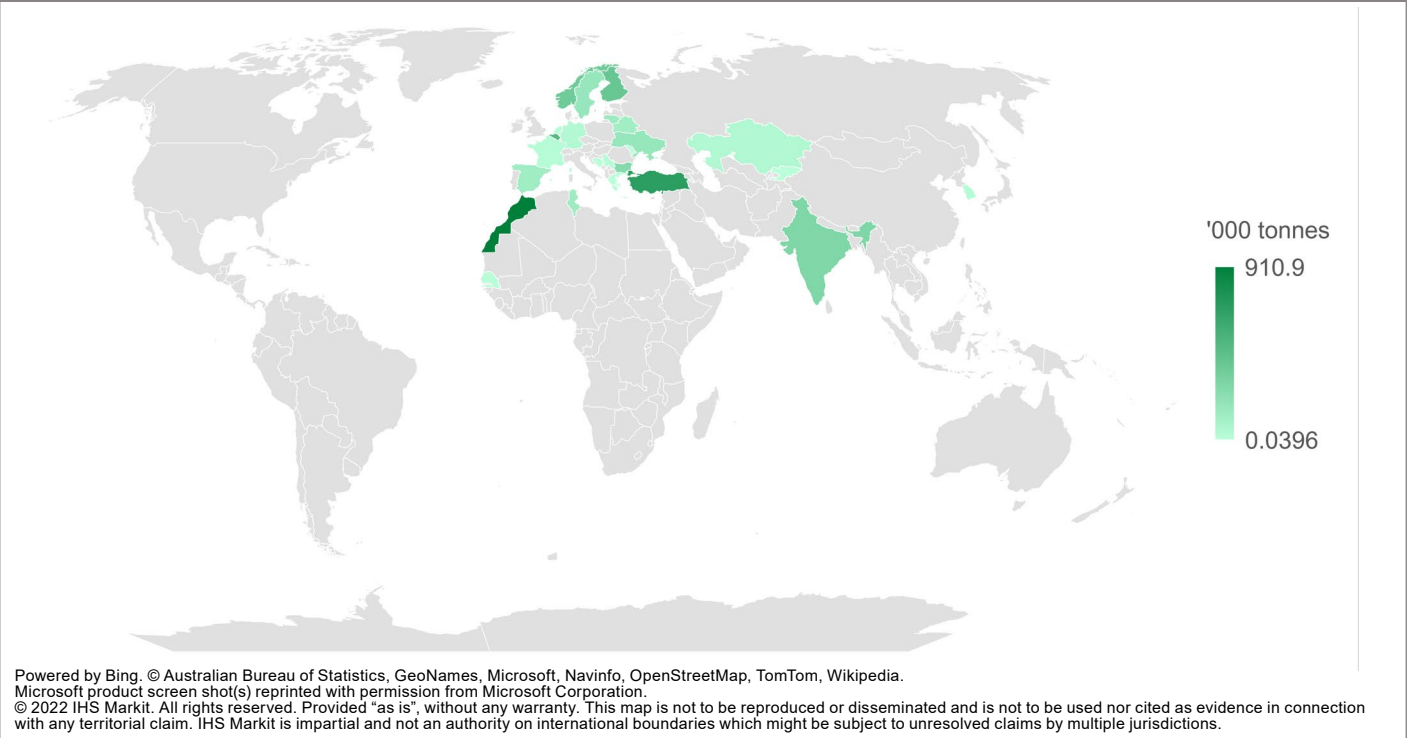
Country	Total ammonia imports (kt)	Imports from Russia (kt)	Russia %
<b>World total</b>	<b>18,902.8</b>	<b>4,458.5</b>	<b>23.6%</b>
Morocco	1,898.1	910.9	48.0%
Turkey	1,213.0	697.1	57.5%
Belgium	781.0	495.2	63.4%
Finland	461.8	398.6	86.3%
Norway	542.7	367.4	67.7%
India	2,436.1	287.3	11.8%
Bulgaria	300.8	257.5	85.6%
Ukraine	178.3	173.7	97.4%
Sweden	241.4	168.7	69.9%
Lithuania	155.2	141.6	91.2%
Tunisia	138.0	138.0	100.0%
Spain	424.2	128.4	30.3%
Belarus	118.0	118.0	100.0%
Others	10,014.0	176.1	1.8%

Source: IHS Markit

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## Russian ammonia exports, 2020 ('000 tonnes)



more than 50% of their ammonia from Russia, and in the case of Morocco, their largest trading partner, the share was 48%. The table therefore reflects a relatively small number of corporate customers, but for many of those customers any sanctions imposed will be an immediate and serious problem in terms of sourcing product.

What are the options for buyers? Merchant trade in ammonia is comparatively modest, with world exports only accounting for around 10% of demand in 2021. By definition this means that the majority of ammonia producers are not geared up for exports, either due to the produced gross ammonia being "locked in" as a feedstock for the downstream processing on site or due to the limitations of logistics capabilities.

Some support might be available from the Ma'aden III unit being commissioned in 2022 in Saudi Arabia – as the ammonia plant will be onstream well before the phosphate units that it is designed to support. All its eventual 1.1 million tonne capacity should be available for export in this interim period – however it is not due to be on-stream until the second half of this year and therefore unless this timeline can be accelerated it provides no short term relief. Another export-orientated new ammonia capacity that was

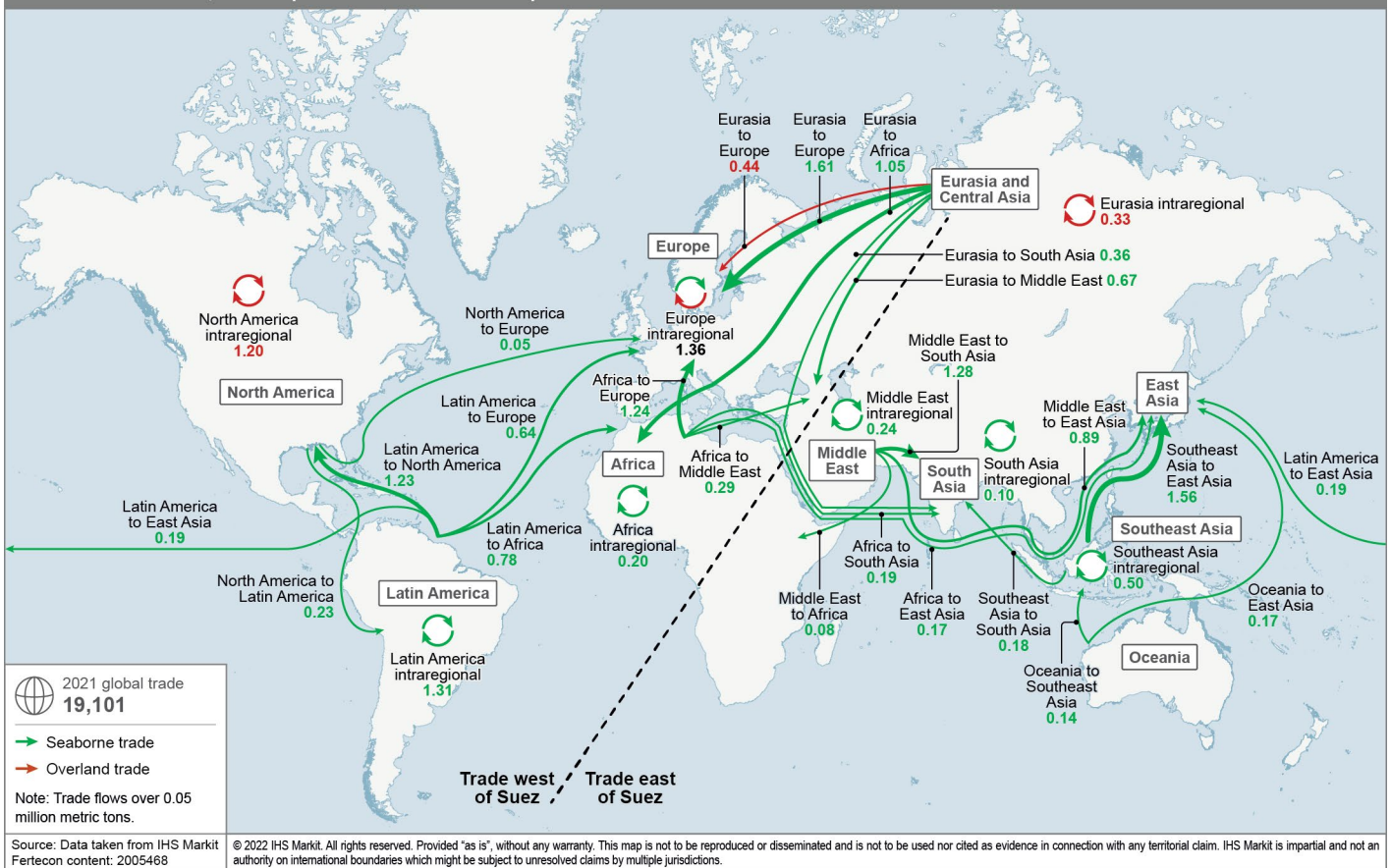
scheduled for commissioning in 2022 is a smaller-scale project developed at Salalah by Oman Oil/OQ in Oman with potentially 330,000 t ammonia available for exports from Q2 2022, provided no delays. Virtually all other expanded capacity in recent times has been to support downstream urea or nitrates production. This suggests that to secure ammonia tonnes, buyers who have been reliant on Russian supply may need to pay very high prices to source alternative tonnes elsewhere if Russian product is unavailable, i.e. exerting additional demand-pressure on other export hubs.

In addition to the potential shortfall of volumes from Russia, Ukraine itself exports around 130,000 tonnes annually (primarily represented by one producer OPZ at Odessa in 2021). It is reasonable to assume that these volumes will not be available until the current crisis stabilizes, and clearly if any of the units become collateral damage in the conflict it might be a very long time before they returned to export markets, if ever.

Although the volumes are modest in the context of overall ammonia demand, sanctions on Russian exports will cause major supply problems for those buyers that habitually buy Russian product, as there is not a surfeit of alternative sources immediately able to take over the trade. This suggests that the crisis will further extend the exceptionally high traded prices



## Ammonia trade, 2021 (million metric tons)



for ammonia, and that any substantial lowering of prices should not be expected until the crisis is resolved. The volume shortfalls may be made up to a certain extent in the short term by some urea producers with an option to export ammonia rather than urea, leaving the implications clear for both ammonia price levels and potentially for urea.

