THE GEOPOLITICS OF FERTILIZER SUPPLY CHAINS: IMPLICATIONS OF THE WAR IN UKRAINE

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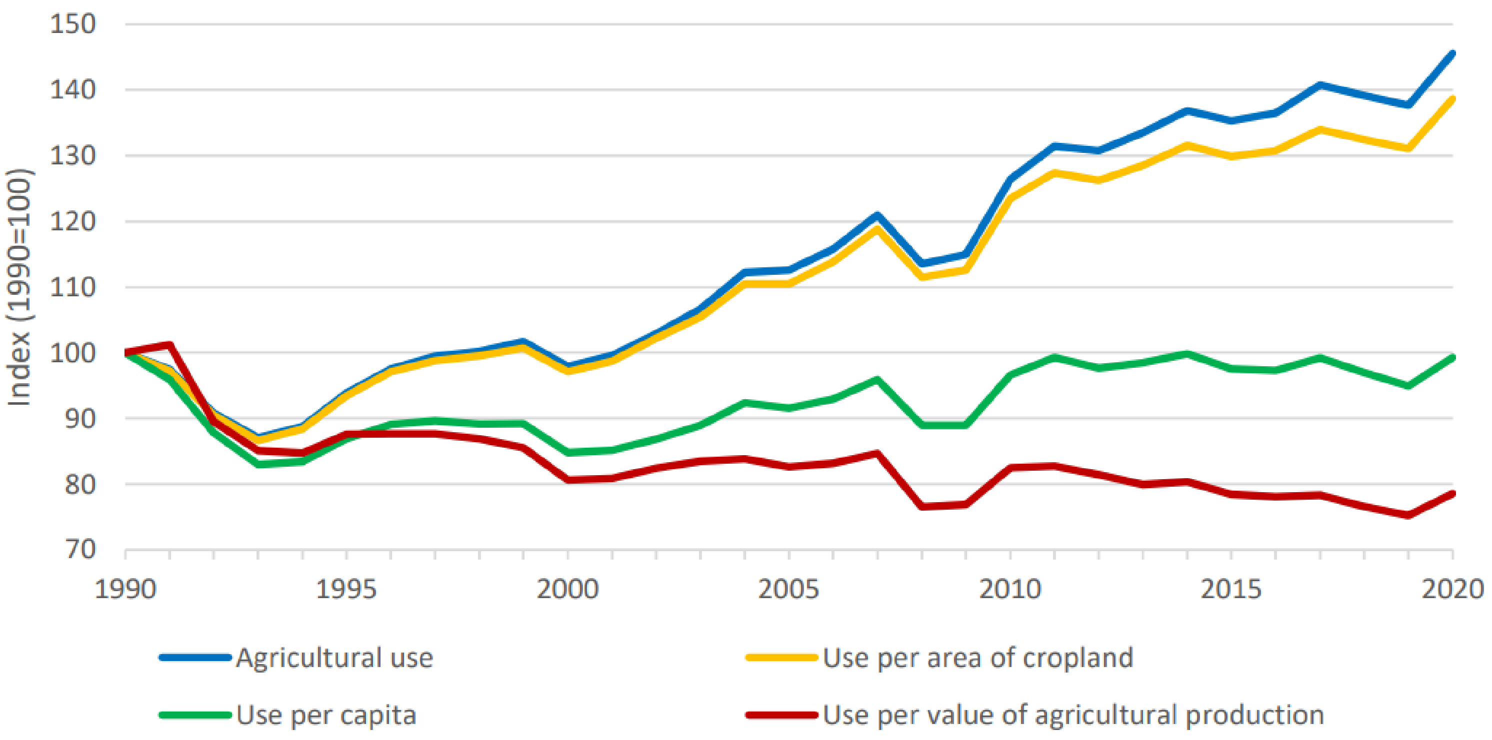
FERTILIZERS & GEOPOLITICS IN A STATUS-QUO WORLD OF FOSSIL-FUEL BASED FERTILIZERS

