



COMMITTEE ON COMMODITY PROBLEMS

Seventy-sixth Session

Rome, 11-13 September 2024

DEVELOPMENTS IN INTERNATIONAL FERTILIZER MARKETS

Executive Summary

This document reviews the developments in international fertilizer markets over the last three years as well as their possible implications for fertilizer affordability. It also explores medium-term considerations, discusses how the fertilizer sector contributes to greenhouse gas (GHG) emissions and highlights FAO's work on monitoring fertilizer markets.

International fertilizer benchmark prices began soaring in 2021 and reached record highs in 2022, following the outbreak of the war in Ukraine. This raised concerns about food availability given the important role of fertilizers for agricultural yields and production. While fertilizer prices have eased significantly since last year, they remain well above their historical levels, while downside risks, particularly those related to geopolitical tensions continue to cause uncertainty on the energy markets, including natural gas, which is the main feedstock for nitrogen-based fertilizers.

Despite the lower prices, fertilizer affordability relative to both maize and wheat, is still in negative territory although it has improved compared to the 2021-22 period when fertilizer prices peaked. At the same time, the crisis highlighted the urgent need to implement approaches and strategies that will improve the efficient use of fertilizers while ensuring that sustainability objectives can be pursued.

FAO is expanding its market intelligence work to include monitoring of fertilizer markets and is developing a fertilizer price index to track price developments of a basket of mineral fertilizers that will complement the market monitoring work of food commodities.

Suggested action by the Committee

The Committee is invited to take note of the information contained in the document and provide guidance as deemed appropriate. The Committee may wish to:

- highlight the significance of monitoring developments in global fertilizer markets and express appreciation for expanding FAO's market intelligence work to cover fertilizers;
- assess the implications of global developments for fertilizer markets and emphasize the importance of taking all necessary measures to avoid increased market uncertainty and reduced fertilizer affordability with negative consequences for food availability;
- underline the importance of keeping open the trade of fertilizers in order to avoid the negative impact on global food security, while also preventing trade distortions and unjustified trade barriers in this respect;
- underline the importance of implementing solutions to increase fertilizer use efficiency.

Queries on the substantive content of the document may be addressed to:

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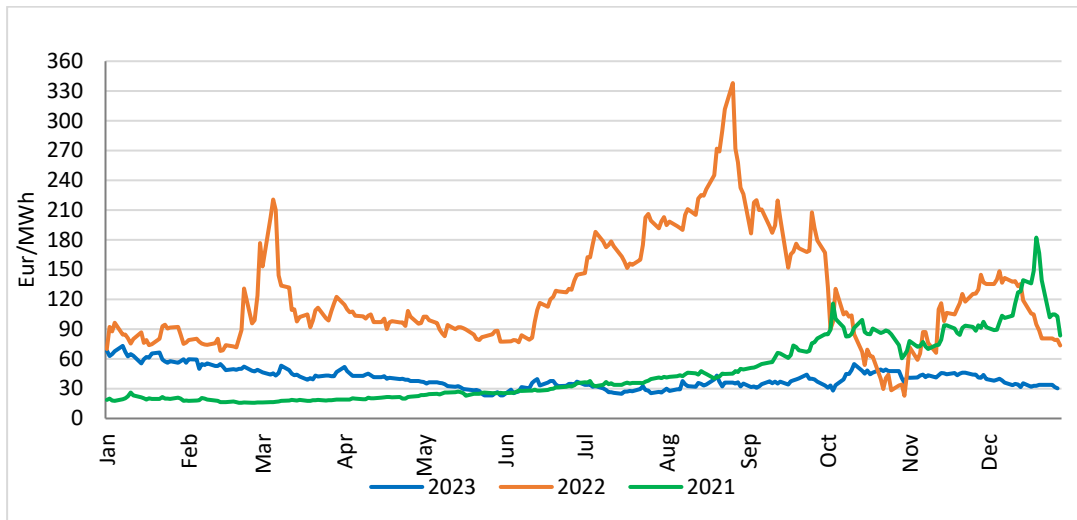
I. Introduction