### Key watch-outs:

- The imposition of the EU sanctions on the use of transit routes that currently enable ammonia exports out of Russia via the EU states in the Baltic, namely access and ability to trans-ship Russian product via Ventspils terminal in Latvia and Sillamae terminal in Estonia. Following the disruption of supplies out of the Yuzhnyy terminal in the Black Sea, the Baltic terminals remain the only seaborne logistic route with the required infrastructure for onward ammonia export deliveries by sea. In the worst-case scenario (i.e. inability to use both terminals in the Baltic Sea), this could imply the shortage of 1.2 Million tonnes (exported via both terminals in 2021 based on provisional estimates).
- As much of the world's nitrogen industry is based on integrated ammonia units, in fertilizer terms the greatest significance of the shortfall in ammonia exports might be to phosphate production, including both ammoniated phosphates (DAP/MAP) and complex NPK fertilizers, followed by nitrates units (both for agriculture grade and technical grade required in the mining industries). E.g. Bulgaria has increasingly become reliant on the procurement of ammonia imports from Yuzhnyy terminal to its Varna terminal in the Black Sea to support nitrates production at Argopolychim.
- OCP (Morocco) can partially offset ammonia demand by switching more  $P_2O_5$  supply to India as phosphoric acid rather than ammoniated phosphates, but whether such a strategy can wholly compensate for the potential loss of Russian tonnes is uncertain. It should be noted that OCP is in the top ranking of the world's three largest ammonia buyers and procured 1.7 million t in 2021 based on provisional estimates.
- Exports to Turkey predominantly supply the phosphate industry – of the current 3.6M tonnes

of complex phosphate fertilizer capacity in Turkey (ammoniated phosphates and NPKs) only 750,000 tonnes – the Eti Bakir plant in Mazidagi – is integrated on-site into ammonia.

- Exports to Belgium from Russia include volumes for NPK production at EuroChem’s facility, as well as for BASF and other ammonia buyers at Antwerp’s industrial cluster for non-fertilizer applications. These could alternatively be sourced from the Baltic, (partly off-setting the disruption out of the Black Sea), but would significantly curtail production at the Belgian facility if stopped.
- Pricing: price risks associated with the conflict are primarily to the upside (including higher energy prices for longer, supply disruption from the Black Sea).
- Implications to the shipping market, as seaborne transportation of ammonia is reliant on the LPG vessels which are typically employed in ammonia trade on Time-Charter basis of varying duration (rather than spot fixtures). Therefore, LPG ships employed in ammonia shipping which would not be able to serve traditional routes out of Black/Baltic might either be available for sub-let opportunities should the conflict take a prolonged nature, or conversely lead to a tighter market as tonne-miles increase if alternative longer-distance ammonia sourcing options could be arranged.
- Implications to non-fertilizer end-user markets. Besides fertilizers for agriculture, merchant ammonia demand is driven to a large degree by multiple industrial applications, including the production of various chemical products such as caprolactam, MDI/TDI, acrylonitrile and others. This sector accounts for around 1/3 of the internationally traded ammonia. Disruptions of ammonia feedstock supplies to maintain the manufacturing of industrial products will have a negative knock-on effect on the extended value chain.

## Urea

### Key recent developments:

- Conflict has entirely reversed the recent reduction in urea prices driven by a weakening balance as new capacity is commissioned.

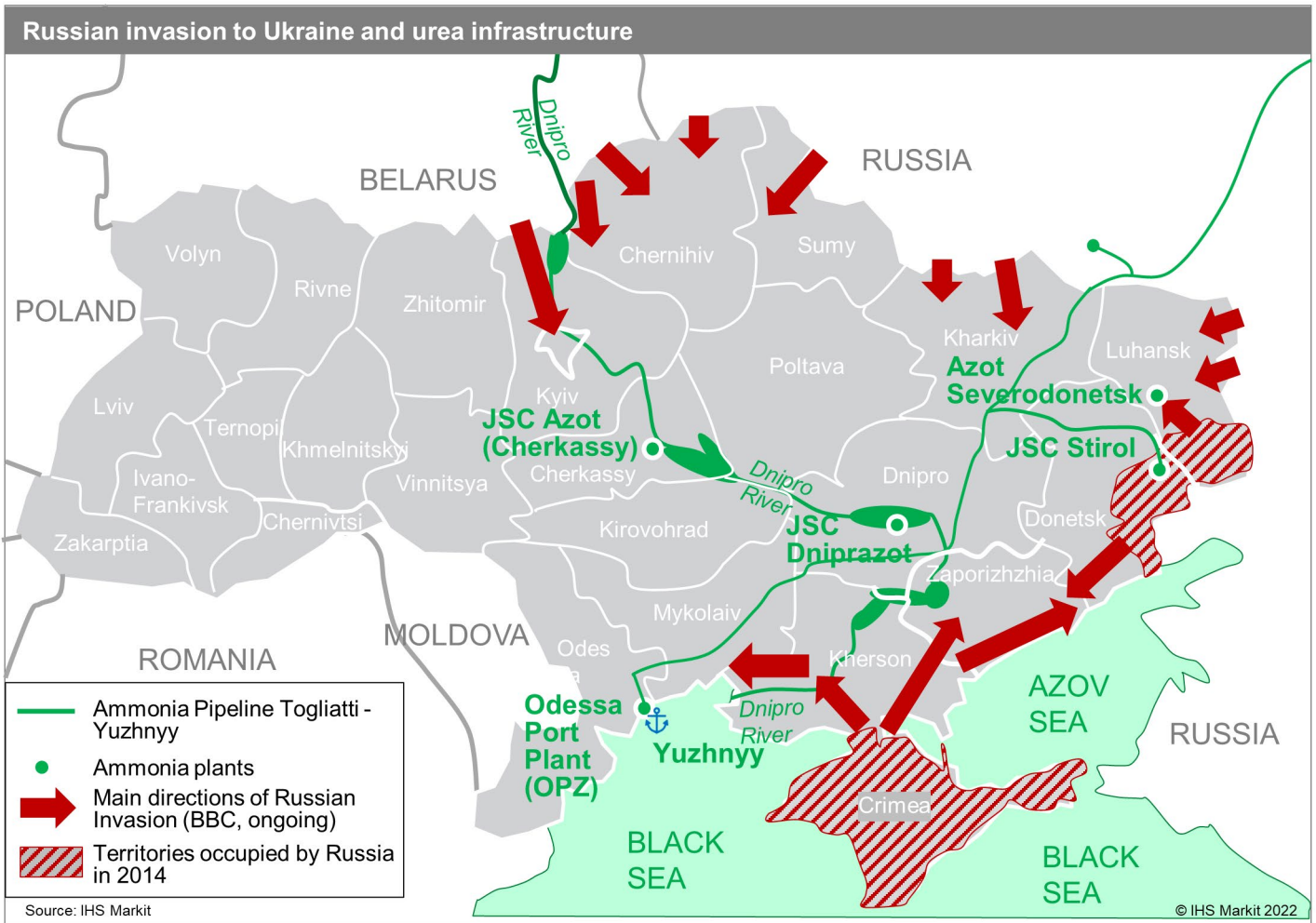
- Black Sea prills trade suspended as traders unwilling or unable to call at Russian and Ukrainian ports.
- Fertecon has declared ‘no market’ for Black Sea prilled price assessment.
- Some granular traffic remains possible from Poti and Batumi in Georgia – but little confidence this will endure.
- Vessel availability in the Baltic is seen as a significant ongoing barrier to trade.

Ukraine has five urea plants. Gas and ammonia availability is understood to be curtailing production. Two plants – DnieprAzot (690,000 tonnes) and Odessa Port Plant (826,000 tonnes) rely on the Togliatti-Yuzhnyy ammonia pipeline and, as noted, no ammonia is currently moving. A third plant Stiroil (990,000 tonnes) would also take ammonia from the pipeline but has been idle since 2014. This just leaves Azot Severodonetsk (788,000 tonnes) and Azot – Cherkassy (885,000 tonnes) with potential to produce. Azot Severodonetsk is very much in the line of the Russian advance, but at the current speed of advance, Cherkassy Azot may not be impacted for some time. However gas supply will be key for both – without the availability of gas production ceases.

### World’s exposure to Russian and Ukrainian urea

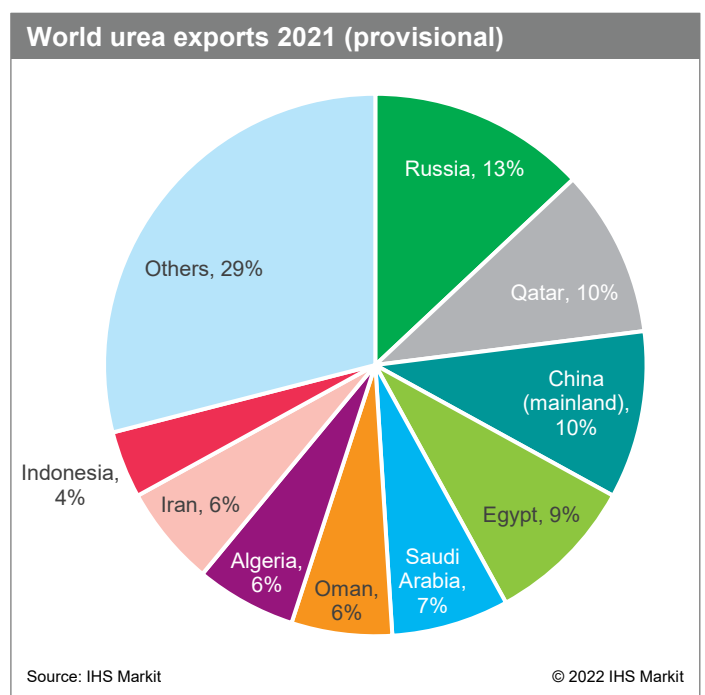
Russia exported 7.1 million tonnes of urea in 2020, and around 7.0 million tonnes in 2021, although we have not yet fully audited the latter number. Total Russian exports accounted for 13.1% of 2020 trade, and if the 2021 data is confirmed, its share in 2021 will be almost identical. Russia is the world’s largest exporter of urea, with a global trade comprising a total of 20 nations exporting more than 500,000 tonnes in 2021, and a total of 45 nations exporting some urea.

Russia’s main urea markets are Brazil, Mexico, the US, Canada and Peru (markets that in 2020 exceeded 300,000 tonnes). It should be noted that trade data needs to be interpreted in this regard – formal statistics show Finland, Estonia and Switzerland as three of the four largest ‘export’ markets, but this is only because of Baltic ports for export (Finland, Estonia) and finance (Switzerland). Although the stance Brazil will take with regard to sanction is not



yet clear, it is highly likely that trade to Mexico, the US and Canada will cease. Based on confirmed 2020 data (and the 2021 situation has not materially changed), Russian urea accounted for around 19% of Brazilian imports, 34% of Mexican imports, 14% of US imports, and 37% of Canadian imports. In 2020, Russian urea imports into Canada, the US and Mexico (the USMCA zone, United States-Mexico-Canada Agreement) totaled 1.6 million tonnes, and provisionally 1.2 million tonnes in 2021. Brazil imported 1.3 million tonnes of Russian urea in 2020 and provisionally 1.4 million tonnes in 2021.

As noted, at this time it is not possible to be clear as to exactly what proportion of Russian exports may be impacted by sanctions. Based on 2020 data, we think that around 47% of Russian exports, or around 3.3 million tonnes, is likely to be subject to the impact of sanctions (such as payment issues etc.) and those importers might therefore need to seek new suppliers. Around 3% of Russian exports, or around 225,000 tonnes, are expected to ignore any sanctions imposed by the west. And the balance of 50%, or 3.5 million



tonnes, is uncertain. In broad terms therefore it seems likely that at least 3.5 million tonnes of trade may need to find a new supplier.



