

Current market situation of urea for agricultural use and other nitrogen fertilisers

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Abstract: Urea is an organic compound of carbon, nitrogen, oxygen and hydrogen, which is used in the production of plastics, adhesives, but also in cosmetics. More than 90% of the world's urea production is for agricultural use as fertiliser. Urea has the highest nitrogen content of the commonly used solid nitrogen fertilisers. Unfortunately, the current price trend is very unfavourable not only for urea but for all nitrogen fertilisers. Although agricultural commodity prices have risen proportionately, they are not always sufficient to cover the costs incurred in producing the commodity. What is certain, however, is that any price anomalies in the morning will ultimately be paid for by all of us in food prices, even in staple food prices. How far are our farmers willing to pay, and what effect will this price anomaly have on agricultural technology, farm composition and farming?

Keywords: urea, price, commodities

JEL Classification: G10 ; G11 ; G12 ; G14

1 Introduction

A growing world population inevitably creates a higher demand for food. While the Western world is concerned with the quality of food, the poorest countries in the world are concerned with its availability, not only in terms of price, but especially availability in a given location. This raises the question of whether the current capacity of agricultural land is sufficient to cover nutritional needs not only in terms of today's needs, but above all in terms of the long-term and, above all, sustainable development of the needs of the world population. By 2050, the world's population is projected to reach up to 9.1 billion. The largest population growth is projected in developing countries, almost as much as 70 %. The urbanization of the world's population is also expected to accelerate. While around 49 % of the population lives in cities today, up to 70 % of the population is expected to live in cities by 2050. The significantly higher number of urban populations necessitates an increase in food production. Unfortunately, agricultural land is limited in its area and cannot be increased without environmental consequences (Skorupka & Nosalewicz, 2021).

Therefore, one of the main ways to partially compensate for the consequences of the increasing population and thus the increasing need for food is proper and appropriate fertilization, the use of quality fertilizers and also the application of appropriate technology for the crop and location. Gathering data on global fertiliser use by country and crop is very challenging to process data and verify. Nevertheless, every two to four years since 1992, expert surveys have been carried out and fertilizer consumption data in the major fertilizer-consuming countries have been published. These surveys are conducted jointly by the Food and Agriculture Organization of the United Nations (FAO), the International Centre for Fertilizer Development (IFDC) and the International Fertilizer Association (IFA). The globally available dataset is the Fertilizer Use by Crops (FUBC) file, which contains CSV data from a survey conducted by IFA in 2017-2018. The following table shows us which fertilizers are primarily monitored (Ludemann & CI, Gruere, A., Heffer, P. a kol., 2022).

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Figure 1

Measurement	Use of fertilizers in crops and soils for nitrogen, phosphorus and potassium.
Technology type(s)	Survey
Factor type(s)	Crop and land
Sample characteristics - Organism	Plantae
Sample characteristics - Environment	World
Sample characteristics - Location	World

Source: (Ludemann & CI, Gruere, A., Heffer, P. a kol., 2022)

From the table above, we can see that the main fertilizers monitored are nitrogen, phosphorus and potassium. Nitrogen and phosphorus inputs are particularly important for high crop yields. (Johnes, Steel, Coffey, & a kol, 2007).

Urea is one of the world's most popular and widely used nitrogen fertilizers. Urea contains 46 % nitrogen and has a very high bioavailability. (Skorupka & Nosalewicz, 2021).

Urea is formed by the reaction of ammonia with carbon dioxide (CO₂) at high pressure and is used as a direct fertilizer, but also for the production of complex fertilizers NPK (nitrogen, phosphorus, potassium) and others. (IFA, 2023). In 2019, the global urea production capacity was approximately 209 million tons. By 2021, global production capacity had increased to 225 million tonnes, an increase of 8%. In 2024, the production of 203 million tonnes of urea is envisaged. And a further increase in demand for urea is expected globally (Skorupka & Nosalewicz, 2021).