1. Fertilizers, both mineral and organic, play a critical role in achieving food security and nutrition goals by enhancing agricultural productivity and ensuring that crops receive the essential nutrients they need to grow. Fertilizers provide essential nutrients like nitrogen (N), phosphorus (P), and potassium (K) which are vital for plant growth.
2. Different nutrients contribute in different ways to crop development. 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).
3. The topic of fertilizers, particularly in terms of access and availability, gained significant attention over the last three years as international fertilizer benchmark prices began soaring in 2021 and reached record highs in 2022 following the outbreak of the war in Ukraine. This raised concerns about food availability given the important role of fertilizers for agricultural yields and production.
4. International fertilizer prices have eased significantly since last year, reflecting lower energy prices, especially of natural gas, which is the main feedstock for nitrogen-based fertilizers in many countries. However, fertilizer prices remained well above their historical levels, while downside risks, particularly those related to geopolitical tensions cause continuing uncertainty on the energy markets. This highlights the importance of strengthened monitoring and assessment of the fertilizer markets to improve information availability, enhance market transparency and inform policy decisions.
5. Movements in fertilizer prices should be considered in relation to commodity prices. The current document summarizes the situation on the global fertilizer markets and presents available market analysis, including medium-term projections, carried out by FAO's Markets and Trade Division (EST) as well as within the framework of the G20 Agricultural Market Information System (AMIS), which is hosted by FAO.

II. Developments in fertilizer markets

6. Since 2021, fertilizer production, distribution and trade have been subject to a vast array of economic, environmental and geopolitical factors driven by developments in energy markets, conflicts and geopolitical risks, trade policies pertaining to fertilizers, and increased transportation costs.
7. In the second half of 2021 and in 2022, elevated prices of energy and other feedstock costs, as well as concerns about availability of fertilizer supplies from the Russian Federation following the outbreak of the war in Ukraine in late February 2022, drove fertilizer prices up. The Dutch natural gas Title Transfer Facility (TTF) index, the main virtual market for gas trading in Europe, reached a historical high of above EUR 300/megawatt-hour in August 2022 and also displayed pronounced volatility (Figure 1). This was reflected in the prices of ammonia, urea and DAP, which all exceeded USD 1 000/tonne, more than three times higher than their historical 10-year averages.

Figure 1: The Dutch natural gas Title Transfer Facility (TTF) index, daily price movements, 2021-2023



Source: Bloomberg

8. Furthermore, several trade restricting measures pertaining to fertilizers, including export controls and import duties, were adopted by governments during the same period. These measures, combined with various foreign currency controls and conservative lending policies, reflected by high interest rates, impacted global and regional fertilizer trade over the 2021-2023 period.