Russian exports of urea, 2020 (qualification = 100kt)			
Country	Total urea imports (kt)	Imports from Russia (kt)	Russia %
<b>World total</b>	<b>54,112.8</b>	<b>7,073.8</b>	<b>13.1%</b>
Brazil	7,018.1	1,317.1	18.8%
Mexico	1,911.6	641.5	33.6%
United States	4,423.2	597.9	13.5%
Canada	942.1	349.3	37.1%
Peru	347.6	308.3	88.7%
United Kingdom	705.3	230.1	32.6%
Ecuador	292.6	229.3	78.3%
Colombia	691.8	209.9	30.3%
India	9,906.7	205.8	2.1%
Poland	712.4	198.2	27.8%
Guatemala	202.3	184.8	91.4%
Serbia	326.3	176.8	54.2%
Israel	150.3	136.0	90.5%
Senegal	192.9	125.2	64.9%
France	1,478.0	122.9	8.3%
Honduras	158.9	121.3	76.4%
Netherlands	317.4	113.7	35.8%
Morocco	145.1	112.8	77.7%
Belarus	117.1	105.0	89.6%
Others	24,073.3	1,588.1	6.6%

Source: IHS Markit

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Exacerbating the current situation is the stance on exports taken by China, which (prior to the start of the Russia-Ukraine conflict) has imposed inspections on any proposed exports to minimise their quantity, keep product within China to try to ensure domestic fertilizer pricing is kept as low as possible. China has been supplying slightly over 5 million tonnes of urea annually to export markets, and although it had been expected the current inspection regime would be reviewed in Q2, we are now significantly less optimistic that this will happen. Therefore China may be substantially absent from export markets in 2022. Add this to the Russian volumes and the deficit for export markets could be between 8.5 million tonnes and 12 million tonnes as a worst case.

At a high level, we expect some 14 million tonnes of new urea capacity to be commissioned in 2022. However, 1.1 million tonnes of this is in Russia, 358,000 tonnes is in Iran, also subject to sanctions, and 4.7 million tonnes is in China which therefore may not be readily accessible to export markets. Some 4.3 million tonnes is in India, which when commissioned will reduce Indian imports by a commensurate volume, significantly assisting the situation. Key new export-oriented capacity is expected on-stream in Nigeria (1.85 million tonnes – ramp-ups of Dangote and Indorama), and the recently commissioned (January 2022) Brunei Fertilizer Industries 1.3 million tonne facility. There is also 495,000 tonne expected to re-start operations in Mexico (Pemex, Pajaritos), which should provide that country with some mitigation

Ukrainian exports of urea, 2020 (qualification = 20kt)			
Country	Total Urea Imports (kt)	Imports from Ukraine (kt)	Ukraine %
<b>World total</b>	<b>54,113</b>	<b>1,480</b>	<b>2.7%</b>
India	9,907	885	8.9%
Italy	910	114	12.5%
Turkey	2,790	87	3.1%
Mexico	1,912	83	4.3%
Tanzania	209	76	36.4%
Romania	274	52	19.1%
Senegal	193	44	22.8%
Honduras	159	32	20.3%
Ghana	86	28	33.1%
Mauritania	21	21	99.9%
Others	37,654	57	0.2%

Source: IHS Markit

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against the potential loss of Russian imports. Capacity which will be accessible to countries impacted by sanctions might therefore total 8 million tonnes in 2022, should the commissioning of new facilities go entirely smoothly.

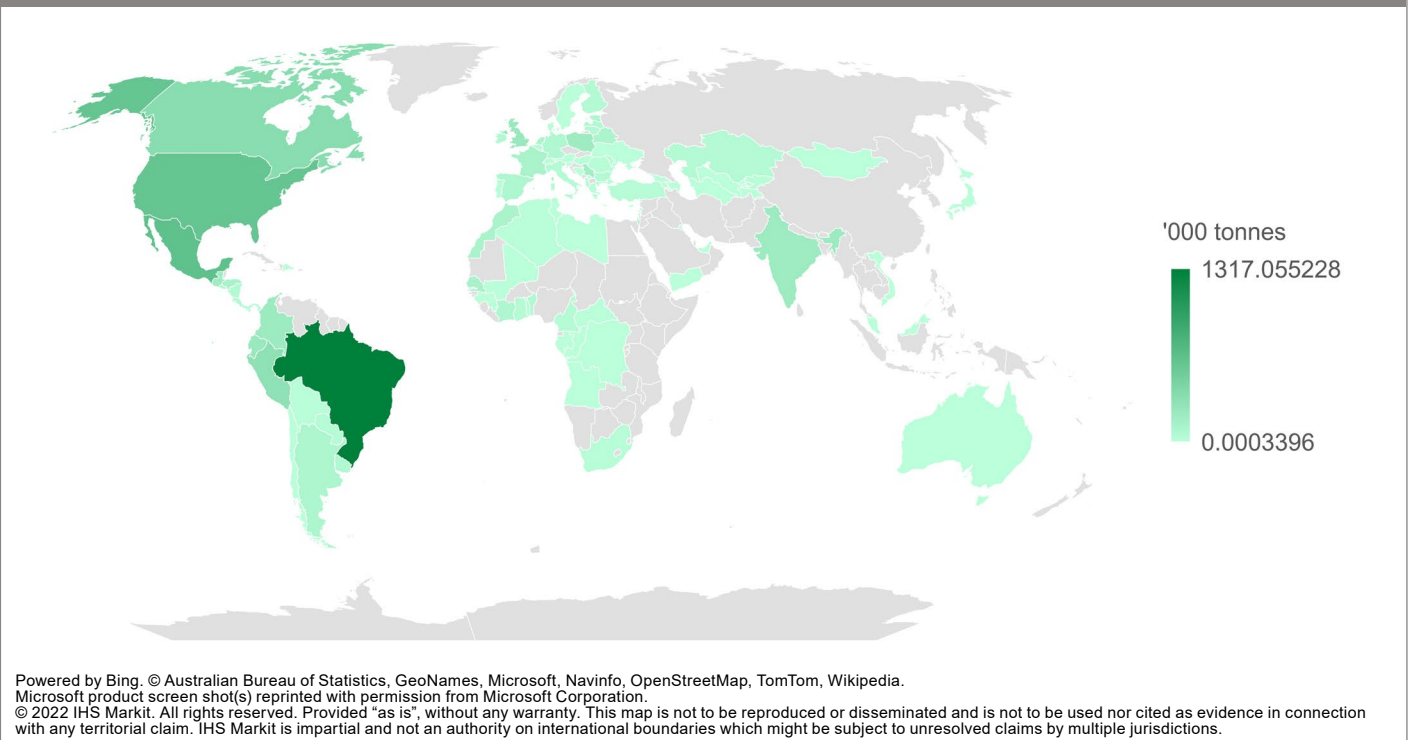
Global exposure to Ukrainian urea is significantly lower than from Russia. Exports in 2020 amounted to just under 1.5 million tonnes, and only one country, Mauritania, took more than 40% of its imports from Ukraine. The profile of exports is summarized in the table on p11.

The short-term impact of this conflict will probably be to inject significant up-ward pressure on price. Urea in 2022 is unique in fertilizer terms in that a significant amount of new capacity is expected – under different circumstances the price outlook later in the year would be for levels to fall significantly. Irrespective of the actual balance for urea, some of the overall market sentiment will impact on urea price expectations. However, as this analysis shows, at a high level the urea market is better positioned than most to weather the initial storms caused by Russia's invasion. Markets will undoubtedly be turbulent through 2022, but a risk to both Chinese and Russian exporters in terms of urea for the future is that it is possible that buyers can manage without them.

### Key watch-outs:

- Expected downturn in prices due to capacity commissioning in 2022 likely to be delayed whilst buyers address ongoing trade routes and supply chain disruptions. However, the urea balance is less stressed than most other products, which means that with prices moving to high levels again, the risk is to the downside.
- European gas pricing makes competitive production problematic.
- Knock-on effects of high demand for LNG will impact production costs in most countries where urea production is based on variable-tariff gas. The supply-side analysis, with significant new capacity being commissioned, could temporarily be negatively impacted where gas prices move to levels which will not support urea production costs at levels acceptable to urea buyers and users.
- Large-scale migration and misplacement of the population from Ukraine might also have an impact on the availability of labor in the agricultural sector in the European region.

Russian urea exports, 2020 ('000 tonnes)



## Nitrates

### Key recent developments:

- Spiking gas prices have forced many key European producers to withdraw from the market.
- Globally importers are beginning to avoid Russian products.
- Ship owners and traders are becoming wary of loading vessels in Russian ports in the Black Sea, but this has already been factored in by the market so its impact on especially UAN markets is moderated.

European nitrate producers are beginning to pull previous offers, for example CF Fertilisers in the UK pulling an offer of UK£651 bagged delivered merchant due to surging natural gas costs. European producers will not be prepared to accept terms where the risks related to gas costs are not offset.

Russia has announced a complete ban on AN exports from 2 February to 2 April to ensure sufficient domestic supply.