Urea is one of the most important fertilizers of the present time, and the development of its price is very important not only in terms of the cost of food production, but also plays a large role in the field of fertilization technology (AGRA, 2023).

2 Developmnet of prices

Prior to 2020, fertilizer prices on the global market showed stability. The increase started at the beginning of 2021, when gas supply and price problems were the main contributor to the price increases. The situation was exacerbated by the war in Ukraine, and prices began to rise rapidly in the second quarter of 2022. Europe is dependent on imports of nitrogen fertilisers, almost 30 % of which have to be imported into Europe. Most of the EU's imports come from Russia and Belarus. Following EU sanctions against these countries, nitrogen fertiliser prices soared in 2022. Natural gas is 80 to 90 % of the dominant cost item in the production of mineral fertilisers, on which Europe is 40 % dependent on imports from Russia. At the end of July 2022, the exchange price in the EU was six times higher than in the first half of 2021 (FiNTAG.cz, 2022).

The following chart shows the evolution of urea prices from December 2013 to September 2023 in USD per tonne. While in 2020 prices were slightly above USD 100 per tonne of urea, the price began to increase at the end of the year and rose steadily throughout 2021 until it ended at USD 550 per tonne of urea at the end of the year. Over the course of 2022, it initially started to fall slightly, but after the Russian invasion of Ukraine, the price began to rise again, stabilizing at a whopping \$620 per tonne (kurzy.cz, 2023).

Figure 2



Source: (IFA, 2023)

In the autumn of 2022, urea for agricultural businesses was traded for up to CZK 22,000 per ton of urea. These prices were maintained until the end of 2022. At the beginning of 2023, the price fell sharply, but unfortunately, most farms had already purchased nitrogen fertilizers in Europe under the promise of a shortage of nitrogen fertilizers. At the moment, a ton of urea is traded on the Czech market at around CZK 14,000 per ton of urea (iDNES.cz, 2023).

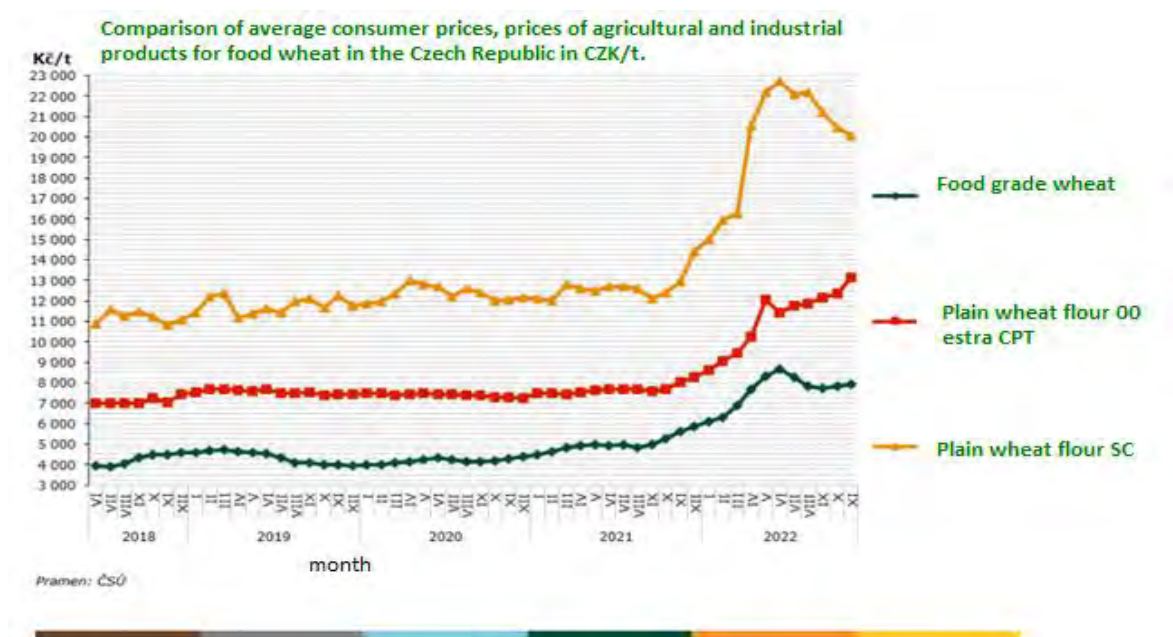
Farmers buy most, if not 100%, of their fertilizers in the fall. Therefore, in the spring of 2023, they had to fertilize with very expensive fertilizers. At the same time, the purchase prices of agricultural commodities began to rise, which could partially compensate for the increased costs of purchased fertilizers. Some farmers already knew at that point that they would not make a profit in 2023, the question was how high their loss would be (asz.cz, 2022)