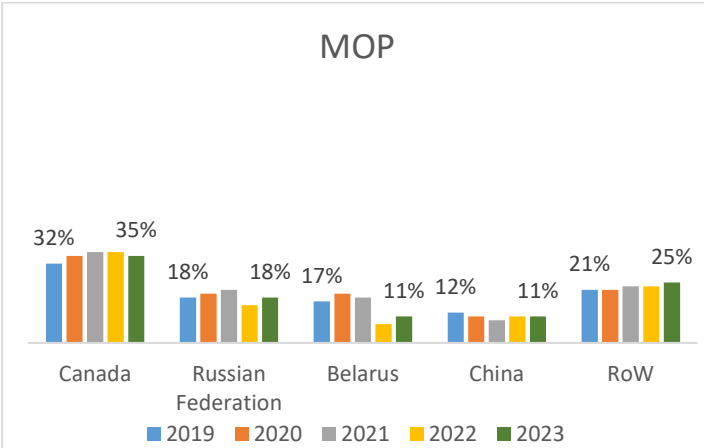
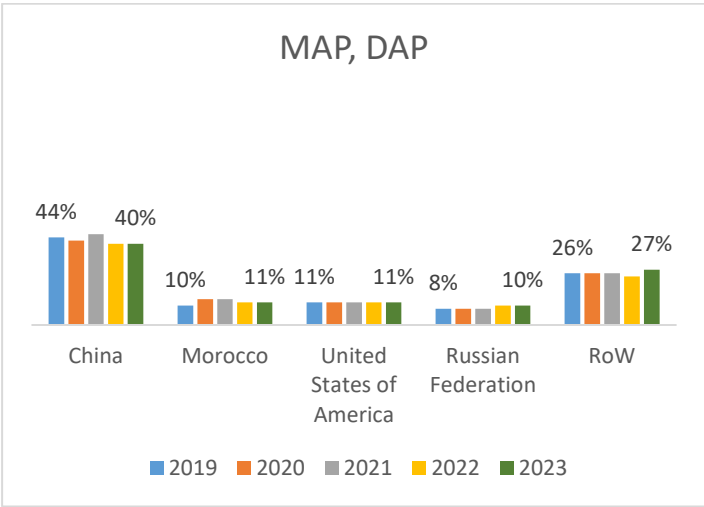
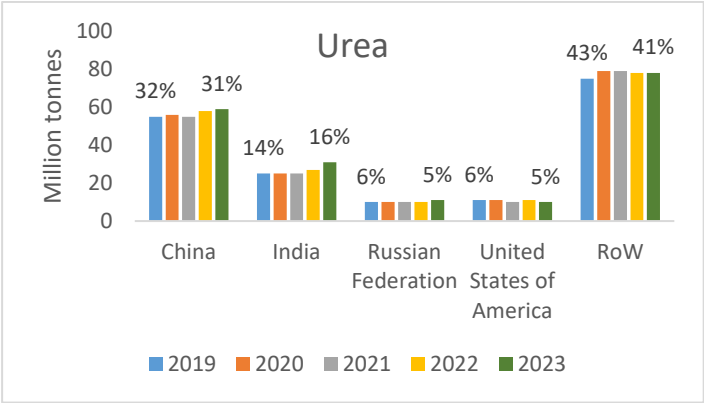
9. At the same time, actors along the fertilizer supply chains, such as shipowners, operators, freight and insurance providers, responded to increasing geopolitical risks by raising freight and insurance premiums to transport fertilizers, altering trade routes and patterns, and adding additional voyage days. Consequently, the average marine transportation cost increased by USD 25-50/tonne globally and up to USD 70/tonne in sub-Saharan Africa in 2022 compared to the year before.

10. The tight situation in fertilizer markets eased in 2023, as the reduction in energy prices spurred fertilizer production and led to an increase in available fertilizer supplies that helped to ease prices. This, in turn, fuelled a rebound in demand and traded volumes.

Fertilizer production

11. Figure 2 shows production quantities of main N, P, K fertilizers and share of total by country. As can be seen, for each fertilizer, production tends to be highly concentrated in a handful of countries. In fact, for urea and phosphate (MAP/DAP), China produces 30 and 40 percent, respectively, of the total global volume, while for MOP, Canada supplies over a third of total world production.

Figure 2: Production quantities and share of total by country, 2019-2023



Source: International Fertilizer Association (IFA) and FAO elaboration

12. A survey conducted by the International Fertilizer Association (IFA) in 2024 revealed that, in 2023, world nitrogen production increased by 3 percent for ammonia and 7 percent for urea, driven mainly by increased production in China, India and the Russian Federation.¹ Production of phosphate rose by 5 percent as lower production in Africa was more than offset by increases in the Near East and

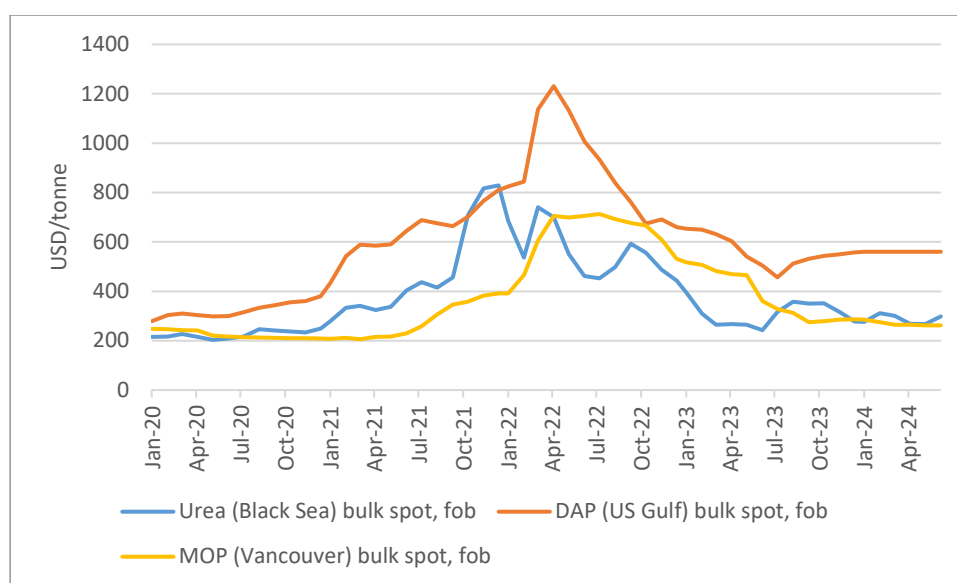
¹ IFA (International Fertilizer Association). 2024. *Fertilizer Market Update*. Paris, IFA. <https://api.ifastat.org/reports/download/14147>, cited in *Food Outlook*, June 2024, available at <https://openknowledge.fao.org/items/d7e220b8-b60d-433d-be1a-d5938b83fe9a>