## World's exposure to Russian and Ukrainian nitrates

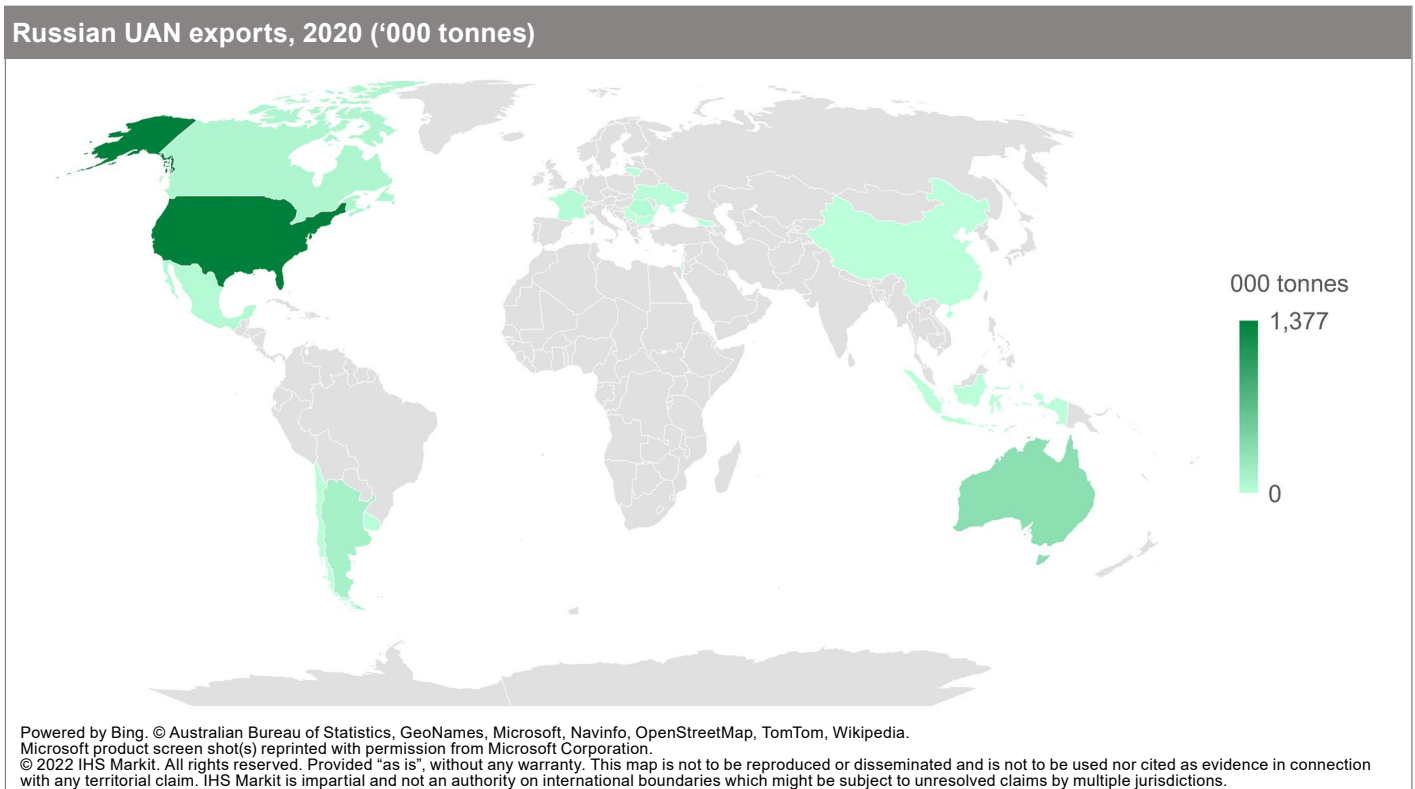
### UAN

UAN exports from Russia account for typically ~26% of total global volumes, equating to around 2.2 million tonnes in 2020 and under 2 million tonnes in 2021, although we have not yet fully audited the latter.

Russia's key UAN export market is the United States (US), which accounted for almost 65% (1.4 million tonnes) of Russian exports in 2020 and 50% of total import volumes for the US. Russia also exports to a series of other destinations though at smaller volumes including Australia (346,000 t) and Argentina (157,000 t).

Irrespective of any sanctions, because of antidumping duties it is generally expected that Russian exports into the US would be reduced from 2022. Russia's volumes to Australia (346,000 t) account for approximately 90% of their imports, with smaller amounts sourced from Lithuania and the United States. Russian volumes to Argentina make up 24% of their total import quantities (157,000 t). Assuming Australia and Argentina decided to place sanctions on Russian imports their choices would be:

**Import more UAN from Europe:** Australia may turn to





other producing countries in Europe including the Netherlands, Slovakia and Poland. However, amid exceptionally high feedstock costs in Europe, this would increase the selling price and freight costs for buyers in the immediate term. Additionally, it should be mentioned that Poland is a major exit channel for Ukrainian refugees, and the country is reportedly handling over 1.5 million people fleeing Ukraine and therefore potential logistics disruptions should not be excluded, as the priority would be given for humanitarian aid.

#### **Import UAN from Trinidad and Tobago (Trinidad):**

Trinidad typically exports approximate 850,000 tonnes to the US and due to antidumping duties it is largely expected that these exports would be largely reduced from 2022. Therefore, this amount could be exported to Australia and Argentina, to fully cover tonnes missing from Russia, though prices will be higher than what they are used to paying for Russian material.

**Change mix of nitrogen fertilizers:** Both countries have the option to maximizing their consumption of other nitrogen fertilizers including ammonia, and urea.

**Maximize domestic production:** Australia and Argentina both have capacity to produce UAN domestically. If domestic production is maximized Argentina would be able to, in theory, remove dependency from imports as they are able to produce an extra 240,000 t. Australia would be able to produce an additional 170,000 t, lightening its dependency on imports.

#### **FGAN (Fertilizer Grade Ammonium Nitrate for agriculture use)**

Russian FGAN exports make up around 45% of global

trade and reached almost 2.2 million tonnes in 2020. Approximately 50% of Russia's export volumes goes to Brazil making up around 96% of its consumption, at 1.1 million tonnes in 2020. Russia exports to a series of other regions at much smaller volumes including Eurasia (352,000 t), Africa (248,000 t) and Europe (114,000 t).

Although the stance Brazil will take with regard to sanctions is not yet clear, if sanctions are placed it has the following options:

**Import AN from the US:** Producers in the US may be looking to maximize domestic UAN production amid countervailing duties placed against Russia and Trinidad therefore this would be dependent on availability.

**Import UAN from other regions:** Quantities may be sourced from European countries including the Netherlands or Poland. However, there might be limitations on the immediate switch, as UAN is a liquid fertilizer requiring specialized equipment and infrastructure for distribution and application in the field.

**Change mix of nitrogen fertilizers:** Brazil could look to import more ammonia, urea or CAN over AN.

**Maximize domestic production:** Brazil produces both FGAN and EGAN. It could in theory maximize its FGAN production and import more explosives to help cover the gap in fertilizer volumes from the Russian market. However, this would give an approximate 220,000 t so would have to be combined with some options above.

Although the stance Brazil will take with regard to sanctions is not yet clear, if sanctions are placed it has the following options:

<b>Russian exports of FGAN, 2020 (qualification = 50kt)</b>			
<b>Country</b>	<b>Total FGAN imports</b>	<b>Imports from Russia</b>	<b>Russia %</b>
<b>World total</b>	<b>4,969</b>	<b>2,181</b>	<b>44%</b>
Brazil	1,144	1,100	96%
Azerbaijan	153	153	100%
Morocco	287	151	53%
Moldova	100	99	100%
Serbia	151	63	42%
Mongolia	59	59	100%
Kyrgyzstan	54	54	100%

Source: IHS Markit

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**Import AN from the US:** Producers in the US may be looking to maximize domestic UAN production amid countervailing duties placed against Russia and Trinidad therefore this would be dependent on availability.

**Import UAN from other regions:** Quantities may be sourced from European countries including the Netherlands or Poland. However, there might be limitations on the immediate switch, as UAN is a liquid fertilizer requiring specialized equipment and infrastructure for distribution and application in the field.

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## CAN

CAN is a heavily European dominated product with Russian exports (385,000 t) contributing 4% of global trade in 2020. Russian exports are spread across 26 countries with Finland taking the highest amount of 85,000 t. With there being such a high level of intra-regional trade in Europe, sanctions placed on Russia will not affect the market greatly.

As Russia is a significant exporter of nitrates, sanctions placed against it will have impact on trade routes and sourcing of product for many countries. In terms of short-term impacts, we expect there to be an upward pressure on price for UAN and AN due to Russia's dominance in exports. In the longer term we may see countries looking to invest in their own production to safeguard themselves from volatility and disruptions in the global market.

## Key watch-outs:

- 'Normal' Q2 price reductions on nitrates seem unlikely in 2022.
- Continuity of ammonia supply to non-integrated nitrates units dependent on overseas feedstock procurement.

- Increases in freight rates especially for UAN (liquid traffic) may exacerbate pricing issues.
- Actual shortages for nitrates, particularly UAN may occur in key markets e.g. US.
- Given UAN pricing, some of the current duty environment becomes less relevant – especially in Europe where anti-dumping duties are a fixed cash equivalent (not a percentage of the current price).
- If exporters stop all exports UAN volumes will be pulled into blanket bans on Russian exports.

## Phosphates

### Key recent developments:

- Various key bulk container companies announced that they will not be loading at Russian ports.
- OCP withdraws offers given concerns about ammonia supplies from the Black Sea.
- Yara's President and CEO openly condemns Russian "illegal military attack" on Ukraine after the Yara Ukraine office in Kyiv is hit by a missile strike.
- A motion at the UN General Assembly asking for unconditional withdrawal of Russian military forces from Ukraine territory received the support of 141 UN members. Notable votes include Brazil supporting the resolution, China and India abstaining, and Morocco not participating to the vote.

Prospects for export availability out of Black Sea ports are bleak in the short-term given the escalation of conflict in the area. The Black Sea still accounts for about 10% of Russian phosphate fertilizer exports, including regional sales (e.g. to Romania) but also meaningful volumes to the United States, and notably close to 30% of volumes exported to Brazil according to our estimates.

Indirect impacts could however be of far wider importance, given the reliance of many phosphate producers on ammonia from Russia. The list includes GCT in Tunisia, various NP/NPK producers in Turkey, Indian producers (e.g. IFFCO), Yara's Finnish units, Lifosa in Lithuania and crucially OCP in Morocco. The latter was quick to withdraw offers

from open tenders until it can better re-assess its raw materials sourcing.

Messages surrounding a recently signed joint-venture agreement between OCP and Koch Ag & Energy Solutions explicitly mention collaboration on ammonia and sulphur supply, although how quick any such plans could be put in motion remains uncertain.

### World’s exposure to Russian phosphates

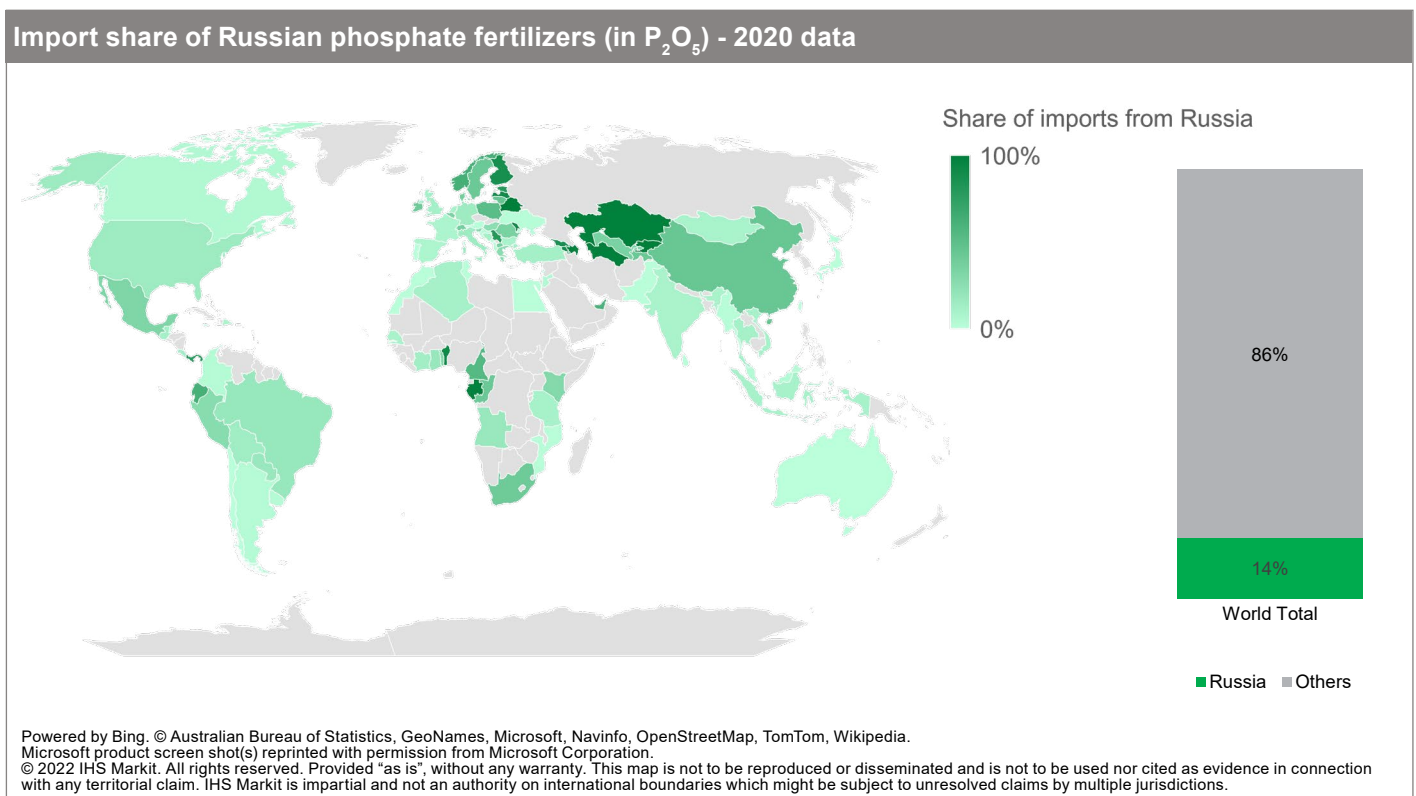
Russia is a key player in the phosphate industry, ranking in 2020 as the fourth-largest producer of phosphate rock on a phosphate content basis, but perhaps most importantly as the third-largest exporter of phosphate fertilizers, with an overall global market share around 14% on a nutrient basis. There are some meaningful product-wise differences: its share of world DAP exports sits at 8%, while MAP is higher at 18%, other NPs at 27%, and NPK complexes at 33%. The latter number is of particular interest: the majority of DAP and MAP are applied in blends alongside other fertilizer products to ensure a desired N-P-K ratio, however, markets used to direct application of NPK complexes would struggle to suddenly switch to alternatives.