I. DIFFERENTIATED USE DYNAMICS …USE IS INCREASING RAPIDLY…

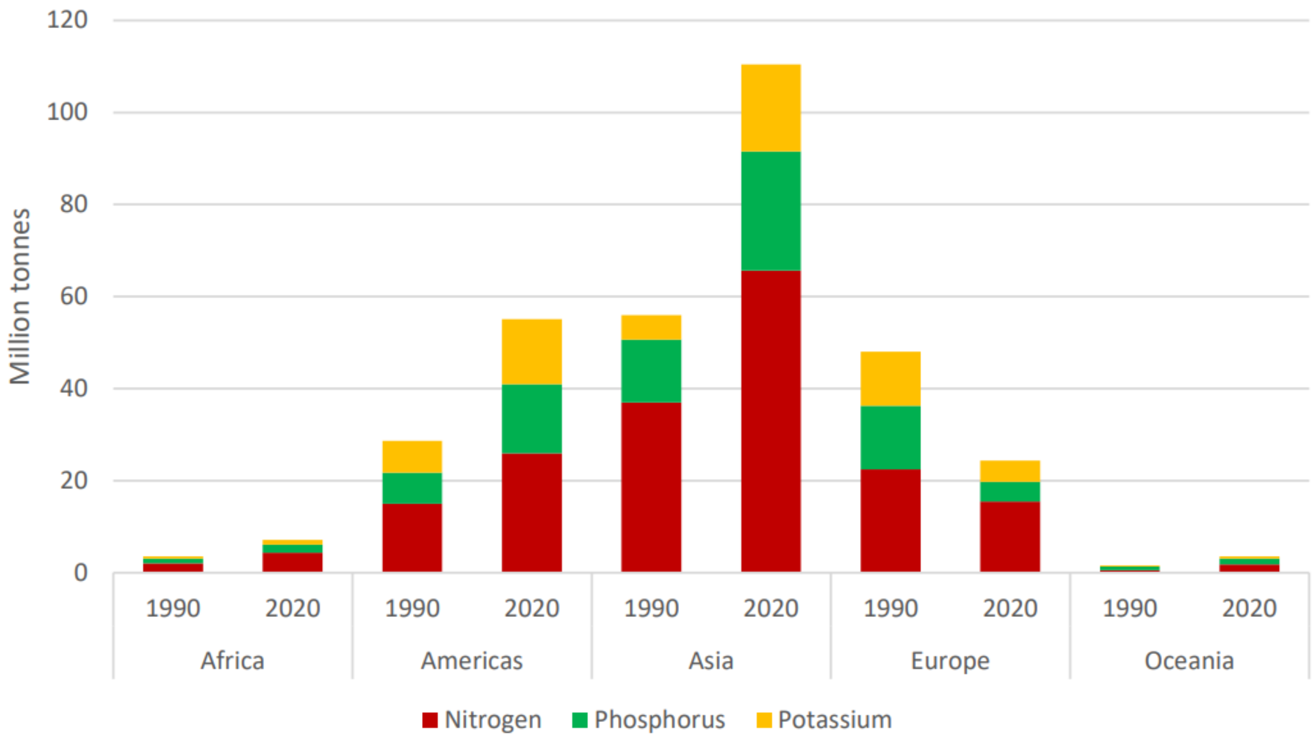
Figure 2: World agricultural use of inorganic fertilizers indicators (index, 1990=100)



Source: FAO. 2022. FAOSTAT: Fertilizers by Nutrient. In: *FAO*. Rome. Cited July 2022. http://www.fao.org/faostat/en/#data/RFN and FAO. 2022. FAOSTAT: Fertilizers indicators. In: *FAO*. Rome. Cited July 2022. http://www.fao.org/faostat/en/#data/EF