East Asia regions. Global potash production in 2023 rebounded by 10 percent from 2022, largely on account of increases in the Russian Federation and Belarus, as well as ramping up of capacity in the Lao People's Democratic Republic.

International fertilizer prices

13. Since mid-2023, global reference fertilizer prices remained well below the record levels reached in 2022 (Figure 3), although lingering at levels higher than those registered in January 2020. In June 2024, one tonne of urea was sold for USD 298 (compared to USD 829 in December 2021) and one tonne of DAP for USD 560 (compared to USD 1 231 in April 2022), while a tonne of MOP cost USD 262 (compared to USD 713 in June 2022). Presented as a basket of nitrogen, phosphorus and potassium price series, global fertilizer prices averaged USD 327/tonne in May 2024, compared to USD 815/tonne in April 2022.

Figure 3: Fertilizer price developments, 2020-2024

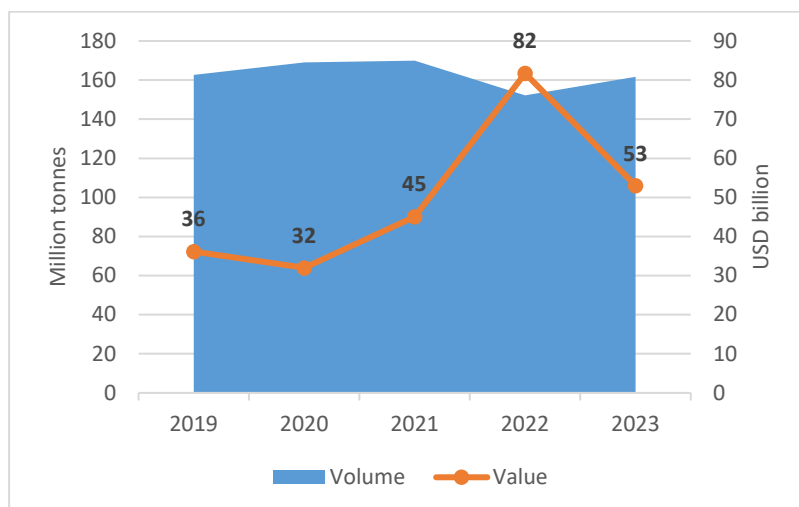


Source: Fertilizer Week (CRU)

Fertilizer trade

14. Elevated prices triggered concerns about affordability of fertilizers and led global fertilizer trade, in volume terms, to contract significantly between 2021 and 2022, before partially recovering in 2023. Estimates indicate that the reduction in the volume of fertilizer trade between 2021 and 2022 reached almost 12 percent. In value terms, however, total value of fertilizer trade in 2022 reached 82 billion dollars, up by over 80 percent from 2021 due to the higher prices (Figure 4).

Figure 4: Global Fertilizer Trade (2019-2023), in volume (million tonnes) and value (USD billion)



Source: Global Trade Tracker (GTT), 2024

15. The contraction in volume terms, while mainly driven by the high prices and reduced affordability, was exacerbated by regional logistical challenges, such as those in the Black Sea, which served as a conduit for some ammonia shipments from the Russian Federation. Furthermore, countries responded by enforcing trade policies either to safeguard domestic supplies or to restrict imports of products based on origin, for example potash from Belarus.

