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Recent developments in global fertilizer markets

Monika Tothova
Senior Economist, FAO
AMIS Secretary

Food and Agriculture Organization
of the United Nations

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Recent developments and challenges in commodity markets: Agriculture Multi-year Expert Meeting on Commodities and Development, UNCTAD

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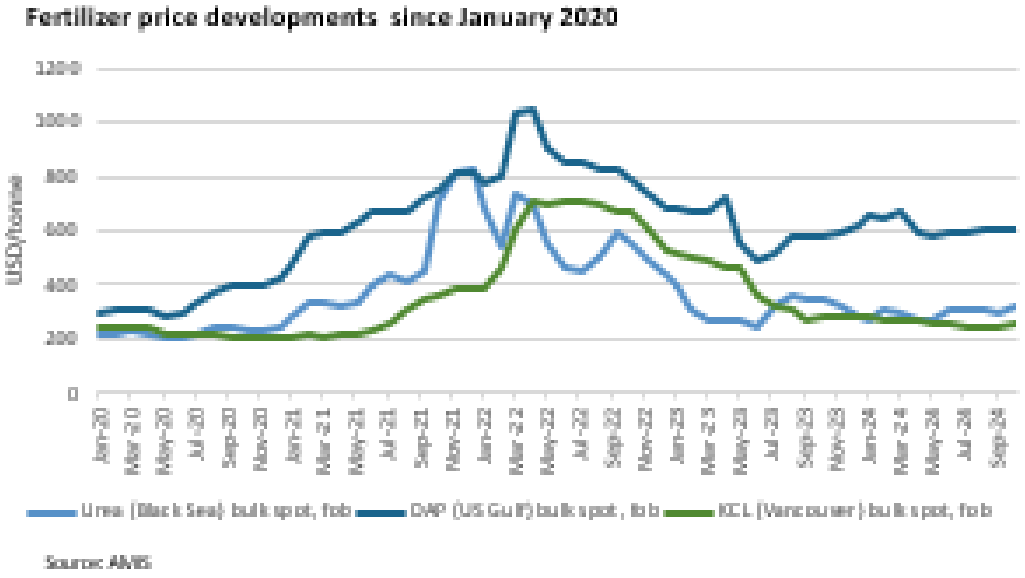
Why fertilizers?

- Nitrogen (N) enables plants to grow, develop and reach full yield potential. Over 100 million tonnes are used globally each year in the form of urea, ammonium nitrate, ammonium sulphate and other compounds.
- Phosphorus (P) facilitates root development and improves resistance to drought. Close to 50 million nutrient tonnes are applied annually in the form of monoammonium phosphate (MAP), diammonium phosphate (DAP), triple superphosphates (TSP) and blends.
- Potassium (K) aids photosynthesis, with 40 million nutrient tonnes applied globally in the form of muriate of potash (MOP), and sulphate of potash (SOP).

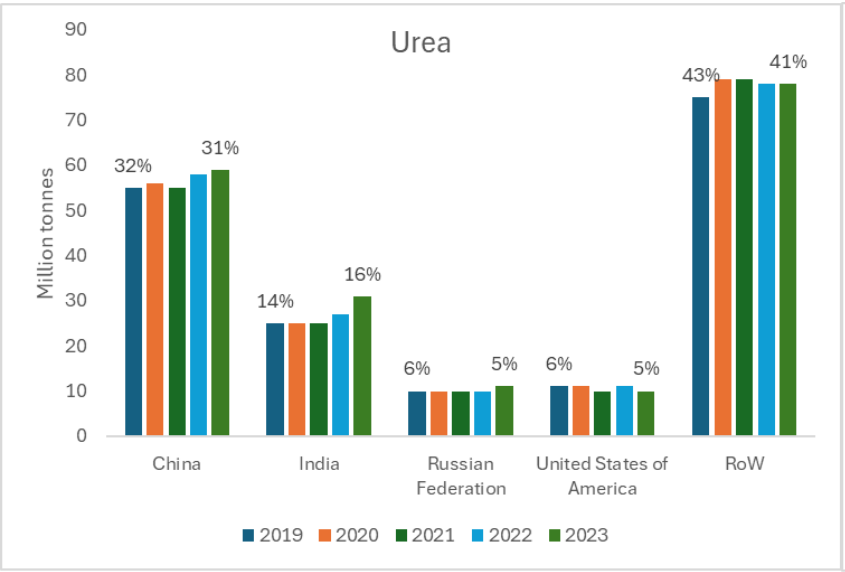


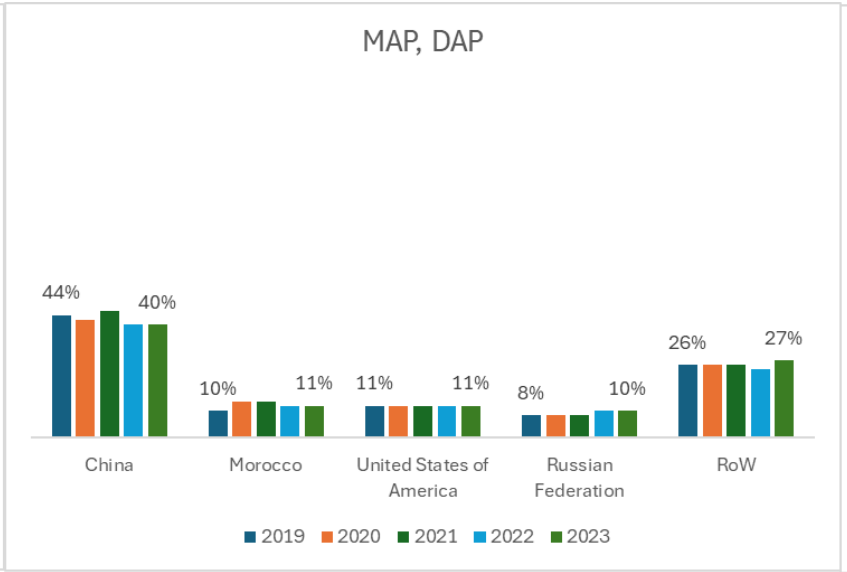
Why now?

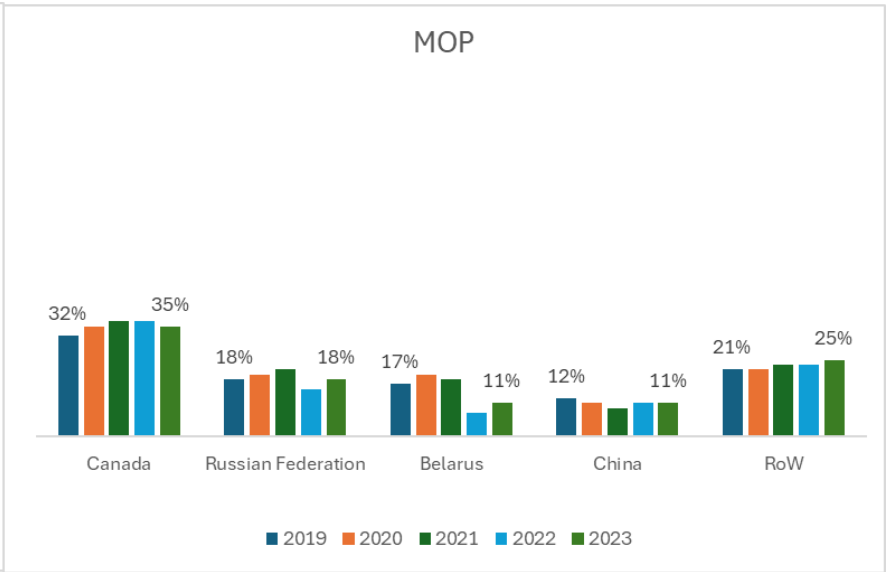
- Fertilizers (mineral and organic) are critical to achieving food security and nutrition goals.
- Fertilizer prices soared in 2021-2022 raising concerns about availability and affordability – and impacts on yields.
- Fertilizer markets subject to geopolitical tensions and their impacts on energy markets, with natural gas a key input for fertilizer manufacturing.
- Strengthened monitoring and assessment of fertilizer markets to improve information availability, enhance market transparency, and inform policy decisions a key.
- FAO and AMIS continue to expand their provision of market intelligence on fertilizers.