The country’s importance as an international supplier

has strengthened further since September 2021, when China (the world’s largest producer and exporter) imposed significant restrictions on its phosphate fertilizer exports set to last until at least the end of June 2022 if not longer (see separate update in the Phosphate Market Report of 3 March) – a move which was matched by the Russian government imposing an export quota to avoid a sudden increase in exports that would leave domestic stocks low. Full trade data for 2021 is not yet available at the time of writing, hence the charts below are based on 2020 data – readers interested in details about recent changes to trade flows are welcome to get in touch.

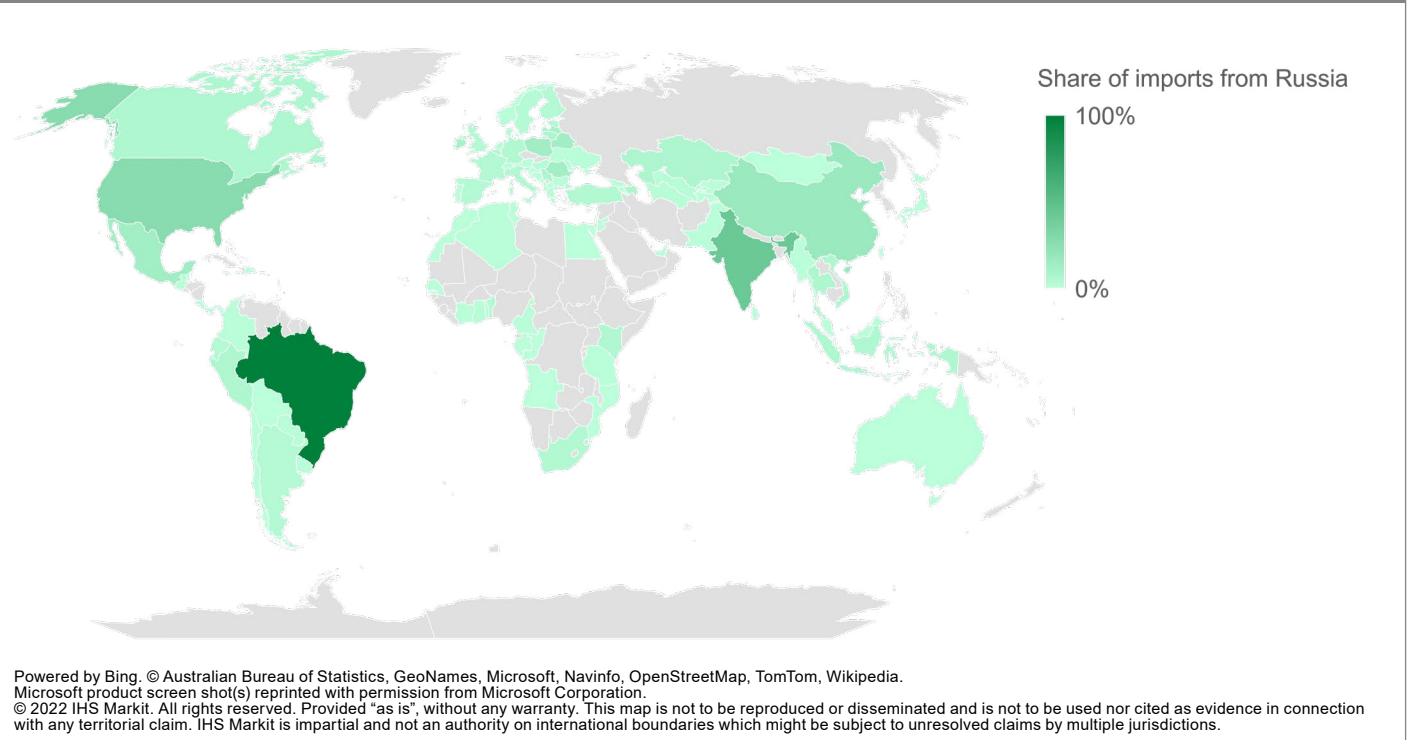
On a nutrient level, Russia’s key national export markets for phosphate fertilizers are Brazil, India, and mainland China – however total sales to the EU makes the bloc Russia’s largest export destination.

Any friction encountered in accessing Russian phosphate fertilizers will affect specific countries in different ways. Some countries (for example most of Central Asia) import relatively small volumes, however, their reliance on Russia as a supplier can be often close to 100%, with no real feasible alternative. Other countries (e.g. Brazil, India) rely relatively less on Russia in terms of share of imports, however, the magnitude of overall imports also





### Russian exports of all phosphate fertilizers (as $P_2O_5$ ) – 2020 data



makes it hard to find alternatives – especially while Chinese export restrictions remain in place. This is of particular political sensitivity in India, a country which has recently seen a considerable increase in the government’s role in fertilizer procurement (either through subsidies or through direct purchases incurring financial losses).

Alternative suppliers are not obvious to find. The United States imposed countervailing duties on Russian and Moroccan phosphate fertilizers in 2021 and replaced its imports from these sources with material from other exporters (e.g. Australia, Jordan, Egypt, Mexico, Tunisia, Bulgaria, but most notably Saudi Arabia). Given their smaller scale compared to Russia and Morocco, export line-ups from producers in all of the mentioned countries are genuinely tight, with little to spare for other destinations as of now.

It appears unlikely that countries such as China or CIS (Commonwealth of Independent States) members in Central Asia would adopt any restrictions against Russia. India is also likely to prioritize fertilizer imports above sanction compliance in the short term – as suggested by recent changes in potash tenders, now accepting quotes in Indian Rupees rather than just Euros or US Dollars.

The biggest question mark will be Brazil, the single-largest importer of Russian phosphate fertilizers, and one that could welcome additional product as well given its continued growth trend. While not a member of NATO, Brazil has strong economic and political relationships with the United States and the European Union, however, some suggest this has weakened somewhat since the election of Jair Bolsonaro as the country’s president. Importantly, however, many US and EU companies are active in the Brazilian fertilizer industry, including grain traders ADM, Bunge, Cargill, DSM, and fertilizer companies Mosaic and Yara to name a few. Russian EuroChem with Headquarters in Switzerland too is a growing presence in the Brazilian market.

Brazil’s willingness (or lack of) to comply with international sanctions on Russian fertilizers will be a key determinant of global  $P_2O_5$  balances. Any increase in imports from Russia could also release more Moroccan and US material for exports elsewhere – possibly relieving buyers from strong inflationary pressures.

Another important aspect to consider is Russia’s role as a supplier of raw materials and upstream phosphates: while not a player in phosphoric acid, exports of phosphate rock sustain fertilizer

production in Norway, Belgium, Lithuania, Romania, Belarus, and to a lesser extent Ukraine. For Belgium and Lithuania, production is in fact carried out at plants fully owned by EuroChem, a company headquartered in Europe but often interpreted in line with its historical Russian heritage. Moreover, Russian phosphate rock is of igneous origin – for which the only meaningful alternative exporter is currently Foskor in South Africa.

A halt to phosphate rock exports (or equivalently import restrictions) could therefore result in the loss of production at least in EU member states and possibly Norway as well. In other words, Russia’s role as a phosphate fertilizer supplier is in fact larger than its 14% share of fertilizer exports: considering its phosphate rock exports as well this share swells to about 18% based on our estimates.