16. In 2023, fertilizer trade increased by 7 percent in volume terms compared to the year before. This growth was mainly driven by a demand rebound in key importing markets such as Türkiye, mid-sized Latin American fertilizer markets – including Mexico, Colombia and Chile, where import demand increased between 14 and 53 percent – and mid-sized Southeast Asian countries – such as the Philippines, Thailand and Viet Nam, where the registered growth was between 9 and 17 percent.

17. Nevertheless, trade volumes have not yet returned to their 2021 levels and access to fertilizer continues to remain a challenge that can disproportionately affect regions already suffering from low agricultural productivity. In many cases, high internal transportation costs and structure of the supply chains are raising prices at the farm gate.

18. In 2023, policy measures adopted by major players in fertilizer markets continue to shape the fertilizer trade landscape. These include, for example, the resumption of the European Union's import duties on ammonia and urea, the implementation of the United States of America's countervailing duties on phosphates imports from Morocco and the Russian Federation, and the enforcement of temporary and seasonal export control measures in China, the Russian Federation, Türkiye and Indonesia.

19. Furthermore, increases in shipping costs and logistical disruptions due to the geopolitical tensions in the Black Sea and Near East also challenged trade recovery and impacted trade flows.

20. It is noted that despite the increase in trade volumes, the value of fertilizer trade in 2023 declined by 35 percent year-on-year because of lower world prices of all fertilizer products compared to 2022, which was the peak year.

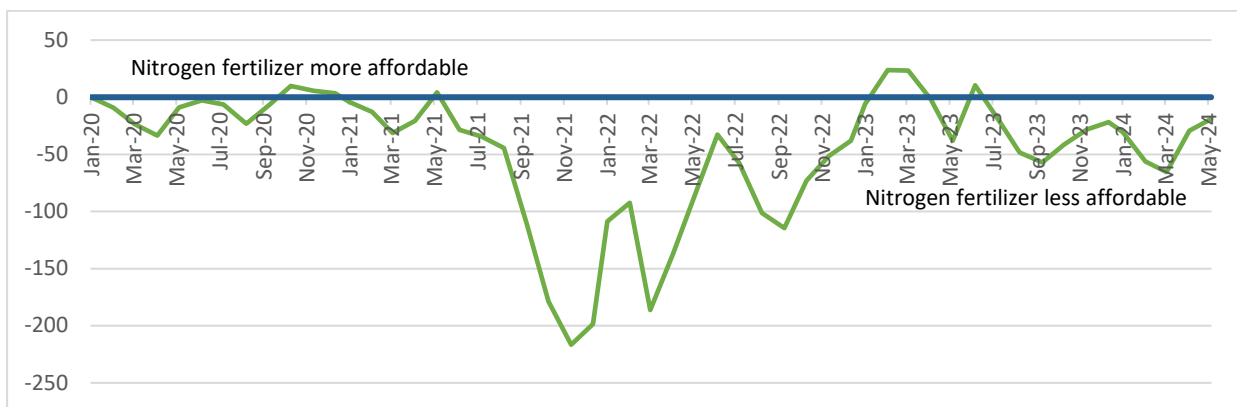
III. Implications for fertilizer affordability

21. As discussed earlier, soaring prices of fertilizers reduced their affordability and raised concerns about their application globally, with potential implications for agricultural production and ultimately for world food security.

22. While fertilizer prices have an impact on the demand for fertilizers, purchasing decisions are also influenced by the relationship between input and output prices. A simplified and generally accepted indicator of fertilizer affordability is the ratio between fertilizer and commodity prices. This ratio is of particular importance considering that the decline in fertilizer prices coincided with an easing of the prices of agricultural commodities, as described in document CCP 24/2. It is noted that a more detailed indicator would differentiate between appropriate application rates across crops and countries, use country specific prices, and focus on the time period during which farmers purchase fertilizers.