Global Fertilizer production is concentrated in a handful of countries

Production quantities and share of total by country, 2019-2023

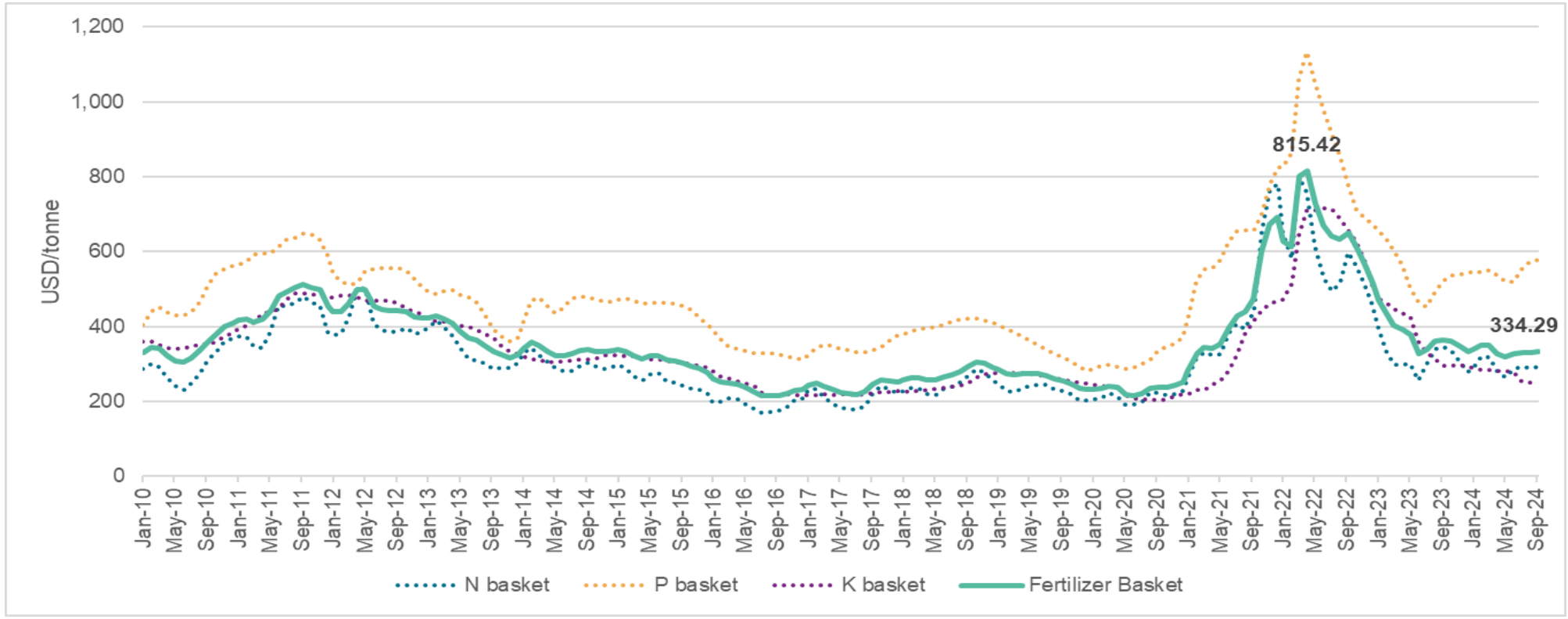






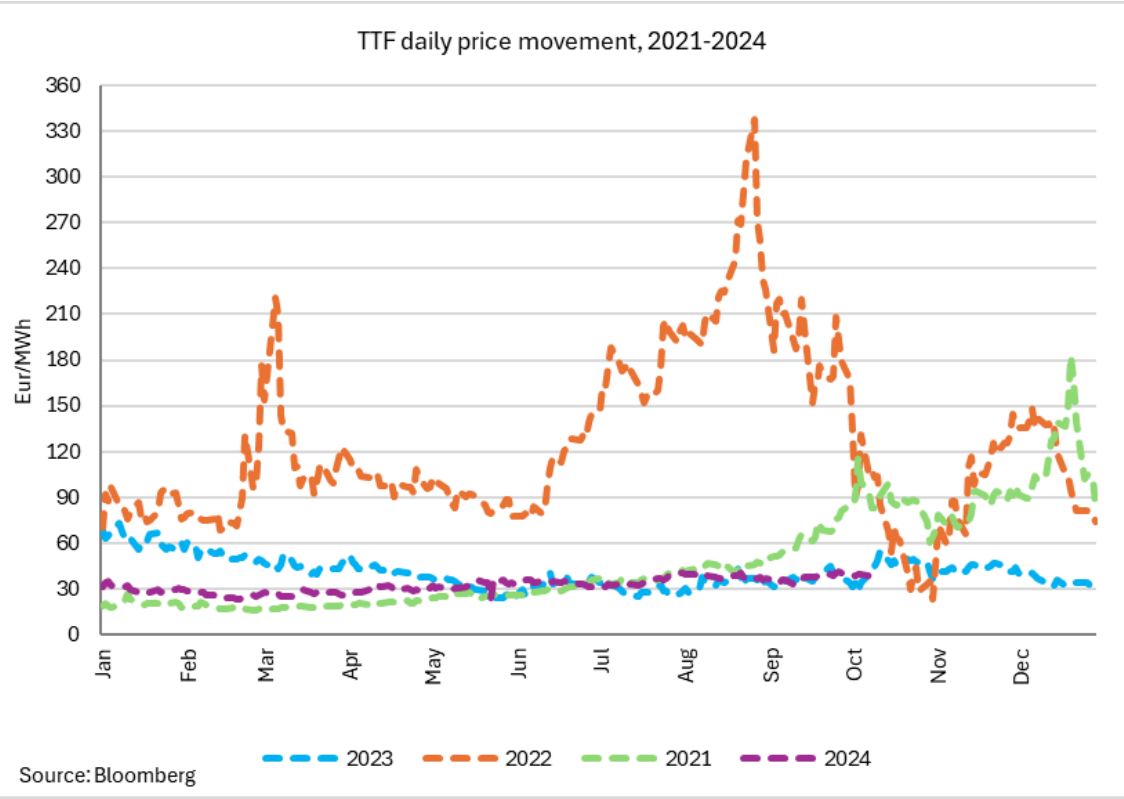
- The potassium (K) market is the most concentrated, with four countries accounting for about 75 percent of all production.
- In contrast, nitrogen is the most fragmented market, with production and exports present in over 85 percent of countries.
- Still four countries are responsible over 55 percent of all production of urea, the most commoditized of the nitrogen products.
- Phosphate production is also concentrated with four countries accounting for more than 70 percent of all production, determined by the presence of phosphate rock.

Fertilizer Prices have come down but remain elevated above pre-2021 levels



- In September 2024, fertilizer prices, as presented by a basket of nitrogen, phosphorus, and potassium price series, averaged USD 334/tonne, compared to USD 650/tonne in September 2022.
- In September 2024, one tonne of urea was sold for USD 293 (compared to USD 801 in March 2022), one tonne of DAP for USD 577 (compared to USD 1 132 in April 2022), while a tonne of MOP for USD 252 (compared to USD 712 in April 2022).
- Different nutrients are influenced by different market fundamentals and trade policies. While Nitrogen and Potassium prices declined significantly since 2022 peaks, Phosphates remain at an elevated level.

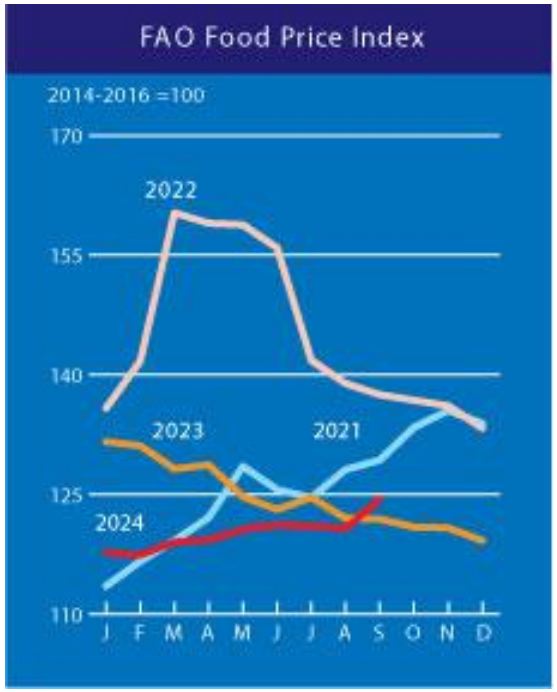
Energy Markets



Dutch natural gas TTF index, daily price movements, 2021-2024

- Natural gas is the main feedstock to produce ammonia, a building block for many other mineral fertilizers.
- Historically high natural gas prices and volatile energy markets drove fertilizer prices up in 2021-2022.
- Prices of ammonia, urea and di-ammonium phosphate exceeded USD 1 000/tonne.
- Prices have eased in 2023-2024 but remain elevated above historical averages.
- Natural gas price volatility is lower in 2024 to date than 2023, a fact which favors fertilizer production and supply predictability.

Fertilizer prices vs global agricultural commodity prices: Global agricultural markets *relatively* calm – but uncertainties persist

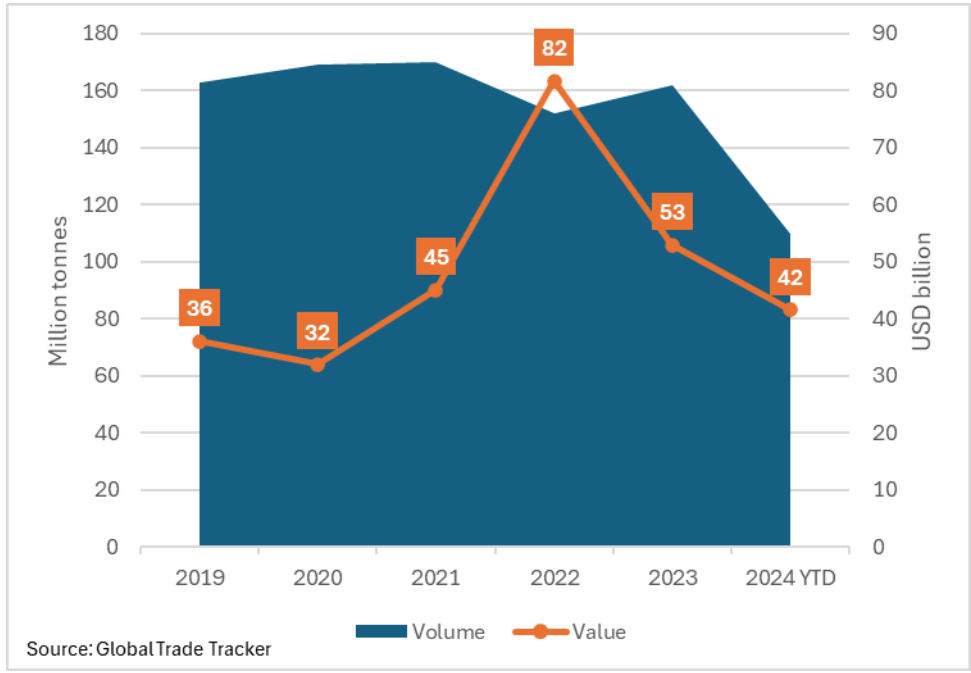


- While international export food prices have fallen significantly, high import prices reflect shipping disruptions in major chokepoints, weak currencies, etc.
- High retail food prices remain a concern.
- Adverse weather conditions pose heightened risk to food production in various areas of the world.
- Conflicts and geopolitical tensions, which can have repercussions on food import demand and create disruptions to trade.