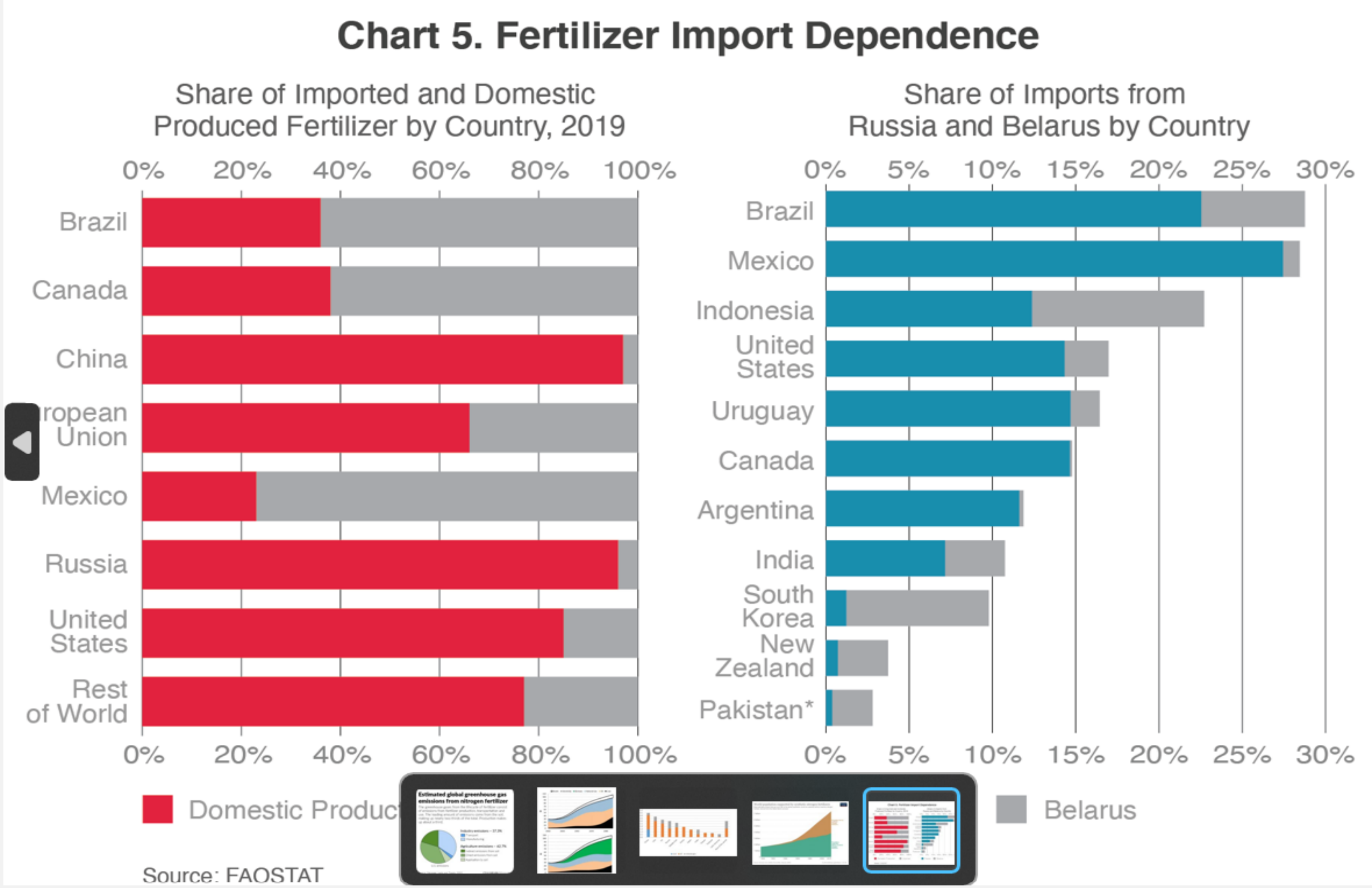
BUT DYNAMICS GEOGRAPHICALLY DIFFERENTIATED: USE

Figure 4: Inorganic fertilizer agricultural use, by nutrient and region



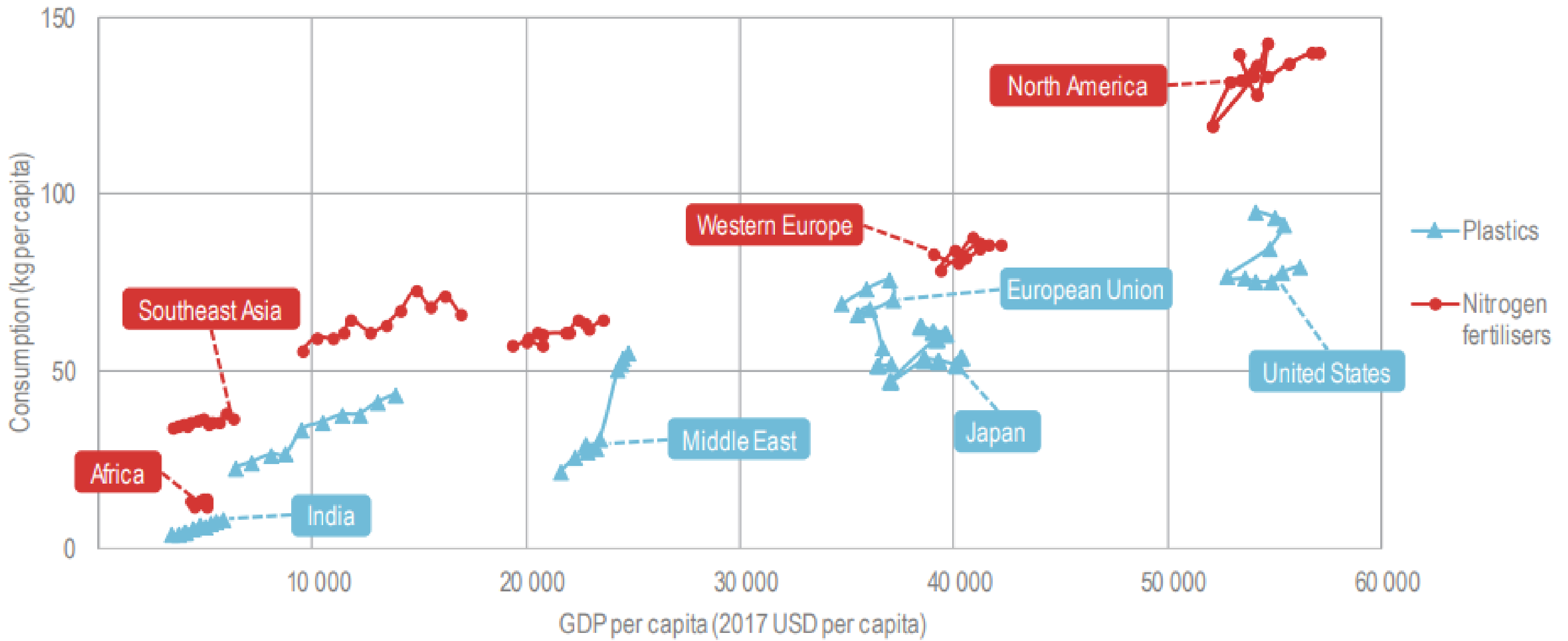
Source: FAO. 2022. FAOSTAT: Fertilizers by Nutrient. In: *FAO*. Rome. Cited July 2022. http://www.fao.org/faostat/en/#data/RFN

BUT DYNAMICS GEOGRAPHICALLY DIFFERENTIATED: DEPENDENCY



BUT… A LOOK AT PER-CAPITA USE REVEALS A DIFFERENT SITUATION

Figure 1.4 • Per capita consumption of plastics and nitrogen fertilisers