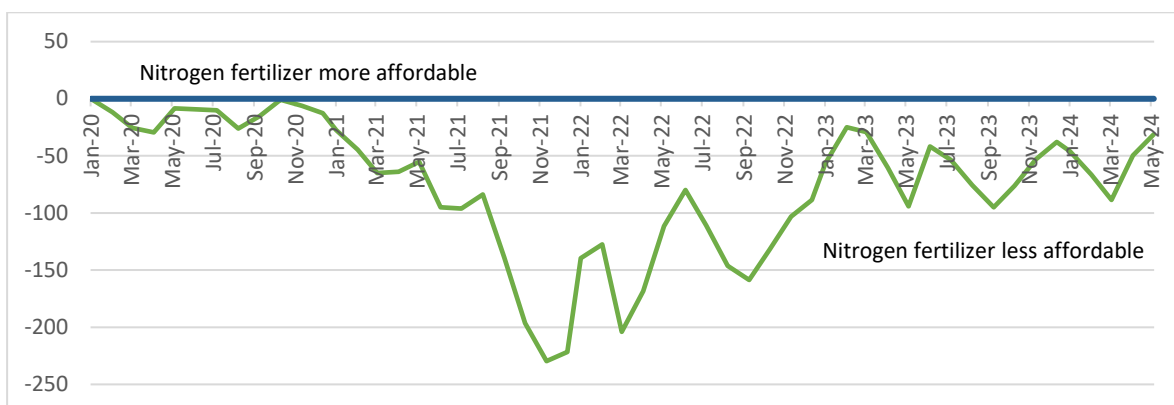
23. Nevertheless, even a simplified indicator showcases limited fertilizer affordability. Using January 2020 as a benchmark, Figures 5 and 6 present the affordability ratio for maize and wheat in relation to nitrogen fertilizers.

Figure 5: Maize to Nitrogen Fertilizer Affordability Ratio



Source: FAO

Figure 6: Wheat to Nitrogen Fertilizer Affordability Ratio



Source: FAO

24. As figures 5 and 6 show, while the prices of nitrogen fertilizers have eased, their affordability relative to both maize and wheat is still in negative territory although improved compared to the 2021-22 period when fertilizer prices peaked.

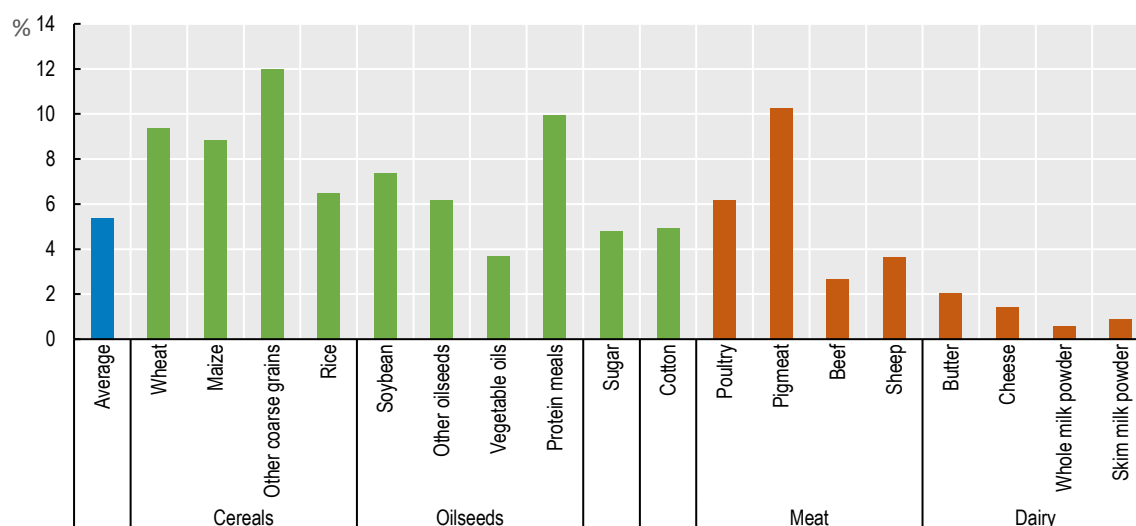
25. It is noted that a similar pattern also prevails for the phosphate affordability relative to soybeans, which, despite some improvements, remains firmly below the January 2020 levels.

IV. Medium-term considerations

26. The OECD-FAO Agricultural Outlook 2023-2032², conducted a scenario analysis to examine the impact of a 25 percent increase of Nitrogen, Phosphate, and Potash prices on fertilizer application and resulting crop production and commodity prices, while keeping oil prices unchanged. It is noted that factors that could underpin such fertilizer price increases, other than an oil price related shocks, would include, for example, market access restrictions, tighter environment regulations, or increases in other manufacturing costs such as labour or minerals.