Fertilizer Trade

- Fertilizer trade **volumes** contracted 12 percent in 2022 compared to 2021.
- In **value** terms, fertilizer trade increased 80 percent on account of higher prices.
- The trade volume contraction was exacerbated by logistical constraints and by export restrictions.
- Fertilizer trade rebounded 7 percent in 2023, driven by improved demand as prices lowered and affordability improved.
- As of 2023, fertilizer trade policies were still prevalent in many countries
- In the first 8 months of 2024 trade volumes amounted to 110 million tonnes, while trade value totaled USD 42 billion
- Seasonality and regional patterns make it difficult to project the last 4 months of 2024 in terms of volumes, but Nitrogen and Potash appear on track to reach 2023 volumes, while Phosphates will likely be lower.

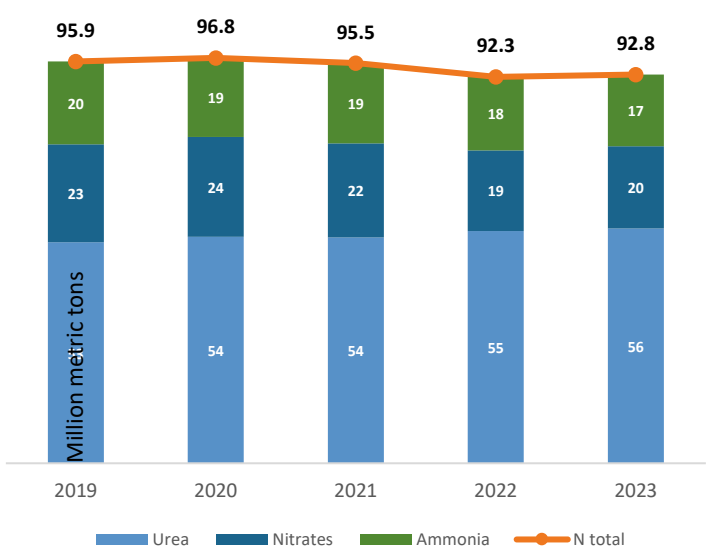
Global Fertilizer Trade (2019-2024), in volume (million tonnes) and value (USD billion



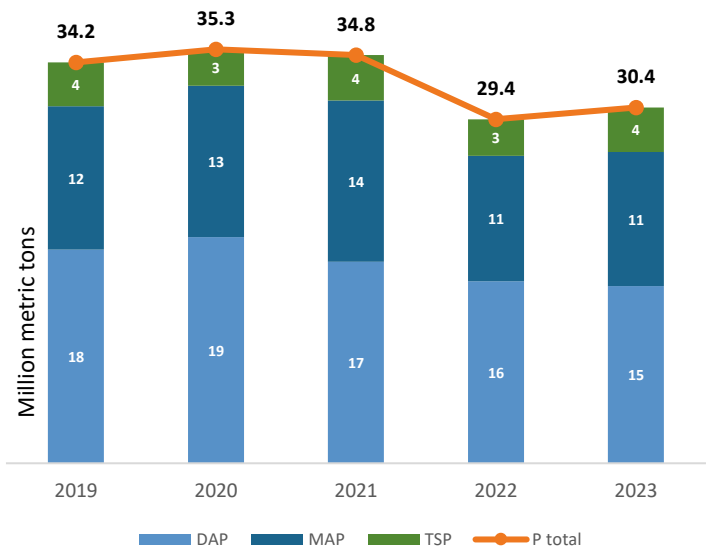
Source: Global Trade Tracker

N and P trade increased by 0.5 Mt and 1 Mt in 2023, while K trade increased by 8 Mt

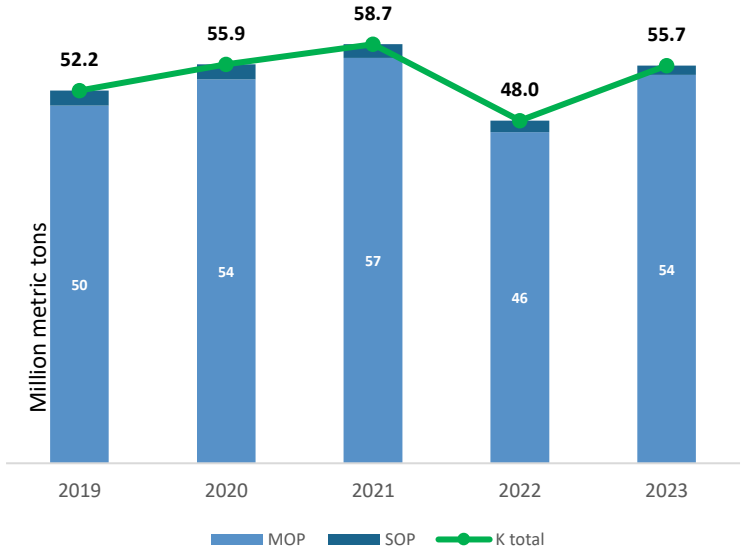
Nitrogen (N)



Phosphates (P)

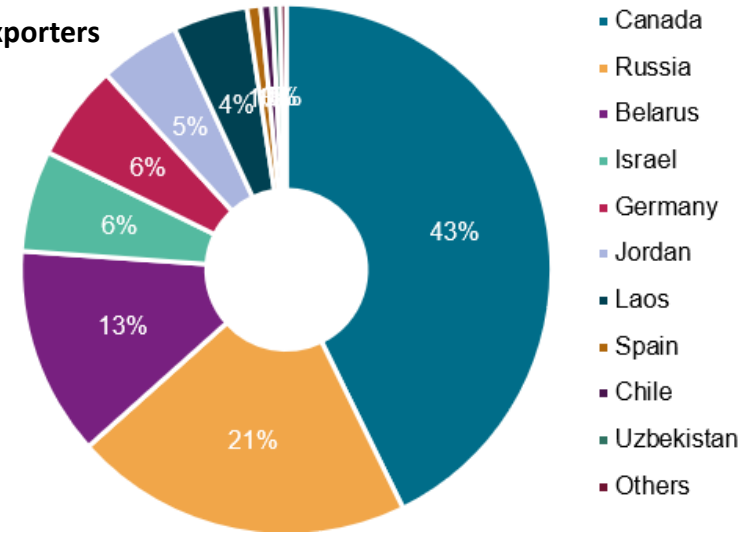


Potash (K)



- In 2022 potash trade declined from the 2021 level, mainly due to supply shortfall brought about by reductions in Belarusian and Russian exports, as well as demand destruction brought about by increased potash prices.
- Global potash trade increased to 55.7 million in 2023, 17 percent up on 2022 due to increase in imports of key markets like China, Brazil, US and India.
- Canada, Russian Federation and Belarus have more 60 percent of global primary potash capacity and as such, Canada's share of global potash trade increased significantly in 2021-2022, while Belarus and Russian Federation's declined.

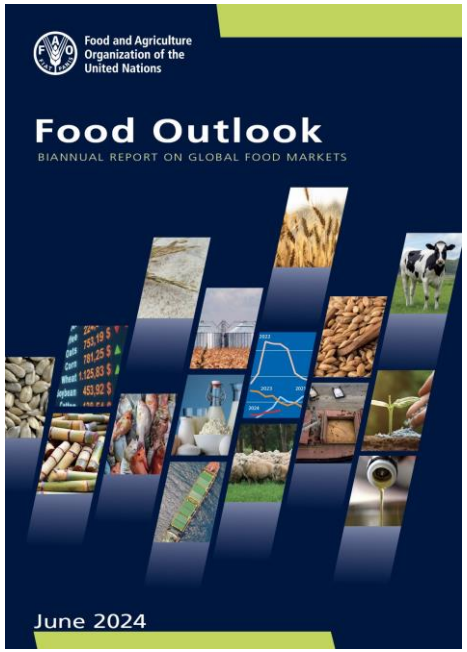
Potash Exporters

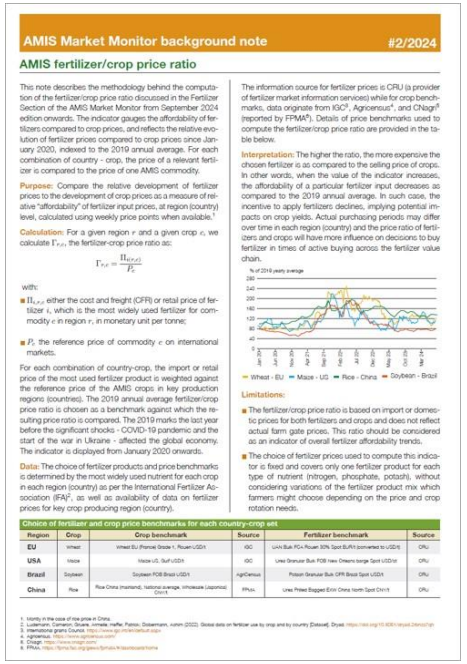


Source: Global Trade Tracker

FAO and AMIS Work on Monitoring Fertilizer Markets

- June 2024 FAO Food Outlook feature article on fertilizer, including a short-term market outlook for 2024/25.
- AMIS monthly Market Monitor contains section on fertilizer markets, further expanded in September 2024 issue
- Fertilizer trade tacker and allocation methodology for Africa developed during the 2022 fertilizer crisis.
- Working in complement to long-standing FAO efforts such as FAOSTAT.