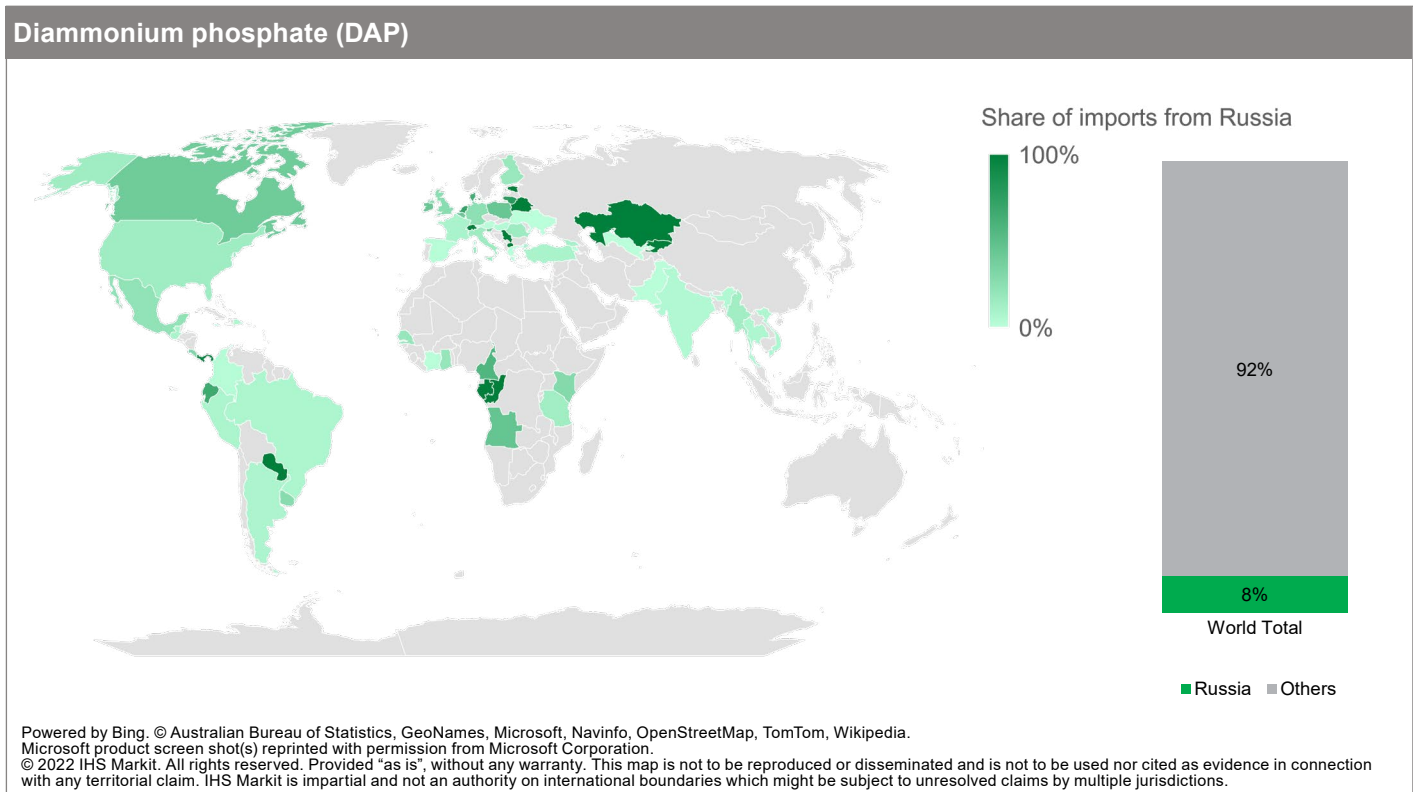
While fertilizers remain the largest market in volume, Russia is also an important exporter of feed-grade phosphate additives (with a trade share of 13%, and again a significant role as a supplier to Europe) and indirectly as a supplier of P<sub>2</sub>O<sub>5</sub> for the manufacture of purified phosphoric acid by Prayon in Belgium, a product used in various industries (e.g. metal treatment, industrial cleaners, food additives). Alternative suppliers could be relatively easy to find

in the feed-grade phosphate market, however, again there seems to be limited options for displacing any significant losses in the purified acid market.

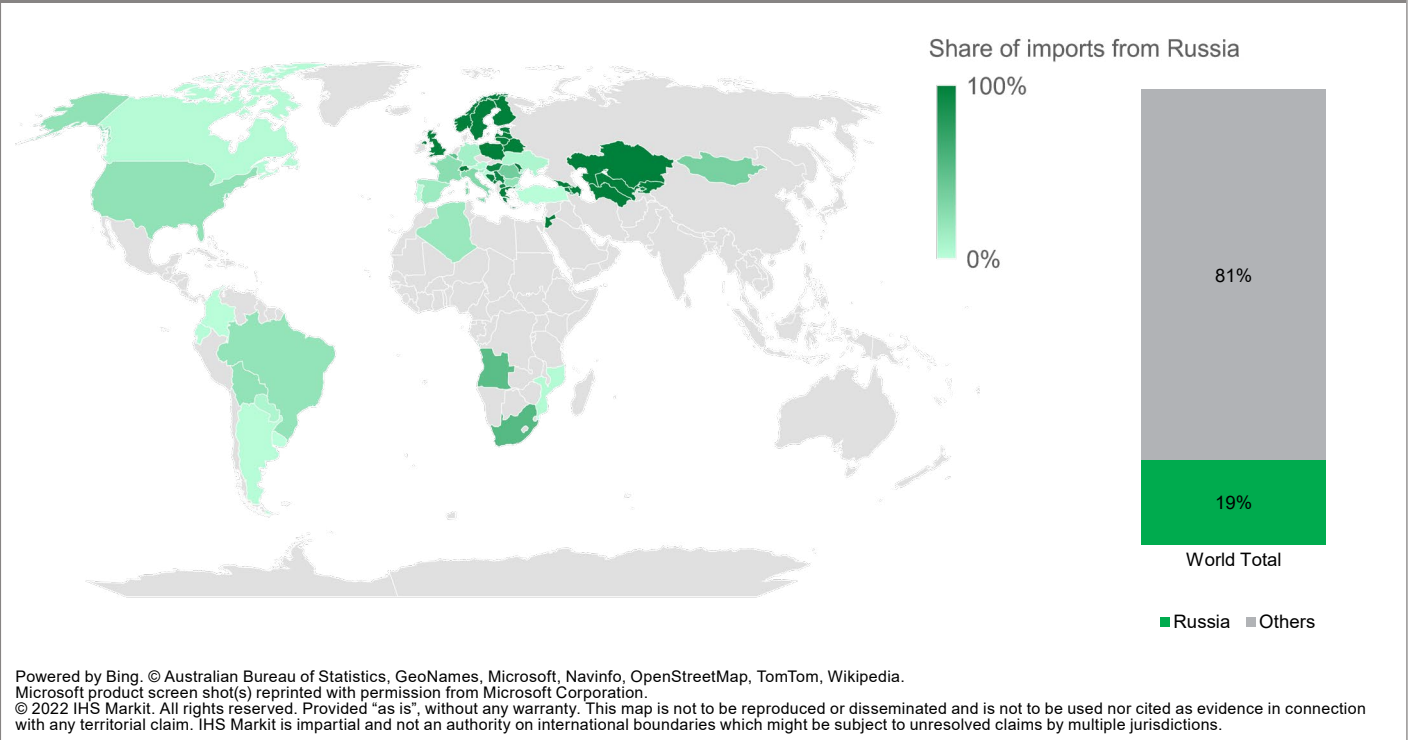
Finally, the supply of raw materials must also be considered, e.g. ammonia and sulphur, both of which Russia exports to phosphate fertilizer producers. OCP’s ammonia line up is dominated by vessels loading in Yuzhnyy with Russian product while Russian sulphur is exported out of the Black Sea ports of Kavkaz and Taman to both Morocco and Tunisia. In the last 3 years, OCP has taken between 800-900,000 t/year ammonia accounting for around 50% of its annual requirement while GCT is almost entirely dependent on Russian ammonia for its DAP production at Gabès.

**Key watch-outs:**

- Restrictions to merchant ammonia availability could hit severely key production hubs for complex fertilizers, including Morocco’s OCP. Trade between Morocco and Algeria is currently restricted given earlier geo-political frictions between these countries.
- As sulphur procurement is more diversified geographically, OCP could divert more P<sub>2</sub>O<sub>5</sub> to exports as phosphoric acid, however logistical



## Monammonium phosphate (MAP)



bottlenecks at Jorf Lasfar could still see a reduction in volumes as many berths are dedicated to dry product handling instead of industrial acids. This would also be successful only if exports are destined to countries that don't also rely on Russian ammonia.

- If OCP were to import more ammonia from the Caribbean, US producers would also be required to outbid Morocco for this vital raw material. OCP's value-chain integration means it could absorb higher input prices while maintaining margins positive – producers e.g. in Florida, Mexico or Brazil could instead struggle to afford higher prices.

## Potash

### Key recent developments:

- BPC announces force majeure for all Belarusian potash exports due to the initial loss of the use of Klaipeda (Lithuania) in February, and the loss of Mykolaiv (Ukraine) following the commencement of the conflict – albeit Ukraine had already suspended rail freight for BPC.
- Exports of Russia product through the Baltic becoming increasingly challenging with some major shippers announcing they will temporarily halt the carriage of Russian product.

- Uncertainty of the availability of both Russian and Belarusian tonnes ( $\pm 40\%$  of global trade) ensures some producers pulling offers and market pricing increasing further.

### World's exposure to Russian potash

The invasion of Ukraine by Russian forces on February 24th is likely to have far-reaching implications for potash markets over the next months and is likely to make an already challenging trading environment significantly tougher. Markets have been trying to absorb the implications of Belarusian supplies being largely eliminated from the market following Lithuania's decision to deny them access to Klaipeda for exports. It now seems there will be restrictions on Russian potash as well. Between them Russia and Belarus account for around 40% of global potash trade. It is not a volume that can be replaced from other producers. So, there is a clear risk of significant shortages of supply through the next few months.