27. As demonstrated in Figure 7 below, the analysis showed that, on average, agricultural commodity prices would increase by 5 percent and that the impact would be greater on crops that use fertilizers as direct inputs than on livestock products that use them indirectly through feed. Among livestock products, the increase in prices was found to be greater for poultry and pig meats than it would be for ruminants because the former animals rely more on compound feed.

Figure 7: Change in agricultural commodity prices due to 25 percent increase in fertiliser prices from the baseline projections in 2032



Source: OECD/FAO (2023), *OECD-FAO Agricultural Outlook 2023-2032*, OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>

28. It is noted that, as with other increases in food prices, while the impact on consumers is straightforward with those spending a high share of their household budget on food and fuel being particularly impacted, the impact on producers is mixed, as only the most efficient users of fertilizers would benefit from higher product prices and increase their profit margins, while the less efficient users would mostly observe higher production costs without benefiting from higher output prices.

29. The recent global fertilizer crisis raised serious concerns about the impact on world food security and how the crisis can be used to find sustainable solutions over the medium term, so that fertilizers can play a positive role in the needed transformation of agrifood systems. There is a critical need to design and implement innovative approaches and strategies to improve the use efficiency of fertilizers and find alternatives to traditional fertilizers. For instance, new technologies are needed to optimize fertilizer application, which should be promoted and made accessible to farmers widely to have an impact at scale.

² https://www.oecd.org/en/publications/oecd-fao-agricultural-outlook-2023-2032_08801ab7-en.html

30. To ensure efficient and responsible use of fertilizers, it is essential to have nutrient management planning. Creating national soil databases and information systems as public goods with access to policymakers, the private sector and farmers would facilitate the efficient use of fertilizers in various agrifood systems, generating long-term benefits. It is also essential to explore and adopt organic and alternative fertilizers, which can promote sustainable agricultural practices and reduce dependency on synthetic fertilizers. In this regard, investment in research and development of sustainable fertilizer technologies can play an important role as well as technology transfer that can ensure global uptake of sustainable practices.

31. Governments can play a vital role in partnership with the private sector to promote sustainable solutions by providing policy support and incentives that encourage research and development as well as the application of responsible fertilizer practices.

V. FAO's work on monitoring fertilizer markets

32. Responding to increased demand for information on fertilizer markets, FAO has strengthened its analytical capacity to monitor and assess developments in global fertilizer markets, including with regard to monitoring energy markets and prices.

33. In its June 2024 edition of the *Food Outlook*³, a biannual report on global food markets, FAO published a feature article providing a comprehensive review of global fertilizer trade between 2021 and 2023 and a short-term market outlook for 2024/25. Similar updates, tackling different underlying market fundamentals, will be prepared and published regularly.

34. Reflecting its overall mandate, the analytical focus foreseen by FAO will be global to include analysis relevant to all the Member. Plans also include broadening analysis of policy developments and their impacts on fertilizer markets.

35. FAO is also developing a Fertilizer Price Index to track price developments of a basket of mineral fertilizers, which will complement the market monitoring work of food commodities and the FAO Food Price Index.

36. Furthermore, responding to its mandate, AMIS has also broadened its analytical capacity in this area. Although AMIS members account for about 80 percent of fertilizer supply and over 90 percent of use, the entry point of AMIS analysis of fertilizers is through the lens of the four basic AMIS crops – wheat, maize, rice and soybeans. The AMIS monthly Market Monitor report contains a page on the developments in the fertilizer markets. Additionally, efforts are under way on developing a series of indicators gauging the affordability of fertilizers.

37. Finally, it is noted that during the global fertilizer crisis in 2022, FAO developed tools, as summarised in the Council document CL171/3⁴, including a fertilizers trade tracker and a fertilizer allocation methodology for Africa.

38. These initiatives complement other long-standing efforts by FAO. For example, the input module in FAOSTAT offers data on the total production, trade and agricultural use of fertilizers on a nutrient basis from 1961 to 2021 (as of June 2024). It also contains a dataset by fertilizer product from 2002 to 2021 (as of June 2024), for a set of 23 product categories.

³ <https://openknowledge.fao.org/server/api/core/bitstreams/825dc0b7-57bc-4a53-8182-056c40c1c80f/content>

⁴ <https://openknowledge.fao.org/server/api/core/bitstreams/328126a8-3952-45de-985d-0e8080cbc4a6/content>