AMIS Market Monitor background note #2/2024

AMIS fertilizer/crop price ratio

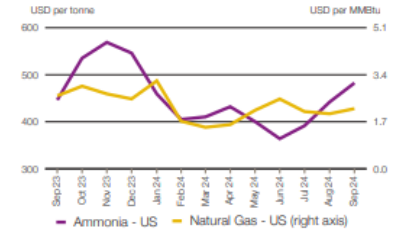
AMIS

Agricultural Market Information System

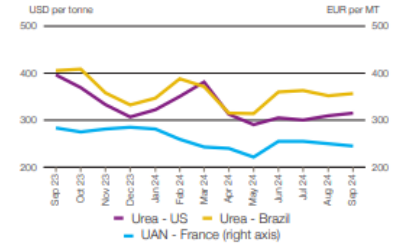
ENHANCING MARKET TRANSPARENCY AND POLICY COORDINATION

Fertilizer outlook

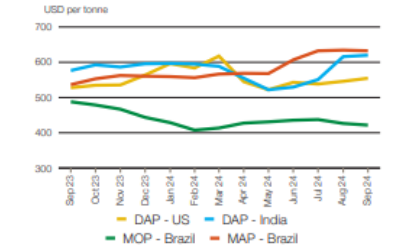
Input prices for manufacturing fertilizers



Nitrogen prices



Potash and phosphate



Major market developments

Fertilizer markets overall were more active compared to the previous month. Stronger than expected import demand from India for nitrogen and phosphates was the major driver of demand globally. The supply situation remains similar to August, with availabilities particularly tight in phosphate fertilizer markets. Going into the last quarter of 2024, fertilizer demand is expected to pick up, further supporting prices.

- **Fertilizer input prices.** Natural gas prices increased in the United States due to weather-related supply disruptions, while European prices eased reflecting sufficient inventories and increased supply from Norway. Tight ammonia availability overcame subdued demand to support a month-on-month ammonia price increase. While ammonia supply levels normalized in Trinidad and North Africa, production in Saudi Arabia decreased due to technical maintenance. Prices are expected to hold due to upcoming seasonal downstream demand in the US, but easing supply constraints should alleviate the tightness on the global market.
- **Nitrogen fertilizer prices.** Urea prices increased slightly in September. Two tenders in quick succession in India were the main drivers of demand in an otherwise quiet market. There appears to be no movement towards softening urea export restrictions in China, which is likely to keep supply tight, especially considering that demand in Brazil and Europe is set to seasonally pick up in the fourth quarter.
- **Phosphorus fertilizer prices.** As with nitrogen, phosphate markets were driven by import demand from India and continued limited exports out of China. The outlook is for continued tight markets, as India likely still requires further imports to meet domestic demand, and global supply remains constrained reflecting the absence of exports out of China.
- **Potassium fertilizer prices.** Potash prices were mostly flat in September. Previous month's potential supply shock due to labor disputes in Canada did not materialize, leading to limited impacts on exports for the leading exporter. Elsewhere, a rebound of supply out of Belarus and the Russian Federation is expected for the rest of the year, supporting the outlook for well-supplied markets.

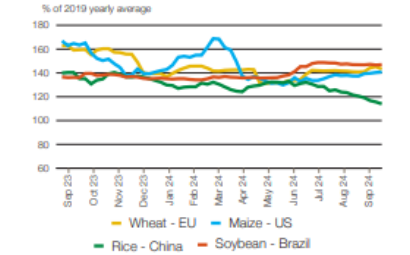
Fertilizer outlook prices

	Sep-24 average	Sep-24 std. dev.	% change last month*	% change last year*	12 month high	12-month low
Ammonia - US (USD/ST)	482.5	-	+9.1	+8.1	569.0	364.0
Natural Gas - US (USD/MMBtu)	2.2	0.1	+9.2	-17.6	3.2	1.5
Natural Gas - EU (EUR/MWh)	35.7	1.4	-5.5	-2.7	43.4	25.6
Urea Ammonium Nitrate (UAN) - France (EUR/MT)	245.0	-	-2.0	-13.6	285.0	221.5
Urea - US (USD/ST)	315.0	1.8	+1.8	-20.5	381.2	290.5
Urea - Brazil (USD/MT)	356.7	1.4	+1.3	-12.0	408.8	314.0
Di-ammonium Phosphate (DAP) - India (USD/MT)	620.0	-	+0.6	+7.5	620.0	522.1
Di-ammonium Phosphate (DAP) - US (USD/ST)	554.7	2.0	+1.6	+5.1	617.5	522.0
Mono-ammonium Phosphate (MAP) - Brazil (USD/MT)	632.5	2.5	-0.3	+17.9	634.5	553.1
Muriate of Potash (MOP) - Brazil (USD/MT)	421.7	2.9	-1.1	-13.6	478.8	407.5

Source: Own elaboration based on Bloomberg. Units: MT = Metric Tonne; ST = Short Ton; MMBtu = Million British Thermal Unit
*Estimated using available weekly data to date.

Fertilizer market developments - Indicators

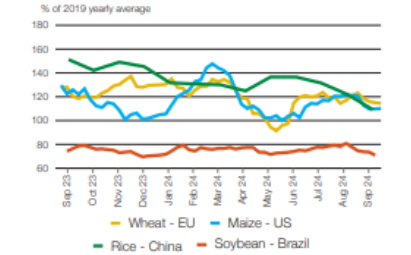
Fertilizer cost index for selected regions and commodities



In September 2024, all fertilizer cost indices remained significantly above their 2019 baseline levels. Fertilizer costs for wheat in the EU and maize in the US remained rangebound in September 2024. Their current values 40 percent above the 2019 baseline show a clear improvement compared to September 2023, benefiting from cheaper prices of nitrogen fertilizers.

Although also rangebound, fertilizer costs for soybeans in Brazil in September 2024 were slightly above their September 2023 level. The phosphate component of the fertilizer mix is higher for soybean than for other crops, so soybean production costs are the most impacted by the continued firmness on phosphate markets since last year. The fertilizer cost index for rice production in China decreased further, reflecting sliding domestic prices for nitrogen. This index is below its September 2023 value and only 14 percent above its 2019 baseline.

Fertilizer crop price ratio for selected regions and commodities



Fertilizer crop price ratios decreased in September 2024 compared to last month, implying improved fertilizer affordability, mostly on rebounding crop prices. Yet they remained above their 2019 average, except for the potash-soybean ratio in Brazil where steady potash prices were offset by firmer soybean prices. However, there is rising concern about the affordability of phosphates, which account for an important share of fertilizer expenses for soybean.

Nitrogen fertilizers were slightly more affordable for wheat production in September in the EU, reflecting a slight rebound in Rouen wheat prices on the back of stable fertilizer costs. Similarly, rebounding maize prices made the nitrogen/maize price ratio more favourable for US farmers. With declining nitrogen fertilizer costs and rangebound rice prices, the affordability of fertilizers improved in September in China.

Fertilizer market developments - Selected leading crop producers

Brazil: The vessel line up is currently considered adequate for nitrogen over the next six weeks, topping above-average imports on the January-August 2024 period. Farmers are thus not concerned about nitrogen availability and buying interest remained subdued in September. Demand should pick up in the coming weeks for the Safrinha crop to be planted in early 2025. By contrast, phosphate imports are delayed because high prices have deterred purchases, creating concerns about stock levels.

China: Inland prices continued to decrease in September, reflecting slow domestic demand. Fertilizer inventory is perceived as sufficient across the supply chain and domestic fertilizer producers lower their operating rates. Yet, no major changes are foreseen on the current restrictions on urea and phosphate exports.

EU: European markets were quiet in September. Fertilizer affordability improved since last year but remains less favourable than before the price peaks of 2021-2022. This justified cautious buying across the value chain as global prices firm again.

India: India is at the center of global attention after issuing two urea purchase tenders in an unusually short timeframe. This confirms strong sales in August and September on the back of heavy monsoon rains supporting fertilizer applications. Details are awaited on the new subsidy scheme that will be applied from October 2024 for the rabi season, with an expected increase in phosphate subsidies compared to the previous kharif season.

US: The US market was seasonnally slow in September, with the exception of ammonia for the fall application season. Phosphate demand may be limited because of constrained affordability, while significant 2024 harvests point toward depletion of soil nutrients.

Fertilizer outlook indicators

This page provides monthly indicators on fertilizer markets with emphasis on selected leading crop producers. It covers the evolution of fertilizers costs and relative pricing compared to crop prices, as well as a summary of major developments on fertilizer markets for a selected set of leading crop producers.
Two background notes, available on AMIS website, explain the rationale, construction, interpretation and limitations of the fertilizer cost index and the fertilizer crop price ratio index.

Fertilizer cost index

- The index aims to monitor the evolution of fertilizer costs per hectare depending on the crop, in selected leading crop producing countries.
- For each country-crop combination, fertilizer costs are obtained by linking selected fertilizer prices at either import or retail level (depending on data availability), with corresponding country-specific application rates by nutrient.