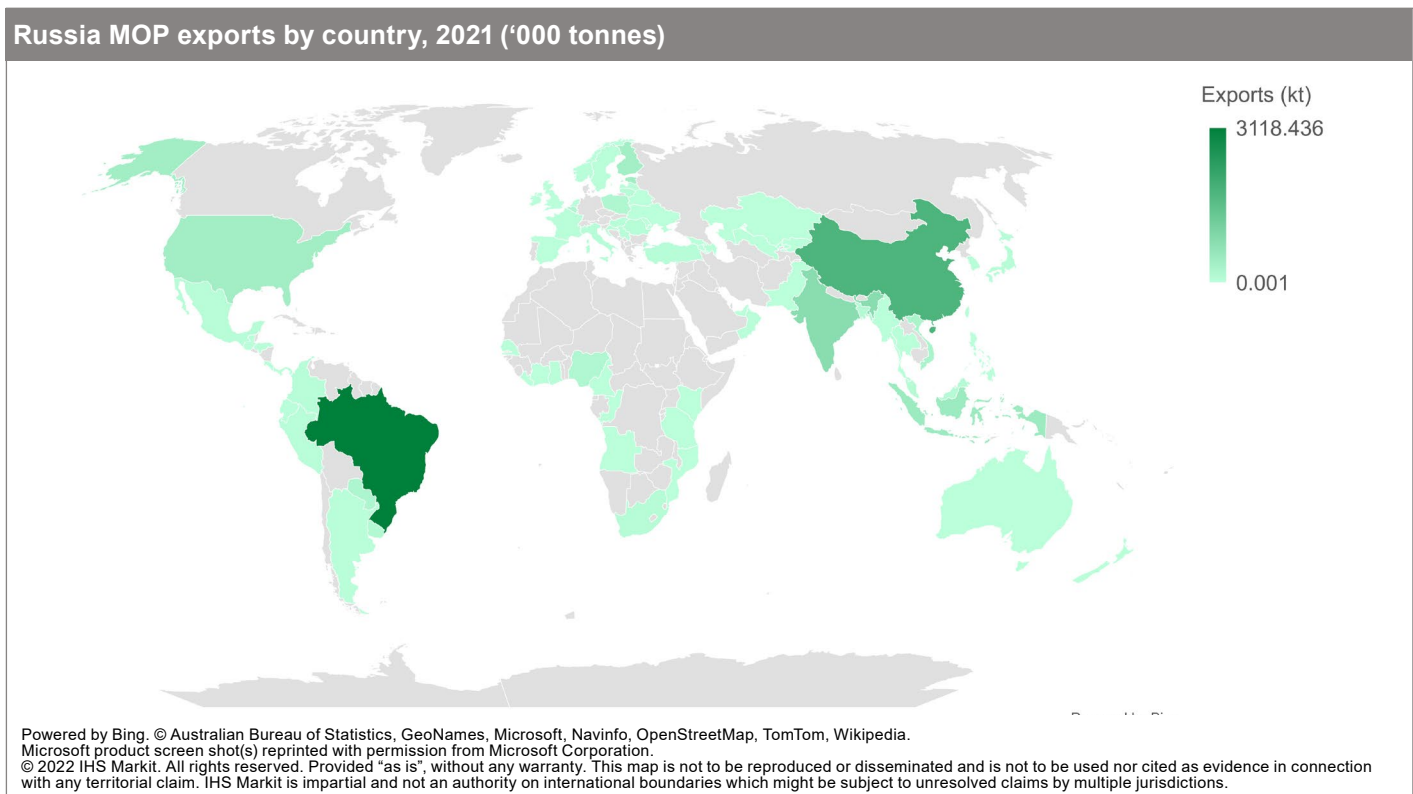
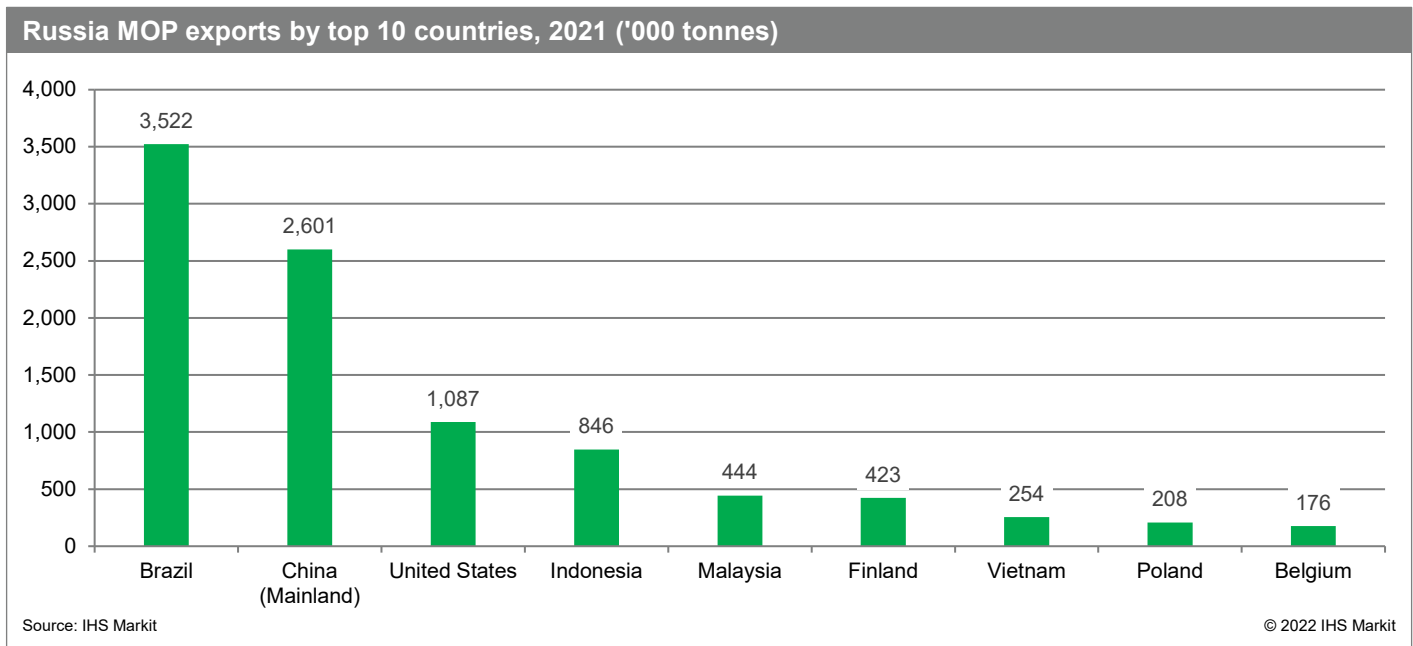
No actual sanctions have currently been imposed on Russian product, but as noted above shipments from the Baltic are becoming increasingly difficult. It is unclear whether, or how much of Uralkali's trade might be implicated. EuroChem's use of Muuga (Estonia) may also face difficulties.

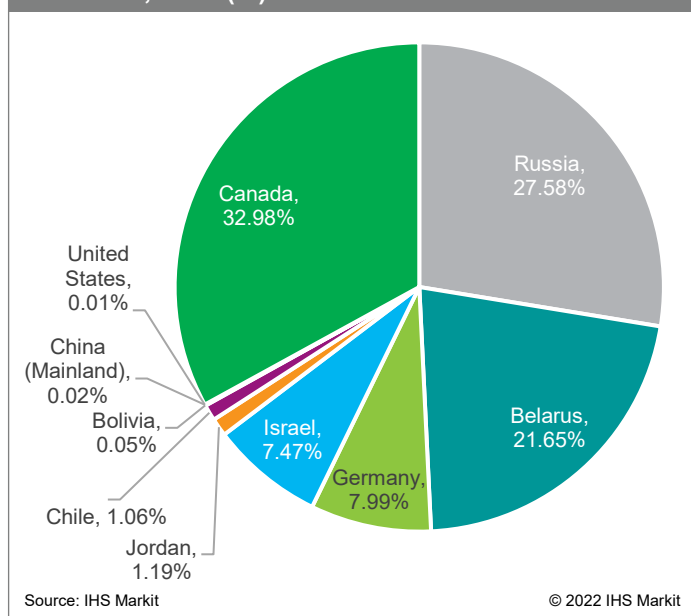


Total Russian MOP exports in 2020 were 9.8 million tonnes and in 2021 11.7 million tonnes. The top ten markets for Russia accounted for around 82% of their exports and included all of the five of the six largest potash markets (Brazil, China, United States, Indonesia, and Malaysia, but not India to which their exports were a more modest 156kt).

It is reasonably clear that any exports to the US and Europe will be subject to sanctions or disruptions.

Equally it is reasonably certain that trade to China will not be affected, and it is unclear whether which direction markets in Southeast Asia and Latin America will go. Our assessment of trade – based on 2021 export data, is that around 28% or 3.2 million tonnes of Russian exports are highly likely to be subject to sanctions, and 23% or 2.7 million tonnes are not going to be impacted by sanctions. The balance of 49% or 5.8 million tonnes is uncertain.



**Brazil: Proportion of MOP imports by exporting countries, 2020 (%)**

depend on whether potential sanctions are observed by them, as Russian producers will be able to export from Russian ports. As noted, we do not expect China (mainland) to observe any US or EU sanctions on Russia or Belarus, and much of Russia's trade with China is now delivered by rail. Sanctions against Russia might make a product swap with BPC more likely, with the combined Russian and Belarusian allocations being shipped from Perm, and the BPC allocation delivered to St. Petersburg for marketing by Uralkali.

United States imports from Russia in 2021 were about 1.1M tonnes compared to average imports from Russia over the last seven years of 803kt. We expect the shortfall in Russian and Belarusian imports will be made up with supply from Canada.

### The threat to markets from sanctions on both Belarus and Russia

The following table identifies the main export markets for MOP from Russia and Belarus. In the column on the far right of the table is the proportion of imports for the country supplied by Belarus and Russia, with those where the total exceeds 50% of all imports highlighted. We would note that the share in the largest market, Brazil, is only 0.8% below the 50% threshold.

If sanctions are imposed and individual countries choose to observe them, the alternative purchasing options for the procurement of MOP are very limited.

The greatest uncertainty and potentially largest impact relates to Brazil. This is due to the fact that Russia and Belarus combined currently supply about 50% of Brazilian MOP. However, unlike Belaruskali, Russia MOP producers are currently able to ship from Russian ports to Brazil and thus the extent to which the sanctions on Russia impact on Brazilian MOP demand will depend on the nature or coverage of the sanctions.

For countries like India, Indonesia and Vietnam, the extent of the impact of sanctions on Russia will

**Top 15 MOP export markets for Russia and Belarus combined, 2020 ('000 tonnes, %)**

	World Total	Belarus Exports	Russia Exports	Total Belarus + Russia	Belarus % of Imports	Russia % of Imports	Total % Bel + Rus
<b>World total</b>	<b>53,797.7</b>	<b>11,497.3</b>	<b>9,790.3</b>	<b>21,287.6</b>	<b>21.4%</b>	<b>18.2%</b>	<b>39.6%</b>
Brazil	11,305.3	2,448.1	3,118.4	<b>5,566.6</b>	21.7%	27.6%	49.2%
China (mainland)	8,134.9	1,393.9	1,817.7	<b>3,211.5</b>	17.1%	22.3%	39.5%
India	5,005.8	1,140.9	823.2	<b>1,964.1</b>	22.8%	16.4%	39.2%
Indonesia	3,163.6	811.0	498.3	<b>1,309.2</b>	25.6%	15.7%	41.4%
United States	8,396.8	680.7	407.3	<b>1,088.0</b>	8.1%	4.9%	13.0%
Bangladesh	889.7	701.5	121.2	<b>822.7</b>	78.8%	13.6%	92.5%
Poland	1,027.9	408.9	189.2	<b>598.0</b>	39.8%	18.4%	58.2%
Belgium	892.5	295.5	187.9	<b>483.4</b>	33.1%	21.1%	54.2%
Norway	485.2	450.0	18.2	<b>468.2</b>	92.7%	3.7%	96.5%
Vietnam	1,007.6	188.0	273.4	<b>461.4</b>	18.7%	27.1%	45.8%
Morocco	400.5	389.1	0.0	<b>389.1</b>	97.1%	0.0%	97.1%
Finland	430.7	0.0	386.7	<b>386.7</b>	0.0%	89.8%	89.8%
Turkey	337.5	274.5	42.6	<b>317.1</b>	81.3%	12.6%	93.9%
Thailand	821.5	275.4	11.1	<b>286.5</b>	33.5%	1.4%	34.9%
Ukraine	301.6	275.3	0.1	<b>275.4</b>	91.3%	0.0%	91.3%
Others	11,196.4	1,764.8	1,894.9	<b>3,659.7</b>	15.8%	16.9%	32.7%

Source: IHS Markit

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Of the major markets, only the US with a 13% or just over 1.0M tonne exposure seems likely to be able to secure replacement tonnes – in this case from Canada. Our assessment of increased capacity available outside Russia and Belarus this year only total 2.9 million tonnes, of which 2.2 million relates to the re-commencement of production at Mosaic's Colonsay facility. The shortfall in volumes may exceed 10M tonnes if we assume that Belarus will continue to struggle to find export ports for its Klaipeda volumes, and therefore even assuming all non-sanctioned units run at maximum output there is no possibility that customers can secure all the tonnes that they might normally want to buy.

It is clear therefore that supply will be significantly reduced in 2022, and pricing will remain at very high levels. In agronomic terms, whilst not in any sense optimal, for one year the impacts on crops might not be too severe – food production survived the 44% (23M tonne) drop in demand in 2009 following the sustained price hike in 2008 which continued through the first half of 2009.