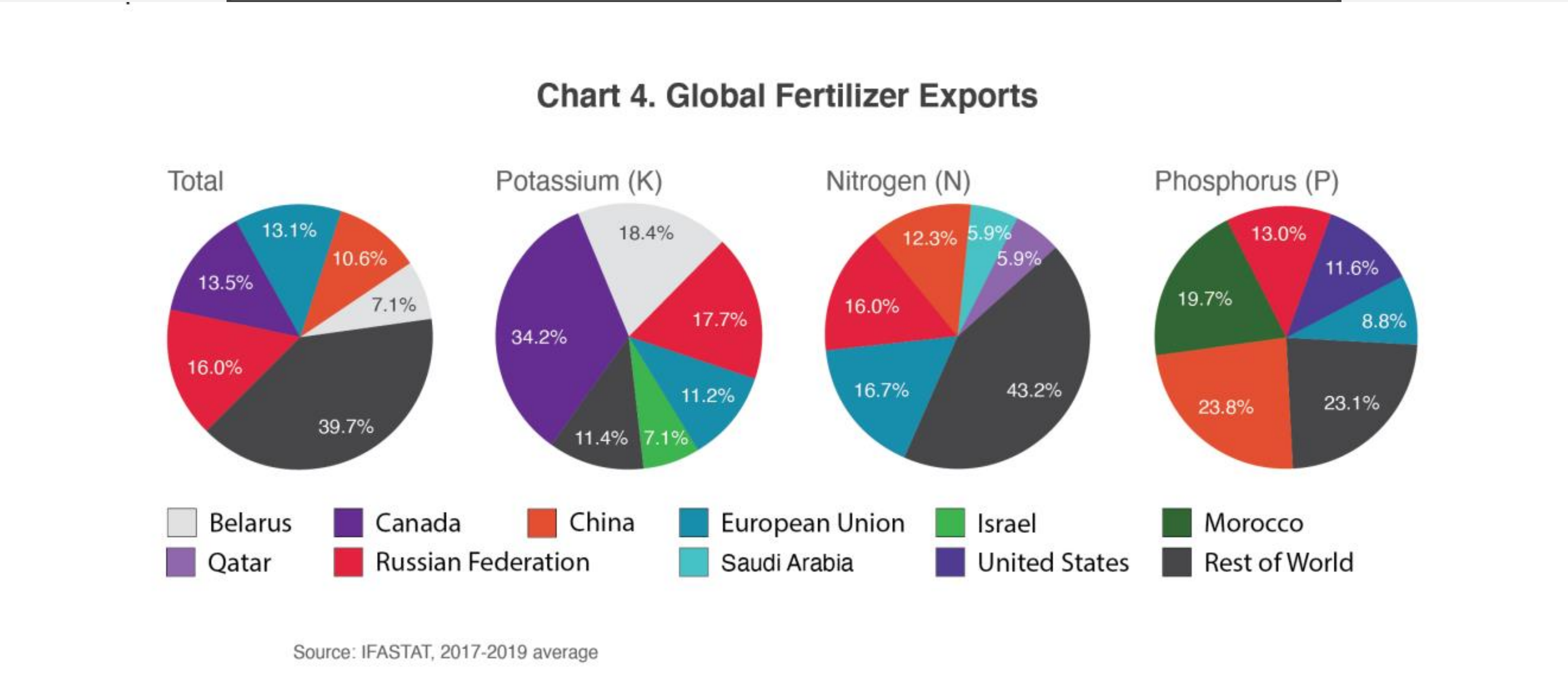
Notes: *Plastics* includes the main thermoplastic resins and excludes all thermosets and synthetic fibre. *Nitrogen fertilisers* includes all major ammonia-based fertiliser compounds. The quantities shown reflect the apparent consumption (production less exports plus imports) by the next tier in the manufacturing chain following primary chemical production (e.g. plastic converters for plastics). USD = United States dollars.