- Cost of fertilizers for crop (USD/ha) = **Price of Nitrogen fertilizer/ [N]*N rate + Price of Phosphate fertilizer/[P]*P rate + Price of Potash fertilizer/[K]*K rate** *(USD/t) / (Unit/t) * (Unit/ha)*

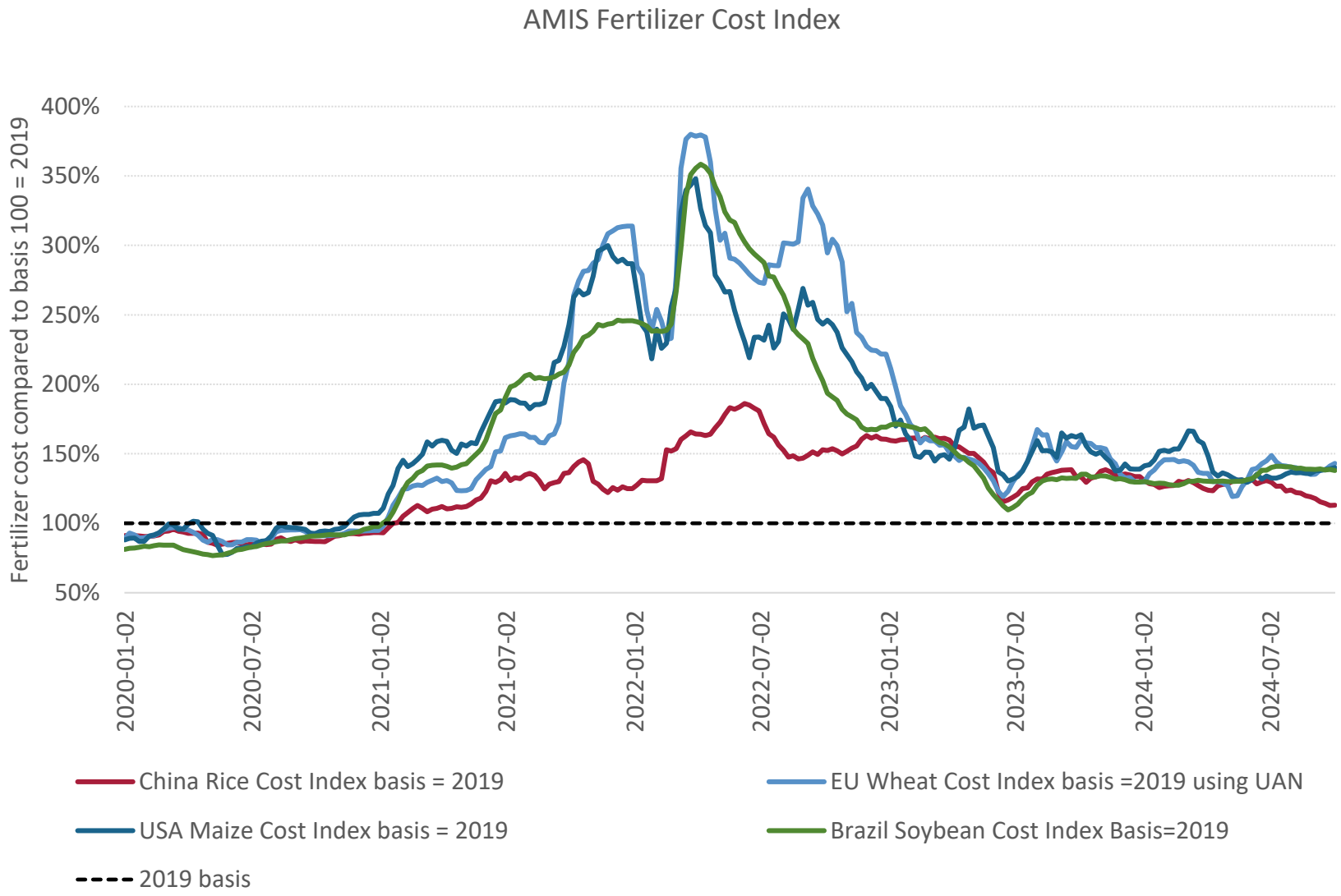
- Historical application rates as per IFA
- Fertilizer prices available for AMIS leading crop producers
- Choice of fertilizer type, benchmark from data available (source: CRU)
- Monthly index: Indexation to compute different crop-country sets – basis 100 = 2019 average.

Limitations:

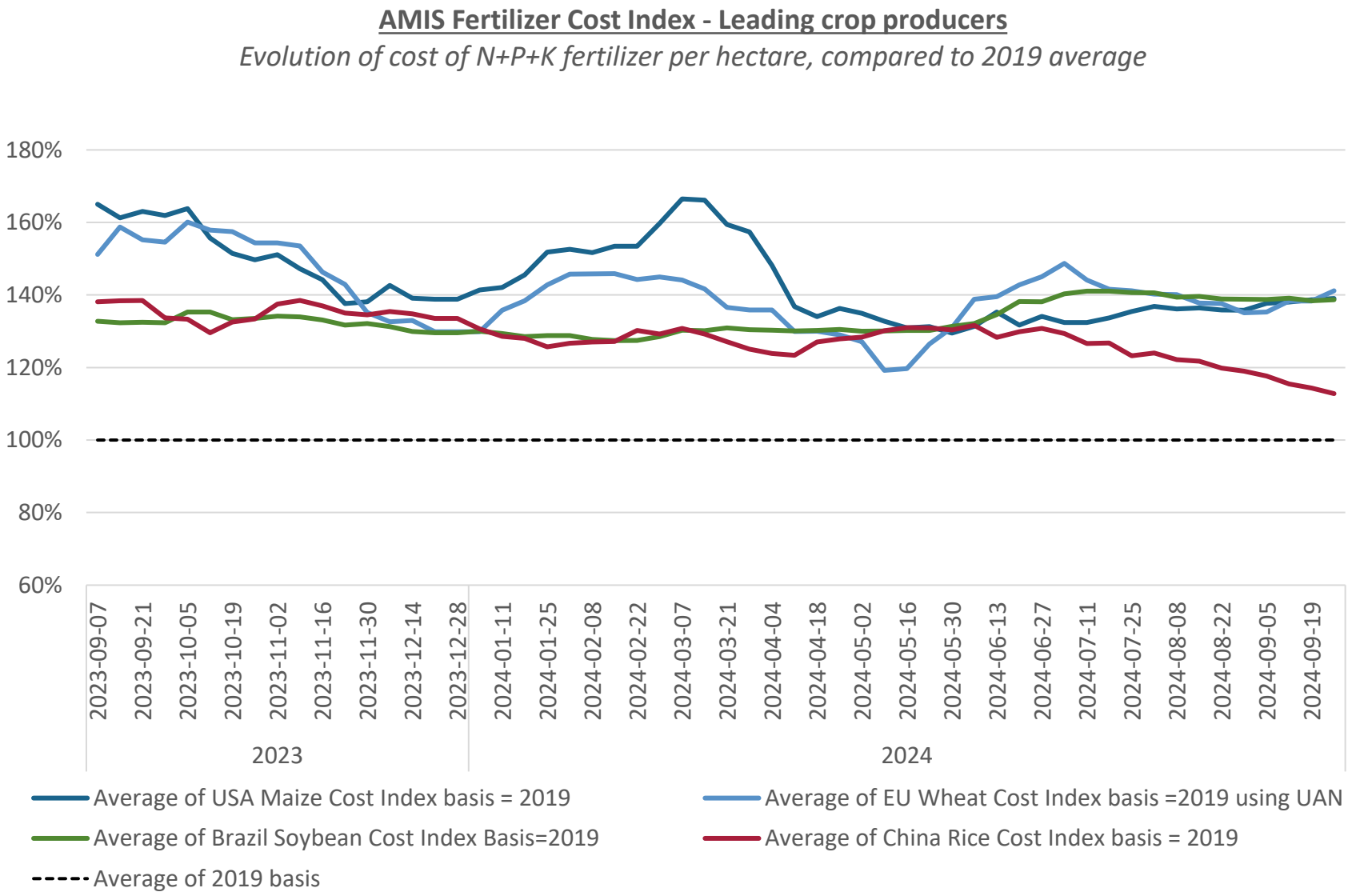
- Application rates as fixed parameter
- Neglects N content of phosphate fertilizer

AMIS Crop	Location
Wheat	EU
Soybean	Brazil
Maize	USA
Rice	China

Fertilizer cost index



Fertilizer cost index



Fertilizer–crop price ratio

- The index aims to monitor the evolution of fertilizer costs per hectare depending on the crop, in selected leading crop producing countries. For each country-crop combination, fertilizer costs are obtained by linking selected fertilizer prices at either import or retail level (depending on data availability), with corresponding country-specific application rates by nutrient.

- **Fertilizer-crop price ratio = price of fertilizer / price of crop**

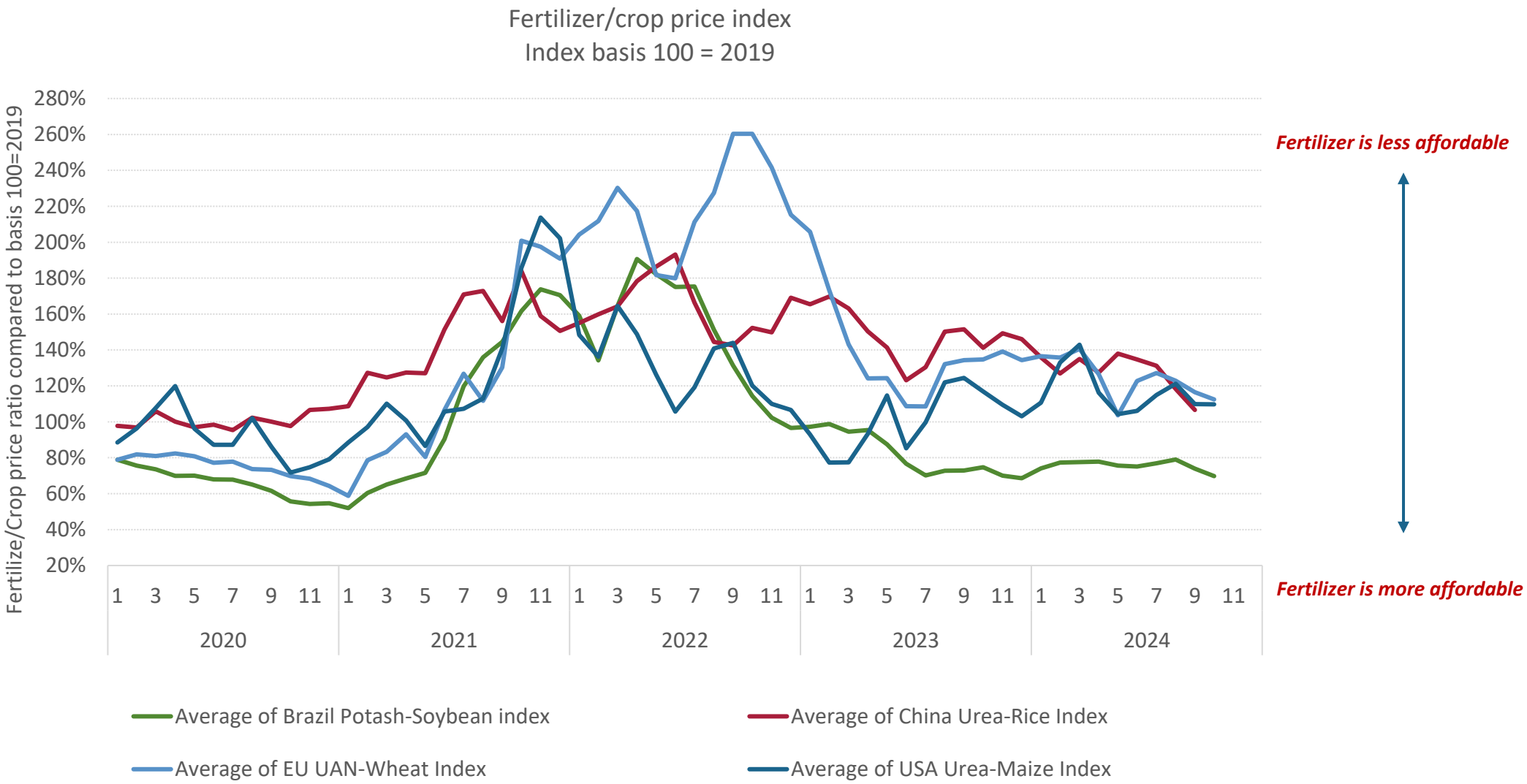
- The higher the ratio, the most expensive the fertilizer compared to the selling price of crops = affordability deteriorates
- This indicator is commonly used in the fertilizer industry
- Fertilizer and crop prices converted to same currency
- Choice of sets consistent with the Fertilizer cost index
- Monthly index: Indexation to compute different fertilizer-crop-country sets – choice of basis 100 = 2019 average