### Key watch-outs:

- Potential suspension of all Baltic exports of MOP. The impact of this will be further up-ward pressure on price.
- With the reduction in availability of Belarusian tonnes being probably followed by Russian tonnes, it is most likely the market will be **supply** constrained. However, with high prices across the fertilizer product roster, there is the potential in markets that are fully supplied for demand destruction, as farmers spend available cash for inputs preferentially on nitrogen followed by phosphate. It is worth remembering that very high prices in 2009 resulted in a decline in MOP usage of 45% – i.e. one year of significantly reduced application, whilst not in any sense optimal, would neither be a unique occurrence in recent history.
- How hard can the Canadians run their mines in 2022? Production in 2021 was just over 22 million tonnes. There is the potential, if all mines and mills run close to capacity, of ramping this up to over 26 million tonnes. This would not in any sense compensate for the loss of Russian and Belarusian tonnes, but it would moderate the impact.

## Sulphur

### Key recent developments:

- Loss of Russian tonnes will further tighten an already tight market, with upward pressure on prices.
- Uncertainty surrounds the ability for Kazakh tonnes to export from the Black Sea, and concerns over their exports from the Baltic.
- Both phosphates and metal leaching sectors have strong demand for sulphur.

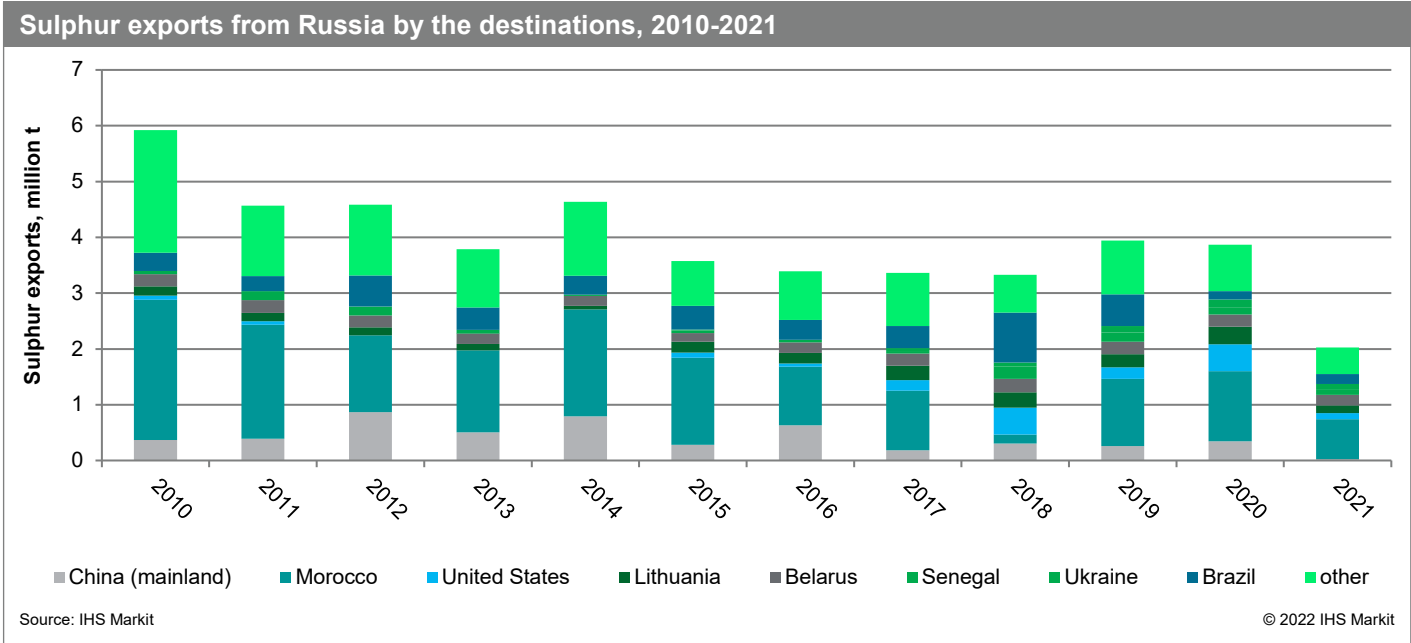
### World's exposure to Russian sulphur

Russia was among the top three largest sulphur exporters before 2020. However, Russian sulphur exports have significantly decreased by 1.8 million t over 2020 and 2021 with a continuous increase in domestic demand for elemental sulphur. Russia ranked sixth in terms of sulphur exports in 2021 and accounted for around 6% (2.1 million t) of total global sulphur exports.

The following chart shows the major destinations of Russian sulphur exports through the last ten years.

Although China is the largest sulphur importer in the world, Russian sulphur shipments to China have remained uncompetitive due to higher logistical costs. China imported around 26,000 t of sulphur from Russia in 2021. The intensified escalation of the Russia-Ukraine invasion has however boosted sentiment, resulting in an increase of over Rmb 200/t in the paper market price as of 24th February 2022.

Russia and Kazakhstan used to have more than 50% of market share in Morocco in the early 2010s. Their positions have been overturned following the supply agreement signed between OCP and ADNOC in 2019. However, Morocco has increased shipments from Russia again over the last couple of years amid OCP's 'diversified sourcing strategy'. Russia ranked 4th in terms of Moroccan sulphur imports in 2021, accounting for 11% of Moroccan market share. Without Russian volumes, we believe OCP is able to find alternative tonnes elsewhere. However, this may reduce flexibility and bargaining power when negotiating prices with contract suppliers.

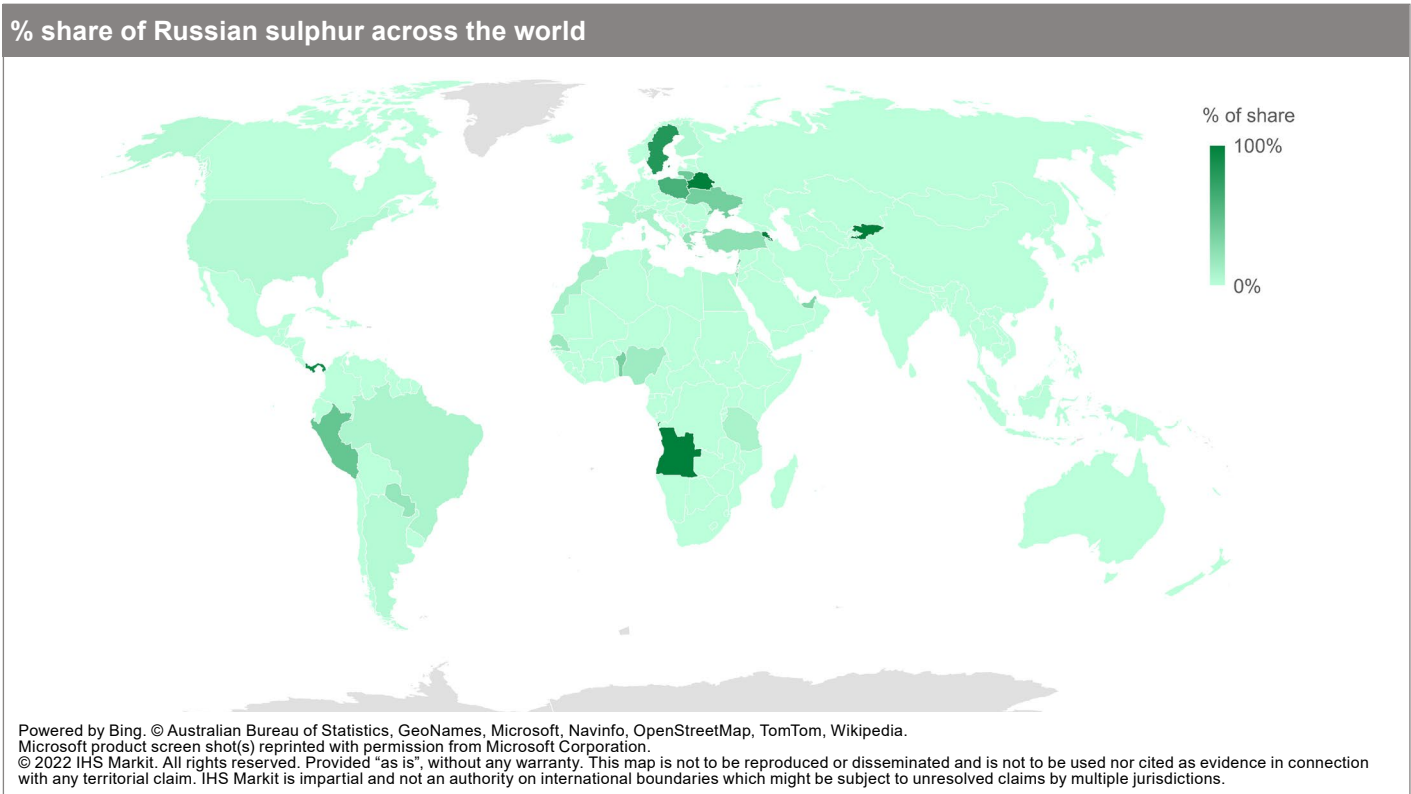


Consumers in Eurasia and Eastern Europe, such as those in Lithuania, will be more vulnerable if they cannot buy Russian sulphur. Russia accounted for 46% of total imports in those regions in 2021. The Black Sea market will also become extremely tight with the loss of Russia tonnes.

Compared with other fertilizer products, the sanctions on Russia would have a comparably smaller impact on the sulphur market in South America. Russia

ranked the fifth largest sulphur supplier in Brazil, accounting for 8% of Brazilian imports in 2021.

Overall, the loss of Russian tonnes in sulphur markets will tighten an already tightened balance, albeit the impact would be comparably smaller than it would be a few years ago. Nevertheless, prohibitive sanctions could result in a supply gap of around 2 million t annually in the global trade market. Moving into H2 2022, the Middle East can fill in the gap if ADNOC





resume operation as normal and other Middle East suppliers ramp up sulphur production as scheduled. Under the best-case scenario, the global market will become tightly balanced without Russian tonnes but, the sulphur market would be extremely vulnerable to any further supply disruption. With continuously increasing sulphur capacity, Saudi Arabia should theoretically have abundant crushed lump to replace Russia if there is any scarcity.

### Key watch-outs:

- The conflict reduces the accessibility of Kazakh tonnes to the market, especially out of the Black Sea. Total Kazakh export volumes in 2021 were 4.2 million tonnes, i.e. combined with Russia total volume would be over 6 million tonnes. Kazakhstan therefore accounts for around 11% of global trade, and combined with Russia the total is just over 16%. If supply from Kazakhstan is impacted by the war, then upward price pressure will be higher.
- European refineries are heavily reliant on sour Russian crude. If Russian oil is sanctioned, then European producers will either have to re-source crude supplies, or stop refining. Either outcome could reduce sulphur production if any new crude supply was significantly sweeter than from Russia – e.g. from shale production in the US. There is a clear downside supply risk to sulphur in Europe from this, which will place further up-ward pressure on price.
- Potential shortages of ammonia for ammoniated phosphate production may reduce sulphur demand for phosphates. If so this might marginally ease the supply-demand balance and provide a downward price risk.
- Lower than expected output in the Middle East would tighten the supply-demand balance, putting further upward pressure on price – and vice versa if output is greater than expected.
- Potential pressure on the Russian oil/gas sectors in the international market could have a knock-on effect on the reduced output of sulphur in Russia.



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