Sources: METI (2016), *Future Supply and Demand Trend of Petrochemical Products Worldwide*, Tokyo, www.meti.go.jp/policy/mono_info_service/mono/chemistry/sekkajyukyuudoukou201506.html; IFA (2018), *International Fertilizers Association Database*, http://ifadata.fertilizer.org/ucSearch.aspx.

QUESTIONS RAISED BY THIS GEOGRAPHICAL DIFFERENTIATION

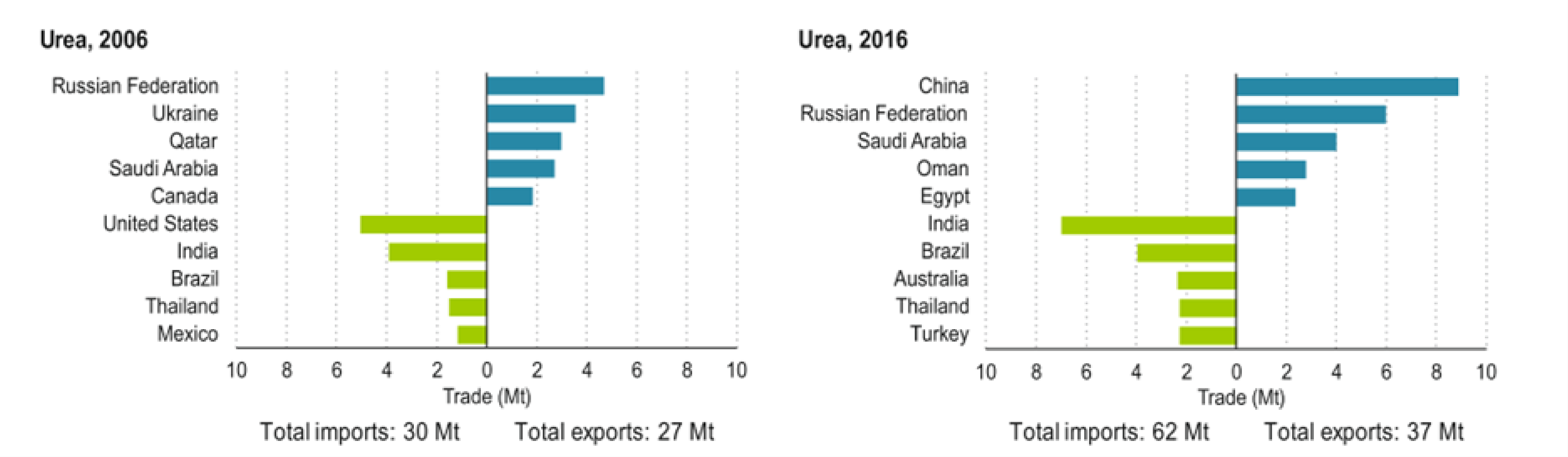
- Still much room to grow for use in developing states
- Developing states (Africa) less diversified in terms of suppliers
- Growing gap between countries with broader nitrogen management policies and those without?