Not only in an effort to reduce losses, but also losses from the unavailability of fertilizers, farmers had to start thinking about changing the crop plan. Each crop consumes nutrients differently, also depending on the turbidity of the soil. It is not possible to choose a one-size-fits-all procedure for all crops and soil types. Another decisive aspect was also the current purchase prices of agricultural commodities and the long-term experience of farmers. Fertilization has become a very expensive affair, while in previous years the farm paid 8 million crowns for fertilizers, in 2022 they paid up to 32 million crowns for hunting. In the past, if farmers used to fertilize excessively, supplementing basic nutritional parameters, it is possible to reduce fertilizer doses, but this trend will only last for one or two years, depending on the quality of the soil (Český rozhlas, 2022).

This year, 2023, farmers have been relieved a little, fertilizer prices have fallen, fuel prices have also fallen, and government tracking is in effect on energy. Thus, prices could have fallen, but so far this has not happened and forecasts show the opposite trend. If farmers decided to reduce fertiliser dosing last year due to high prices in autumn 2022, this may have a negative impact on agricultural crop yields. This may not be reflected in this year's yields, but only in the yields of the following year, if farmers do not have enough fertilizers, but above all will not make up for the financial deficit of this spring (iDNES.cz, 2023).

As can be seen in the following graph, the purchase prices of some agricultural commodities copied the increase in fertilizer prices and therefore it can be assumed that they could help farmers reduce their losses from the increase in fertilizer prices not only but also other costs such as energy, fuel and labor costs (SZIF, 2022).

Figure 3



Source: (SZIF, 2022)

3 Summary

The ever-growing population is increasing the demand for food and with it the increasing need for fertilizers. Europe is not self-sufficient in fertiliser production. A large part of the fertilizers is imported from high-risk areas.

A large percentage of the necessity to import from risk areas disproportionately and without the possibility of prediction increases the price of fertilisers and thus large cost inputs into primary food production for the EU population. Dependence not only on economic but also on political aspects and EU measures.

Short-term options to reduce the impact of unforeseen fluctuations in fertilizer prices by adjusting the technology and doses of fertilizer used. It can only be used for one to two years, taking into account the replenishment of basic nutritional parameters in previous years and the quality of the soil.

Sustainability of the profitability of agricultural business in relation to high fertilizer prices and corresponding purchase prices of agricultural fertilizers.

Shopping habits and panic due to fertilizer shortages lead to wrong decisions. Which can have incalculable consequences for the profit and further functioning of the entire agricultural sector of the investigated site.

If the prices of fertilizers increase in proportion to the purchase prices of agricultural commodities and at the same time if other inputs such as diesel, labor costs, rents and others remain at the same level or with a slight increase, it is possible to maintain fertilization technologies and thus maintain the quality of the soil in the medium term. With the increase in other inputs, it is unsustainable to maintain healing technologies in such a way as to maintain soil quality in the medium term. From an economic point of view, this soil quality can only be maintained for one or two years, depending on the quality of the soil and also on the quality of previous fertilization practices, as all the necessary basic nutritional parameters of nitrogen, phosphorus and potassium have or have not been supplemented. Fertilization is only one of the initial impacts on the disproportionate increase in the price of agricultural inputs. Of course, other impacts are also expensive food and other economic impacts.

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