- **Limitations:**

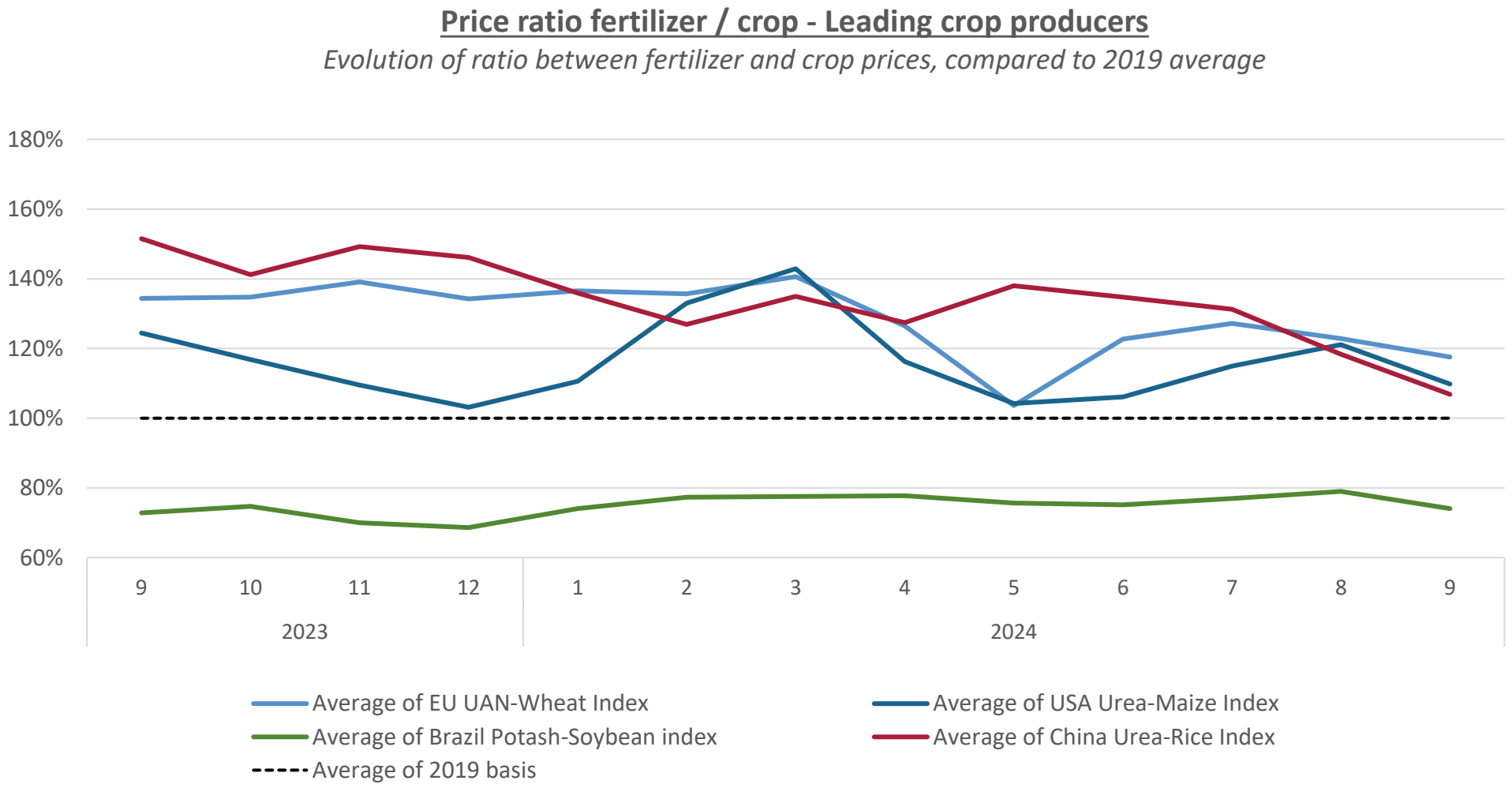
- Currently using monthly values for crop prices

AMIS Crop	Geography	Fertilizer
Wheat	EU	UAN
Soybean	Brazil	MOP
Maize	USA	Urea
Rice	China	Urea