II. DIFFERENTIATED MARKET SUPPLY DYNAMICS…



MAJOR GLOBAL FERTILIZER SUPPLIERS

… BUT CHINA'S CLEAR RISE AS FERTILIZERS SUPERPOWER



III. GEOPOLITICAL INTERFACES THROUGH NODES IN THE SUPPLY CHAIN

- Broadly similar to oil, key role of processing and intermediate products
- Ammonia key ingredient in nitrogen fertilizers, some producers produce it themselves, others import it (key small-state producers)
- Infrastructural path dependencies (Togliatti-Odesa ammonia pipeline RU-UA)

IV. FERTILIZERS AND THE POLITICS OF SANCTIONS

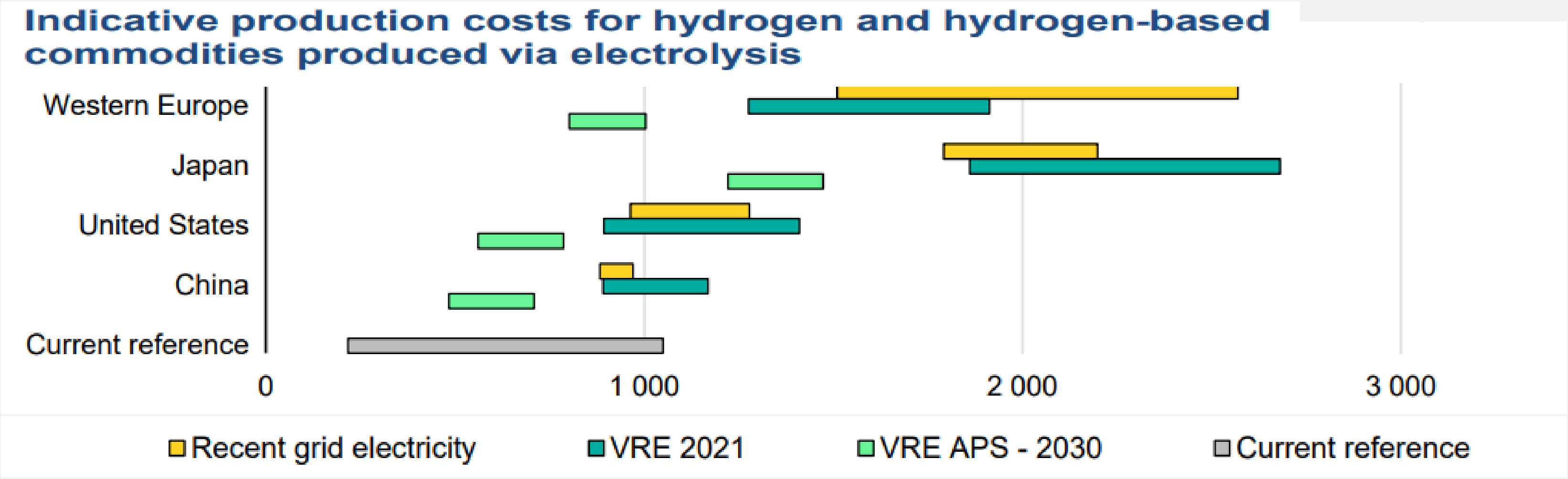
- Russia's income from nat gas exports but, from nitrogen fertilizer increased 70% reaching $16.7 billion (2022)
- Role of base chemicals such as ammonia create openings for intermediary players
- With fertilizer use geographically differentiated, including fertilizers in Russia sanctions would have strongly differentiated effects

FERTILIZERS & GEOPOLITICS IN A WORLD OF TAXING AND REPLACING CARBON

PRODUCTION VIA GREEN AMMONIA RAISES INTERESTING CHOICES & OPTIONS

- * major phosphorus fertilizer exporters such as Morocco emerge as possible key players in *nitrogen* fertilizers
- but China could also emerge as key player due to potential for low-cost green hydrogen (IEA 2023)
- [yet: domestic political element?]

CHINA AS KEY GREEN AMMONIA PLAYER (IEA *ENERGY TECHNOLOGY PERSPECTIVES 2023*)



WHAT CAN BE DONE?

- Increase transparency in supply chains
- Support Global South states in planned, gradual transitions to organic fertilizers
- Create dedicated transportation and insurance facilities