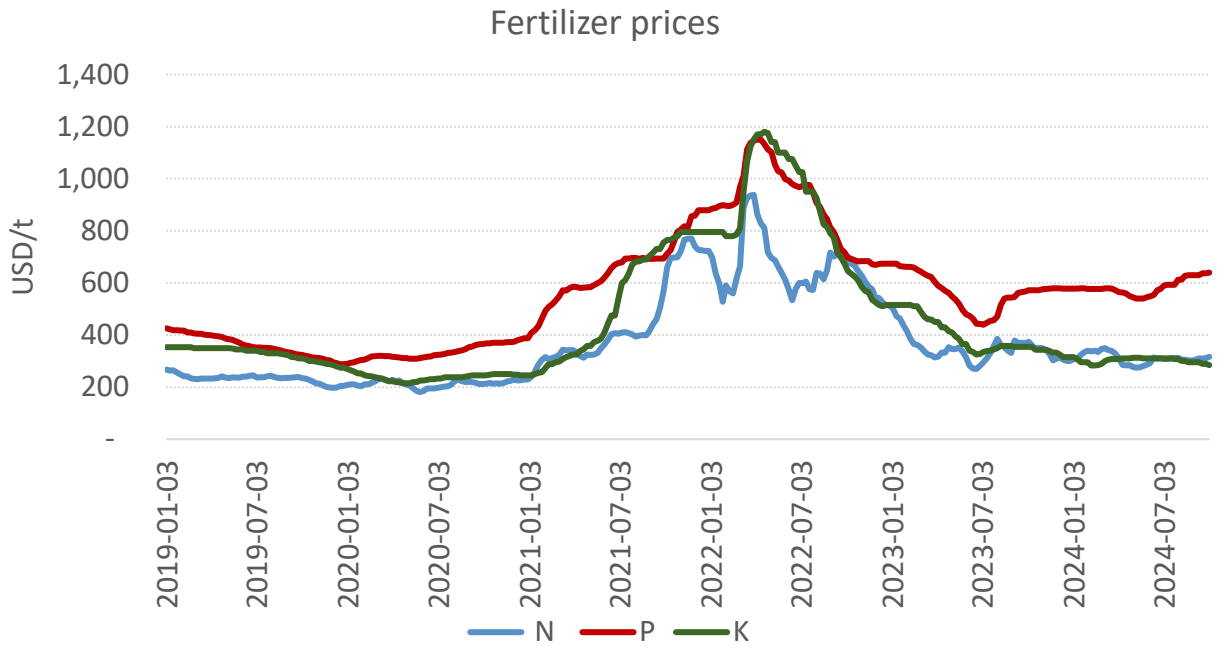
Fertilizer–crop price ratio

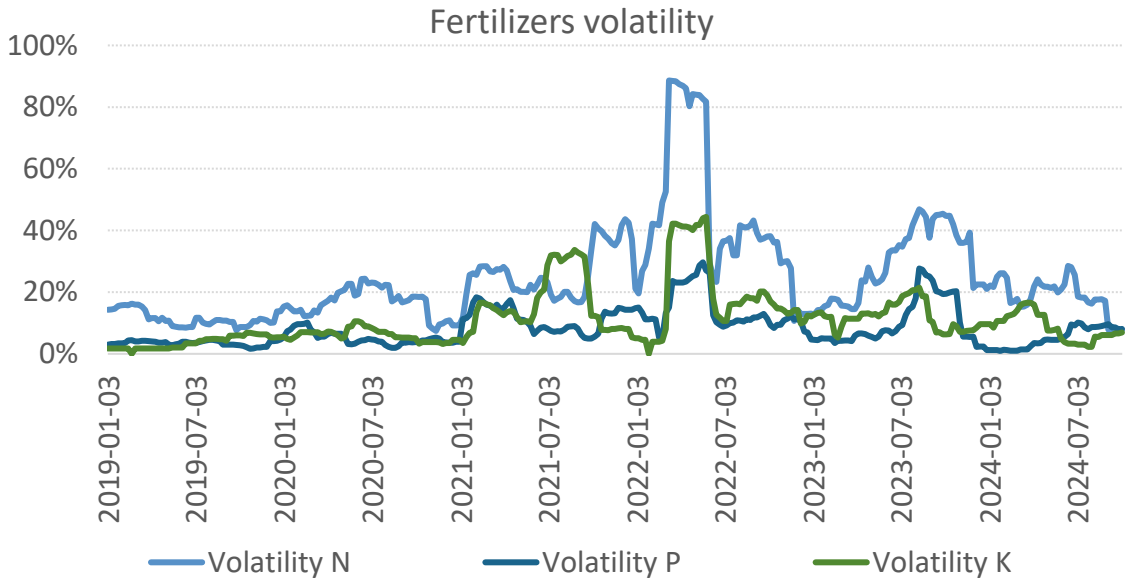


Fertilizer–crop price ratio



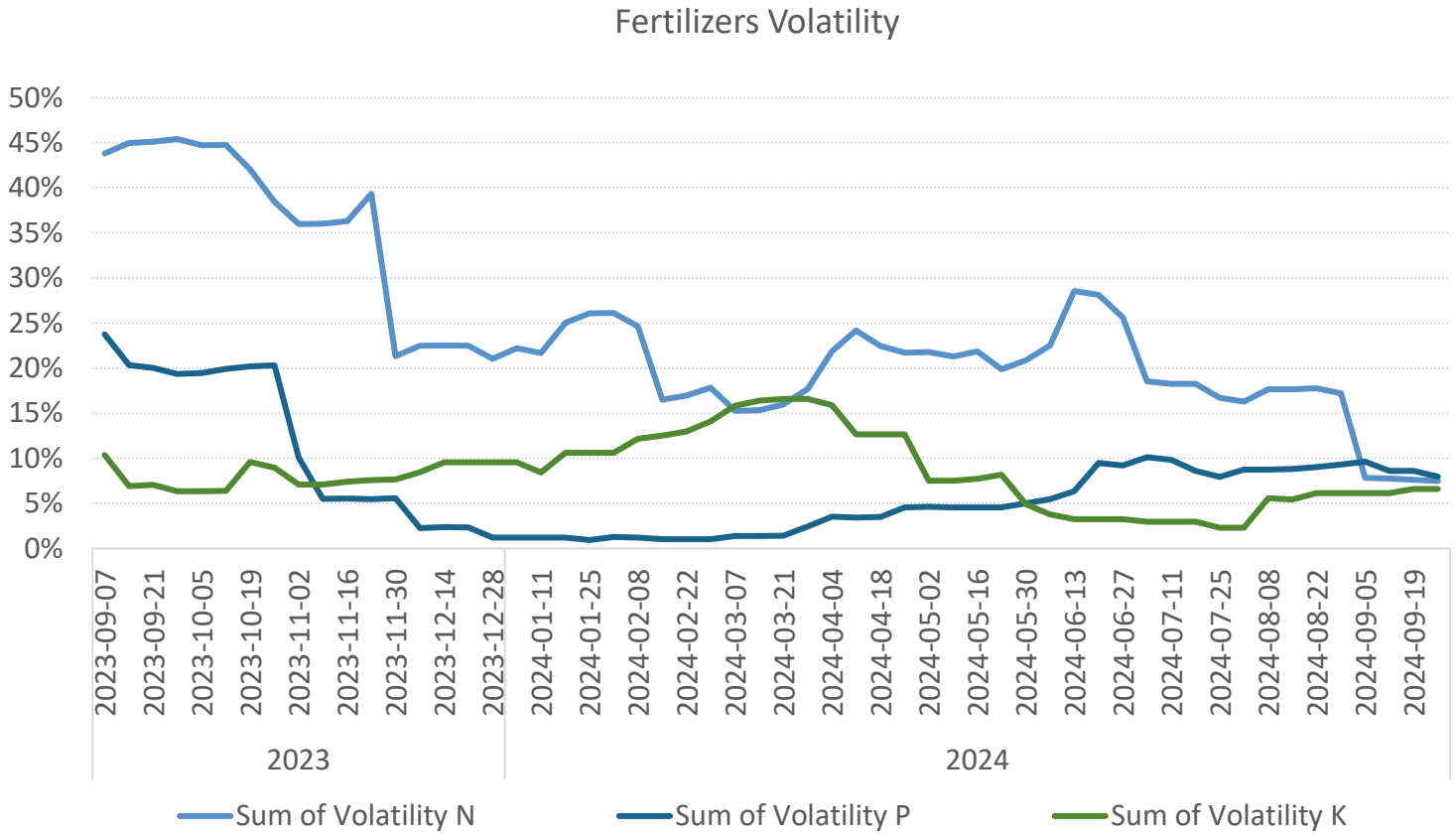
Volatility





Source: AMIS

Volatility

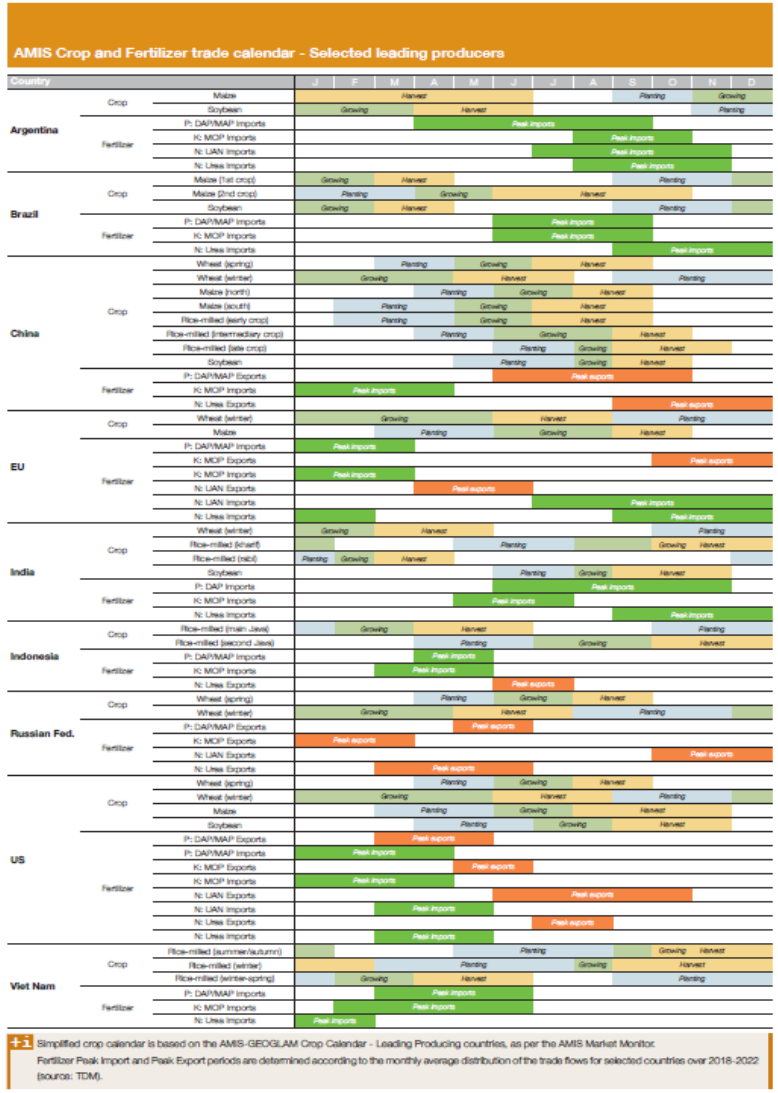


Volatility	Sep '24	Month ago	Year ago
Nitrogen	7%	17%	45%
Phosphate	8%	9%	19%
Potash	7%	6%	6%

Source: AMIS

Crop and Fertilizer calendar

Fertilizer series



Simplified crop calendar is based on the AMIS-GEOGLAM Crop Calendar - Leading Producing countries, as per the AMIS Market Monitor.
Fertilizer Peak Import and Peak Export periods are determined according to the monthly average distribution of the trade flows for selected countries over 2018-2022 (source: TDM).

AMIS fertilizer series #2/2024

Production of mineral fertilizers

AMIS fertilizer series #1/2024

Introduction to fertilizers

Plants require nutrients to grow and develop. While some soils naturally contain sufficient nutrients to support crop growth, others may require fertilizer application to optimize plant health and yield. The term fertilizer refers to "a chemical or natural substance or material that is used to provide nutrients to plants"[1]. It is commonly assumed that about half of the food we eat relies on mineral fertilizer applications[2].

What main nutrients do fertilizers bring?

Nutrients are applied either from organic sources (for example manure and compost) or inorganic sources (mineral fertilizers). Independently from the source, the goal of fertilization is to bring supplemental nutrients to crops. Each nutrient plays a specific role in plant physiology and cannot be replaced by another nutrient. Nitrogen, phosphorus, and potassium are primary nutrients and will be the focus of this series. Others, like sulfur or magnesium, are secondary nutrients that are also essential to plants, but in smaller quantities.

Global fertilizer consumption (million tonnes nutrient)[3]

Nitrogen (N) is the most important nutrient. It is the basic constituent of proteins. Its availability determines the ability of plants to grow, develop and reach full yield potential. Nitrogen fertilizers need to be applied each year to maintain yield and biomass, except for nitrogen-fixing crops like soy-

lodging and diseases. Global applications of potassium are about 40 million tonnes.

Soils retain phosphorus and potassium for longer periods and farmers may decide to skip applications of P and K fertilizers depending on market contexts. Global use of phosphates and potash can thus vary from one year to the next, more than the use of nitrogen.

What are the main fertilizers?

The terms nitrogen, phosphorous and potassium used in the previous section refer to the nutrients required by plants. Those nutrients are contained in fertilizer products which are in turn called nitrogen, phosphate, and potash fertilizers. A given fertilizer may contain one or more nutrients, in specific concentrations. Fertilizers are characterized by their concentration in each nutrient.

Nutrient content of the most widely used fertilizers

Fertilizer group	Commercial name	% N	% P_2O_5	% K_2O
Nitrogen	AN - Ammonium nitrate	33.5	0	0
	CAN - Calcium Ammonium Nitrate	26	0	0
	UAN - Urea Ammonium Nitrate	32	0	0
	Urea	46	0	0
Phosphate	DAP - Diammonium Phosphate	18	46	0
	MAP - Monoammonium Phosphate	11	52	0
Potash	MOP - Muriate of Potash	0	0	60
NPK	NPK 15-15-15	15	15	15

provide several nutrients to the plant in a single

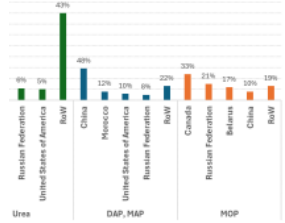
e main suppliers of fertilizers globally?

duction requires access to abundant natural re- well as financial and technical capabilities and [4].

en is captured from the atmosphere, N-fertilizers tially be produced anywhere in the world. How- of the need for large amounts of energy, pro- articularly strong in countries that have access as or coal resources. China, India, the Russian and the US are the biggest urea producers and about half of global supplies. Urea production se to 180 million tonnes per year over the 2018- ime.

phosphate and potash resources are concen- a few countries. China, Morocco, the US, and Federation accounted for almost 80 percent of nd MAP production of 65 million tonnes p.a., 22. Over the same period, Canada, the Rus- ion, Belarus, and China represented more than of global potash production of about 70 million

MT, left axis) and share of total production r each fertilizer category (%, labels), 2021[5]



duction relies on the availability of raw materials al facilities, driving the geographic distribution of and for fertilizers, on the other hand, is driven by tion factors, which explains why fertilizers trade alized.

/2022/fertilizer-industry-handbook-2022-with-notes.pdf

modities-glance-special-issue-phosphate

Short term outlook

Nitrogen supply sufficient, with natural gas prices significantly less volatile – but still an upside risk, particularly for production in Europe. Demand-wise, Europe slow to buy urea and nitrates for the 2024-2025 season partly on account of weather delays and is expected to step in to cover its needs before spring. Low stocks in India.

Phosphates supply remains strained, with overlapping plant maintenance amidst robust demand in India. Many countries prioritize domestic market.

Potassium supply is ample, with trade in 2024 slated to surpass 2023 levels. New capacity additions in Laos and higher Canadian production and exports will continue to improve availability and affordability of potash

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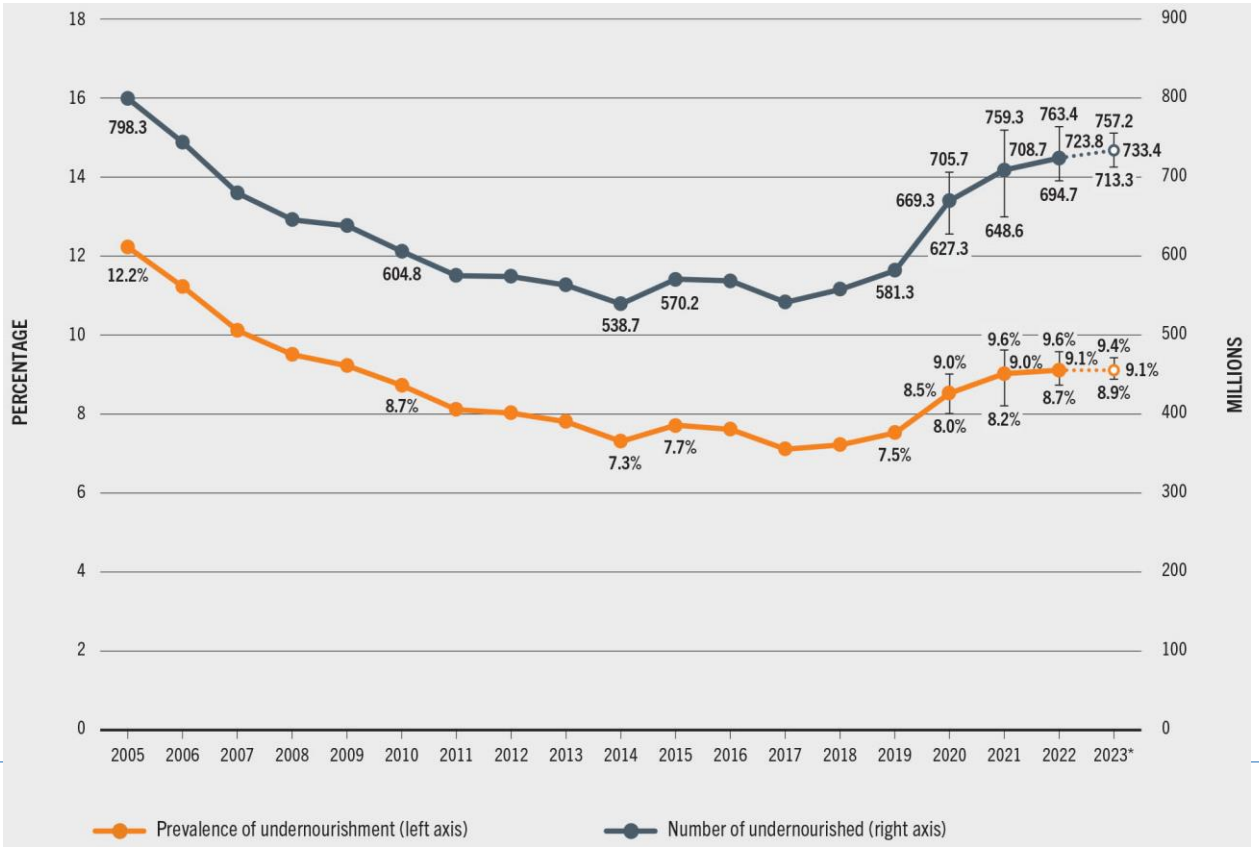
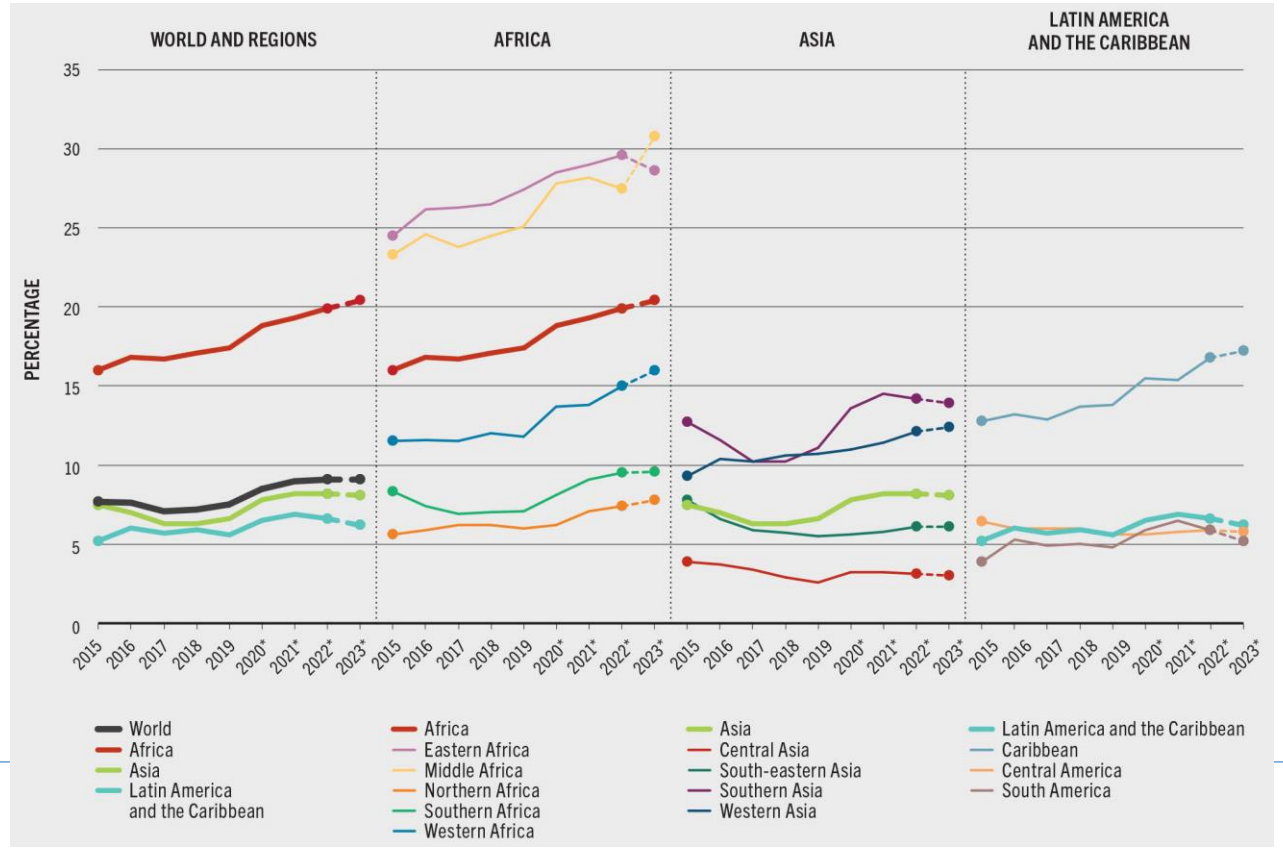
RISKS AND UNCERTAINTIES

- Developments on the agricultural commodity markets
- Developments on the energy markets
- Geopolitical risks

Global hunger rose sharply from 2019 to 2021 and persisted at the same level to 2023



Progress was made towards reducing hunger in some subregions of Asia and in L. America, but hunger is still on the rise in W. Asia, the Caribbean and most subregions of Africa



Thank you!

CONTACT
Monika Tothova
Monika.Tothova@fao.org